5C_001

HGL HydroGeoLogic, Inc

BORING LOG

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5c, Group 1	Location ID 1
Drilling Company HGL	Driller D. Stone	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/26/10, 1400 (PS)	Date/Time Total Depth Reached 10/26/10, 1415, 0.5 ft
Type of Sampling Device trowel / shovel		Samples Collected 1000 1, 1405, 1 4oz jar, 2 ½ gal bags	
Geologist P. Streath		Checked by/Date 10/27/10 / SLM 4/22/11	

Radiological Background	Radiological Equipment Used	PID Used
15 µR	µR meter	Mini Rae 2000 (Background = 2.3 ppm)

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5			5.9 ppm	17 µR	silty sand (SM), yellowish brown (10YR 5/6) dry, loose, 75% fine sand, 20% silt, 5% clay, rootless, few angular gravel, electrical wire & other construction material found.	SM		
					TD = 0.5 ft			
					Groundwater not reached			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C 1	1
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bart Longyear	D. Hansen	NA	~~9FT~~ 9.5ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	13/4"	12/13/10 1505	12/13/10 1515
Type of Sampling Device		**Samples Collected**	
13/4" macrocore acetate liner		10002 – 1520 2- 1/2 gallon bags, 1-4oz jar	
Geologist		**Checked by/Date**	
I. Stone		4/22/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
60 / 2708	Pancake / Downhole	Mini RAE 2000	(Background=0.1ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches ±0.5" = 2775 (CPM)
0	Sample		0.0	51	Silty SAND, Dark yellowish brown (4/4 10YR)		3587
			0.1	62	60% fine grained subrounded sand,		4424
1			0.1	70	40% silt, dry, med dense.	SM	4908
					No odor or staining		
			0.1	93			5425
2			0.1	91			5262
			0.1	82			5190
					SAND w/weathered Sandstone fragments, Brownish Yellow (6/6 10YR)	SP	
3			0.1	68	90% fine grained sand, 10% Sandstone gravel, dry, loose, no odor or staining		5253
					Silty SAND, Dark yellowish brown (4/6 10YR)	SM	
			0.1	66	65% fine grained subrounded sand,		5351
4			0.1	74	35% silt, dry, med. dense, no		5328
					odor or staining		
			0.1	58			5468 5461
5			0.1	44			5247
					Clayey Silt, very dark grayish brown (3/2 10YR)		
			0.1	68	~~FS~~ 65% silt, 30% clay, 5% fine grained	ML	4845
					sand, dry, low strength, low toughness,		
6			0.1	72	no odor, some staining from 5.5–		4882
					7.3 ft bgs, trace gravel fill throughout		

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
60 / 2708	SSFL Area IV Radiological Study	EP9038.01.22.04.03	1

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.1	72	Same as above			4882
			0.1	76				4862
7			0.1	92				4864
					end of staining			
			0.1	31		ML		4898
8			0.1	68				4942
			0.1	63				4768
					IS			
9			0.1	71	~~TD= 9.0 ft~~ IS			4661
					~~No gw encountered~~ IS	ML		
			0.1	54				4772
					TD= 9.5 ft			
10					No gw encountered			

5C_002

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	Sc, Group 1	2
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	E. Stone	NA	0.5 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	NA	10/26/10, 1345	10/26/10, 1355, 0.5 ft
Type of Sampling Device		**Samples Collected**	
trowel / shovel		10003, 1350, (15) ~~1~~ 4oz jar, 2 1/2 gal bag	
Geologist		**Checked by/Date**	
P. Stream		[signature] 4/22/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
14 uR	µR meter	Mini Rae 2000 (Background = 1.7 ppm)	

Depth (ft)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	X	X	2.1 ppm	15 uR	Silt w/ fine sand, dark yellowish brown, (10YR 4/4), dry, firm, 70 % silt, 20 % fine sand, 10 % clay, trace rootlets, 5 % gravel rock fragments.	ML		
					TD 0.5 ft			
					Watertable not reached			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C 1	2
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	NA	10 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	12/14/10 0820	12/14/10 0828
Type of Sampling Device		**Samples Collected**	
1 3/4" macrocore		10004-6845 (2) 1/2 gallon bags; (1) 4oz jar	
Geologist		**Checked by/Date**	
I. Stone		4/22/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
43 / 2613	Pancake / Downhole	Mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 0.5 = 2464 (CPM)
			0.0	23	Sandy Silt, Dark yellowish brown (4/4 10YR)			3317
			0.0	89	65% silt, 35% fine grained, subrounded			4252
1			0.0	32	Sand, dry, low toughness, low strength, low plasticity, no odor or staining.	ML		4477
			0.0	61				4530
2			0.0	38				4703
			0.0	69				4913
					Silty Clay, dark grayish brown (4/2 10YR)	CL		5041
3			0.0	22	Silty Sand, 70% clay, 30% silt, trace gravel size quartzite fragments, dry, medium strength, medium toughness, med plasticity, no odor or staining			5183
			0.0	56	Yellowish Brown (5/6 10YR)			
4			0.0	52	70% fine grained, subrounded sand, 30% silt, dry, ~~med~~ loose (low dense), no odor or staining	SM		5171
			0.0	47				4800
5			0.0	28				4776
					Silty Clay, Yellowish Red (4/6 5YR)			
			0.0	82	60% clay, 40% silt, trace fine grained sand, dry, med. tough, med. strength, med. plasticity, no odor, staining from 5.5 ft bgs - 6.5 ft bgs,	CL		4712
6			0.0	95				4816

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
43 / 2613	SSFL Area IV Radiological Study	EP9038.01.22.04.03	2

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6			0.0	95	Continued from above			4816
			0.0	60	Staining also occurs from 8-8.5 ft bgs and 9-10 ft bgs.			4524
7			0.0	76	Staining color is Black (2/1 10YR)			~~4757~~ 4729 IS
			0.0	23		CL		~~4739~~ 4757 IS
8			0.0	45				~~4496~~ 4734 IS
			0.0	21				~~4518~~ 4496 IS
9			0.0	30				~~4566~~ 4518 IS
			0.0	60				4566
10			0.0	33				NM
					TD = 10 ft bgs no gw encountered			

5C_003

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c 1	Location ID 3
Drilling Company Bart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 7ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 13/4"	Date/Time Drilling Started 12/13/10 1340	Date/Time Total Depth Reached 12/13/10 1346
Type of Sampling Device 13/4" macrocore acetate liner		Samples Collected 10005-1355 2-1/2 gallon bags; 1-402 jar	
Geologist I. Stone		Checked by/Date 4/22/11	
Radiological Background 57 / 2501	Radiological Equipment Used Pancake / Downhole	PID Used Mini RAE 2000	(Background 0.0)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings ±0.5 = 2298 (CPM)
			0.1	61	Sandy Silt, Yellowish brown (5/4 10YR)			2782
			0.1	81	70% silt, 30% fine grained subrounded sand,			3980
1			0.1	93	dry, low dense, no odor or staining	ML		4432
			0.1	77	low strength, low toughness.			4362
2			0.1	51				4517
			0.1	63				4701
					Silty Clay, Very dark grayish brown (3/2 10YR)			
3			0.1	53	65% clay, 30% silt, 5% fine grained			4680
			0.1	74	sand, low plasticity, medium stiff	CL		4435
4			0.1	62	medium toughness, medium strength,			4505
			0.1	69	dry, no odor or staining			4652
					Silty Sand, Dark yellowish brown (4/4 10YR)			
5			0.1	54	65% fine grained sand, 30% silt,	SM		4984
			0.1	70	5% fine gravel (quartzite, granite),			5037
6			0.1	56	dry, med dense, no odor.			5171

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
57 / 2501	SSFL Area IV Radiological Study	EP9038.01.22.04.03	3

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
2			0.1	56		SM		5171
			0.1	42	- light staining (1.5")			5238
7			0.2	58	SAND, Brownish yellow (6/6 10YR) 90% fine grained sand, 5% silt, 5% fine gravel, dry, low density	SP		5443
					Refusal @ 7ft bgs			
					No gw encountered			

5C_004

BORING LOG

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Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, Group 1	Location ID (P3) ~~5C, Group 1, #4~~
Drilling Company HGL	Driller E. Stone	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/26/10, 13~~30~~25	Date/Time Total Depth Reached 10/26/10, 1340, 0.5 ft
Type of Sampling Device trowel/shovel		Samples Collected 10006, 1330, (2) ½ gal bags; (1) 4oz. jar	
Geologist P. Smith		Checked by/Date [signature] 4/22/11	
Radiological Background 13 µR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.9 ppm)	

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5			1.6 ppm	13 µR	silt w/ fine sand, (ML) dark brown (10YR 3/3), clay, medium stiff, 70% silt, 20% fine sand, 10% clay, trace rootlets, trace gravel rock fragments	ML		
					TD = 0.5 ft watertable not reached			

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c 1	Location ID 4
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 13/4"	Date/Time Drilling Started 12/14/10 1005	Date/Time Total Depth Reached 12/14/10 1015
Type of Sampling Device 13/4" macrocore acetate liner		Samples Collected 10007 - 1035 (2) 1/2 gallon bags; (1) 4oz jar	
Geologist L. Stone		Checked by/Date 4/22/11	
Radiological Background 47 / 2728	Radiological Equipment Used Pancake / Downhole	PID Used Mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 = 2712 (CPM)
			0.0	52	Sandy Silt, Dark yellowish brown (4/4 10YR)			0.0 = 3483
			0.0	57	70% silt, 30% fine grained, subrounded			4604
1			0.0	58	Sand, dry, low toughness + strength no odor or staining	ML		4796
			0.0	93	Silty SAND, Yellowish Brown (5/6 10YR), 70% fine sand, 30% silt, dry, low dense, no odor or staining	SM		4954
2			0.0	77	Silty Clay, Yellowish Red (4/6 5YR), 60% clay, 35% silt, 5% fine sand, dry, med toughness strength, med plastic, no odor	CL		4957
			0.0	74	Silty Sand, Yellowish Brown (5/6 10YR) 70% fine sand, 30% silt, dry, low			5068
3	Sample		0.0	86	dense, no odor or staining.	SM		5123
			0.0	74				5274
4			0.0	85				5057
			0.0	78	Silty Clay, ~~Dark yello~~ Is Yellowish Red (4/6 5YR) 60% clay, 35% silt, 5% fine sand.			4771
5			0.0	90	med strength, med. toughness, med plasticity, dry, no odor.	CL		4607
			0.0	56	Some staining ~~fracture~~ Is from 5-5.5ft			4775
6					Staining color is black (2/1 10YR)			

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
47 / 2728	SSFL Area IV Radiological Study	EP9038.01.22.04.03	4

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	37	(cont'd) Silty Clay, Yellowish Red (4/6 5YR)		6.0	4873
			0.0	75	60% clay, 40% silt, trace		6.5	4712
7			0.0	59	Sand, med strength, med		7.0	4840
					staining toughness, med plasticity.			
					no odor		7.5	4889
			0.0	86	staining from 7-7.5 ft and 9-10 ft			
8			0.0	41		CL	8.0	4822
			0.0	35			8.5	4706
9			0.0	40	staining		9.0	4695
			0.0	23			9.5	4616
10			0.0	54			10.0	4789
					TD = 10ft bgs			
					no gw encountered			

5C_005

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 1	Location ID 5
Drilling Company Bart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/10/10 / 1446	Date/Time Total Depth Reached 12/10/10 / 1456
Type of Sampling Device 1 3/4" macrocore acetate liner		Samples Collected #10008 1610 (2) 1/2 gal bags / (1) 4oz jar	
Geologist Stephanie Lapeyre Montrose		Checked by/Date [illegible] 5/20/11	
Radiological Background 60cpm / 2671cpm	Radiological Equipment Used Pancake / Downhole	PID Used Mini RAE 2000	(Background = 0.1 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings @ 0.0-0.5 = 2583 (CPM)
			0.2	64	ML sandy SILT (brown 10YR 5/3) 10% clay, 20% fine grained sand, 70% silt, dry, plant material (rootlets), low plasticity, soft	ML		0.0 = 3194
	11"		0.2	77				0.5 = 4132
1.0			0.2	90	SC clayey SAND (brown 10YR 5/3) B 25 clay, 20% silt, 55% fine grained sand, trace gravel - subangular, low plasticity, soft, dry	SC		1.0 = 4338
			0.2	75				1.5 = 4419
2.0			0.2	42				2.0 = 4727
			0.2	68	Same as above			2.5 = 4882
3.0			0.2	69				3.0 = 4854
	36"		0.2	74	3'6" - 4'4" sandy CLAY with silt (brown 10YR 4/3) 45% clay, 25% silt, 30% fine to med. grained sand, med. plasticity, firm, dry	CL		3.5 = 4688
4.0			0.2	114				4.0 = 4658
	4'4"		0.2	81	SC clayey SAND (brown 10YR 4/3) 25% clay, 20% silt, 55% fine grained sand, trace gravel - subangular, low plasticity, soft, dry	SC		4.5 = 4596
	4'7"		0.2	70	4'7" CL sandy CLAY with silt (brown 10YR 4/3) 35% fine grained sand, 40% clay, 25% silt, med. plasticity, firm, dry	CL		5.0 = 4504
5.0	5'1"		0.2	88	SC SAND with clay (yellowish brown 10YR 5/4) 20% clay, 15% silt, 65% fine to med. grained sand, low plasticity, ~~very soft~~, dry, trace coarse grained sand, trace gravel - sub rounded and sub angular	SC		5.5 = 4772

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background 60cpm / 267 cpm

Project Name: SSFL Area IV Radiological Study

Project Number: EP9038.01.22.04.03

Location: 5

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.2	105	same as above	SC	6.0 =	4970
6'3" → 6'3"					6'3" concrete debris (pieces) (7")			
			0.2	65	6'4" SM silty SAND (brown 10YR 4/3) 15% clay, 25% silt, 60% fine to coarse grained sand, non plastic, loose, dry	SM	6.5 =	5162
7.0			0.2	56			7.0 =	5216
7'7"			0.2	33	CL silty CLAY with sand (reddish brown 5YR 4/4) 45% clay, 25% fine - med. grained sand, 30% silt, med. plasticity, hard, dry	CL	7.5 =	5201
7'10"					7'10" - 7'11" broken cobbles (sandstone)			
8.0			0.2	30	SP SAND (pale brown 10YR 7/4) 15% silt, 85% fine to med. grained sand, trace broken cobbles, loose, dry	SP	8.0 =	5328
			0.2	71			8.5 =	5291
9.0			0.2	128	9'2" - 9'6" clayey SAND with silt (brown 10YR 5/3) 25% clay, 55% fine grained sand, 20% silt, low plasticity, firm, dry	SC	9.0 =	5115
9'2"								
9'6"			0.2	52	clayey SAND with silt (brown 10YR 5/4) same as above color change 25% clay, 55% fine grained sand, 20% silt	SC	9.5 =	5347
10.			0.2	43			10. =	5210

TD = 10 ft bgs

NO GW encountered

5C_006

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 1	Location ID 6
Drilling Company: Bort Longyear	Driller: D. Haniza	Ground Elevation: NA	Total Drilled Depth: 10 ft
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 13¼"	Date/Time Drilling Started: 12/13/10 0838	Date/Time Total Depth Reached: 12/13/10 0843
Type of Sampling Device: 3¾" macrocore Acetate liner		Samples Collected: 10009 - 0900 2-½ gallon bags, 1-4oz jar	
Geologist: I. Stone		Checked by/Date: 4/25/11	
Radiological Background: 56 / 2662	Radiological Equipment Used: Pancake / Downhole	PID Used: Mini RAE 2000 (background = 0.0)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 = 2594 (CPM)
			0.0	45	Sandy Silt, Dark yellowish brown (4/4 10YR) 70% silt, 30% fine grained subrounded sand, low strength, low toughness, dry, no odor or staining.	ML	3703
			0.0	101			4393
1			0.0	70	Sandy Silt, Brown (4/3 10YR) 65% silt, 30% fine grained subrounded sand, 5% clay, dry; low strength, low toughness, low plasticity. no odor or staining.		4435
			0.0	56			4704
2			0.0	39			4909
			0.0	56			4874
3			0.0	73			4569
			0.0	92	Silty Clay, Dark Brown (3/3 10YR) 70% clay, 30% silt, dry, medium strength, med toughness, low plasticity, medium stiff, no odor or staining.	CL	4710
4			0.0	47			4885
			0.0	68			5097
5			0.0	52			5020
			0.0	75	Silty SAND, Dark yellowish Brown (4/4 10YR), moderate 70% fine grained subrounded sand, 30% silt dry no odor or stain	SM	5187
6			0.0	70	SAND w/ silt Yellowish Brown (5/6 10YR) 90% fine grained sand, 10% silt, low dense, dry, no odor or staining	SP	5066

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
56 / 2662	SSFL Area IV Radiological Study	EP9038.01.22.04.03	6

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6			0.0	70	~~Same as above~~ Is S.Ity SAND, Dark Yellowish Brown (4/4 10YR), 70% fine grained sand, 30% silt, dry, med dens	SM		5062
			0.0	120	SAND (weathered sandstone), brownish yellow (6/6 10YR) 100% sand, med dense, fine grained	SP		5116
7			0.0	106				5203
			0.0	97	S.Ity SAND, Brown (4/3 10YR), ~~Dry~~ Is 65% fine grained subrounded sand, ~~Same~~ Is 35% silt, dry; med dense,	SM		5128
8			0.0	73	no odor ~~or staining~~ Is trace gravel			5241
			0.0	40				5247
9			0.0	62	light staining from 8'9" - 8'10½"			5234
			0.0	60				5084
			0.0	137				NM
10					TD = 10ft bgs			
~~10~~ 15					TD = 10 ft bgs No gw encountered			

5C_007

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c 1	Location ID 7
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 13/4"	Date/Time Drilling Started 12/13/10 1339	Date/Time Total Depth Reached 12/13/10 1045
Type of Sampling Device 13/4" macrocore acetate liner		Samples Collected 10010 - 1050 (10241, 10220, 10230) 2-1/2 gallon bags - 1-402 jar	
Geologist I. Stone		Checked by/Date 4/25/11	
Radiological Background 52 / 2479	Radiological Equipment Used Pancake / Downhole	PID Used Mini RAE 2000 (Background: 0.0)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings +0.5 = 2618 Inches	(CPM)
			0.0	66	Sandy silt, Yellowish Brown (5/4 10YR)			3014
			0.0	73	70% silt, 30% fine grained, subrounded			3916
1			0.0	78	sand, dry, low strength, low	ML		4394
			0.0	49	toughness, low plasticity, no odor			4553
2			0.0	57	or staining			4629
			0.0	55				4609
					Silty Clay, very dark grayish brown (3/2 10YR)			
3			0.0	68	70% clay, 30% silt, dry, medium stiff,			4709
			0.0	48	medium strength, medium toughness, dry	CL		4608
4			0.0	61	plasticity, no odor or staining			4836
			0.0	118				5022
					Silty SAND, dark yellowish brown (4/4 10YR)			
5			0.0	63	70% fine grained subrounded sand, 30%	SM		5270
			0.0	67	silt, dry, medium dense, no odor			5307
			0.0	90	or staining			5190

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
52 / 2479	SSFL Area IV Radiological Study	EP9038.01.22.04.03	7

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	90	Same as above			5190
			0.0	76				5184
7			0.0	40	SAND, Brownish yellow (6/6 10YR) 90% fine grained sand, subrounded, dry, 10% weathered sandstone coarse gravel size, easily crushable, No odor or staining	SP SP SP		5373
			0.0	80	Silty SAND, Brown (4/3 10YR) 70% sand, 30% silt, dry, mod dense, fine grained No odor or staining			5113
8			0.0	72				5051
			0.0	67	Silty SAND, Brown (4/4 10YR) 80% sand, fine grained, 20% silt, dry mod. dense, trace granitic, quartzite gravel throughout,	SM		5004
9			0.0	61				5009
			0.0	85				4925
10			0.0	55				NM
					TD = 10 ft bgs No gw encountered Fill material			

5C_008

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BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	Sc, Grapl	B
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	C. Stone	NA	0.5 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	NA	10/26/10, 10:05	10/26/10, 10:15, 0.5ft
Type of Sampling Device		**Samples Collected**	
trowel / shovel		10011, 10:10, (1) 4oz jar, 1/2 gal bag (a)	
Geologist		**Checked by/Date**	
R. Steele		4/25/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
15 nR	µR Meter	Mini Rae 2000 (Background = 1.8 ppm)	

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5			1.8	15	silt w/ fine sands (ML), dark yellowish brown (10 YR 4/4), dry, moderately firm, 70% silt, 15% clay, 15% fine sands, trace rock segments, roots, roots.	ML		
					TD = 0.5 ft water table not reached			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	SC 1	8
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	NA	9
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	12/10/10 / 1127	12/10/10 / 1140
Type of Sampling Device		**Samples Collected** #10012 1150	
1 3/4" macrocore acetate liner		(2) ½ gal bags / (1) 40z jar	
Geologist		**Checked by/Date**	
Stephanie Leppin, Montrose		TBD 5/27/11	

Radiological Background 51 cpm / 7692 cpm **Radiological Equipment Used** Paxcake / Downhole **PID Used** mini RAE 2000 (Background = 0.0ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol
	11"		0.0	48	ML sandy SILT (brown 10YR 4/3) 10% clay, 20% fine grained sand, 70% silt dry; plant material (rootlets), low plasticity, soft	ML
1.0			0.0	30		
			0.0	49	SM silty SAND 20% clay, trace gravel - subangular (brown 10YR 4/3) 25% silt, 55% fine to med. grained sand low plasticity, soft, dry	SM
			0.0	57		
2.0			0.0	45	Same as above	
			0.0	96		
3.0			0.0	68	SP SAND ~~with silt~~ @ 3'5" 10% clay, 20% silt, 70% fine to coarse grained (pale brown 10YR 7/4)	SP
3'5"					broken @ weathered sandstone, trace gravel - subangular	
3'7"			0.0	71	loose, dry, non plastic 3'7" CL silty CLAY with sand 45% clay, 25% fine to med. grained sand (dark brown 10YR 3/2)	CL
4.0			0.0	69	30% silt hard, med. plasticity, dry rootlets,	
4'1"					4'1" same as above - color change (brown 10YR 4/3)	
4'8"			0.0	82	4'8" SP SAND 20% silt, 80% fine grained sand (brown 10YR 4/3) non plastic, loose, dry	SP
5.0		NR	0.0	77	4'11" - 5' NO Recovery	
					5' - found black rubber piece' SP SAND (brown 10YR 5/6)	SP
			0.0	87	15% silt, 85% fine to med grained sand, trace coarse grained sand very loose, dry	

Inches	Borehole Gamma Readings 0.0-0.5 = 2573 cps (CPM)
0.0	2914
0.5	3716
1.0	4008
1.5	4335
2.0	4717
2.5	4539
3.0	4559
3.5	4636
4.0	4844
4.5	4815
5.0	4895
5.5	5674

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
51 cpm / 2692 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	8

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	52	Same as above		6.0	6040
			0.0	80			6.5	6187
6'11"					6'11" SP SAND 10% silt, 80% fine to med grained sand (yellowish brown 10YR 5/8) trace gravel - subangular, 10% coarse grained sand very loose, dry (B)	SP		
7.0			0.0	65			7.0	6528
			0.0	80	7'11" SP SAND 10% silt, 90% fine to med. grained sand (light yellowish brown 10YR 6/4) very loose, dry	SP	7.5	6384
7'11"								
8.0			0.0	92	8' Same as above - pieces of plant debris (small twigs)	SP	8.0	5945
			0.0	78	SP SAND 10% silt, 90% fine - med. grained sand (light yellowish brown 10YR 6/4) very loose, dry	SP	8.5	5725
9.0			0.0	67			9.0	5190
					Hit Refusal at 9 ft bgs (TD) NO GW encountered		9.5	(B)
10							10	(B)

5C_009

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BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	SC 1	9
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	NA	10
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	12/10/10 / 1329	12/10/10 / 1340
Type of Sampling Device		**Samples Collected** # 10013	1350
1 3/4" macrocore acetate liner		(2) 1/2 gal bags / (1) 4oz. jar	
Geologist		**Checked by/Date**	
Stephanie Lepuw Montrose		TQW 5/27/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
47 cpm / 2510 cpm	Pancake / Downhole	mini RAE 2000	(Background = 0.2 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 0.0-0.5= 2471 (CPM)
			0.1	65	ML Sandy SILT (brown 10YR 5/3)	ML	0.0 =	3247
			0.1	68	10% clay, 20% fine grained sand, 70% silt		0.5 =	4360
9"				51	dry, plant material (rootlets) low plasticity, soft			
1.0			0.1	51	SM silty SAND (brown 10YR 5/3)	SM	1.0 =	4659
				55	20% clay, 25% silt, 55% fine to medium grained sand			
			0.1	53	low plasticity, soft, dry		1.5 =	4661
1'8"				21	1'8" - 3' CL silty CLAY with sand (brown 10YR 4/3)	CL		
2.0			0.1	46	45% CLAY, 25% fine to med. grained sand,		2.0 =	4602
			0.1	46	30% silt, hard, med. plasticity, dry		2.5 =	4554
				53				
3.0			0.1	55	3'-4' silty SAND (yellowish brown 10YR 5/4)	SM	3.0 =	4481
			0.1	72	20% clay, 25% silt, 55% fine to coarse grained sand, low plasticity, soft, dry		3.5 =	4766
4.0			0.1	65	4'-4'4" ML clayey SILT with sand (dark brown 10YR 3/3)	ML	4.0 =	4791
4'4"				30	35% clay, 25% fine to med. grained sand, 40% silt			
			0.1	40	med. plasticity, firm, dry		4.5 =	5051
				67	4'4"-4'7" SP SAND (yellowish brown 10YR 5/4)	SP		
4'7"				67	20% silt 30% fine to medium grained sand, trace			
5.0			0.1	67	coarse grained sand, trace gravel - subangular		5.0 =	5104
					loose, dry			
					4'7" same as above - color change (brown 10YR 5/3)	SP		
						SM		
				35	SM silty SAND		5.5 =	5215
			0.1	36	20% clay, 30% silt, 50% fine to coarse			
					grained sand, loose, dry, non plastic			
					trace gravel - sub angular			

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
47 cpm / 2510 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	9

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.1	72	SM silty SAND Same as above (brown 10YR 4/3)		6.0 =	5187
6'4"					6'4"-6'6" SP SAND (brownish yellow 10YR 6/6) 15% silt, 85% fine to med. grained sand, loose, dry			
6'6"			0.1	90	~~Sand as above~~ pieces of asphalt		6.5 =	5160
				(91)	SM silty SAND (brown 10YR 4/3) 20% clay, 30% silt, 50% fine to coarse grained sand, loose, dry, non plastic trace gravel subangular	SM		
7.0			0.1	99			7.0 =	4976
				(99)				
			0.1	67			7.5 =	5092
				(67)				
7'9"					pieces of broken concrete			
7'10"								
8.0			0.1	52	7'10" ML Sandy SILT with clay (brown 10YR 4/3) 25% clay, 30% fine grained sand, 45% silt low plasticity, soft, dry	ML	8.0 =	5250
			0.1	59			8.5 =	5055
8'7"					SM silty SAND (brown 10YR 4/3)	SM		
9.0			0.1	26	15% clay, 25% silt, 60% fine to coarse grained sand trace gravel - subangular non plastic, loose, dry		9.0 =	5111
			0.1	74			9.5 =	5045
10			0.1	57			10.0 =	5157

TD = 10 ft bgs

NO GW encountered

5C_010

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BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	SC 1	10
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	NA	10
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	12/10/10 / 1003	12/10/10 / 1015
Type of Sampling Device		**Samples Collected**	
Geoprobe 6600 → 1 3/4" macrocore acetate liner		# 10014 / 1030 (2) 1/2 gal bag / (1) 4oz jar	
Geologist		**Checked by/Date**	
Stephanie Lepera, Matthew		LSW - 5/27/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
93 cpm / 2589 cpm	Pancake / Downhole	mini RAE 2000 (Background = 0.2 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 0.0-0.5= 2495 (CPM)
			0.1	72	ML Sandy SILT (brown 10YR 4/3)	ML	0.0 =	3173
			0.1	47	10% clay, 20% fine grained sand, 70% silt dry, plant material (top soil), low plasticity, soft		0.5 =	3943
8"								
1.0			0.1	40	SM silty SAND (brown 10YR 5/4)	SM	1.0 =	4459
					15% clay, 25% silt, 60% fine grained sand low plasticity, soft, dry, rootlets		1.5 =	4714
			0.1	85				
2.0			0.1	82	2'4" - 2'6" C		2.0 =	4812
2'4"					SM silty SAND	SM		
			0.1	69	30% silt, 70% fine grained sand (yellowish brown 10YR 5/4)		2.5 =	4685
2'6"					indurated sand, dry			
					2'6" - 3'11"			
			0.1	89	CL silty CLAY with sand (dark brown 10YR 4/3)	CL	3.0 =	4670
					45% clay, 25% fine to medium grained sand, 30% silt med. plasticity, firm-hard, dry			
			0.1	94			3.5 =	4708
3'11"					3'11" - 4'11" (brown 10YR 4/3)			
4.0			0.1	51	SP SAND	SP	4.0 =	4842
					15% silt, 85% fine to coarse grained sand, trace gravel sub angular, non plastic, loose, dry (primarily fine and medium grained sand)			
			0.1	67			4.5 =	4977
				C				
5.0		NR	0.1	~~55~~ 58	4'11" - 5' No recovery		5.0 =	5134
					SM silty SAND with clay (brown 10YR 4/4)	SM		
					(20-25%) (25-30%) 25% clay, ~~25~~ % silt, 50% fine grained sand			
			0.1	58	trace gravel - subangular low plasticity, soft, dry		5.5 =	5423

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
43 cpm / 2589 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	10

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6'1"			0.1	69	Same as above		6.0	5309
6'4"			0.1	74	broken cobble (sandstone)		6.5	5689
7.0			0.1	58	SM silty SAND (brown 10YR 4/4) 15% clay, 25% silt, 60% fine grained sand trace gravel, subangular, low plasticity, soft, dry	SM	7.0	5280
7'3"			0.1	47	7'-7'3" broken cobble (sandstone)		7.5	5206
7'10"					SM silty SAND 15% clay, 25% silt, 60% fine grained sand trace gravel subangular, low plasticity, soft, dry	SM		
8.0			0.1	62	SP SAND (tannish/yellowish brown 10YR 5/4) 20% silt, 80% fine to coarse grained sand, trace gravel - subangular dry, non plastic, loose	SP	8.0	5188
			0.1	48			8.5	5218
9.0			0.1	66			9.0	5085
9'2"					CL Sandy CLAY (black 10YR 2/1) 45% clay, 30% fine grained sand, 25% silt medium plasticity, hard, dry	CL		
9'6"			0.1	72	staining (GLEY 4/1) same as above no odor (9'2" to 9'6")		9.5	4970
10.0			0.1	56	same as above (reddish brown 5YR 4/4)	CL	10.0	5231

TD = 10 ft bgs

no GW encountered

5C_011

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C /	Location ID 11
Drilling Company: Bart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10
Drilling Equipment: Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/10/10 / 0815	Date/Time Total Depth Reached 12/10/10 / 0830
Type of Sampling Device: 1 3/4" macrocore acetate liner		Samples Collected #10015 0920 (2) 1/2 gal bag / (1) 4oz jar	
Geologist: Stephanie Lepoyre Montrose		Checked by/Date TBS 5/27/11	
Radiological Background: 43cpm / 2505cpm	Radiological Equipment Used: Pancake / Downhole	PID Used: mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 0.0-0.5 = 2504 (CPM)
			0.1	60	ML sandy SILT (brown 10YR 4/3)	ML	0.0 =	3311
			0.1	40	10% clay, 20% fine grained sand, 70% silt		0.5 =	4079
7"					7"-2'1" dry, plant material (top soil), low plasticity, soft			
1.0			0.1	55	SM silty SAND (brown 10YR 5/3)	SM	1.0 =	4335
					15% clay, 25% silt, 60% fine grained sand			
			0.1	62	low plasticity, soft, dry		1.5 =	4617
2.0			0.1	87	2'1" - 3'10"		2.0 =	4633
2'1"					CL Silty CLAY with sand (dark brown 10YR 3/3)	CL		
			0.1	57	45% clay, 25% fine to medium grained sand, 30% silt		2.5 =	4655
					medium plasticity, firm - hard, dry			
3.0			0.2	64	fibrous material		3.0 =	4734
3'5"			0.2	53	same as above, trace gravel sub angular, broken piece of cobble (sandstone)	CL/GR	3.5 =	4887
3'10"					3'10"-4'3"			
4.0			0.1	64	SP SAND (brown 10YR 4/3)	SP	4.0 =	4866
					15% silt, 85% fine to coarse grained sand, trace gravel - subangular			
4'3"					4'3"-4'8" non plastic, loose, dry (primarily fine & med. grained sand)			
			0.1	47	SC clayey SAND with silt (brown 10YR 3/3)	SC	4.5 =	5116
4'8"					25% clay, 20% silt, 55% fine grained sand			
					low plasticity, soft, dry			
		NR			4'8" - 5' NO RECOVERY			
5.0			0.0	61	5'-5'2"		5.0 =	5188
5'2"-					SC clayey SAND with SILT (brown 10YR 3/3)	SC		
					25% clay 20% silt, 55% fine grained sand			
					low plasticity, soft, dry			
5'4"-			0.1	60	45% clay. CL silty CLAY with sand (dark brown 10YR 3/2)	CL	5.5 =	5191
					25% fine grained sand, 30% silt			
					5'4"-5'6" mid-plasticity, firm-hard, dry (brown 10YR 4/4)			
					SM silty SAND (brown 10YR 4/4)	SM		
					15% clay, 25% silt, 60% fine to medium grained sand			
					non plastic, loose, dry			

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
43cpm / 2505 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	11

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.2	78	Same as above		6.0=	5098
6'6"			0.2	45	6'6" – 6'8" wood		6.5=	5138
6'8"					6'8" (yellowish brown 10YR 5/4)			
7.0			0.2	53	SM silty SAND 30% silt, 70% fine to coarse grained sand, trace gravel - subangular non plastic, loose, dry	SM	7.0=	5182
7'2"					7'2" (brown 10YR 4/3)			
			0.2	48	SC clayey SAND 25% clay, 15% silt, 60% fine to coarse grained sand low plasticity, very soft, dry	SC	7.5=	5107
8.0			0.2	36			8.0=	5237
8'3"					8'3" – 8'9" same as above trace gravel - subangular and concrete debris	SC	8.5=	4961
8'9"			0.2	30				
9.0			0.2	36	same as above		9.0=	5139
9'2"					same as above - greenish gray staining (GLEY 4/1) no odor	SC	9.5=	5169
			0.2	72	same as above, trace gravel subangular (brown 10YR 4/3)			
10.2			0.2	26			10.0=	—

TD = 10 ft. bgs

NO GW encountered

5C_012

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5c, Group 1	V2
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	I. Stone	NA	0.5 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	NA	10/26/10, 10:35	10/26/10, 10:45, 0.5 ft
Type of Sampling Device		**Samples Collected**	
trowel / shovel		10016, 10:40, ① 402 jar, ② 1/2 gal bags	
Geologist		**Checked by/Date**	
P. Strom		4/25/11	

Radiological Background	Radiological Equipment Used	PID Used
1.3 mR	ΔR meter	Mini Rae 2000 (Background = 1.7 ppm)

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5			1.5 ppm	1.3 mR	silt w/ fine sands (cont); brown (10YR 4/3), dry, moderately firm; 70 % silts, 15 % clay, 15 % fine sands, trace gravel rock fragments, trace rootlets	ML		
					TD = 0.5 ft bgs Groundwater not reached			

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BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	SC 1	12
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	NA	10
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	13/4"	12/9/10 / 1410	12/9/10 / 1422
Type of Sampling Device		**Samples Collected**	
1 3/4" Macrocore acetate liner ~~sleeve~~		10017 (1430) (2) ½ gal bags / (1) 4 oz. jar	
Geologist		**Checked by/Date**	
Stephenie Lepeyre Northrop		TBW 5/27/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
41 cpm / 2472 cpm	Parcale / Downhole	Mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 0.0-0.5 = 2413 (CPM)
			0.0	64	ML Sandy SILT (brown 10YR 4/3)	ML	0.0	= 3153
			0.0	72	10% clay, 20% fine grained sand, 70% silt dry, plant material, low plasticity, soft		0.5	= 4038
1.0			0.0	87			1.0	= 4459
1'3"			0.0	46	ML clayey SILT with sand (brown 10YR 4/3) 35% clay, 25% fine to coarse grained sand, 40% silt fiber material, roots, firm, med. plasticity, dry	ML	1.5	= 4482
2.0			0.0	74	2' CL silty CLAY ~~with sand~~ & (brown 10YR 4/3) 45% clay, 20% fine grained sand, 35% silt med. plasticity, firm, dry	CL	2.0	= 4521
			0.0	92			2.5	= 4358
3.0			0.0	97			3.0	= 4344
3'5"			0.0	53	SM silty SAND (brown 10YR 5/4) 15% clay, 25% silt, 60% fine to coarse grained sand, dry, non plastic, loose, trace gravel subangular	SM	3.5	= 4714
4.0			0.0	72			4.0	= 5123
			0.0	90			4.5	= 5037
5.0			0.0	67	SM SAND with silt (brown 10YR 4/3) 10% clay, 20% silt, 70% fine to med. grained sand non plastic, loose, dry, trace gravel - subangular	SM	5.0	= 5002
			0.0	62			5.5	= 5097

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
41 cpm / 2472 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	12

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.0	59	Same as above		6.0 =	5150
			0.0	76			6.5 =	4962
7.0			0.0	60	7'-7'3" Same as above – rust staining		7.0 =	4937
7'3"					7'3" - 7'5" SP SAND with silt (tan 10YR 6/3)	SP		
7'5"			0.0	58	20% silt, 80% fine to med. grained sand @ 100%, dry, trace gravel – subangular		7.5 =	5011
7'10"					7'5" Same as above – color change to (brown 10YR 4/3)	SP		
8.0			0.0	65	SP SAND (yellowish brown 10YR 6/6) 20% silt, 80% fine grained sand 100%, dry, trace gravel - subangular	SP	8.0 =	5187
8'7"			0.0	60			8.5 =	5107
9.0			0.0	57	CL Silty CLAY with sand (brown 10YR 4/3) 35% clay, 30% fine to med. grained sand, 35% silt (35-40) (30-35) med. plasticity, firm, dry	CL	9.0 =	5296
			0.0	77	@			
9'7"					9'7" - 9'8" CL silty CLAY (dark brown 10YR 3/2) 45% clay, 20% fine grained sand, 35% silt	CL	9.5 =	5353
9'8"					hard, med. plasticity, dry			
10.			0.0	64	9'8" - 10' SP SAND 20% silt, 80% fine grained sand (brown 10YR 4/3) 100%, dry, trace gravel - subangular	SP	10.0 =	—

TD = 10 ft bgs

No groundwater encountered

5C_013

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BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C 1	13
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	NA	10
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	12/9/10 / 1247	12/9/10 / 1300
Type of Sampling Device		**Samples Collected**	
1 3/4" macrocore acetate liner		10018 1300 (2) 1/2 gel bags / (1) 4oz. jar	
Geologist		**Checked by/Date**	
Stephanie Leppert Montrose		5/27/11 TDJ	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
59 cpm / 2347 cpm	Paragon / Downhole	mini RAE 2000 (Background = 0.0ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 0.0-0.5 = 2439 (CPM)
0.0			0.0	47	ML sandy SILT (brown 10YR 4/3)	ML	0.0	= 3248
0.5			0.0	54	10% clay, 20% fine grained sand, 70% silt dry, plant material, low plasticity, soft		0.5	= 3987
9"						CL		
1.0			0.0	63	9" - 1'6" CL sandy CLAY with silt		1.0	= 4527
					(3)			
			0.0	70	CL sandy CLAY with silt (brown 10YR 5/3)	CL	1.5	= 4598
1'6"					30% clay, 25% silt, 45% fine to med. grained sand			
2.0			0.0	54	(2) trace gravel subangular, med. plasticity, soft, dry		2.0	= 4342
					1'6" - CL sandy CLAY with silt (brown 10YR 5/3)	CL		
2'3"			0.0	67	40% clay, 25-30% silt, 25-30% (30-35%) fine to coarse grained sand firm, med. plasticity, dry		2.5	= 4294
					1'9" - 2'3" CL sandy CLAY with silt (dark brown 10YR 3/3)	CL		
3.0			0.0	77	45% clay, 25% silt, 30% fine grained sand, trace pieces of asphalt, pieces of fiber material med. plasticity, firm, dry		3.0	= 4577
					2'3" same as above - trace coarse grained sand, no asphalt, no fiber material	CL		
3'5"			0.0	41	3'5" same as above color change (brown 10YR 5/4)	CL	3.5	= 4790
3'6"					no asphalt or fiber material			
4.0			0.0	62	3'6" same as above - rust staining, no odor, subangular	CL	4.0	= 5004
					3'7" SM silty SAND no asphalt or fiber material, trace gravel			
4'4"			0.0	62	5% gravel subangular, 15% clay, 20% silt, 55% fine - coarse grained sand (brown 10YR 4/3) low plasticity, soft, dry	SM	4.5	= 5115
					4'4" SP SAND with silt (tan 10YR 4/4)	SP		
4'10"					5% gravel subangular, 20% silt, 75% fine grained sand non plastic, loose, dry			
5.0			0.0	86	4'10" SM silty SAND (brown 10YR 4/3)	SM	5.0	= 5074
					5% gravel - subangular, 15% clay, 25% silt, 55% fine - coarse grained sand			
			0.0	57	low plasticity, soft, dry		5.5	= 4136
					5' SC clayey SAND (brown 10YR 4/4) 15% 30% clay, 15% silt, 55% fine to med. grained sand, trace gravel - subangular low plasticity, soft - firm, dry	SC		

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
59 cpm / 2347 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	13

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM)
6.0			0.0	64	SC Same as above	SC	6.0 = 5150
6'6"			0.0	68	ML sandy SILT (dark brown 10YR4/3) 20% clay, 30% fine to coarse grained sand, 50% silt low plasticity, soft, dry, trace gravel sub-angular	ML	6.5 = 5140
7.0			0.0	37			7.0 = 5007
			0.0	54			7.5 = 5139
8.0			0.0	69	Same as above		8.0 = 5105
			0.0	71			8.5 = 5188
9.0			0.0	56			9.0 = 5188
9'4"			0.0	64	SM silty SAND (brown 10YR 4/4) 10% clay, 25% silt, 65% fine to coarse grained sand, trace gravel sub angular	SM	9.5 = 5230
10.0			0.0	88	low plasticity, soft, dry, loose		10.0 = —

TD = 10 ft bgs

No groundwater encountered

5C_014

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 1	Location ID 14
Drilling Company Bort Longyear	Driller D. Iltansen	Ground Elevation –	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 13/4"	Date/Time Drilling Started 12-7-10 1415	Date/Time Total Depth Reached 12-7-10 1440
Type of Sampling Device 13/4" Macrocore		Samples Collected 10019 (1430) 2-1/2gal bags, 1-4oz Jar	
Geologist C. Knight		Checked by/Date [signature] 4/25/11	
Radiological Background 49 cpm, 2518 cpm	Radiological Equipment Used Pancake, Downhole Gamma logger	PID Used Mini RAE 2000 (Background=0.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 2567 (CPM)
			0.3	80	surface: soil Artifical Fill Sandy silt: light olive brown (10YR 5/4), dry, soft, no odor, 30% fine sand, 5% medium, 5% coarse, 60% silt, rootlets in upper 6", extremely mottled with fine grained sand packets	AF/ML	3998
0.5			0.3	70			4066
1.0			0.3	50			4584
			0.3	55			4494
2.0			0.3	100			4515
			0.3	60			4620
3.0			0.3	60			4742
			0.3	70	Fill: Clay w/ s.H: Brown (10YR 4/4), moist, stiff, no odor, 10% fine sand, 25% silt, 5% coarse c/s sand, 60% clay	AF/CL	4704
4.0			0.3	65			4713
			0.3	55	Fill Material Silty gravelly sand: Yellowish brown (10YR 5/4), moist, med. dense, no odor, 5% angular gravel sandstone and granite, 30% coarse sand, 10% silt, 40% coarse, 15% medium sand	AF/SW	4963
5.0			0.3	75	@ 5' large red brick w 1" in thickness		4955
			0.4	75			5154
6.0			0.4	55			5018

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
46cpm, 2518cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	14

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.4	55	Fill material	AF/SW		5018
					Same as above			
			0.4	70				5180
7.0			0.4	55				5217
			0.4	30	-2" granite diameter gravel piece			5127
8.0			0.4	55	piece of black solid tar found			5046
			0.4	35	-trace 1/2 cm muscovite flake			5046
9.0			0.4	75				4901
			0.4	85				5107
					Fill			
10.0			0.4	80	same as above: trace brick fragment			5016
					Total depth 10.0' bgs			
					No GW encountered			

5C_015

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BORING LOG

Sheet 1 of 2

Project Name	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C / 1	15
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Horsen	NA	10 ft. bgs
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	12/8/10 / 1330	12/8/10 / 1341
Type of Sampling Device		**Samples Collected**	
1 3/4" macrocore acetate liner		10020 1345 (2) 1/2 gal bags / (1) 40z. jar	
Geologist		**Checked by/Date**	
Stephanie Lopeyre Montrose		TOJ 5/27/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
57 cpm / 2419 cpm	Pancake / Down hole	Mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 0.-0.5 = 2493 (CPM)
0.0			0.0	70	ML sandy SILT (brown 10YR 4/3) 10% clay, 20% fine grained sand, 70% silt, dry plant material (top soil), low plasticity, slow dilatency soft	ML	0.0 =	3032
0.5			0.0	60			0.5 =	3999
1.0			0.0	35	SM silty SAND 10% clay, 20% silt, 70% fine grained sand, low plasticity, loose, dry, soft (light brown 10YR 6/4)	SM	1.0 =	4443
1.5			0.0	45			1.5 =	4599
2.0 2'2"			0.0	55	CL sandy CLAY (dark brown 10YR 3/3) 40% clay, 25% silt, 35% fine grained sand medium plasticity, slow dilatency, dry, firm	CL	2.0 =	4570
2.5			0.0	70			2.5 =	4465
3.0			0.0	70			3.0 =	4513
3.5			0.0	60	SM silty SAND (brown 10YR 5/4) 10% clay, 20% silt, 70% fine grained sand, low plasticity, loose, dry, soft	SM	3.5 =	4703
5'8" 4.0			0.0	65			4.00 =	4905
4.5			0.0	65			4.5 =	4936
5.0 5'3"			0.0	75	SM silty SAND 10% clay, 20% silt, 70% fine grained sand low plasticity, dry, soft (brown 7.5YR 4/3) (brown 10YR 5/4) ↑ color change at 5'3"		5.0 =	5014
5.5			0.0	65			5.5 =	5295

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
57 cpm / 2419 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	15

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	85	CL Sandy CLAY			6ft = 5106
6'1"					40% clay, 35% silt, 35% fine grained sand (brown 10YR 4/3)	CL		
6.5			0.0	100	sand, med. plasticity, slow dilatency, dry, firm	SM		6.5 = 5175
					6'1" SM silty SAND			
7.0			0.0	50	25% silt, 75% fine grained sand (brown 10YR 4/3) low plasticity, slow dilatency, dry, loose, trace gravel - sub angular			7.0 = 4947
			0.0	75				7.5 = 5200
					Same as above			
8.0			0.0	110		SM		8.0 = 5009
			0.0	55				8.5 = 5196
8'6"					SP SAND			
					10% silt, 90% fine to med. grained sand (pale brown 10YR 6/3) loose, dry, trace gravel	SP		
9.0			0.0	75	sub angular, pieces (2) of concrete debris (brown 10YR 4/3)			9.0 = 5143
					SM			
			0.0	50	25% silt, 75% fine grained sand low plasticity, trace gravel subangular, dry (fill), pieces of concrete debris	SM		9.5 = 5291
10.0			0.0	55	Same as above - 2 pieces of compacted fine to medium grained sand stone (greenish grey GLEY 1 6/1)			10 = 5017
					TD = 10 ft bgs			
					NO groundwater encountered			

5C_016

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 1	Location ID 16
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10 ft bgs
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/8/10 / 1515	Date/Time Total Depth Reached 12/8/10 / 1527
Type of Sampling Device 1 3/4" macrocore acetate liner		Samples Collected 10021 1530 (2) 1/2 gal bags / (1) 4oz jar	
Geologist Stephenie Lepeyre Montrose		Checked by/Date PAW 5/27/11	
Radiological Background 61 cps / 2635 cpm	Radiological Equipment Used Pancake / Down hole	PID Used mini RAE 2000 (Background 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings 0.0-0.5 = 2399 Inches (CPM)
0.0			0.0	45	ML sandy SILT (brown 10YR 4/3)	ML	0.0 = 2562
0.5			0.0	90	10% clay, 20% fine grained sand, 70% silt, dry plant material (top soil), low plasticity, soft		0.5 = 3926
9"					SM silty SAND with clay (brown 10YR 5/4)	SM	
1.0			0.0	35	20% silt, 65% fine grained sand, 15% clay low to med. plasticity, soft, dry		1.0 = 4315
1.5			0.0	55			1.5 = 4530
2.0			0.0	30	2'3" - 3'9"		2.0 = 4486
2'3"					CL sandy CLAY (dark brown 10YR 4/2)	CL	
			0.0	60	40% clay, 25% silt, 35% fine grained sand Medium plasticity, dry, firm, rootlets		2.5 = 4549
3.0			0.0	65			3.0 = 4478
	Sample				SM 3'9" - 5'	SM	
3'9"			0.0	75	silty SAND		3.5 = 4328
					25% silt, 75% fine to med. grained sand (brown 10YR 4/4)		
4.0			0.0	55	non plastic, loose, dry, trace gravel - sub angular		4.0 = 4550
			0.0	65	Same as above		4.5 = 5000
					CL sandy CLAY (brown 7.5 YR 4/6)	CL	
5.0			0.0	55	40% clay 25% silt, 35% fine grained sand medium plasticity, dry, firm		5.0 = 4963
			0.0	70	SM silty SAND 5'11"- (tan 10YR 6/3)	SM	5.5 = 5138
5'11" - 5'11"					10% clay, 70% fine grained sand, 20% silt low plasticity, dry, soft		

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
61 cpm / 2635 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	16

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.0	70	Same as above (color change to brown 10YR 4/3)		6.0	5131
6.5			0.0	65			6.5	5082
7.0			0.0	30	SM silty SAND (brown 10YR 4/3) 10% clay, 20% silt, 70% fine grained sand medium plasticity, dry, soft trace gravel - sub angular	SM	7.0	5138
			0.0	25			7.5	5191
8.0			0.0	45	Same as above		8.0	5089
			0.0	50			8.5	5260
9.0			0.0	80			9.0	5188
9'5"			0.0	65	SM silty SAND (tan 10YR 6/3) 10% clay, 15% silt, 75% fine to medium grained sand, medium plasticity, loose, dry, soft, trace gravel - sub angular	SM	9.5	5165
10.0			0.0	65			10	5166

TD = 10 ft. bgs

No groundwater encountered

5C_017

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 1	Location ID 17
Drilling Company Bart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/9/10 /1028	Date/Time Total Depth Reached 12/9/10
Type of Sampling Device 1 3/4" macrocore acetate liner		Samples Collected 10022 1050 (2) 1/2 gal bags / (1) 4 oz. jar	
Geologist Stephenie Lepera Montrose		Checked by/Date TOW 5/22/11	
Radiological Background 42 cpm / 2468 cpm	Radiological Equipment Used Pancake / Downhole	PID Used Mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol
			0.0	50	ML sandy SILT (brown 10YR 4/3) 10% clay, 20% fine grained sand, 70% silt, dry, plant material, low plasticity, soft	ML
			0.0	41		
1.0			0.0	26		
1'2"					CL sandy CLAY with silt 45 (brown 10YR 5/3) 30% clay, 25% silt, 45% fine to med. grained sand, trace gravel subangular med. plasticity, soft, dry	CL
1'5"			0.0	40		
1'10"					CL silty CLAY with sand 40 (brown 10YR 4/3) 40% clay, 25% fine grained sand, 35% silt med plasticity, firm, dry	CL
2.0			0.0	62		SP
2'2"					1'10" SP SAND 80% fine to med. grained sand, 20% silt (yellowish brown 10YR 5/4) non plastic, loose, dry	SM
			0.0	98	2'2" SM silty SAND (dark brown 10YR 3/3) 25% silt, 10% clay, 65% fine grained sand	
2'10"					low plasticity, soft, dry (brown 10YR 4/3)	
3.0			0.0	65	2'10" SM silty SAND 30 silt 70% fine to coarse grained sand, trace pieces of asphalt, trace gravel subangular low plasticity, soft, dry	SM
			0.0	52		
4.0			0.0	50	4.0' ML sandy SILT (dark brown 10YR 3/3) 20% clay 35% fine to med. grained sand, 45% silt low plasticity, soft, dry	ML
			0.0	76		
5.0			0.0	52	SC clayey SAND (dark brown 10YR 3/4) 25% clay, 60% fine grained sand, 15% silt low plasticity, soft, dry	SC
			0.0	75		
5'10"					rust staining - same as above	

Borehole Gamma Readings Inches	0.0 - 0.5 = 2368 (CPM)
0.0 = 3439	
0.5 = 4319	
1.0 = 4660	
1.5 = 4986	
2.0 = 5297	
2.5 = 5240	
3.0 = 4968	
3.5 = 5108	
4.0 = 4873	
4.5 = 4551	
5.0 = 4634	
5.5 = 4702	

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
42 cpm / 2468 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	17

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
6'			0.0	85	SC clayey SAND (brown 10YR 4/3)	SC	6.0 = 4878
6.5			0.0	76	20% clay, 10% silt, 70% fine grained sand		6.5 = 4901
7.0			0.0	64	low plasticity, soft, dry		7.0 = 4877
			0.0	70	same as above		7.5 = 4976
8.0			0.0	58			8.0 = 4913
			0.0	60	same as above		8.5 = 4901
9.0			0.0	85			9.0 = 4844
9'2"					SM silty SAND (greenish gray GLEY 1 5/1)	SM	
			0.0	58	10% clay, 70% fine grained sand, 20% silt		9.5 = 4845
10.0			0.0	70	non plastic, very soft, very loose, no odor, stained		10.0 = —

TD = 10.0 ft. bgs

No groundwater encountered

5C_018

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, group 1	Location ID 18
Drilling Company HGL	Driller [illegible]	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10.26.10, 08:55	Date/Time Total Depth Reached 10.26.10, 0910, 0.5 ft
Type of Sampling Device trowel/shovel		Samples Collected 10023, 0900, 1 4oz jar, 2 ½ gal bags	
Geologist [illegible]		Checked by/Date [signature] 4/25/11	
Radiological Background 14 µR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.3ppm)	

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	X	X	1.3 ppm	15 µR	Silt with fine sands (ML), (RS) dark yellowish brown (10YR 3/4), dry, moderately firm. 75% silts, 15% clay, 10% fine sand, trace rock fragments, common rootlets.	ML		
					TD: 0.5 ft water table not reached			

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BORING LOG

Sheet 1 of 2 (P5)

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC, 1	Location ID 18
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 5.0'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/06/10, 1250	Date/Time Total Depth Reached 12/06/10, 1300
Type of Sampling Device 1 3/4" macrocore		Samples Collected 10024, 1255 (2) 1/2 gal bags; (1) 4oz jar	
Geologist P. Steeah		Checked by/Date 4/26/11	
Radiological Background 57 cpm, 2599 cps	Radiological Equipment Used pancake, downhole scanner	PID Used Mini RAE 2000 (Background = 0.6 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 2521 (CPM)
			0.6	80	Silt w/ sand, dark yellowish brown (10YR 3/4) moist, soft, 80 % silt, 20 % fine sand, few rootlets, no odor	ML		3432
			0.6	70				4319
1.0			0.6	65	Silt w/ sand, yellowish brown (10YR 5/4) dry, med. stiff, 85 % silt, 15 % fine sand, no odor	ML		4640
			0.6	50				4421
2.0			0.6	55	Clayey silt w/ sand, dark yellowish brown (10YR 4/4), dry, stiff, 50 % silt, 30 % clay, 20 % fine sand, low plasticity, no odor	ML		4683
			0.6	60				4526
3.0			0.6	50				4451
			0.6	30				4545
4.0			0.6	75	Silty sand, dark yellowish brown (10YR 4/6) dry, med. dense sand, 30 % silt, 70 % poorly graded sand (50 % coarse, 50 % fine), no odor	SM		4804
			0.6	90				4947
5.0			0.6	50	Refusal TD = 5.0' Groundwater not encountered			5144

5C_019

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 1	Location ID 19
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 9.5
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1-3/4"	Date/Time Drilling Started 12-7-10 1245	Date/Time Total Depth Reached 12-7-10 1305
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10025 (1255) 2-1/2gal bags, 1-4oz Jar	
Geologist C. Knight		Checked by/Date [signature] 4/25/11	
Radiological Background 65 cpm, 2344 cpm	Radiological Equipment Used Pancake, Downhole Gamma logger	PID Used mini RAE 2000 (Background = 0.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM) +0.5 2343
			0.3	40	Fill Surface: Soil		2883
0.5			0.3	90	Sandy Silt: Brown (10YR 5/3), ~~moist~~ dry, soft, no odor, 10% clay, 35% fine sand, 55% silt, low plasticity, cohesive, roots in upper surface, trace fine gravel and coarse sand, mottled texture in some zones	AF/ML	4043
1.0			0.3	75			4546
			0.3	50			4480
2.0			0.3	90			4496
			0.3	65	@ 2.8' granite gravel pieces		4522
3.0	Sample		0.3	80			4586
			0.3	50			4904
4.0			0.4	60	Fill Material:		5201
			0.3	66	Silty Sand: dark yellowish brown (10YR 4/4), moist, medium dense, no odor, 30% silt, 5% medium, 65% fine sand, trace coarse sand, trace decomposed rootlets	AF/SM	5092
5.0			0.3	80			5115
			0.3	70			5126
6.0			0.3	30			5015

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
65 cpm 2344 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	19

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.3	30	Same as above	AF/SM		5015
			0.3	50				4874
7.0			0.3	75	Fill Material: Poorly graded Sand: dk/lg ry, ish brown (2.5Y 4/2), moist, med dense, 10% silt, 90% fine sand, no odor, slight Fe staining.	AF/SP		4925
			0.3	80				4924
8.0			0.3	80				4948
			0.3	70				4863
9.0			0.3	55				4355
			0.3	75	recovered 9.5' in sample able to downhole to 9.0'			NM
10.0					No GW encountered			

5C_020

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, Group 1	Location ID 20
Drilling Company HGL	Driller I. Stone	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/26/10, 1050	Date/Time Total Depth Reached 10/26/10, 1100, 0.5 ft
Type of Sampling Device trowel / shovel		Samples Collected 10026, 1055, 1 4oz jar, 2 1/2 gal bags	
Geologist P. Sterchi		Checked by/Date 4/26/11	
Radiological Background 15 µR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.9 ppm)	

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	X	X	2.0 ppm	15 µR	~~Sandy silt~~ silty sand (SM), dark yellowish brown (10YR 3/6), dry, soft to medium stiff, ~~60~~ 50 % fine sands, 35 % silt, 15 % clay. ~~5 %~~ trace gravel fill rock fragments, trace rootlets	SM	
					TD = 0.5 ft		
					watertable not reached		

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c 1	Location ID 20
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 8.5 ft.
Drilling Equipment: Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/8/10 / 0850	Date/Time Total Depth Reached 12/8/10 / 0900
Type of Sampling Device: 1 3/4" macrocore acetate liner		Samples Collected 10027 - 0900 (2) 1/2 gal. bag / (1) 4oz. jar	
Geologist: Stephanie Lapeyre Montrose		Checked by/Date 5/27/11 TBW	
Radiological Background: 37 cpm / 2644 cpm	Radiological Equipment Used: Pancake / Downhole	PID Used: Mini RAE 2000 (background 0.0ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol
			0.0	60	ML, sandy SILT (brown 10YR 4/3)	ML
			0.0	70	10% clay, 20% fine grained sand, 70% silt	
1ft.			0.0	75	low plasticity, slow dilatancy, dry	SM
					SM silty SAND plant material top 2 inches (brown 10YR 4/3)	
			0.0	75	10% clay, 30% silt, 60% fine to coarse grained sand	
2ft.			0.0	100	SM silty SAND rapid dilatancy, very soft, dry	SM
			0.0	90	10% clay, 25% silt, 65% fine to medium grained sand, very soft, dry, rapid dilatancy, trace gravel	
3.ft			0.0	55		
3'6"	Sample		0.0	70	same as above - color change to brown 10YR 4/4	
4'			0.0	70		
4'6"			0.0	60	4'6" - 5' NO recovery	
5'		NR	0.0	65	SP SAND (light brown 10YR 5/3)	SP
					10% silt, 90% fine to medium grained sand	
			0.0	80	very soft, loose, dry, trace gravel	
5'10"					ML sandy SILT (dark brown 10YR 3/2)	ML
6			0.0	60	15% clay, 35% fine grained sand, 50% silt, low plasticity, slow dilatancy, 6'2" tar stained with tar + dirt size dry, soft trace gravel	
			0.0	60		
7'10"					SM silty SAND (dark brown 10YR 3/2)	SM
7'			0.0	45	15% clay, 60% fine grained sand, (color change at 7'4" dark brown 10YR 3/3)	
7'4"			0.0	75	25% silt, dry, low plasticity,	
			0.0	75	medium dilatancy, soft, trace gravel	
			0.0	70	same as above	
8'6"						
					TD = 8.5 ft. bgs (refusal at 8.5 ft bgs)	
					no groundwater encountered	

Borehole Gamma Readings 0-0.5ft = 2480

Inches	(CPM)
0.0	2,730
0.5ft.	4580
1.0	4999
1.5	5165
2.0	5323
2.5	5462
3.0	5182
3.5	5241
4.0	5320
4.5	5317
5.0	5365
5.5	5259
6.0	5139
6.5	5036
7.0	4878
7.5	4539
8.0	4582
8.5	4808

5C_021

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 1	Location ID 21
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10.0 ft. bgs
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/8/10 1048	Date/Time Total Depth Reached 12/8/10 1100
Type of Sampling Device 1 3/4" macrocore acetate liner		Samples Collected 10028 (2) 1/2 gal bags (1) 4oz. jar 1050	
Geologist Stephanie Lepeyre Montrose		Checked by/Date TBD 5/27/11	
Radiological Background 55 cpm # 2343 cpm	Radiological Equipment Used Pancake / Down-hole	PID Used Mini RAE 2000 (Background = 0.0 ppm)	

Depth ft. bgs	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 0 to 0.5 ft = 2296 (CPM)
			0.0	45	ML sandy SILT (brown 10YR 4/3) 10% clay, 20% fine grained sand, 70% silt	ML	0.0	= 2922
			0.0	65	(2) plant material (topsoil), low plasticity, slow dilatancy, dry, soft	CL	0.5	= 4004
					CL ~~clayey SAND~~ sandy CLAY with silt 35% clay, 25% silt, 40% fine grained sand (light brown 10YR 5/4) dry, rootlets, medium plasticity, slow dilatancy, firm		1.0	= 4461
1.0			0.0	50	CL sandy CLAY with silt 40% clay, 25% silt, 35% fine grained sand (brown 10YR 4/3)	CL	1.5	= 4560
1'3"			0.0	40	medium plasticity, slow dilatancy, dry, firm			
					Same as above (no roots)		2.0	= 4511
2.0			0.0	70		CL	2.5	= 4492
			0.0	50				
					Same as above		3.0	= 4369
3.0			0.0	70		CL	3.5	= 4545
			0.0	75				
					SM silty SAND 10% clay, 20% silt, 70% fine grained sand (brown 10YR 5/3) low plasticity, medium dilatancy, trace gravel, dry, soft	SM	4.0	= 4994
3'11" 4.0			0.0	40			4.5	= 5215
			0.0	60				
					SM silty SAND 10% clay, 15% silt, 75% fine grained sand (brown 10YR 4/3) low plasticity, medium dilatancy, trace gravel, dry, soft	SM	5.0	= 5154
5.0			0.0	40			5.5	= 5209
			0.0	80				

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
55 cpm / 2343 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	21

Depth (ft. bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.0	30	SM silty SAND 30% silt, 70% fine grained sand (brown 10YR 4/3) low plasticity, med. dilatancy, trace gravel, dry soft	SM	6.0 =	5314
			0.0	60			6.5 =	5078
7.0			0.0	85	SM silty SAND (brown 10YR 4/3) 10% clay, 20% silt, 70% fine to med. grained sand, low plasticity, med. dilatancy, trace gravel, dry, soft.	SM	7.0 =	5076
			0.0	50			7.5 =	5255
8.0			0.0	50	SM silty SAND (brown 10YR 4/3) 5% clay, 20% silt, 70% fine to med. grained sand, 5% gravel subangular, pieces of well indurated sand, soft, pieces of concrete debris (2 dime size pieces)	SM	8.0 =	5109
			0.0	60			8.5 =	5143
9.0			0.0	40	Same as above		9.0 =	5148
			0.0	90			9.5 =	5225
10.			0.0	40			10 =	5089

TD = 10 ft. bgs

No groundwater encountered

5C_022

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 1	Location ID 22
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/9/10 / 0840	Date/Time Total Depth Reached 12/8/10 / 0856
Type of Sampling Device 1 3/4" macrocore acetate liner		Samples Collected 10029 0850 (2) 1/2 gal bags / (1) 4oz jar	
Geologist Stephanie Lopeyn Montrose		Checked by/Date 5/27/11 TSW	
Radiological Background 47 cpm / 2377 cpm	Radiological Equipment Used Pancake / Down hole	PID Used mini RAE 2000	(Background = 0.0ppm)

Borehole Gamma Readings 0.0-0.5 = 2536 (CPM)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	60	ML Sandy SILT (brown 10YR 4/3) 10% clay, 20% fine grained sand, 70% silt, dry, plant material, low plasticity, soft.	ML	0.0	0.0 = 3262
			0.0	45			0.5	0.5 = 4311
7"-					7"-9": SW SAND 50% (brown 10YR 4/3)	SW		
9"- 1.0			0.0	60	10% silt, 70% fine to coarse grained sand, 10% gravel SM Sub angular, loose, dry (brown 10YR 4/3)	SM	1.0	1.0 = 4936
			0.0	80	silty SAND with clay 15% clay, 25% silt, 60% fine grained sand, low plasticity, dry, soft		1.5	1.5 = 5238
2.0			0.0	70		CL	2.0	2.0 = 4996
2'2"					CL sandy CLAY (2'-2'2") (brown 10YR 4/2)	SP		
	Sample		0.0	45	35% clay 20% silt, 45% fine grained sand med. plasticity, firm, dry		2.5	2.5 = 5194
					SP ~~silty~~ SAND (2'2"-3'3") (brown 10YR 3/2) 20% silt, 80% fine to coarse grained sand non plastic, loose, soft	SP		
3.0			0.0	55			3.0	3.0 = 5334
3'3"					SM silty SAND (3'3"-3'11") (brown 10YR 3/3)	SM		
			0.0	60	15% clay, 50% fine grained sand, 35% silt, trace gravel subangular non plastic, loose, soft		3.5	3.5 = 5306
3'11"					ML Sandy SILT (3'11"-4'9")	ML		
4.0			0.0	75	10% clay, 40% fine grained sand, 50% silt low plasticity, dry, very soft		4.0	4.0 = 5130
			0.0	40			4.5	4.5 = 4701
4'9"-					4'9" - 5' NO Recovery			
5.0		NR	0.0	35	SM Silty SAND (brown 10YR 4/4) 10% clay, 15% silt, 75% fine to med. grained sand low plasticity, dry, soft	SM	5.0	5.0 = 4747
			0.0	30			5.5	5.5 = 4704
5'11"					ML sandy SILT (brown 10YR 3/3) 15% clay 50% silt, 35% fine grained sand low plasticity, dry, ~~soft~~ very soft			

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
47 cpm / 2377 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	22

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.0	75	Same as above	ML	6.0	4775
6'4"			0.0	50	ML clayey SILT (6'4"-8'11") (brown 10YR 4/3) 35% clay, 45% silt with sand, 20% fine grained sand @ 35%		6.5	4834
7.0			0.0	65	med-plasticity, firm, dry		7.0	4607
			0.0	85			7.5	4653
8.0			0.0	50	Same as above		8.0	4673
8'11"			0.0	25	ML sandy SILT (8'11"-9'8") (brown 10YR 4/3) 20% clay, 45% silt, 35% fine grained sand, trace gravel @	ML	8.5	4596
9.0			0.0	40	low plasticity, soft, dry, plant debris subangular		9.0	4685
9'8"			0.0	55	SM silty SAND (9'8"-10') (brown 10YR 4/3) 10% clay, 25% silt, 40% fine to coarse grained sand, trace gravel @ subangular	SM	9.5	4845
10.			0.0	50	non plastic, soft, loose, dry		10	—
			@		TD = 10 ft bgs NO groundwater encountered			

5C_023

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 1	Location ID: 23
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 2/4/11		Date/Time Total Depth Reached: 2/4/11
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.)		1030 (NO SAMPLE)
Geologist: Cliff Knight		Checked By / Date:		TSW 11/14/11
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			N	A	Storm drain did not have sufficient material to collect a sample		1	No down hole Gamma logging Collected
1.0								
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_024

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C, Grid 2	24
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	J. Stone	NA	0.5 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	NA	10/26/10, 8:35	10/26/10, 8:45, 0.5 ft
Type of Sampling Device		**Samples Collected**	
trowel / shovel		10031 / 8:40 / 1 4oz. jar, 2 1/2 gal bags	
Geologist		**Checked by/Date**	
S. Stroh		[signature] 4/25/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
15 MR	µR meter	Mini Rae 2000 (Background = 1.1 ppm)	

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5			1.2 ppm	14 MR	silt with sand (SM), dark yellowish brown (10 YR 3/4), dry, medium stiff, 80% silt, 10% clay, 10% fine sand, some gravel fill rock fragments, trace rootlets	SM		
					TD = 0.5 ft			
					Ground water not reached			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5c , 1	24
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	–	10.0'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
6600 (2) Geoprobe	1 3/4"	12/06/10, 1010	12/06/10, 1015
Type of Sampling Device		**Samples Collected**	
1 3/4" macro core		10032, 1020	(2) 1/2 gal bags; (1) 4 oz. jar
Geologist		**Checked by/Date**	
P. Secrain			4/26/11

Radiological Background	Radiological Equipment Used	PID Used
40 cpm, 2432 cpm	Pancake, downhole & scanner	MiniRAE 2000 (Background = 0.4 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 = 2444 (CPM)
			0.4	70	Sandy silt, dark yellowish brown (10YR 4/4), moist, soft, 40% fine sand, 60% silt, common rootlets, no odor.	ML		2683
			0.4	75				4120
1.0			0.4	100				4681
			0.4	60	Silty sand, brownish yellow (10YR 6/6), dry, loose sand, 40% silt, 60% sand poorly graded (70% fine, 30% med.), no odor.	SM		4856
2.0			0.4	30				4925
			0.4	40	clayey silt, dark yellowish brown (10YR 3/4), dry, med. stiff, 10% fine sand, 60% silt, 30% clay, no odor, low plasticity	ML		4883
3.0			0.4	65				4809
			0.4	30	silty sand w/ clay, brown (10YR 4/3), dry med. stiff, 50% poorly graded sand (80% fine, 20% med.), 35% silt, 15% clay, no odor	SM		4962
4.0			0.4	80				4814
			0.4	45				4825
5.0			0.4	70				4669
			0.4	70	silty sand, yellow (10YR 7/6), dry, very loose, 55% poorly graded sand (90% fine, 10% med.), 45% silt, no odor	SM		4489
6.0			1.0	75				4278

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
40 cpm, 2432 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	24

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			1.0	75	same as above	SM		4278
			1.2	70				4331
7.0			0.7	60				4448
			0.7	75				4531
8.0			0.6	45	sandy ~~silt~~ silt, yellowish brown (10YR 5/6)	ML		4725
			0.7	70	dry, soft, 45% fine sand, 55% silt, no odor			4695
9.0			0.8	55				4770
			0.7	45				4866
10.0			0.7	30				4805
					TD = 10.0 ft			
					Groundwater not encountered			

5C_025

HGL HydroGeoLogic, Inc

BORING LOG

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C, 1	25
Drilling Company: Bort Longyear	Driller: D. Hansen	Ground Elevation: —	Total Drilled Depth: 10.0 ft
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4"	Date/Time Drilling Started: 12/06/10, 1305	Date/Time Total Depth Reached: 12/06/10, 1415
Type of Sampling Device: 1 3/4" macrocore		Samples Collected: 10033, 1310	2-1/2 gal bags, 1-4 oz jar
Geologist: P. Skeath		Checked by/Date: [signature] 4/26/11	
Radiological Background: 40 cpm, 2559 cpm	Radiological Equipment Used: pancake, Bismuth X scanner	PID Used: Mini RAE 2000	(Background = 0.6 ppm)

Depth (ft)	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM)
					0.5 2495
0	0.6	60	sandy silt, dark yellowish brown (10YR 4/4) moist, soft, 35% fine sand, ~~70~~ 65% silt; common rootlets, no odor.	ML	3213
	0.6	85			4270
1.0	0.6	80	silt w/ sand, dark yellowish brown (10YR 4/4) dry, med. stiff, ~~70~~ 80% silt, 20% fine sand, few rootlets, no odor.	ML	4601
	0.6	50			4572
2.0	0.6	55	clayey silt, dark yellowish brown (10YR 3/4) dry, med. stiff, 10% fine sand, 55% silt, 35% clay, no odor, low plasticity	ML	4621
	0.6	60			4533
3.0	0.7	30			4436
	0.7	35			4491
4.0	0.6	40	poorly graded sand w/ silt, dark yellowish brown (10YR 4/6), moist, med. dense sand, ~~80~~ 65% sand (70% fine, 30% med.), ~~20~~ 15% silt, 20% gravel fill, no odor	SP	4654
	0.6	90			4636
5.0	0.6	60			5053
	0.6	40			5076
6.0	0.6	65			5126

Sample (interval marked approx. 1.0–5.0 ft)

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
40 cpm, 2554 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	25

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.6	65	same as above	SP		5126
			0.6	65				5097
7.0			0.6	90				5128
			0.6	70				5118.5 (D)
8.0			0.7	70				5041
			0.7	85	poorly graded sand w/ silt, dark yellowish brown (10YR 4/6), moist, ~~dense~~ med. dense sand, 90 % sand (30% coarse, 70% fine) 10 % silts, no odor (P5)			5091
9.0			0.7	70				4795
			0.7	45				5183
10.0			0.7	50	~~Refusal~~ (P2)			5175
					TD = 10.0 ft Groundwater not encountered Fill to 10.0 ft			

5C_026

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 1	Location ID #26, 10034
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-25-10/1440	Date/Time Total Depth Reached 10-25-10 / 1457
Type of Sampling Device trowel / shovel		Samples Collected ID 10034 1445 2 - 1/2 gallon bags, 1 4-oz jar	
Geologist C. Carmichael		Checked by/Date TJW 10/29/10	
Radiological Background (PID) 1.0, 14 (microR)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	0.5		0.9	15	Silty sand (10YR, 3/6) reddish-brown, 60% sand (medium-grained, subrounded), ~~25~~ 25% silt, 15% rock fragments - subrounded quartzite, sandstone and fill rocks, dry, dense, slow dilatency, low plasticity.	SM		

No groundwater encountered.

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC / 1	Location ID 26
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth ~~10.0~~ 9.5' CK
Drilling Equipment 6600 Creeprake	Borehole Diameter 13/4"	Date/Time Drilling Started 12/7/10 0815	Date/Time Total Depth Reached 12/7/10 0830
Type of Sampling Device 13/4" Macrocore		Samples Collected 10035 (0825)	2-1/2 gallbags, 1-4oz Jar
Geologist C. Knight		Checked by/Date	4/25/11
Radiological Background 4 'cpm, 2724cpm	Radiological Equipment Used Pancake / Downhole logger	PID Used mini RAE 2000	(Background = 0.1 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.2	60	surface: grass		10.5	2565
0.5			0.2	70	Artificial Fill Poorly graded Sand w/ Silt: Brown (10YR 5/3), moist, medium dense, no odor, 15% silt, 5% coarse, 20% medium, 60% fine sand, trace fine sand/fine gravel, hydroseed mat at 4" bgs, semi mottled texture	SP		28e7
1.0			0.2	65				4712
			0.2	70				5414
2.0			0.2	50				5584
			0.1	60				5634
3.0	Sample		0.2	60	Sandy Silt: clay yellowish brown (10YR 4/4), moist, medium stiff, no odor, 30% fine sand, 70% silt, low plasticity, minor Fe staining	ML		5531
			0.2	60				5378
4.0			0.2	70				5425
			0.2	65				5337
5.0			0.2	60				5242
			0.1	75				5090
6.0			0.2	65	contact 6.0'			5048
								5103

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
41 cpm, 2724	SSFL Area IV Radiological Study	EP9038.01.22.04.03	26

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.2	65	Silty Sand : dark yellowish brown (10YR 4/6), moist, medium dense, no odor, 30% silt, 10% medium, 60% fine sand, mottled	SM		5103
			0.2	80				5148
7.0			0.2	80	Same as above : dark grayish brown (2.5Y 4/2), mottled	SM		5021
			0.2	85				4979
8.0			0.2	65				5052
			0.2	90	Poorly graded Sand w/ Silt : yellowish brown (10YR 5/4) moist, medium dense, no odor, 25% silt, 5% medium, 70% fine sand, trace Fe staining, semi mottled texture to total depth	SP		4993
9.0			0.2	50				4710
			0.2	70				4841
10.0			0.2	50	End boring at ~~10.0~~ 9.5' bgs			NM

No GW encountered

5C_027

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5c / 1	Location ID #27, 10036
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-25-10 / 1500	Date/Time Total Depth Reached 10-25-10 / 1515
Type of Sampling Device trowel / shovel		Samples Collected ID 10036 2 ½-gallon bags, 1 4-oz	
Geologist C. Carmichael		Checked by/Date DW 10/29/10	
Radiological Background (PID) 0.9, 14 (micro R)	Radiological Equipment Used uR meter	PID Used Mini Rae 2000	(Background = 0.9 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
					Sand with silt			
0.5	0.5' sample	0.5'	1.1	14	~~Silty Sand~~ SP (10 YR, 3/6), brown, 65% medium-grained sand, 20% silt, 15% subrounded rock fragments - granite, sandstone fill rocks/gravel, medium dense, moist. SM	SP SM		

TD = 0.5'
No Groundwater encountered

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 1	Location ID 27
Drilling Company Bart Longyear	Driller D. Hansen	Ground Elevation –	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12-7-10 0950	Date/Time Total Depth Reached 12-7-10 1005
Type of Sampling Device 4 1/3" Macrocore		Samples Collected 100 37 (1000) 2-1/2 gal bags, 1-4oz Jar	
Geologist C. Knight		Checked by/Date [signature] 4/25/11	
Radiological Background 90 cpm, 2571 cpm	Radiological Equipment Used Pancake, downhole logger	PID Used mini RAE 2000	(Background = 0.1 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.3	50	surface: soil			
0.5			0.3	50	Artificial Fill: Poorly graded sand w/silt; Yellowish brown (10YR5/4), moist, medium dense, no odor, 15% silt, 10% medium sand, 75% fine sand, subrounded grains, mottled concrete pieces upper 6"	AF/SP	CK	4493
1.0			0.3	90			CK	5317
			0.3	60			CK	5567
2.0			0.2	40			CK	5608
			0.3	40	At 3.0' same as above staining color Dark bluish gray (5GY 4/1)		CK	5450
3.0			0.4	60			CK	5418
					Silty Sand: Very dark gray (10YR 3/1), moist, medium dense, no odor, 30% silt 70% fine sand, non cohesive, rapid to slow dilatancy, trace rootlets	AF/SM	CK	5291
4.0			0.5	80			CK	5549
			0.5	60			CK	5445
5.0			0.4	50			CK	5047
			0.4	50			CK	5024
6.0			0.4	70				5047

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
90 cpm, 2571 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	27

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.4	70				5049
			0.4	50	@ 6.5' 40% silt, cohesive, 10% coarse, 10% medium, 40% fine sand, mottled	AF/SM		4940
7.0			0.4	55				4817
			0.4	70				4890
			0.4	70	Poorly graded Sand: Brown (10YR 5/3), moist, medium dense, no odor, 10% silt, 90% fine sand, trace Fe staining, slightly mottled	SP		5014
8.0			0.4	70				
			0.4	80				4735
9.0			0.4	90				4595
			0.4	95				4361
10.0			0.4	90	End boring at 10.0'			NM
					No GW encountered			

5C_028

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BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C , 1	28
Drilling Company	Driller	Ground Elevation	Total Drilled Depth
Bort Longyear	D. Hansen	—	7.0'
Drilling Equipment	Borehole Diameter	Date/Time Drilling Started	Date/Time Total Depth Reached
Geoprobe	1 3/4"	12/06/10 , 0840	12/06/10 , 0845
Type of Sampling Device		Samples Collected	
1 3/4" macro core		10038 , 0850 (2) 1/2 gal bags ; (1) 4oz jar	
Geologist		Checked by/Date	
P. Stcath		[signature] 4/25/11	
Radiological Background	Radiological Equipment Used	PID Used	
45 cpm , 2638 cpm	pancake , 2x2 NaI scanner	Mini RAE 2000 (Background = 0.0 ppm)	

Depth (ft)	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM) @ 0.5 = 2338
	0	40	Silt w/ sand, brown (10YR 4/3), moist, stiff, 75% silt, 25% fine sands, common rootlets, no odor	ML	2888
	0	40			4088
1.0	0	60	Silt, yellowish brown (10YR 5/4), dry, med. stiff, 85% silt, 15% fine sands, no odor	ML	4562
	0	70			4598
2.0	0	60	Clayey silt, dark yellowish brown (10YR 4/4), dry, med. stiff, 55% silt, 35% clay, 10% fine sands, no odor, low plasticity	ML	4551
	0	55			4327
3.0	0	65			4368
	0	75			4602
4.0	0	75 / 100 ⓢ	Silty sand w/ clay, dark yellowish brown (10YR 3/6), dry, med. dense sand. 50% fine sands, 30% silt, 20% clay, no odor	SM	4890
	0	100 / 70 ⓢ			5083
5.0	0	70 / 55 ⓢ			5062
	0	55 / 30 ⓢ			5253
6.0	0.2	30 / 45 ⓢ			5115

Interval: 3.0 samples

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
45 cpm, 263 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	28

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.2	30	same as above	SM		5115
			0.1	45				5229
7.0			0.1	50	Refusal			5276
					TD: 7.0'			
					Groundwater not encountered			
					Fill/disturbed to 7'			

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_029

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 2	Location ID: 29
ing Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 2/4/11		Date/Time Total Depth Reached: 2/4/11
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.)		10039 (NO SAMPLE)
Geologist: Cliff Knight		Checked By / Date: TBW		11/14/11
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			N	A	Storm drain did not have sufficient material to collect a sample			No down hole Gamma logging Collected
1.0							1	
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_030

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 2	Location ID 30
Drilling Company: Bort Longyear	Driller: D. Hansen	Ground Elevation: —	Total Drilled Depth: 10.0
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4"	Date/Time Drilling Started: 12-3-10 0925	Date/Time Total Depth Reached: 12-3-10 1100
Type of Sampling Device: 1 3/4" Macrocore		Samples Collected: 10040 (0930)	2 - 1/2 gal bags
Geologist: C. Knight		Checked by/Date: 5/19/11	
Radiological Background: 50 cpm / 24 Rcpm	Radiological Equipment Used: pancake / borehole logger	PID Used: mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 2187 (CPM) 3601
			0.0	46	Surface 3" Asphalt	AC	
0.5			0.0	55	Fill: Silty Sand: dark yellowish brown (10YR 4/4), moist, medium dense, no odor, 30% silt, 10% medium sand, 60% fine sand	SM	5163
1.0			0.0	62	same as above: Yellowish brown (10YR 5/4) 10% fine to coarse subrounded gravel, 10% coarse sand, 15% medium sand, 35% fine sand, 30% silt, mottled, trace Fe staining		5574
			0.0	55			5559
2.0			0.0	45			5624
			0.0	55			5364
3.0	Sample		0.0	70		SP/SM	5253
			0.0	65	- coarse gravel sandstone (Gley 1 greenish gray (10GY 6/1)) @ 3.5' bgs		5035
4.0			0.0	70			5121
			0.0	65	Silt: dark yellowish brown (10YR 3/4), moist, med. stiff, no odor, 10% fine sand, 5% coarse sand, 85% silt, non cohesive, no plasticity	ML	5215
5.0			0.0	60			5063
			0.0	45			5182
6.0			0.0	45			5124

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
Depth 7.4/13 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	30

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.0	45	Sandy Silt : dark yellowish brown (10YR 3/4), moist, medium stiff, no odor, 25% fine sand, 75% silt	ML		5124
			0.0	55				5066
7.0			0.0	45	Poorly graded Sand w/ silt : dark yellowish brown (10YR 4/4), moist, med. dense, no odor, 25% silt, 75% fine sand, trace med. sand, abundant Fe staining	SP		5227
			0.0	70				5128
8.0			0.0	65				5232
			0.0	70				5378
9.0			0.0	75	Same as above : all fine sand greenish gray (5GY 5/1), moist, med-dense, no odor, some Fe staining. Soil appeared stained.	SP		5193
			0.0	55				5161
10.0			0.0	45	End boring @ 10.0' bgs No GW encountered			NM

5C_031

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 2	Location ID 31
Drilling Company Bort Longyear	Driller Dr. Hansen	Ground Elevation —	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12-3-10 / 1120	Date/Time Total Depth Reached 12-3-10 / 1200
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10041 (1130)	2 - 1/2 gal bags
Geologist C. Knight		Checked by/Date [signature] 4/25/11	
Radiological Background 52cpm / 2248cpm	Radiological Equipment Used Duncle / Downhole logger	PID Used Mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	80	3" Asphalt : surface Fill:		0:5	2154 3376
0.5			0.0	50	Silty Sand : dark yellowish brown (10YR 4/6), moist, med. dense, no odor, 30% silt, 5% fine angular gravel, 15% medium sand, 10% coarse sand, 40% fine sand, mottled texture	SM		5191
1.0			0.0	90				5543
			0.0	60				5574
2.0			0.0	40				5540
			0.0	65				5578
3.0			0.0	40				5371
			0.0	65	Sandy silt : dark brown (10YR 3/3), moist, med. stiff, no odor, 25% fine sand, 10% medium sand, 5% clay, 60% silt, non cohesive, non plastic	ML		5112
4.0			0.0	75				5130
			0.0	70				5078
5.0			0.0	80				5057
			0.0	55				5036
6.0			0.0	75				5136

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
52 cpm / 224 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	31

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.0	75	Same as above	ML		5136
			0.0	90				5172
7.0			0.0	100				5121
			0.0	75				5118
8.0			0.0	50				5190
			0.0	45				5276
9.0			0.0	70	Poorly graded Sand w/ silt: dark grayish brown (2.5Y 4/2), moist, medium dense, no odor, 25% silt, 10% clay, 10% medium sand, 5% coarse sand, 50% fine sand	SP		5243
			0.0	50				5200
10.0			0.0	25				4842
					Total depth 10.0' End boring			
					NO GW encountered			

5C_032

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 2	Location ID # 32, 10042
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-25-10 / 1337	Date/Time Total Depth Reached 10-25-10 / 1358
Type of Sampling Device trowel / shovel		Samples Collected ID 10042 1348: 2 1/2 gall bags, 1 4-oz jar	
Geologist C. Carmichael		Checked by/Date TBW 10/29/10	
Radiological Background (PID) 0.4, 13 (micro R)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (background = 0.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	Borehole Gamma Readings (CPM)
0.5'	1 sample		0.6	14	Silty sand (10 YR, 4/4), brown, 50% medium-grained, subrounded sand, 50% silt, trace rootlets, trace rock fragments - sandstone and asphalt (subrounded), moist, loose, slow dilatency.	SM		

No groundwater encountered.

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 2	Location ID 32
Drilling Company: Bort Longyear	Driller: Dr Hansen	Ground Elevation: -	Total Drilled Depth: 5.0
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4"	Date/Time Drilling Started: 12-3-10 / 1350	Date/Time Total Depth Reached: 12-3-10 / 1415
Type of Sampling Device: 1 3/4" Macrocore		Samples Collected: 10043 (1410) 2 - 1/2 gal bags	
Geologist: C. Knight		Checked by/Date: 4/25/11	

Radiological Background: 57cpm, 2655cpm
Radiological Equipment Used: Pancake / borehole logger
PID Used: Mini RAE 2000 (Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 2702 (CPM)
			0.0	75	Fill surface soil	Af/ML	2866
0.5			0.0	85	Sandy silt: yellowish brown (10YR 5/4), moist, soft, no odor, 5% coarse, 10% medium, 20% fine sand, 65% silt, trace rootlets, non cohesive, low plasticity		4255
1.0			0.0	57	Silt w/ sand: Yellowish brown (10YR 5/4) moist, med dense, no odor, 5% coarse, 10% medium, 10% fine sand, 65% silt, 10% clay, cohesive, low plasticity		5091
			0.0	45			5313
2.0			0.0	100	Weathered sandstone and siltstone bedrock: Chatsworth Formation: very pale brown (10YR 7/4), dry, dense, no odor, fine sand w/ 20% silt	Kcs	5544
			0.0	90			5629
3.0			0.0	80			5577
			0.0	45			5801
4.0			0.0	65			5709
			0.0	100			5923
5.0			0.0	90	very fine poorly graded sandstone, very weathered. TD = 5' bgs (refusal) ND GW encountered		NM
6.0							

5C_033

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, Group 2	Location ID 33
Drilling Company HGL	Driller F. Stone	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/26/10, 1300	Date/Time Total Depth Reached 10/26/10, 1315, 0.5 ft
Type of Sampling Device trowel / shovel		Samples Collected 10044, 1305, 2X 1/2 gal bag	
Geologist P. Stean		Checked by/Date 4/25/11	
Radiological Background 17 µR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.6 ppm)	

Depth (ft)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	X	X	1.6 ppm	16 µR	poorly graded sand (SP) with ..., dark yellowish brown (10YR 4/6), dry, loose sand, (SP) 75% medium to fine sand, 15% silt, 10% clay, trace gravel sandstone, rootless, common mottling.	SP		

TD = 0.5 ft

water table not reached

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 12	Location ID 33
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 2.5'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12-3-10 / 1520	Date/Time Total Depth Reached 12-3-10 / 1540
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10045 (1525) 2-1/2 gal bags	
Geologist C. Knight		Checked by/Date [signature] 5/19/11	
Radiological Background 48cpm, 3039	Radiological Equipment Used pancake / downhole gamma logger	PID Used mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings +0.5 - 2800 (CPM)
0.0		0.0	0.0	50	Surface: soil Silty Sand: Yellowish brown (10YR 5/4), dry, soft, no odor, 35% silt, 5% coarse, 20% medium, 40% fine sand, trace rootlets	SM	3201
0.5		0.0	0.0	65	Poorly graded sand / weathered Sandstone: brownish yellow (10YR 6/6), dry, dense, no odor, 10% medium sand, 10% silt, 80% fine sand, some Fe staining	SP	5198
1.0		0.0	0.0	65			6212
		0.0	0.0	80	-siltstone beds ~2" thick		6258
2.0	Sample	0.0	0.0	80			6053
		0.0	0.0	75	-Claystone bed: light greenish gray (Gley1 7/5GY), very hard, no odor, dry, thinly laminated refusal @ 2.5' bgs		6420
3.0		0.0			No GW encountered		
4.0							
5.0							
6.0							

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_034
Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 2	Location ID: 34
ng Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 2/4/11		Date/Time Total Depth Reached: 2/4/11
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10046 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: TBJ 11/14/11		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			N	A	Storm drain did not have sufficient material volume to collect a sample		1	No down hole Gamma logging Collected
1.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_035

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 2	Location ID: 35
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 2/4/11		Date/Time Total Depth Reached: 2/4/11
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.)		10047 (NO SAMPLE)
Geologist: Cliff Knight		Checked By / Date:		RGW 11/14/11
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			NA		Storm drain did not have sufficient material volume to collect a sample			No down hole Gamma logging Collected
1.0							1	
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_036

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C/2	Location ID 36
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 1/4/11 / 1014	Date/Time Total Depth Reached 1/4/11 / 1019
Type of Sampling Device trowel / shovel		Samples Collected 2 1/2 gall bags (~~#~~10048) (1018)	
Geologist C. Carmichael		Checked by/Date [signature] 4/25/11	
Radiological Background (PID) 0.1, 12 (microR)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.1 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'			0.1	12	Top 3" is asphalt. Sandy silt with clay, (10 YR, 4/4), brown, 65% silt, 25% fine grained, subrounded sand, 10% clay; soft, moist, trace sandstone fragments, no odor. No groundwater encountered.	ML		

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 2 5C	Location ID 36
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 6'
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12-2-10/1515	Date/Time Total Depth Reached 12-2-10/1521
Type of Sampling Device 1 3/4" macrocore		Samples Collected 2 1/2 gall bags, #10049 (1520)	
Geologist C. Carmichael		Checked by/Date [signature] 4/25/11	
Radiological Background 2499, 66 cpm	Radiological Equipment Used pancake meter, downhole scanner	PID Used mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	45	Asphalt - 3"			0.5 – 2394
			0.0	60	Silty sand, (10YR, 5/6), light reddish-brown, 60% fine grained, subrounded, poorly graded sand, 40% silt, no plasticity or toughness, loose, dry, no odor.	SM		0 – 2746
1'			0.0	65				4518
			0.0	40	.....			5034
					Same as above, except spreckles of light colored sand concretions (~1mm diameter)	SM		5037
2'			0.0	80				4979
			0.0	55				4970
3'			0.0	50				4832
			0.0	35				4913
4'			0.0	60	.....			4745
			0.0	55	Sand with silt (10YR, 6/4), beige, 75% fine to medium grained sand, 25% silt, iron-oxide tinting mottled throughout, loose, moist, no odor.			4744
5'			0.0	60				5023
			0.0	55				5089
6'			0.0	45				5415

Refusal hit at 6' bgs.
No groundwater encountered.

5C_037

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 2 5C	Location ID 37
Drilling Company: Bort Longyear	Driller: D. Hansen	Ground Elevation: —	Total Drilled Depth: 4.5'
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1 3/4"	Date/Time Drilling Started: ~~12-2-10~~ 12-2-10/0830	Date/Time Total Depth Reached: 12-2-10/0858
Type of Sampling Device: 1 3/4" macrocore		Samples Collected: 2 1/2 gall bags, #10050 (0845)	
Geologist: C. Carmichael		Checked by/Date: [signature] 4/25/11	
Radiological Background: 2121, 48 cpm	Radiological Equipment Used: pancake, downhole scanner	PID Used: mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	45	Asphalt – surficial 3"			0.5 - 2154
			0.0	55	Gravel with fines, (10YR, 4/2), 80% subrounded pea gravel (granite/asphalt), 15% medium grained sand, 5% silt, no plasticity or toughness, moist, very loose.	GM		0 - 3020
			0.0	55	Clayey silt, (10YR, 3/2), dark brown, 60% silt, 40% clay, trace fine sand, low toughness, low dry strength, low plasticity, dry, no odor.	ML		4329
1'			0.0	55				5220
			0.0	85	Same as above, except dry and beige in color (10YR, 5/3) with tinting of iron-oxide in the silt, no odor.			5820
2'			0.0	55				6258
			0.0	70				6552
3'			0.0	95	Siltstone (weathered) from Chatsworth Fm (Kcs), (10YR, 7/4), beige, 65% siltstone, 20% silt, 15% clay, laminae throughout, low plasticity and toughness, dry, no odor.			6435
			0.0	80				6314
4'			0.0	70				5886
			0.0	–	Same as above, except weathered sandstone from Chatsworth Fm, 90% fine grained sand, 10% silt, no odor.			–
5'					Refusal reached at 4.5'. No groundwater encountered.			
6'								

5C_038

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 2	Location ID #38, 10051
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-25-10 / 1402	Date/Time Total Depth Reached 10-25-10 / 1420
Type of Sampling Device trowel / shovel		Samples Collected ID 10051 1410 2 - 1/2 gallon bags	
Geologist C. Carmichael		Checked by/Date TGW 10/29/10	
Radiological Background (PID) 0.8, 14 (microR)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.8ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'	1 Sample		0.8	14	Silty sand (10YR, 4/4), brown, 80% medium grained, subangular sand, ~~30~~ 20% silt, moist, loose, fast-medium dilatency, large subrounded cobbles of sandstone in location; Sand is poorly graded.	SM		

No groundwater encountered.

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, group 2	Location ID 38
Drilling Company HGL	Driller H. Thompson	Ground Elevation NA	Total Drilled Depth 5'5"
Drilling Equipment hand auger/ trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 1-5-11 / 0845	Date/Time Total Depth Reached 1-5-11 / 0914
Type of Sampling Device trowel / shovel / hand auger		Samples Collected 2 1/2 gall bags (#10052) (0945)	
Geologist C. Carmichael		Checked by/Date 5/19/11	
Radiological Background (PID) 0.0, 12 (micro R)	Radiological Equipment Used @ 4R meter, ~~4 Radeye~~ Downhole meter	PID Used Mini Rae 2000 (Background=0.0 ppm)	

Downhole 2907

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
							0.5	2907
							0	3351
			0.0	50/45	Sand with silt, (10YR, 4/4), brown, 80% fine to medium grained subangular sand, 20% silt, some rootlets, trace rock fragments (sandstone) - subrounded, no odor.	SM Silt @		3864
1'			0.0	70				4877
			0.0	70				4946
2'			0.0	40				5001
			0.1	60				5174
3'			0.1	60				5150
			0.1	60	Same as above except beige in color (10YR, 6/4) and 80% sand, 10% silt, 10% subrounded sandstone rock fragments.			5049
4'			0.0	50	Same as above, except brown (10YR, 4/4)			5039
			0.0	95				4969
5'			0.0	85				4987
			0.0	50				4940
6'					TD = 5'5" No groundwater encountered. @			

5C_039

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C/2	Location ID 39
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 1/4/11 / 0948	Date/Time Total Depth Reached 1/4/11 / 0955
Type of Sampling Device trowel / shovel		Samples Collected 2 1/2 gall bags (#10053)(0955)	
Geologist C. Carmichael		Checked by/Date [signature] 4/25/11	
Radiological Background (PID) 0.1, 12 (micro R)	Radiological Equipment Used ud R meter	PID Used Mini Rae 2000 (Background = 0.1 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'			0.0	13	Top 3" is asphalt. Sandy silt with clay, (10 YR, 4/4), brown, 60% silt, 25% f the grained subrounded sand, 15% clay, soft, trace sandstone clasts/fragments, dry, no odor. No groundwater encountered.	ML		

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name	Project Number	Subarea ID & Group 2	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C	39
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	—	~~5.5'~~ 5'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	12-2-10 / 1400	12-2-10 / 1410
Type of Sampling Device		**Samples Collected**	
1 3/4" macrocore		2 1/2 gall bags, #10054 (1410)	
Geologist		**Checked by/Date**	
C. Carmichael		[signature] 4/25/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
2067, 46 cpm	pancake meter, downhole scanner	mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.0	55	Asphalt - surficial 4"		0.5	2200
			0.0	90	Silty sand with gravel, (10YR, 5/4), light reddish-brown, 70% fine grained sand, 20% silt, 10% subrounded pea gravel (asphalt), dry, loose, no toughness or plasticity, no odor.	SM		4614
1'			0.0	80				4974
			0.0	65	Silty sand, same as above, except 65% fine to medium grained subrounded sand, 35% silt, and no gravel.	SM		5318
2'			0.0	45				5377
			0.0	90				5328
					Sand with silt (10 YR, 6/6), light reddish-brown, 75% fine sand, 25% silt, loose, dry, no toughness or plasticity, no odor.	SM		
3'			0.0	65				5104
					Silty sand, same as 2nd layer, except with iron-oxide mottled texture.	SM		
			0.0	70				5119
					Sand, (10YR, 6/4), beige, 95% fine to medium grained, subrounded, well-graded sand, <5% silt, no bedding (probable weathered Chatsworth Fm), no plasticity or toughness, slight iron-oxide tinting in silt, no odor, loose, dry.	SW		
4'			0.0	45				5254
			0.0	65				5149
5'			0.0	45				
					Refusal reached at 5.0'. No groundwater encountered.			
6'								

0 — 3009

5C_040

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C	40
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	—	10'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	12-2-10/1026	12-2-10/1050
Type of Sampling Device		**Samples Collected**	
1 3/4" macrocore		2 1/2 gall bags, #10055 (1045), DUP's: 10239 MS, 10228 FD, 10218 LD	
Geologist		**Checked by/Date**	
C. Carmichael		[signature] / 4/25/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
2591, 43cpm	Pancake meter, downhole scanner	mini RAE 2000 (0.0)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	55	Asphalt – surficial 3"			0.5 – 2271
			0.0	75	Sandy silt, (10YR, 4/4), dark reddish-brown, 55% silt, 45% fine, subrounded, poorly graded sand, ~~loose~~ medium dense, no toughness, very low plasticity, no odor.	SM ML		3181
1'			0.0	85				4248
			0.0	65				4841
2'			0.0	55				5034
			0.0	30				4983
3'			0.0	50				4913
			0.0	80	Same as above except light reddish-brown in color			5052
4'			0.0	50				5013
			0.0	55				4765
5'			0.0	80	Gradational Contact			4692
			0.0	65	Silty sand, (10YR, 4/4), reddish-brown, 60% fine-grained, subrounded sand, 40% silt, moist, medium dense, no toughness or plasticity, no odor.	SM		4746
6'			0.0	70				5151
								5036

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2591, 43 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	40

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	40	Same as above, except 75% fine to medium grained, well ~~gr~~ graded, sand, 25% silt.	SM	5119	
7'			0.0	90				5088
			0.0	110				4812
8'			0.0	90				5024
			0.0	110				4910
9'			0.0	60				5005
			0.0	40				4505
10'			0.0	25	Same as above, except 60% fine to medium-grained sand, 30% silt, 10% clay, and soil is dense.	SM		
					Goal depth of 10' reached. No groundwater encountered.			

5C_041

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID/Group SC/2	Location ID #41, 10056
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10-25-10/0948	Date/Time Total Depth Reached 10-25-10/0959
Type of Sampling Device trowel/shovel		Samples Collected ID 10056 0950 2 1/2 gall bags	10234 (MS) (0950) 10223 (FD) (no time) ~~10213 (lab dup)~~ (0950)
Geologist C. Carmichael		Checked by/Date TRW 10/29/10	
Radiological Background (PID) 0.7, 13 (micro)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.7 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5'	1 Sample SM		0.7	14	Sand with silt ~~Silty Sand~~ (10 YR, 4/4), brown, 70% coarse to medium grained, subangular sand, 25% silt, 5% rock fragments- sandstone clasts (subangular), trace rootlets, dry, loose.	SM	

No groundwater encountered.

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC / 2	Location ID 41
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 5'
Drilling Equipment Geoprobe 6600	Borehole Diameter 13/4"	Date/Time Drilling Started 2/4/11 / 0842	Date/Time Total Depth Reached 2/4/11 / 0850
Type of Sampling Device 13/4" macrocore acetate liners		Samples Collected ID 10057 / time: 0915 (2) 1/2 gallon bags	
Geologist Stephanie Lopez, Monrose		Checked by/Date 5/27/11 TBW	
Radiological Background 47 / 2079	Radiological Equipment Used Pancake / Borehole	PID Used MiniRAE 2000 (Bkgd: 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	65	0-7" SP SAND (brownish yellow 10YR 6/6) 15% silt, 85% fine-coarse grained sand, very loose, dry, non plastic, plant material (roots)	SP	0.0	0.0 = 2903
			0.0	73			0.5	0.5 = 3762
1.0			0.0	71	7"-2'4" SM silty SAND with clay (dark yellowish brown 10YR 4/4) 20% clay, 30% silt, 50% fine-med. grained sand, low plasticity, soft, dry	SM	1.0	1.0 = 4488
			0.0	90			1.5	1.5 = 4940
2.0			0.0	75			2.0	2.0 = 5007
			0.0	66	2'4"-3'11" ML sandy SILT with clay (yellowish brown 10YR 5/4) 25% clay, 30% silt, 45% fine-med. grained sand, low plasticity, soft, dry	ML	2.5	2.5 = 5051
3.0			0.0	49			3.0	3.0 = 5051
			0.0	79			3.5	3.5 = 5228
4.0			0.0	58	3'11"-4'10" SM silty SAND (pale yellow 2.5Y 7/4) 20% silt, 80% fine-coarse grained sand, non plastic, dry	SM	4.0	4.0 = 5315
			0.0	64	primarily: Sandstone interbedded with thin bedded clay layers (surrounding loose soil is silty SAND)		4.5	4.5 = 5347
5.0		NR	0.0	65	4'10"-5' NO Recovery		5.0	5.0 = 5288
					TD = 5' bgs (refusal) NO GW encountered			

5C_042

HGL HydroGeoLogic, Inc

BORING LOG

Surface Sample

Sheet 1 of 1

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5c, 2	42
Drilling Company (2) HGL ~~SOFT Longyear~~	**Driller** I. Stone	**Ground Elevation** —	**Total Drilled Depth** 0.5 ft
Drilling Equipment shovel, trowel	**Borehole Diameter** (2) ~~1 3/4~~ NA	**Date/Time Drilling Started** 11/19/10 1400	**Date/Time Total Depth Reached** 11/19/10 1425
Type of Sampling Device shovel, trowel, hand		**Samples Collected** 10058, 1415 (2) 1/2 gal bags	
Geologist D. Steak		**Checked by/Date** — 4/26/11	

Radiological Background 2968 / 55 | **Radiological Equipment Used** Ludlum X scanner / ~~Microrem~~ Pancake (PR) | **PID Used** Mini RAE 2000 (Background = 0.3 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0							0.0 = 2798
			0.2	—	silty sand, ~~10YR~~ (5) dark yellowish brown (10YR 3/6), dry, soft, ~~45~~ 60 % fine sand, ~~40~~ 30 % silt, 25 % nonnative gravel & asphalt, few rootlets	SM	
0.5					TD = 0.5 ft Groundwater not encountered Originally a subsurface sample location, however, due to shallow refusal decided on 11/19/10 to collect a surface sample (note: no subsurface sample was collected). (SW)		

5C_043

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5c / 2	Location ID #43, 10059
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-25-10/1122	Date/Time Total Depth Reached 10-25-10/ 1142
Type of Sampling Device trowel / shovel		Samples Collected 2 ½ gallon bags ID 10059 1130	
Geologist C. Carmichael		Checked by/Date 10/29/10 / 4/25/11	
Radiological Background (PID) 0.6, 12 (micro R)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.6ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'	1 sample		0.7	12	Silty sand ~~Sandy silt~~ (10YR, 4/3), brown, 60% silt, 40% sand (medium-grained, sub-rounded), trace rock fragments - sandstone and gravel, slow dilatency, medium dense, moist, many rootlets.	SM ML		

No groundwater encountered.

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of ~~2~~ 1

Project Name:	Project Number	Subarea ID & Group 2	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C	43
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	—	3'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	11-30-10/1432	11-30-10/1436
Type of Sampling Device		**Samples Collected**	
1 3/4" macrocore		2 1/2 gallon bags,	#10060 (1435)
Geologist		**Checked by/Date**	
C. Carmichael			4/25/11
Radiological Background	**Radiological Equipment Used**	**PID Used**	
2410.44 cpm	pancake, downhole scanner	mini RAE 2000	(Background=0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	60	Sandy silt (10YR, 4/4), brown, 60% silt, 40% fine grained, subangular sand, trace rootlets (in top 6"), low plasticity, very low toughness, dry, loose.	~~SM~~ ML		cc ~~0.5~~ 0.5 - 2392; cc ~~2392~~ 2812
			0.0	60				cc ~~2812~~ 4144
1'			0.0	45	..... Gradational Contact			cc ~~4144~~ 5018
			0.0	55	Sand ~~with silt~~ (10 YR, 7/4), beige, 90% fine to medium grained, well-sorted sand, 10% silt, no toughness or plasticity, dry, very loose sand.	SW		cc ~~5018~~ 5364
2'			0.0	75				cc ~~5364~~ 5575
			0.0	80	..... Same as above, except sand is poorly graded and only fine-grained.	SP		cc ~~5575~~ 5402
3'			0.0	65				cc ~~5402~~ 5090
					Refusal reached at 3 ft. No groundwater encountered.			
4'								
5'								
6'								

5C_044

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group nC 12	Location ID 44
Drilling Company Bort Longyear	Driller Don Hansen	Ground Elevation –	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/1/10 1040	Date/Time Total Depth Reached 12/1/10 1120
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10061 (1050) 2 - 1/2 gal bags	
Geologist C. Knight		Checked by/Date [signature] 4/25/11	
Radiological Background 43cpm / 2676cpm	Radiological Equipment Used Pancake / Downhole logger	PID Used mini RAE 2000 (Background=0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	10.5' 2615 (CPM)
			0.0	20	surface: grass			3197
0.5			0.0	50	Fill Material Well graded sand: brownish yellow (10YR 6/6), moist, medium dense, no odor, 15% coarse sand, 25% medium sand, 50% fine sand, 10% silt, mottled texture	SW		4332
1.0			0.0	55				5251
			0.0	55	Silty sand: Yellowish brown (10YR 5/8), slightly moist, medium dense, no odor, 40% silt, 5% coarse, 20% medium sand, 35% fine sand, slow dilatancy, trace rootlets and pinhole pores	SM		5408
2.0			0.0	50				5273
			0.0	55				5306
3.0	Sample		0.0	65				5214
			0.0	75				4875
4.0			0.0	80				5039
			0.0	55				4873
5.0			0.0	55				4992
			0.0	65	same as above	SM		5115
6.0			0.0	80	see next page	ML		4936

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
43cpm/2676cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	44

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0				80	Sandy silt w/ clay: dark yellowish brown (10YR 4/4), moist, medium stiff, no odor, 30% fine sand, 20% clay, 50% silt, cohesive, low plasticity	ML		4936
			0.0	65				5214
7.0			0.0	45				4995
			0.0	35				4747
8.0			0.0	20				4719
			0.0	70				4791
9.0			0.0	70				4883
			0.0	80	Poorly graded Sand: light yellowish brown (10YR 6/4), moist, dense, no odor, fine sand, trace silt.			4817
				SP		SP		
10.0			0.0	85				5123

End boring at 10.0'

No GW encountered

5C_045

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group SC / 2	Location ID 45, 10062
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-25-10/0910	Date/Time Total Depth Reached 10-25-10/0929
Type of Sampling Device trowel / shovel		Samples Collected ID 10062 0915 2 1/2 gall bags	
Geologist Chelsea Carmichael		Checked by/Date TGW 10/29/10	
Radiological Background Micro R: 14, 0.0 ppm (PID)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	0.5'		0.2	13	Sandy silt ~~Silty sand~~ (10YR, 3/4), brown, loose, moist, 70% silt, 30% medium-grained sand, >5% sandstone clasts, trace rootlets, well-graded sand.	ML SM	24	

No groundwater encountered.

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BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C / 2	45
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	—	9.0
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
6600 Geoprobe	1 3/4"	12-1-10 / 1300	12-1-10 / 1330
Type of Sampling Device		**Samples Collected**	
1 3/4" Macrocore		10063 (1310)	2-1/2gal bags
Geologist		**Checked by/Date**	
C. Knight		[signature]	4/25/11

Radiological Background	Radiological Equipment Used	PID Used
60 cpm / 2725 cpm	panasonic / downhole gamma logger	mini RAE 2000 (Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.0	55			10.5'	2667
					surface - grass			2834
					Fill: Silt w/ Sand: Yellowish brown (10YR 5/4), moist, med. stiff, no odor, 20% fine sand, 5% clay, 75% silt, trace rootlets	ML		4094
0.5			0.0	65				
1.0			0.0	100				4223
			0.0	75				5415
					Sandy Silt: Yellowish brown (10YR 5/6), moist, med. stiff, no odor, 10% coarse sand, 15% medium sand, 30% fine sand, ~~55~~ 45% silt, non cohesive, no plasticity, (CK)	ML		5470
2.0			0.0	85				
			0.0	120				5325
								5347
3.0	Sample		0.0	85				
			0.0	80				5178
								5326
4.0			0.0	75	- increase in coarse sand			
			0.0	80				5281
					trace			
5.0			0.0	60	$CaCO_3$ stringers @ 5.0' bgs			5291
			0.0	90				5135
					geological contact			
6.0			0.0	65				5149

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
60 / 2735	SSFL Area IV Radiological Study	EP9038.01.22.04.03	45

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.0			0.0	65	Silty Sand : Very pale brown (10YR 7/4), dry, medium dense, no odor, 30% silt, 70% fine sand	SM		5149
			0.0	65				5114
2.0			0.0	100	-increases sand and absence of silt ~8.0' bgs			5049
			0.0	65				5105
8.0			0.0	90	Poorly graded Sand : brownish yellow (10YR 6/8), dry, dense, no odor, fine sand	SP		4933
			0.0	50	fine sand w/ 10% coarse, 15% medium sand, 85% fine sand			5422
9.0			0.0	65	End boring refusal @ 9.0' bgs			5593
			0.0					
					No GW encountered			
10.0			0.0					

HGL HydroGeoLogic, Inc

BORING LOG

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 2	Location ID 46
Drilling Company Bort Longyear	Driller Dr Itkinsen	Ground Elevation —	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/1/10 0835	Date/Time Total Depth Reached 12/1/10 0930
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 0915 (0845) CK 10064	2 - 1/2 gal bags
Geologist CrKnight		Checked by/Date [signature] 4/25/11	
Radiological Background 51cpm / 2661cpm	Radiological Equipment Used Pancake / Downhole Logger	PID Used mini RAE 2000 (Background = 0.1 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings t0.5 2620 (CPM)
			0.0	55	Surface: grass		3596
0.5			0.0	65	Sandy Silt: dark yellowish brown (10YR 3/6), moist, medium stiff, no odor, 5% medium sand, 35% fine sand, 60% silt, non cohesive, no plasticity	ML	4914
1.0			0.0	80			5090
			0.0	65			5136
2.0			0.0	40	Silty sand: Yellowish brown (10YR 5/4), moist, med. dense, no odor, 35% silt, 10% coarse sand, 25% medium sand, 30% fine sand, trace Fe staining, some motteled texture, trace clay	SM	4964
			0.0	54			4869
3.0	Sample		0.0	60			5009
			0.0	80			5037
4.0			0.0	75			5196
			0.0	80			5036
5.0			0.0	50			5157
			0.0	65			5157
6.0			0.0	50			4968

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
51cpm / 2661cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	46

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	80	Same as above	SM		4968
			0.0	50				5131
7.0			0.0	45				4947
			0.1	50				4921
8.0			0.1	30	Poorly graded sand; Pale yellow (2.5Y 7/3), dry, medium dense, no odor, fine sand			4895
			0.1	30				4871
9.0			0.1	40	- trace fine gravel and coarse sand 9 to 9.5' bgs			5041
			0.1	45	- trace $CaCO_3$ stringers @ 9.5' bgs			5275
10.0			0.1	40	End boring at 10.0' bgs			5247
					No GW encountered			

5C_047

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group SC / 2	Location ID 47, 10065
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-25-10/0930	Date/Time Total Depth Reached 10-25-10/0940
Type of Sampling Device trowel / shovel		Samples Collected ID 10065 0940 2 1/2 gall bags	
Geologist C. Carmichael		Checked by/Date TBW 10/29/10	
Radiological Background (PID) 0.5, 14 (MicroR)	Radiological Equipment Used MicroR meter	PID Used Mini Rae 2000 (Background = 0.5 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'	0.5' grab	0.5'	0.7	14	Silty Sand (10 YR, 5/6), light brown, dry, loose, 55% medium-grained sand, 25% silt, 20% rock fragments - siltstone and sandstone, subrounded, trace rootlets.	SM		
					No groundwater encountered.			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC / 2	Location ID 47
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation –	Total Drilled Depth 7.0'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12-1-10 / 1435	Date/Time Total Depth Reached 12-1-10 / 1445
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10066 (1440)	2 - 1/2 gal bags
Geologist C. Knight		Checked by/Date	5/19/11
Radiological Background 53 cpm 2632 cpm	Radiological Equipment Used Pancake / Downhole gamma logger	PID Used mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 = 2660 (CPM)
			0.0	55	Fill/Surface: grass			2900
0.5			0.0	75	Poorly graded Sand: light yellowish brown (10YR 6/4), moist, loose, no odor, 10% silt, 10% coarse, 10% medium, 70% fine sand, trace rootlets	Af/SP		4542
1.0			0.0	70	Silt w/ sand: dark yellowish brown (10YR 4/4), moist, medium stiff, no odor, 15% fine sand, 85% silt, non cohesive, no plasticity, low dry strength	ML		5175
			0.0	85				5193
2.0			0.0	80				5283
			0.0	55				5263
	Sample		0.0	100				5192
3.0			0.0	85	gradational contact Silty Sand: Brown (10YR 4/3), moist, medium dense, no odor, 10% coarse sand, 20% medium sand, 35% silt, 35% fine sand, slow dilatancy, non cohesive	CL/ML/SM		4951
4.0			0.0	85				4939
			0.0	60				4883
5.0			0.0	95				4975
			0.0	70				4904
6.0			0.0	75	Poorly graded Sand: Brownish yellow (10YR 6/8), dry, dense, no odor, 5% coarse, 20% medium sand, 75% fine sand	SP		4691

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
53 cpm, 2632 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	47

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	75	Same as above	SP		4691
			0.0	60	-2-inch lense of sandy silt @ 7.5' bgs			4891
7.0			0.0	60	refusal @ 7.0' bgs			NM
					No GW encountered			
8.0								
9.0								
10.0								

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_048

Sheet _1__ of __1__

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group:	Location ID: 48
ing Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 2/4/11		Date/Time Total Depth Reached: 2/4/11
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.)		10067 (NO SAMPLE)
Geologist: Cliff Knight		Checked By / Date: TBJ 11/14/11		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			NA		Storm drain did not have sufficient material volume to collect a sample			No down hole Gamma logging Collected
1.0							1	
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_049

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group Group 3 / 5C	Location ID 49
Drilling Company HGL	Driller C. Carmichael	Ground Elevation NA	Total Drilled Depth 0-5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1355	Date/Time Total Depth Reached 10/21/10 1420
Type of Sampling Device trowel / shovel		Samples Collected 10068 1410 (2) 1/2 gal bags	
Geologist C. Knight		Checked by/Date FQW 10/28/10 10/25/11	
Radiological Background 11	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 6.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0	Sample		11	0.5	Sand with Silt: Yellowish brown (10YR 5/4), moist, med dense, no odor, 20% coarse subrounded gravel and gravel, 30% medium sand, 35% fine sand, 15% coarse sand, 15% silt, fill material	SW		
0.5			CK		TD = 0.5' bgs NO GW encountered			

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c, 3	Location ID 49
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 2.0 ft
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/19/10, 1310	Date/Time Total Depth Reached 11/19/10, 1312
Type of Sampling Device macro core (1 3/4")		Samples Collected 10069, 1315 (2) 1/2 gal bags	
Geologist P. Skrath		Checked by/Date [signature] 4/26/11	
Radiological Background 2418cpm, 48cpm	Radiological Equipment Used Ratemeter, Double & scanner	PID Used Mini RAE 2000 (Background = 0.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings 2458 (CPM)
			0.1	72	Silty gravel, brown (10YR 5/3), dry, soft silt nodules, 60% gravel, 30% silt, 10% fine sands, no odor, common rootlets	GM	2682
							3697
			0.1	66			
							4498
1.0	sample		0.1	78	silty sand, dark yellowish brown (10YR 3/6), dry, loose sand, ~~80~~ ~~70~~ 60 % fine sand, 30 % silt, 10 % clay, no odor (PS)	SM	
							4928
			0.1	51			
							4947
2.0			0.1	76	~~sand/gravel~~ (PS) Refusal	SC	

TD: 2.0 ft

Groundwater not encountered

5C_050

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID/Group 5C/3	Location ID 50
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1430	Date/Time Total Depth Reached 10/21/10 1450
Type of Sampling Device trowel/shovel		Samples Collected 2- 1/2 gallon bags 10070-1450	
Geologist I. Stone		Checked by/Date [signature] 10/21/10	
Radiological Background 22	Radiological Equipment Used yR meter	PID Used mini RAE 2000	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		9.7	24	Silty sand, Brown (7YR 4/4), 75% fine grained sand, 25% silt, med dense, dry, fill material.	SM		
					Total Depth = 0.5 ft Ambient PID = 10.0 ppm No GW encountered			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID SC / 3	Location ID 50
Drilling Company Boart Longyear	Driller Don Hansen	Ground Elevation —	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1-3/4"	Date/Time Drilling Started 11/22/10 0830	Date/Time Total Depth Reached 11/22/10 0850
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10071 (0835) 2 - 1/2 gal bags	
Geologist C. Knight		Checked by/Date 4/26/11	
Radiological Background 46cpm / 3505cpm	Radiological Equipment Used Pantake / Borehole gamma logger	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
			0.0	50	surface: grass		10.5 2438 2740
0.5			0.0	50	Sandy Silt: Brown (10YR 4/3), dry, ~~medium dense~~ med. stiff (CH), no odor, 65% silt, 5% coarse sand subangular, 10% medium sand, 20% fine sand, low plasticity, trace rootlets in upper 1.5'	ML	4030
1.0			0.0	55			4810
			0.0	55			5136
2.0			0.0	50			5072
			0.0	60			5272
3.0			0.0	65			5142
			0.0	65			5131
4.0			0.0	80			5131
			0.0	65	same as above:		5033
5.0			0.0	80			4982
			0.1	60	Clay: Very dark grayish brown (10YR 3/2), moist, stiff, no odor, low plasticity, 15% silt, 85% clay, medium toughness	CL	4915
6.0			0.0	50			4975

Silty sample

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
46 / 3505 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	50

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.2	50	Same as above:	CL		4935
			0.0	65				5104
7.0			0.1	50	Poorly graded Sand w/silt: Dark yellowish brown (10YR 4/4), slightly moist, medium dense to dense, no odor	SP		5172
			0.0	60	20% silt, 80% fine sand, rapid dilatancy, no plasticity			5119
8.0			0.2	50				5222
			0.2	45	- trace subrounded gravel			5161
9.0			0.0	45				5079
			0.1	70				5323
10.0			0.2	65				NM
					TD = 10.0' bgs			
					No GW encountered			

5C_051

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group SL/3	Location ID 51
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1315	Date/Time Total Depth Reached 10/21/10 1335
Type of Sampling Device trowel / shovel		Samples Collected 1003 2 - 1/2 gallon plastic bags 1332 - 1335	
Geologist I. Stone		Checked by/Date [signature] 10/21/10 / [signature] 4/26/11	
Radiological Background 21	Radiological Equipment Used uR meter	PID Used mini RAE 2000	(Background = ~~Due ppm~~ ~~12.5~~ 16.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	0.5'	0.5'	12.5	21	Silty Sand, Dark brown (7.5YR 3/2) 65% fine grained sand, 30% silt, 5% fine gravel (max size ~2 inches), med dense, dry, fill material.	SM		
					Ambient PID = 12.5-18.0 ppm due to moisture			
					TD = 0.5' No GW encountered			

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BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	SC / 3	51
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	—	4.0 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
6600 Geoprobe	1 3/4"	11/19/10, 1055	11/19/10, 1059
Type of Sampling Device		**Samples Collected**	
1 3/4" macro core		10073, 1100 (2) 1/2 gal bag	
Geologist		**Checked by/Date**	
P. Secain		[signature] 4/26/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
86 cpm, 3054 cpm	Pancake, Downhole & scanner	Mini RAE 2000 (Background = 0.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 2742 (CPM)
			0.4	74	~~silty~~ sandy gravel w/ silt, dark brown (10YR 3/3), moist, soft (PS) 70% gravel, 25 ~~20~~ % fine sand, 5 ~~10~~ % silt, ~~10~~ % (PS) ~~clay~~, gravel is fill, no odor	GM		2957
			0.4	54				3906
1			0.4	58	dry, loose, silty sand, yellowish brown (10YR 5/6), 60 % fine sand, 35 % silt, 5 % clay, no odor (PS)	SM		4825
			0.4	22				4915
2			0.4	29	~~silty sand~~ sandy silt, dark yellowish brown (10YR 4/6), dry, soft, ~~70~~ 60 % silt, 40 % fine sand, no odor (PS)	ML		5123
			0.4	82				5058
3			0.4	65	silty sand, yellowish brown (10YR 5/6), dry, loose, 70 % sand, 30 % silt, no odor	SM		4894
			0.4	83				5109
4			0.4	84	(PS) ~~poorly~~ graded sand w/ silt, dark yellowish brown (10YR 4/6), dry, medium dense, 75 % f sand, 15 % silt, 10 % clay, no odor	SP		5157

Refusal @ 4

TD = 4.0 ft

5C_052

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C group 3	Location ID 52
Drilling Company HGL	Driller C. Carmichael	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1325	Date/Time Total Depth Reached 10/21/10 1350
Type of Sampling Device trowel / shovel		Samples Collected 10054 1330 (2) ½ gal bags	
Geologist C. Knight		Checked by/Date TRW 10/28/10	
Radiological Background 11 nR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 12.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	Sample		10.5	11	well graded Sand: Grayish brown (10YR 5/2), moist, loose, no odor, 20% coarse sand subangular, 35% medium sand, 30% fine sand, 15% fine gravel, evidence of sand bags. fill material	SW	
					TD: 0.5'		
					No GW encountered		

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c, 3	Location ID 52
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 3.0 ft
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/19/10, 0958	Date/Time Total Depth Reached 11/19/10, ~~0958~~ DS 0959
Type of Sampling Device 1 3/4 macrocore		Samples Collected 10075, 10000 (2) 1/2 gal bags	
Geologist P. Scegath		Checked by/Date 4/26/11	

Radiological Background Borehole 2731 cpm, Pancake 44 cpm

Radiological Equipment Used pancake, downhole & scaler

PID Used Mini RAE 2000 (Background = 0.2 ppm)

Depth (ft)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.2	39	silt w/ sand, dark brown (10YR 3/3), moist, soft, 70 % silt, 10 % clay, 20 % fine sands, trace rock fragments (gravel), no odor	ML	2402	
			0.2	55				4396
1.0			0.2	75	silt w/ sand, dark yellowish brown (10YR 4/4), dry, medium stiff, 80 % silt, 5 % clay, 15 % fine sand, no odor	ML		5019
			0.3	75	silty sand, yellowish brown (10YR 5/6), dry, medium dense, 70 % fine sand, 30 % silt, no odor			5051
2.0			0.2	39	poorly graded sand w/ silt, dark yellowish brown (10YR 4/6), dry, very dense, 85 % fine to medium sand, 15 % silt, no odor	SP		4945
			0.2	53				5377
3.0			0.2	93	Refusal TD = 3.0 ft Groundwater not encountered			5516

5C_053

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID group 3, 5C	Location ID 53
Drilling Company HGL	Driller C. Carmichael	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1435	Date/Time Total Depth Reached 10/21/10 1455
Type of Sampling Device trowel / shovel		Samples Collected 10076 1440 2-1/2 gal bags	
Geologist C. Knight		Checked by/Date RQW 10/28/10 / CE 4/26/11	
Radiological Background 11 μR	Radiological Equipment Used μR meter	PID Used Mini Rae 2000 (Background = 6.1 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		9.9 / 7.7 / CK	11 μR	Sand w/ silt: light yellowish brown (10YR 6/4), moist, med. dense, to dense, 60% fine sand, 15% medium sand, 5% coarse, 10% sandstone gravel or outcrop; 10% silt	SP		

TD: 0.5'

No GW encountered

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BORING LOG

Sheet 1 of 1

Project Name	Project Number	Subarea ID	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C / 3	53
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Beart Longyear	D. Hansen	–	4.0
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
6600 Geoprobe	1-3/4"	11/22/10 1040	11/22/10 1045
Type of Sampling Device		**Samples Collected**	
1 3/4" Macro Core		10077 (1045) 2-1/2 gal bags	
Geologist		**Checked by/Date**	
C. Knight		4/26/11	

Radiological Background: 38 cpm / 2762

Radiological Equipment Used: pancake/dual probe logger

PID Used: Mini Rae 2000 (Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.0	60	native ground : surface		+0.5	2669
0.5			0.0	75	Fill) Sandy / silt : dark yellowish brown (10YR 4/6), moist, loose, no odor, 20% silt, 20% coarse subrounded sand, 40% medium, 20% fine sand, trace clay pockets and fine gravel	SC/SW		3156
1.0			0.0	80				4360
								5119
			0.0	85	silty sand : Yellowish brown (10YR 5/4), dry, med. dense, no odor, 35% silt, 5% coarse sand, 10% medium sand, 50% fine sand, rapid-slow dilatancy, no plasticity	SM		5214
2.0			0.0	65				5450
			0.0	50				5639
								5693
3.0			0.0	35				6314
			0.0	10	Chatsworth Formation : Yellow (10YR 7/6) sandstone bedrock, dry, hard, no odor, fine grained sand, trace siltstone sand rootlets at terminus of boring	Kcs		
4.0			0.0	55				6273
					refusal at 4.0' bgs			
					No GW encountered			
5.0								
6.0								

5C_054

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID Group 3, SC	Location ID 54
Drilling Company HGL	Driller C. Carmichael	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1150	Date/Time Total Depth Reached 10/21/10 1205
Type of Sampling Device trowel / shovel		Samples Collected 10078 1159 2-½ gal bags	
Geologist C. Knight		Checked by/Date TRW 10/28/10	
Radiological Background 11	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 5.5 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample	55		11	Silty sand; dk/lt yellowish brown (10YR 3/4), moist, med. dense, no odor, 25% non native coarse subangular gravel, 35% silt, 25% fine sand 5% coarse sand, 10% medium sand, trace rootlets, fill material, w/gravel	SM		
					TD: 0.5' No GW encountered			

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BORING LOG

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C, 3	Location ID 54
Drilling Company Boart Longyear	Driller D. Hanson	Ground Elevation —	Total Drilled Depth 4.0 ft
Drilling Equipment 6600 macrocore	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/18/10, 1410	Date/Time Total Depth Reached 11/18/10, 1420
Type of Sampling Device 1 3/4" macro core		Samples Collected 10079, 1415	(2) 1/2 gal bag
Geologist P. Skeagan		Checked by/Date [signature] 4/26/11	
Radiological Background 80 cpm, 3001 cpm	Radiological Equipment Used pancake, downhole & scanner	PID Used Mini RAE 2000 (Background = 1.2 ppm)	

Depth	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings 2635 (CPM)
	1.2	100	sandy silt, dark yellowish brown (10YR 4/5), dry, soft, 60% silt, 35% vf sand, 5% clay, low plasticity, trace rootlets, some rock fragments, no odor	ML	3061
	1.3	95			4441
1.0	1.4	75	silty clay, dark greyish brown (10YR 4/2), dry, very stiff, 50% clay, 35% silt, 15% fine sand, medium plasticity, < 5% rock fragments, some rootlets, no odor	CL	4859
	1.3	95	silty sand, dark yellowish brown (10YR 4/6), dry, dense sand, 65% vf sand, 30% silt, 5% clay, trace rock fragments, no odor	SM	4923
2.0	1.6	85			5246
	1.3	80	sand w/ silt, brownish yellow (10YR 6/6), dry, loose sand, 85% fine sand, 15% silts, some sandstone gravels, no odor	SM	5396
3.0	1.4	65			5564
	1.4	50			6028
4.0	1.4	65			NM
			sandstone — Refusal		
			TD = 4.0 ft Groundwater not encountered		
5.0					

5C_055

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C, 3	Location ID 55
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 1' 9"
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/19/10, 0848	Date/Time Total Depth Reached 11/19/10, 0853
Type of Sampling Device 1 3/4 macro core		Samples Collected 100PX? , 0850 (2) 1/2 gal bags	
Geologist P. Sreath		Checked by/Date [signature] 4/26/11	
Radiological Background Downhole 3525 cpm, Pancake 49 cpm	Radiological Equipment Used Pancake, Downhole & Scanning	PID Used Mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 3131 (CPM)
0			0	44	Silty ~~sand~~ Gravel, dark yellowish brown (10YR 4/6), dry, soft silt aggregates, max gravel=1", 50% gravel, 30% silt, 20% sand, no odor,	GM		3743
								5847
0.5			0	42				
								4774
1.0	Sample		0	61	weathered silt stone, yellowish brown ~~brownish yellow~~ (10YR 5/8), dry, hard/compacted, 90% silt, 10% fine sand, no odor	Chatsworth Formation		
								5791
1.5			0	60	silt, brownish yellow (10YR 6/8), dry, soft, 100% silt, no odor, trace nodules of compacted silt	ML		
				54	~~clayey silt~~ Refusal			NM
2.0					TD = 1' 9" groundwater not encountered Asphalt = 3"			

5C_056

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 3	Location ID 56, 10081
Drilling Company HGL	Driller M Engle	Ground Elevation —	Total Drilled Depth 0.5'
Drilling Equipment trowel, shovel	Borehole Diameter —	Date/Time Drilling Started 10-22/1052	Date/Time Total Depth Reached 10-22/1110
Type of Sampling Device trowel, shovel		Samples Collected ID 10081 ~~1346~~ @ 1055 2 - 1/2 gall bags	
Geologist C. Carmichael		Checked by/Date TBW 10/28/10 / (S) 5/9/11	
Radiological Background MicroR = 28, 3.4 ppm (PID)	Radiological Equipment Used Model 19 μR meter	PID Used Mini Rae 2000 (Background = 3.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'	sample		1.8	27	Silty sand with gravel - gravelly soil, brown (10YR, 3/6), 60% medium-sized sand, 20% silt, 20% gravel composed of asphalt, sandstone, concrete (fill), well-graded gravel, poorly-graded sand, sub-angular grains, low plasticity, loose, moist. Top 2-3 in is dark soil, underneath is a thin bed of gravel, then below is probable fill - gravel w/sand matrix. No groundwater encountered.	GW SM		

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 3	Location ID 56
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth ~~0.5~~ cc 10'
Drilling Equipment hand auger/ trowel / shovel	Borehole Diameter ~~NA~~ cc 2 3/4"	Date/Time Drilling Started 1/4/11 / 1315	Date/Time Total Depth Reached 1/4/11 / 1530
Type of Sampling Device trowel / shovel / hand auger		Samples Collected 2 1/2 gall bags (#10082) (1530)	
Geologist C. Carmichael		Checked by/Date [signature] 4/26/11	
Radiological Background (PID) 0.0, 16 (Micro R)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM) 0.5 - 3144, 2 - 3254
0.5'			0.1	110 140 ~~110~~ cc	Sandy silt, (10 YR, 4/4), brown, 60% silt, 40% subrounded fine grained sand, soft, semi-moist, no odor.	ML		3461
1.0'			0.1	80 140 ~~80~~ cc				3962
			0.1	110 ~~80~~ cc	Clayey silt, (10YR, 4/2), greyish dark brown, 70% silt, 25% clay, 5% fine grained sand, soft, moist, no odor, medium plasticity.	ML		4744
2'			0.1	80 ~~110~~ cc				4944
			0.1	100 ~~80~~ cc				5036
			0.1	60 ~~100~~ cc				5212
3'			0.1	90 ~~60~~ cc	Same as above, except mottled texture shows up (clayey silt mottled with weathered sandstone)			5324
4'			0.1	90				5366
			0.1	80				5620
5'			0.1	80	Clayey silt with sand, (10 YR, 4/2), brown mottled with orange, 60% silt, ~~30~~ 25% clay, 15% fine grained sand (weathered sandstone), soft, dry, no odor.			5432
			0.1	90				5456
6'			0.1	60				5100

Sample @ 1.0'

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
0.0, 16	SSFL Area IV Radiological Study	EP9038.01.22.04.03	5b

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.1	80				5044
7'			0.1	60	Same as clayey silt above, with some rootlets.	ML		cc 5024 5025
			0.1	100				5129
8'			0.1	70				5278
			0.1	60				5411
9'			0.1	110				5365
			0.2	100				5312
10'			0.2	110	No refusal hit - 10' goal reached. No GW encountered. (CA)			5430

5C_057

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID/Group 5c/Group 3	Location ID 57
Drilling Company HGL	Driller R. Skeath	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/22/10 1120	Date/Time Total Depth Reached 10/22/10 1135
Type of Sampling Device trowel/shovel		Samples Collected 10083-1135 2 - 1/2 gallon bags	
Geologist I. Stone		Checked by/Date TAW 10/28/10	
Radiological Background 17	Radiological Equipment Used ud Rmeter	PID Used Mini Rae 2000 (Background = 1.6 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		2.6	13	Silty sand, Brown (7.5 YR 4/4), w/gravel 75% fine-medium grained sand, 10% gravel (max size 1cm), 15% silt, subangular medium dense, dry, no odor or staining. total Depth = 0.5ft Ambient PID: 1.6 ppm 4 inches of pea gravel ~~and rock is dust~~ layed on top of soil.	SM		

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 3 5C	Location ID 57, ~~#10084~~ CC
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 8 ft
Drilling Equipment: Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-30-10/0835	Date/Time Total Depth Reached 11-30-10/0845
Type of Sampling Device: 1 3/4" macrocore		Samples Collected: 2 1/2 gall bags, #10084 (0845)	
Geologist: C. Carmichael		Checked by/Date: [signature] 4/26/11	
Radiological Background: 3641, 60 cpm	Radiological Equipment Used: pancake, downhole scanner	PID Used: mini RAE 2000 (Background=0.0ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.0	50	Silty Sand (10YR, 3/6), brown, 70% fine grained sand, subrounded, 25% silt, 5% fm-sized rounded pea gravel, loose, moist, trace rootlets, very low toughness.	SM	0.5	3359
			0.0	100				3739
1'			0.0	75				4885
			0.0	55				5015
					Sand with silt (10YR, 4/3), light brown, 90% poorly graded, fine grained, subrounded sand, 10% silt, no toughness, medium dense, dry.	SP		5024
2'			0.0	60				5056
			0.0	70	Sandy silt (10YR, 3/4), dark brown, 65% silt, 35% fine-grained sand, dry, medium dense, low toughness, low plasticity.	ML		5166
3'	Sample		0.0	70				5056
					Gradational Contact			
			0.0	60	Silt with sand and clay, (10YR, 3/3), dark brown, 80% silt, 10% fine grained sand, 10% clay, medium toughness and plasticity, medium stiff.	ML		4895
4'			0.0	90				5082
			0.0	90				4858
5'			0.0	65				4867
			0.0	70				4832
6'			0.0	100				4978

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name: SSFL Area IV Radiological Study	Project Number: EP9038.01.22.04.03	Location: 57, #10084

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.0	85				4830
7'			0.0	80				4879
			0.0	70	@ 6 ft Same as above except percentages are 70% silt, 20% fine grained sand, 10% clay.			4979
8'			0.0	100				5084
9'					@ 7.5 ft Sand with silt, (10YR, 5/4), 85% fine to medium grained, well-graded sand, 15% silt, no toughness or plasticity, medium dense.	SM		
10'					Refusal hit at 8 ft. No groundwater encountered.			

5C_058

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C/3	Location ID 58
Drilling Company: Boart Longyear	Driller: D. Hansen	Ground Elevation: -	Total Drilled Depth: 4.0
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 13/4"	Date/Time Drilling Started: 11/29/10 0905	Date/Time Total Depth Reached: 11/29/10 0930
Type of Sampling Device: 13/4" Macrocore		Samples Collected: 10085 (0915) (2) 1/2 gal bags	
Geologist: C. Knight		Checked by/Date: 4/26/11	
Radiological Background: 40 cpm / 2660	Radiological Equipment Used: Pancake / downhole logger	PID Used: Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings #05 2406 (CPM) 3496
			0.0	75	2.5" surface asphalt			
0.5			0.0	75	Fill Material: Clayey/sand and gravel: dark yellowish brown (10YR 3/4) moist, medium stiff, no odor, 15% fine gravel, 10% coarse sand, 10% fine sand (CL), 5% medium sand, 10% silt, 50% clay, non cohesive, trace rootlets	AF/CL		4951
1.0			0.0	55				5194
			0.0	45	Silty Sand: light olive brown (2.5Y 5/4), moist, medium dense, no odor, 35% silt, 5% clay, 60% fine sand, trace gravel angular, some mottling	SM		5341
2.0			0.0	60				5584
			0.0	45				5657
3.0			0.0	40				5514
	Sample		0.0	40	well graded Sand: brownish yellow (10YR 6/6), dry, med. dense, no odor, 25% coarse sand, 40% medium sand, 35% fine gravel, subrounded grains	SW		5286
4.0			0.0	60	Silty Sand w/ gravel: dark yellowish brown (10YR 4/4), dry, medium dense, no odor, 15% sandstone fine gravel, 30% silt, 5% coarse sand, 10% med. sand, 40% fine sand, Fe staining, some roots	SM		5336
					refusal @ 4.0 bgs			
					NO GW encountered			
5.0								
6.0								

5C_059

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / 3	Location ID 59
Drilling Company: Boart Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 10.0'
Drilling Equipment: 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/25/10 1015	Date/Time Total Depth Reached 11/25/10 1040
Type of Sampling Device: 1-3/4" Macrocore		Samples Collected 10086 (1025) 2-1/2gal bags	
Geologist: C. Knight		Checked by/Date: 4/26/11	
Radiological Background: 61cpm / 2522	Radiological Equipment Used: Ranger / Rumble Logger	PID Used: Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 2582 (CPM) 2710
			2.0	45	3" Asphalt surface		
0.5			0.0	50	Fill Material; clay w/silt: dark olive brown (2.5Y 3/3), moist, medium stiff, trace odor, 15% silt, 10% fine sand, 75% clay, trace sandstone gravel angular, stained pockets from 1-2' bgs	Af/CL	4596
1.0			0.0	65			5178
			0.0	65			5159
2.0			0.0	60			5175
			0.0	40	Fill material: silt w/ clay and sand & very dark grayish brown (2.5Y 3/2), moist, medium stiff, no odor, 25% fine sand, 25% clay, 50% silt, non cohesive, low plasticity, trace stained sandstone gravel angular	Af/ML	5079
3.0			0.0	50			4853
			0.0	45	Concrete chunks in 4" thickness		
					Silt: dark yellowish brown (10YR 3/4), moist, med. stiff, no odor, 10% fine sand, 90% silt, non cohesive, low toughness, low plasticity	ML	5407
4.0	Sample		0.0	50			5342
			0.0	50			5088
5.0			0.0	50			4998
			0.0	80	Clay w/ silt: dark yellowish brown (10YR 4/4), moist, stiff, no odor, 25% silt, 10% fine sand, 65% clay, cohesive, low plasticity	CL	4830
6.0			0.0	75			4858

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
61/2522 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	59

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	75	Same as above	CL		4858
			0.0	70				4876
7.0			0.0	75	Clay: increase coarse sand to 20%,			4995
			0.0	65	medium tough ness, low plasticity: trace silt			4894
			0.0	75				5004
8.0			0.0	60				4877
			0.0	30	CL			4998
9.0			0.0	70	CL			5225
			0.0	70	Poorly graded sand w/ clay: dark yellowish brown (10 YR 4/4), moist, dense, no odor, 80% fine sand, 20% clay, no toughness	SP		NM
10.0			0.0	70				

total depth 10.0'

No GW encountered

5C_060

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BORING LOG

Sheet 1 of 7

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C group 3	Location ID 60
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/22/10 1020	Date/Time Total Depth Reached 10/22/10 1035
Type of Sampling Device trowel/shovel		Samples Collected 2- 1/2 gallon bags 10087-1035	
Geologist I. Stone		Checked by/Date TRW 10/28/10	
Radiological Background 12	Radiological Equipment Used NF meter	PID Used mini RAE 2000 (Background = 2.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	Sample		2.5	12	Silty Sand, Dark brown (10YR 3/3) 75% fine grained sand, 20% silt, 5% gravel/rock fragments (max size 1.5cm), subangular, med dense, dry, no odor or staining total depth = 0.5 ft Ambient PID = 2.3 ppm No GW encountered	SM	

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & group 5C / 3	Location ID 60
Drilling Company Boart Longyear	Driller D. Duncan	Ground Elevation –	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 13/4"	Date/Time Drilling Started 11/23/10 1245	Date/Time Total Depth Reached 11/23/10 1305
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10088 (1250) 2 1/2 gal bags	
Geologist C. Knight		Checked by/Date 4/26/11	
Radiological Background 5/1/2611	Radiological Equipment Used pancake / Portable gamma logger	PID Used Mini Rae 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 2654 (CPM) 2883
			0.0	60	surface: grass and soil			
0.5			0.0	40	Fill Material: Silty Sand; dark yellowish brown (10YR 4/4), slightly moist, loose to medium dense, no odor, 5% coarse subangular sand, 40% silt, 15% medium sand, 40% fine sand, slow dilatency, no plasticity, non-cohesive, trace rootlets in upper 1.0'	AF/SM		4358
1.0			0.0	45				4442
			0.0	55				4822
2.0			0.0	45				5044
			0.0	60	Drillers Note: very easy to drill through entire 10' section			5106
3.0	Sample		0.0	30				5106
			0.0	65				5185
4.0			0.0	60				5110
			0.0	60				5343
5.0			0.0	65				5227
			0.0	65	- increase moisture content, less silt			5196
6.0			0.0	50				5142

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
5/1/2011	SSFL Area IV Radiological Study	EP9038.01.22.04.03	60

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	70	Same as above	SM		4452
			0.0	50				5089
7.0			0.0	50				5201
			0.0	65				4947
8.0			0.0	60				4885
			0.0	30				5032
9.0			0.0	70				5004
			0.0	40				4992
10.0			0.0	70	End boring @ 10.0' bgs			5090

T.D. 10.0'

No GW encountered

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 3	Location ID 60
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 11 ft
Drilling Equipment Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 12/14/10 1515	Date/Time Total Depth Reached 12/14/10 1525
Type of Sampling Device 1 3/4" macrocore acetate liner		Samples Collected 10247 - 1550 (2) 1/2 gallon bags	
Geologist I. Stone		Checked by/Date 4/26/11	
Radiological Background 61 / 2746	Radiological Equipment Used Pancake / Downhole	PID Used Mini RAE 2000 (Background = 0.0)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
10			0.0	79	Silty sand, dark yellowish brown (4/4 10YR) slightly moist, loose - med dense, no odor or staining. ~~10%~~ 60% fine sand, 40% silt.	SM		5226
			0.0	68				5168
					Silty clay, ~~fat clay~~, 65% clay, 30% ~~fine~~ silt, 5% fine sand, med plasticity, TD soil	CL		5366
11			0.0	82	Siltstone at TD			
					TD = 11 ft bgs			
					No gw encountered			
					See previous logs for first 10 ft			
12					no sample collected from 10-11 ft			
13								
14								
15								
16								

5C_061

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BORING LOG

Sheet 1 of 1

Project Name	Project Number	Subarea ID / Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	SC / 3	#61, 10089
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	M. Engle	—	0.5'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	—	10-22-10/1023	10-22-10/1030
Type of Sampling Device		**Samples Collected**	
trowel / shovel		ID 10089 2- 1/2 gall bags 1055	
Geologist		**Checked by/Date**	
C Carmichael		TBS 10/28/10	

Radiological Background 23, 0.9 ppm (MicroR) (PID) | **Radiological Equipment Used** Model 19 μR Meter | **PID Used** Mini Rae 2000 (Background = 0.9 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings: Inches	Borehole Gamma Readings: (CPM)
0.5'	0.5'	0.5'	2.9	24	Silty Sand (10 YR, 4/4), light brown, moist, loose, 70% medium sized sand, 25% silt, 5% sub-rounded cobbles, trace rootlets, not well graded, low plasticity, wood piece noted, large SS cobbles (subangular) in proximity 3 in subsurface.	SM		
					No groundwater encountered.			

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 52 3	Location ID 61
Drilling Company Bart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/24/10 1121	Date/Time Total Depth Reached 11/24/10 1125
Type of Sampling Device 1 3/4" macro core acetate liner		Samples Collected 10090 - 1200 2-1/2 gallon bags	10238 MS (1200) 10227 Field Dup (no time) 10219 Lab Dup (1200)
Geologist I. Strom		Checked by/Date 4/26/11	
Radiological Background 2538 / 52	Radiological Equipment Used Downhole / Pancake	PID Used Mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches 0.5' = 2469 (CPM)
			00	~~70~~			~~3217~~
			00	70	~~Sandy silt~~ Silty sand, (3/3 10YR) Dark Brown IS 60% fine grained sand, 40% silt, dry, low density, no odor or staining	SM	4691
1			00	70	FS Concrete ~~chunks~~ (8/1 10YR) White		4972
			00	70	Sandy silt, 70% silt, 30% fine grained sand, dry, low strength, low toughness, no odor or staining	ML	5022
			00	70	SAND, Pale Brown (6/3 10YR) 90% fine-medium grained sand, 10% silt	SP	
2			00	65	Sandy silt, ~~1/2~~ IS Brown (4/3 10YR) ~~70% silt, 20%~~ IS 60% silt, 30% fine grained sand, 10% clay, dry, med. dense, low toughness, low dry strength		5017
			00	65			4998
3			00	65			4822
			00	65		ML	4915
4			00	65			5006
			00	70			4806
5			00	50	Same as above, ~~low~~ low density ID		5002
			00	60			4975
6			00	60			4873

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2538 / 52	SSFL Area IV Radiological Study	EP9038.01.22.04.03	61

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	60	Same as above			4643
			0.0	50		ML		4747
								4644
7			0.0	60				
			0.0	65	SAND, Pale Brown (6/3 10YR 95% fine ~~coarse~~ grained, subrounded sand, 5% fine gravel, dry, loose, no odor or staining			4611
								4667
8			0.0	65		SW SP		
			0.0	66				4658
								4762
9			0.0	60				
			0.0	80				4692
								4807
10			0.0	75	TD = 10ft bgs No gw encountered Fill material			

5C_062

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5c group 3	Location ID 62
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5ft
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/22/10 1045	Date/Time Total Depth Reached 10/22/10 1100
Type of Sampling Device trowel / shovel		Samples Collected 1009 - 1100 2-1/2 gallon bags	
Geologist I. Stone		Checked by/Date TSW 10/28/10	
Radiological Background 11	Radiological Equipment Used Micro R	PID Used Mini RAE 2000 (Background = 1.9 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	0-0.5	0.5	~~4.3~~ ~~4.7~~ 4.2	12	Silty Sand, Brown (7.5YR, 4/3), 60% fine grained sand, 40% silt, med dense, subangular, dry slight odor, no staining.	SM	
					total depth = 0.5ft no gw encountered.		

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 3	Location ID 62
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 3.5'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/23/10 1000	Date/Time Total Depth Reached 11/23/10 1005
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10092 (1000)	2 - 1/2 gal bags
Geologist Cartwright		Checked by/Date [signature] 4/26/11	
Radiological Background 56 / 2655	Radiological Equipment Used Pancake / Borehole gamma logger	PID Used Mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 70.5 2598 (CPM) 3036
			0.0	41	Surface : grass			
0.5			0.0	40	Silty Sand : Brown (10YR 5/3), moist, loose, no odor, 35% silt, 10% clay, 15% coarse, 20% medium sand, 20% fine sand	SM		4091
1.0			0.0	30	Silty Sandy Silt : Brown (10YR 5/3), moist, med. stiff, no odor, 35% fine sand, 65% silt, non cohesive, no plasticity	ML		4698
			0.0	30				4878
2.0			0.0	45				5068
	sample 2		0.0	50	Clay w/ silt : Yellowish brown (10YR 5/4), moist, stiff, no odor, 25% silt, 10% fine sand, 5% medium sand, 60% clay, cohesive, low plasticity	CL		5538
3.0			0.0	40	Sandy clay : Yellowish brown (10YR 5/4), moist, stiff, no odor, 5% coarse sand, 10% medium sand, 20% fine sand, 10% silt, 55% clay	SC CL		5422
					Bedrock : Chatsworth Fm: light yellowish brown (10YR 6/4), dry, hard, no odor, fine sand, friable	Kcs		
			0.0	40		Kcs		NM
					refusal @ 3.5' bgs			
4.0								
					No GW encountered			
5.0								
6.0								

5C_063

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 3	Location ID 63
Drilling Company: Bart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 5.5ft
Drilling Equipment Geoprobe	Borehole Diameter 13/4"	Date/Time Drilling Started 11/24/10 0818	Date/Time Total Depth Reached 11/24/10 0823
Type of Sampling Device 1 3/4 macro core acetate liner		Samples Collected 10093 - 0845 2- 1/2 gallon bags	
Geologist I. Stone		Checked by/Date [signature] 4/26/11	
Radiological Background 2545 / 43	Radiological Equipment Used Downhole / Pancake	PID Used Mini RAE 2000	background (0.0)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0	0-5'	2.0	0.0	50	Sandy Silt, Brown (4/3 10YR)		3601
		1.0	0.0	50	70% silt, 30% fine grained sand, dry, low-med dense, low strength, low toughness,	ML	4747
1			0.0	60	no odor or staining, trace rock fragments from 4-8 inches bgs.		5178
			0.0	60			5268
2		2.0	0.0	60			5148
			0.0	65			5089
					Clayey Silt, Dark Brown (3/3 10YR)		
3		0.0	0.0	60	~~70%~~ 65% silt, 30% clay, 5% fine grained Sand, dry, med dense, no odor or staining, low strength, low toughness	ML	5041
			0.0	50			4921
4		2.0	0.0	55			4966
			0.0	55	Clayey silt w/ sand: 60% silt, 25% clay, 15% fine grained Sand, dry, some mottling. Grayish Brown (5/2 10YR)	ML	5178
					Silty Sand, Yellowish brown (5/8 10YR)	SM	
5		0.0	0.0	40	70% fine grained, subrounded sand, 30% silt, dry, ~~med~~ loose med dense, no odor or staining		5284
			0.0	55			NM
					TD = 5.5ft		
6					No GW encountered		

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HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 3	Location ID 64
Drilling Company Bart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 7.0 ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/24/10 0935	Date/Time Total Depth Reached 11/24/10 0939
Type of Sampling Device 1 3/4" macrocore acetate liner		Samples Collected 1009A - 1000 2 - 1/2 gallon bags	
Geologist I. Stone		Checked by/Date 4/26/11	
Radiological Background 2662 / 51	Radiological Equipment Used Downhole Gamma / Pancake	PID Used Mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 (CPM)
			0.0	60	Sandy silt, Brown (4/4 10YR) 70% silt, 30% sand, dry, low strength, low toughness, low plasticity.	ML	3266
			0.0	60			4596
1			0.0	55	~~Sandy silt~~ ~~Clayey silt~~ Sandy silt, Brown (4/3 10YR) ~~55 60%~~ 55% silt, 40% ~~fine grained~~ fine grained sand, 5% clay, low strength, low toughness, dry, no odor or staining, med dense	ML	3958
			0.0	65			4943
2			0.0	65			5021
			0.0	50	Silty Sand, Brown (5/3 10YR) 60% sand, 40% silt, dry low dense, no odor, no staining Sand range - fine - medium (90% fine / 10% medium)	SM	5109
3	Sample		0.0	45			5940
			0.0	50	Sandy silt, light brown (6/4 10YR) 70% silt, 30% fine grained sand, dry, med dense, low strength, low toughness, no odor or staining		4804
4			0.0	55		ML	4817
			0.0	50	Clayey silt, light brown (6/4 10YR) 60% ~~70%~~ silt, 30% clay, 10% fine grained sand dry, med dense, some roots (max size 1/8" dia)		4540
5			0.0	50			4812
			0.0	65	Silty sand, Reddish Yellow (6/6 10YR) 80% fine grained subrounded sand, 20% silt, dry, loose/low dense, no odor or staining	SM	4929
6			0.0	55			5140

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
2662 / 51	SSFL Area IV Radiological Study	EP9038.01.22.04.03	64

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6			0.0	55				5140
			0.0	75		SM		5320
					- same as above, med dense			
7			0.0	75				5445
					TD = 7.0 Ft bgs			
					No gw encountered			

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group SC / 3	Location ID #65, 10095
Drilling Company HGL	Driller M. Engle	Ground Elevation —	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter —	Date/Time Drilling Started 10-22 / 1003	Date/Time Total Depth Reached 10-22 / 1015
Type of Sampling Device trowel / shovel		Samples Collected 2 - 1/2 gall bags ID 10095 1005	
Geologist C. Carmichael		Checked by/Date TAW 10/28/10	
Radiological Background Micro R: 23, ~~6.4~~ 6.6 ppm (PID)	Radiological Equipment Used Model 19 μR meter	PID Used Mini Rae 2000 (Background = 6.6 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	0.5'	0.5'	1.9 ~~2.5~~ ppm	23 ~~19~~ 1 ce	Silty Sand (10 YR, 3/5), brown, moist, loose, 75% medium sized sand, 25% silt, trace rootlets, sub-rounded cobbles of probable fill, well graded sand with sub-rounded to sub-angular grains, low plasticity.	SM		

No groundwater encountered.

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5L / 13	Location ID 65
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 3.5
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-23-10 0835	Date/Time Total Depth Reached 11-23-10 0850
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10096 (0840) 2 - 1/2 gal bags	
Geologist C Knight		Checked by/Date [signature] 4/26/11	
Radiological Background 38 / 24972	Radiological Equipment Used Pancake / Downhole logger	PID Used mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings $\pm$0.5 2580 (CPM)
			0.0	50	surfacing rass. Silt w/ clay: Dark yellowish brown (10YR 3/6) moist, soft, no odor, 25% clay, 10% fine sand, 65% silt, trace gravel and asphalt pieces	AF/ML		2776
0.5			0.0	45				4100
					Silt: Yellowish brown (10YR 5/4), moist, ~~dry~~ med. stiff (CK) no odor, 10% fine sand, 10% clay, 80% silt, low plasticity	ML		
1.0			0.0	40				4999
								5254
			0.0	30				
								5171
2.0	Sample		0.0	50				
					Clay: Dark yellowish brown (10YR 4/6), moist, stiff, no odor, 10% fine sand, 10% silt, 80% clay, cohesive, low plasticity	CL		4887
			0.0	50				
								4763
3.0			0.0	50				
					weathered bedrock sandstone: Chatsworth Formation: light yellowish brown (10YR 6/4), dry, hard, no odor, 10% medium sand, 90% fine sand	Kcs		NM
			0.0	50				
					refusal @ 3.5' bgs			
4.0					No GW encountered			

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID/Group 5C / 3	Location ID 66
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5ft
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1455	Date/Time Total Depth Reached 10/21/10 1510
Type of Sampling Device trowel/shovel		Samples Collected 10097-1510 2 - 1/2 gallon bags.	
Geologist I. Stone		Checked by/Date Cliff Kuyl 10/21/10 / QA 4/26/11	
Radiological Background 23	Radiological Equipment Used MR meter	PID Used mini RAE 2000	(Background = 7.9 ppm / 15)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	Sample		7.5	20	Silt w/sand, Very dark brown (7.5YR 2.5/2), 90% silt, 10% fine grained sand, low plasticity, soft, dry. lots of fine roots, fill material.	ML		

Total Depth = 0.5 ft
location at the base of a hill.
No GW encountered

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C/3	Location ID 66
Drilling Company: Boart longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 4'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/22/10 1210	Date/Time Total Depth Reached 11/22/10 1250
Type of Sampling Device 1-3/4" Macrocore		Samples Collected 10098 (1245) 2 - 1/2 gal bags	
Geologist C. Knight		Checked by/Date 4/27/11	
Radiological Background 49 cpm / 2747	Radiological Equipment Used Pancake / downhole logger	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.0			0.0	70	surface: grass		+0.5	2569
0.5			0.0	60	clayey silt: dark brown (10YR 3/3), moist, soft, no odor, 40% clay, 5% medium sand, 5% fine sand, 50% silt, cohesive, low plasticity, low toughness	ML		3297
1.0			0.0	55				4252
			0.0	60				4925
			0.0	60	Clay: dark yellowish brown (10YR 4/4), moist, stiff, no odor, 10% silt, 5% fine sand, 85% clay, med. toughness, low plasticity	CL		4885
2.0			0.0	60				4945
			0.0	70	Same as above	CL		5219
3.0			0.0	80	Bed rock sandstone: Chatsworth Formation: Very pale brown (10YR 7/4), dry, hard, no odor, fine grained sand	Kcs		5529
			0.0	85				5022
4.0			0.0	70				5117
					4.0' refusal at bedrock			
					No groundwater encountered			
5.0								
6.0								

5C_067

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID group 3, 5C	Location ID B57
Drilling Company HGL	Driller C. Carmichael	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1135	Date/Time Total Depth Reached 10/21/10 1150
Type of Sampling Device trowel / shovel		Samples Collected 1099 1140 2 - 1/2 gal bags	
Geologist C. Knight		Checked by/Date TSW 10/28/10	
Radiological Background 10	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 3.5 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		3.3	12µR	w/gravel Silty Sand: Dark yellowish brown (10YR 3/6), moist, stiff, no odor, 25% coarse subangular gravel, 15% coarse sand, 30% silt, 25% fine sand, 15% medium sand, trace asphalt, fill material No GW encountered TD = 0.5' bgs	SM		

HGL HydroGeoLogic, Inc

BORING LOG

Project Name: SSFL Area IV Radiological Study	Project Number: EP9038.01.22.04.03	Subarea ID & Group: 5C, 3	Location ID: 67
Drilling Company: Boart Longyear	Driller: D. Hansen	Ground Elevation: –	Total Drilled Depth: 4 ft
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4"	Date/Time Drilling Started: 11/18/10, 1015	Date/Time Total Depth Reached: 11/18/10, 1025
Type of Sampling Device: 1 3/4" macrocore		Samples Collected: 10100, 1020 (2) 1/2 gal bags	
Geologist: P. Skeath		Checked by/Date: [signature] 4/27/11	
Radiological Background: 71 cpm, 2959 cpm	Radiological Equipment Used: pancake, borehole & scanner	PID Used: Mini RAE 2000 (Background = 0.6 ppm)	

Depth (ft)	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM) 2738
	0.8	75	sandy silt, dark brown (10YR 3/3), dry, soft, 65% silt, 30% fine sand, 5% clay, low plasticity, trace rock fragments, no odor	ML	3543
	0.6	78			4869
1	0.8	105	~~silty c~~ (PS)		5261
	0.9	80			5523
2	0.8	50			5588
	0.9	50	silty clay, yellowish brown (10YR 5/4), dry, very stiff, 65% clay, 30% silt, 5% fine sands, 0% rock fragments, medium to high plasticity, trace rootlets, no odor	CL	5237
3	1.0	60			5555
	0.9	90	weathered siltstone, brownish yellow (10YR 6/6), hard		5652
4	0.9	90	siltstone Refusal TD = 4 ft Groundwater not reached		5627
5					

5C_068

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID (Group 5C/3	Location ID 68
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1135	Date/Time Total Depth Reached 10/21/10 1155
Type of Sampling Device trowel / shovel		Samples Collected 2 - 1/2 gallon bags 10/01 - 1155	
Geologist S. Shaw		Checked by/Date [signature] 10/21/10 / @ 4/27/11	
Radiological Background 23	Radiological Equipment Used MR meter	PID Used mini RAE 2000 (Background = ~~5.0~~ 6.9 PPM) IS	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	0-0.5	0-0.5	8.6	23	Sand, Brown (7.5YR 4/4), 90% fine to medium grained sand, 5% silt, 5% fine gravel (max .25 in), med dense, dry. fill material.	SP	
					Total depth: 0.5' No GW Encountered		

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c, 3	Location ID 68
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation –	Total Drilled Depth 4.5 ft
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/18/10, 1240	Date/Time Total Depth Reached 11/18/10, 1250
Type of Sampling Device 1 3/4" macrocore		Samples Collected 40102, 1245 (2) 1/2 gal bags	
Geologist P. Sweatt		Checked by/Date 4/27/11	
Radiological Background 63 cpm, 2847 cpm	Radiological Equipment Used pancake meter, Downhole γ scanner	PID Used Mini RAE 2000	(Background = 0.6 ppm

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0			0.9	75	Silt w/ sand, brown (10YR 4/3), dry, stiff, 70 % silt, 25 % fine sand, 5 % clay, trace rootlets, no odor, low plasticity, <5 % rock fragments	ML		3731 (R)
			0.9	120				5062
1.0			0.8	95				5484
			0.9	100				5492
2.0			0.8	95				5527
			1.0	70	silty clay, dark yellowish brown (10YR 4/4), dry, very stiff, 65 % clay, 30 % silt, 5 % fine sand, medium plasticity, no odor, 0% rock fragments	CL		5442
3.0			0.8	80				5193
			0.8	75	poorly graded sand w/ silt, yellowish brown (10YR 5/6), dry, medium dense sand, 85 % medium sand, 15 % silt, no odor, 10% common (R) sandstone rock fragments.	SP		5227
4.0			1.0	80				5255
			0.9	75				NM
5.0					sandstone Refusal Chatsworth formation			
					TD = 4.5' Groundwater not encountered			

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_069

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 3	Location ID: 69
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: 2.0 ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 11/9/10 0840		Date/Time Total Depth Reached: 11/9/10 0850
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10103 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: TBD 11/14/11		
Radiological Background: 44cpm / 3345cpm	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: 0.0 ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			N/A		Surface sample was not collected due to 3" of asphalt on surface and shallow 2.0' bgs refusal. Subsurface soil sample collected from 0.5-2.0' bgs		1	
1.0								
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

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HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c, 3	Location ID 69
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 2 ft
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/18/10, 0840	Date/Time Total Depth Reached 11/18/10, 0850
Type of Sampling Device 1 3/4" macro core		Samples Collected 10164, 0845 (2) 1/2 gal bags	
Geologist P. Skrath		Checked by/Date [signature] 4/27/11	
Radiological Background 44 cpm, 3345 cpm	Radiological Equipment Used Pancake, Downhole & scanner	PID Used Mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings ± 0.5 ft 2929 (CPM)
0			0.3	65	3" Asphalt surface ~~sand w/ silt~~, poorly graded gravelly sand (SP) w/ silt, yellowish brown (10YR 5/6), dry, very dark grey (10YR 3/1) gravel/asphalt fill, soft 85% medium sand, 15% silt, many gravel, no odor.	SP		3260
			0.3	60				4384
1.0			0.2	75	Silt, yellowish brown (10YR 5/8), dry, soft, 95% silt, 5% fine sand, ~~15%~~ abundant siltstone, no odor.	ML		3312
			0.2	50				4928
								NM
2.0			0.2	89	Siltstone Refusal			

TD: 2.0'

Ground water not encountered

Asphalt: 3"

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 13	Location ID 70
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 10'
Drilling Equipment: Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-30-10/1230	Date/Time Total Depth Reached 11-30-10/1240
Type of Sampling Device: 1 3/4" macrocore		Samples Collected: 2 1/2 gall bags, #10105 (1235)	
Geologist: C. Carmichael		Checked by/Date: [signature] 4/27/11	
Radiological Background: 2844, 54 cpm	Radiological Equipment Used: pancake, downhole scanner	PID Used: mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	70	Asphalt – surficial 3 inches		0.5	2495
			0.0	70	Sandy silt with clay (10 YR, 3/2) dark brown, 70% silt, 20% fine grained sand, 10% clay, low plasticity, low toughness, trace asphalt pea gravel.	~~SM~~ ML		2952
1'				85				4483
				95				5477
2'				100				5079
				100				5658
3'				60				5333
				75				5290
4'				65	Sand with silt (10 YR, 5/6), light reddish brown, 90% well-graded, fine to medium grained, subrounded sand, 10% silt, no toughness or plasticity, loose, dry.	SW SP		5374
				80	Silty clay, ~~with~~ (10 YR, 3/2), dark brown, 60% clay, 40% silt, trace fine sand, medium toughness and plasticity.	CL		5590
5'				65	Sand with silt (same as above – 2nd layer)	SW		5438
				40	Silty clay (same as 3rd layer)	CL		5529
6'				45				5095
								5051

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2844, 54 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	70

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.0	50				4924
7'				55				4801
				40				4849
8'				65				4941
				45	..... Gradational Contact			4841
					Clayey silt with sand (10 YR, 4/6), reddish brown, 65% silt, 25% clay, 10% fine grained sand, low plasticity, low toughness.	ML		
9'				80				4923
				60				4995
10'				65				—
					Goal depth of 10' reached. No groundwater encountered.			

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HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C 13	Location ID 71
Drilling Company Beart Longyear	Driller D. Harsen	Ground Elevation –	Total Drilled Depth 9.5'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/29/10 1300	Date/Time Total Depth Reached 11/29/10 1330
Type of Sampling Device 1 3/4" ~~Geoprobe~~ (dir) Macrocore		Samples Collected 10106 (1320) (2) 1/2 gal bags	
Geologist C. Knight		Checked by/Date 4/27/11	
Radiological Background 69 cpm / 2485	Radiological Equipment Used Pancake / Ludlum logger	PID Used Mini Rae 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 2220 (CPM) 3622
0			0.0	50	4" Asphalt surface			
0.5			0.0	60	Fill Material: Silty Sand: Very dark grayish brown (2.5Y 3/2), moist, medium dense, no odor, 35% silt, 5% coarse sand, 10% medium sand, 45% fine sand, 5% fine gravel, mottled texture, trace clay pockets	SF/SM		4891
1.0			0.0	65				5613
			0.0	70				5584
2.0			0.0	65				5560
			0.0	65				5553
3.0			0.0	60	Artificial fill: well graded sand; Yellowish brown (10YR 4/4), moist, medium dense, no odor, 5% silt, 15% coarse sand, 30% medium sand, 50% fine sand, trace gravel fine mottled texture, trace Fe staining	SF/SW		5349
			0.0	70				5117
4.0			0.0	60	Silt: Very dark grayish brown (10YR 3/2), very moist, soft to medium stiff, no odor, 10% fine sand, 10% clay, 80% silt, low toughness, low plasticity, slow dilatancy, non cohesive	(CL) ML		4657
			0.0	60				4805
5.0			0.0	70	Clay: Very dark grayish brown (10YR 3/2) moist, stiff, no odor, 10% silt, 10% fine sand, 80% clay, low plasticity, medium toughness, high dry strength	CL		4788
			0.0	60				4764
6.0			0.0	50				4836

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
69cpm/2485	SSFL Area IV Radiological Study	EP9038.01.22.04.03	71

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	50	Clay: Same as above	CL		4836
			0.0	55				5040
7.0			0.0	50				5066
			0.0	60				5277
			0.0	65				5437
8.0			0.0		Poorly graded Sand: Brownish yellow (10YR 6/8), moist, dense, no odor, fine sand	SP		
			0.0	50				5386
9.0			0.0	50	-some silt packets in fine sand			5496
			0.0	60				5522
					refusal @ 9.5' bgs			NM
10.0			0.0	60				

No GW encountered

5C_072

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 3	Location ID 72
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1114	Date/Time Total Depth Reached 10/21/10 1125
Type of Sampling Device trowel / shovel		Samples Collected 10107_1120 2 - ½ gallon plastic bags	
Geologist I. Stone		Checked by/Date [signature] 11/21/10 / [initials] 4/27/11	

Radiological Background	Radiological Equipment Used	PID Used
23	uR meter	min. RAE 2000 (Background = 6.1 ppm) IS

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample	X	6.3	22	Sand w/ Silt + Gravel, Brown (7.5YR 4/2), 80% fine to medium grained Sand, 10% fine-coarse gravel (max=1"), 10% silt, med dense, dry, fill material. ~~Gravel~~ IS	SP		

total depth 0.5 ft

No GW encountered

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BORING LOG

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 3	Location ID 72
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 8.5 ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/17/10 1420	Date/Time Total Depth Reached 11/17/10 1431
Type of Sampling Device 1 3/4" macrocore acetate liner		Samples Collected 1010 8 - 1435 2 - 1/2 gallon bags	
Geologist I. Stone		Checked by/Date 4/27/11	
Radiological Background 3036 cpm / 84 cpm	Radiological Equipment Used Downhole / 44-9 Pancake	PID Used mini RAE 2000	Background (1.2)

Depth	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM) Inches 0.5 = 2695
	1.2	68	Gravelly SAND, Pale brown (6/3 10YR) 70% sand, 30% gravel (fine), fill, dry, (fine-medium) no odor or staining, granitic gravel	SP	2636
	1.1	31			2849
					4148
1	1.2	84	Sandy Silt, Dark Grayish Brown (4/2 10YR) 75% silt, 25% fine grained sand, low strength, dry, no odor or staining	ML	
	1.2	96			4900
2	1.3	62			5412
	1.2	75	Silty Clay, Dark Brown (3/3 10YR) 70% clay, 25% silt, 5% fine grained sand, dry, medium plasticity, medium strength, no odor or staining	CL	5280
3	1.2	46			5001
	1.3	53			4926
4	1.2	82	Clayey Silt, Dark yellowish brown (3/4 10YR) 60% silt, 30% clay, 10% fine sand, dry, medium plasticity, medium strength	ML	4865
	1.3	99			5089
5	1.2	90	Silty SAND, Yellowish Brown (5/6 10YR) 60% fine grained sand, 40% silt, med. dense	SM	5092
	1.4	29	Silty SAND, Yellowish Brown (5/6 10YR) 70% fine grained sand, 30% silt, low dense		5223
6	1.2	56			5058

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
3036 / 84	SSFL Area IV Radiological Study	EP9038.01.22.04.03	72

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			1.2	56	Same as above			5058
			1.2	44				4944
7			1.2	99	Silty SAND, Brownish yellow (6/6 10YR)	SM		4852
			1.2	73	80% fine grained sand, 20% silt,			4936
					medium dense, no odor or staining			
8			1.1	81				4776
			1.2	73				5353
					TD = 8.5ft bgs			
9					no GW encountered			

5C_073

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BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C, Group 3	#73, 10109
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	P. Skeath	NA	0.5'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	NA	10-27-10/1020	10-27-10/1036
Type of Sampling Device		**Samples Collected**	
trowel / shovel		2 - 1/2 gall bags (ID 10109) (time 1025)	
Geologist		**Checked by/Date**	
C. Carmichael		TBW 10/29/10 / 4/29/11	

Radiological Background	Radiological Equipment Used	PID Used
(PID) 0.3, 13 (MicroR)	µR meter	Mini Rae 2000 (Background = 0.3 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'	0.5'	0.5'	0.2	13	Sandy silt, (10 YR 4/4), ~~35~~ 65% medium grained sand (subrounded), 65% silt, brown, moist, loose, trace rootlets, trace/few cobbles of asphalt and fill rock fragments.	~~SM~~ ML		
					No groundwater encountered.			

5C_074

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 3 5C	Location ID 74
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation /	Total Drilled Depth 9 ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-30-10/1008	Date/Time Total Depth Reached 11-30-10/1015
Type of Sampling Device 1 3/4" macrocore		Samples Collected 2 1/2 gallon bags #10110(1010)	
Geologist C. Carmichael		Checked by/Date [signature] 4/27/11	
Radiological Background 2205, 52 cpm	Radiological Equipment Used pancake, downhole scanner	PID Used mini RAE 2000 (Background=0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
							0.5	2467
							0	3359
			0.0	55	Asphalt (3 inches)			
			0.0	65	Sand with silt, (10YR, 4/6), light reddish brown, 85% fine grained, subrounded, poorly graded sand, 10% silt, 5% asphalt gravel, loose, dry, no toughness or plasticity.	SM		4903
1'			0.0	60				5496
			0.0	25				5682
2'			0.0	90				5598
			0.0	70				5253
3'			0.0	58	Silty clay, (10 YR, 3/2), dark brown, 60% clay, 40% silt, stiff, medium toughness, medium-high plasticity.	CL		5092
			0.0	35				4945
4'			0.0	25				4891
			0.0	45				4892
5'			0.0	60				4957
			0.0	100	Same as above, except with Iron-oxide tinting and trace fine sand (<5%)			4863
6'			0.0	85				4959

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2205, 52 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	74

Depth	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM)
	0.0	60			4790
7'	0.0	60			4743
	0.0	75	Gradational contact. Silty Sand (10 YR, 4/4), light brown, ~~75~~ 70%, fine to medium grained, well-graded sand, 30% silt, trace clay (diminishing with depth), low toughness and plasticity.	SM	4546
8'	0.0	65			4568
	0.0	80	Same as above, except 90% sand, 10% silt	SP	4613
					4917
9'	0.0	30			

Refusal hit at 9 ft.

No groundwater encountered.

5C_075

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C 13	Location ID 75
Drilling Company Boart Longyear	Driller D. Hanson	Ground Elevation —	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/29/10 1450	Date/Time Total Depth Reached 11/29/10 1510
Type of Sampling Device 1 3/4" Macro Core		Samples Collected 10111 (1455)	2 - 1/2 gal bags
Geologist C. Knight		Checked by/Date	4/27/11
Radiological Background 471 cpm / 2314 cpm	Radiological Equipment Used Pancake / Borehole Logger gamma	PID Used Mini Rae 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
							0.5	2377
			0.0	60	3.5" Asphalt surface	AS		3849
0.5			0.0	45	Fill material; silty sand; dark yellowish brown (10YR 4/6), moist, med. dense, no odor, 30% silt, 10% coarse sand, 25% medium sand, 35% fine sand, trace fine gravel, mottled (10) (12)	SM		5128
1.0			0.0	35				5545
			0.0	38	Fill: Poorly graded Sand: Yellowish brown (10YR 5/8), moist, medium dense, no odor, 5% coarse sand, 80% medium sand, 15% fine sand	SP		5577
2.0			0.0	40				5372
			0.0	48				5376
								5064
3.0	5cm/0/2		0.0	55	Silt w/ Sand: dark brown (10YR 3/3), moist, medium stiff, no odor, 25% fine sand, 75% silt, non cohesive, low plasticity, low toughness	ML		4934
			0.0	25				4808
4.0			0.0	25	Clay w/ silt: dark brown (10YR 3/3), moist, medium stiff, no odor, 15% silt, 10% fine sand, 75% clay, low plasticity, med dry strength, med toughness	CL		4750
			0.0	45				4889
5.0			0.0	40				4663
			0.0	40				4647
6.0			0.0	40				

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
41 cpm / 23 14 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	75

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	40	Same as above; increasing sand content and Yellowish brown (10YR 5/8)	CL		4647
			0.0	30				4675
7.0			0.0	50				4679
			0.0	50				4727
8.0			0.0	60				4783
			0.0	70	Sandy silt; clark yellowish brown (10YR 4/6), moist, stiff, no odor, 35% fine sand, 10% clay, 55% silt, low toughness, low plasticity	ML		4768
9.0			0.0	50				5132
			0.0	40	Same as above increasing sand content to fine sand: silty Sand 65% fine sand, 35% silt	SP		4938
10.0			0.0	60				NM
					Total depth 10.0' No GW encountered			

5C_076

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5c / 3	Location ID 10112, #76
Drilling Company HGL	Driller I. Stone	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-22 / 0940	Date/Time Total Depth Reached 10-22 / 1005
Type of Sampling Device trowel / shovel		Samples Collected 2 - 1/2 gallon bags 10112 - 1005	
Geologist C. Carmichael		Checked by/Date TBJ 10/28/10	
Radiological Background 12	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 2.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'	1 grab	X	2.5	10	Sandy Clay, Dark brown (10YR 3/3), 40% Sand, 60% clay, low plasticity, dry, no odor or staining, fill material.	CL		

total depth = 0.5ft

Ambient PID = 3.0 ppm

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 3	Location ID 76
Drilling Company: Bort Longyear	Driller Dr. Hansen	Ground Elevation —	Total Drilled Depth 4.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/23/10 1440	Date/Time Total Depth Reached 11/23/10 1450
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10113 (1445)	(2) 1/2 gal bag
Geologist C Knight		Checked by/Date	5/19/11
Radiological Background 42/25 37 cpm	Radiological Equipment Used pancake/downhole logger	PID Used Mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.0			0.0	45	Surface: Soil Fill: Silt w/ sand: dark yellowish brown (10YR 4/4), slightly moist, soft, no odor, 25% medium sand, 5% gravel, 60% silt, 10% clay	FILL	0.0 = 3360
0.5			0.0	50			0.5 = 4795
					gradational contact		
					Silt: same as above: 90% silt, 10% fine sand	ML	1.0 = 5033
1.0			0.0	45	Clay: dark yellowish brown (10YR 4/6), moist, stiff, no odor, 5% coarse, 5% medium, 5% fine sand, 85% clay cohesive	CL	1.5 = 4945
			0.0	45			
2.0			0.0	40			2.0 = 4868
							2.5 = 5011
			0.0	40			
3.0			0.0	40	Weathered Sandstone Bedrock: Chatsworth Formation: Yellow (10YR 7/6), dry, hard, no odor, 10% medium, 90% fine sand	Kcs	3.0 = 5153
			0.0	50			3.5 = 5153
4.0			0.0	65			4.0 = NM
					refusal on bedrock @ 4.0' bgs		
					No GW encountered		
5.0							
6.0							

Sample

5C_077

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 3	Location ID #11, 10114
Drilling Company HGL	Driller C. Knight	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-22 / 0920	Date/Time Total Depth Reached 10-22 / 0940
Type of Sampling Device trowel / shovel		Samples Collected ID 10114 0925 2 1/2 gallon bags	
Geologist Chelsea Carmichael		Checked by/Date TRW 10/29/10	
Radiological Background (MicroR) 23, 1.4 ppm (PID)	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'	Sample	1	1.0	20	Silty sand (10YR, 3/4), brown, moist, loose, 75% fine-medium sized sand, 25% silt, trace rootlets, rounded cobbles, well graded / poorly sorted sand, sub-rounded grains, low plasticity.	SM		

No groundwater encountered.

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 3	Location ID 77
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation	Total Drilled Depth 4.0'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/23/10 / 1045	Date/Time Total Depth Reached 11/23/10 / 1100
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10/15 (1100)	2 1/2 gal bags
Geologist C. Knight		Checked by/Date	4/27/11
Radiological Background 36/2568	Radiological Equipment Used pancake / downhole logger	PID Used mini RAE 2000	(Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches 0-5 2475 (CPM) 2996
			0.0	45	surface: gravel		
0.5			0.0	60	Silt w/ sand: dark yellowish brown (10YR 4/4), slightly moist, soft - med stiff, no odor, 5% coarse, 5% medium, 15% fine sand, 75% silt, non cohesive, low plasticity	ML	4454
1.0			0.0	60	clay: dark yellowish brown (10YR 4/4), moist, stiff no odor, 5% fine sand, 5% medium sand, 10% silt, 80% clay, low plasticity, med. to thin beds, trace rootlets		5197
			0.0	70			5230
2.0			0.0	50			5119
	Sample		0.0	50		CL	5300
3.0			0.0	50	- blocky texture w/ increasing fine sand		5766
			0.0	55			6017
4.0			0.0	95	weathered Chatsworth Formation sandstone: light yellowish brown (10YR 6/4), dry, hard, no odor, fine sand	Kcs	NM
					refusal @ 4.0' bgs		
					No GW encountered		

5C_078

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID group 3, 5C	Location ID 78
Drilling Company HGL	Driller C. Carmichael	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1455	Date/Time Total Depth Reached 10/21/10 1515
Type of Sampling Device trowel / shovel		Samples Collected 10116 1500 (2) 1/2 gal bags	
Geologist C. Knight		Checked by/Date TEW 10/28/10	
Radiological Background 10	Radiological Equipment Used ΔR meter	PID Used Mini Rae 2000 (Background = 2.8 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	0.5	0.5	2.9	11μR	Silt: dark yellowish brown (10 YR 4/4), moist, loose, no odor, 15% fine sand, 85% silt, non cohesive, trace rootlets.	ML		

TD: 0.5'

NO GW encountered

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 3	Location ID 78
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 7.5'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/22/10 1410	Date/Time Total Depth Reached 11/22/10 1430
Type of Sampling Device 1-3/4" Geoprobe		Samples Collected 10117 (1420) 2- 1/2 gal bags	
Geologist C. Knight		Checked by/Date 4/27/11	
Radiological Background 49 cpm / 2632	Radiological Equipment Used Pancake/Downhole Logger	PID Used Mini Rae 2000 (Background = 0.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 10.5 2354 (CPM)
			0.2	45	surface = grass			2529
0.5			0.2	50	Silty / clay : Dark yellowish brown (10YR 3/6), moist, soft, no odor, 15% fine sand, 25% clay, 60% silt, cohesive, low plasticity	ML		4543
1.0			0.2	40				3943
			0.2	50				4811
2.0			0.2	50	Sandy Clay : dark yellowish brown (10YR 4/4), moist, stiff, no odor, 5% coarse sand, 10% medium sand, 20% fine sand, 10% silt, 55% clay, cohesive, low plasticity, med. toughness, increasing sand toward bottom	SC CL		4874
			0.2	60				4903
3.0			0.3	50				5268
			0.3	45				5354
4.0			0.3	70				5486
			0.3	45	gradational contact			5617
5.0			0.3	45	Sand w/ Silt : Yellowish brown (10YR 5/8), dry, med. dense, no odor, 10% medium sand, 20% silt, 70% fine sand, mottled brown and red texture, trace coarse sand (Fe staining?)	SP		5698
			0.2	45				5613
6.0			0.2	50				5468

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
HG 12632	SSFL Area IV Radiological Study	EP9038.01.22.04.03	78

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.2	50	same as above			5468
			0.2	45	weathered sandstone bedrock; weathers to poorly graded sand: yellowish brown (10YR 5/8), dry, very dense, no odor, fine sand, some Fe staining	SP		5256
7.0			0.2	65				5379
			0.2	66				NM
					refusal @ 7.5' bgs			
8.0					No GW encountered			
9.0								
10.0								

5C_079

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C group 3	Location ID 79
Drilling Company HGL	Driller C. Carmichael	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1055	Date/Time Total Depth Reached 10/21/10 1120
Type of Sampling Device trowel / shovel		Samples Collected 10118 1100 2 - 1/2 gal bags	
Geologist C. Knight		Checked by/Date TBW 10/28/10 / @ 4/27/11	
Radiological Background 12 µR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 8.2 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.25"					well graded sand w/ gravel; Brown (10YR 4/3), moist, dense, no odor, 25% crushed gravel subangular, 10% silt, 35% coarse sand, 20% medium, 10% fine sand, seems like road base, fill material	SW		
0.5			8.0	11	Silt: dark yellowish brown (10YR 3/6), moist, med stiff, no odor, 10% fine sand, 10% clay, 80% silt, cohesive, non plastic	ML		

TD = 0.5' bgs
No GW encountered

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 3	Location ID 79
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth ~~DFT~~ ID 9.5 ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 13/4"	Date/Time Drilling Started 4/17/10 1055	Date/Time Total Depth Reached 4/17/10 1101
Type of Sampling Device 1 3/4" macrocore Acetate liner		Samples Collected 1019-1105 2- 1/2 gallon bags	
Geologist I. Stone		Checked by/Date 4/27/11	
Radiological Background 2833 / 53	Radiological Equipment Used Downhole / 44-9 Pancake	PID Used Mini RAE 2000 (Background = 0.5 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5' 2769 (CPM)
			0.6	55	Sandy Silt, Brown (4/3 10YR)		3290
			0.5	92	60% silt, 30% fine grained sand, 10% clay		4474
1			0.6	41	dry, low plasticity, low strength.	ML	5220
			0.6	81	no odor, no staining		5211
2			0.6	80			4971
			0.5	78	Silty Clay, Very dark grayish Brown (3/2 10YR)		5071
3			0.6	54	60% clay, 35% silt, 5% fine grained Sand, dry, medium plasticity, medium strength, no odor or staining	CL	4948
			0.6	70			5306
							5267
4			0.6	57	Silty Sand, Yellowish Brown (5/8 10YR)		5845
			0.5	101	60% fine grained sand, 40% silt, med dense, dry, no odor or staining	SM	
5			0.6	83			6137
					Same as above, except (5/6 ~~7.5~~ YR) Strong Brown		
			0.6	49	70% fine grained sand, 30% silt		6158
6			0.6	52			5221

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2833 / 55	SSFL Area IV Radiological Study	EP9038.01.22.04.03	79

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.6	52	same as above			5221
			0.6	19				5126
7			0.6	101		SM		5175
			0.6	97				5469
								5725
8			0.8	62				
			0.7	62	Clayey silt w/sand, light yellowish brown (6/4 10YR) 50% silt, 40% clay, 10% fine grained sand, low plasticity, low strength, dry, no odor or staining, some mottling	ML		5836
9			0.6	67				5663
			0.6	82				NM
					TD = 9.5 ft bgs			
10					~~TD = 95 ft bgs~~ JS No GW encountered			

5C_080

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 3	Location ID 80
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 1050	Date/Time Total Depth Reached 10/21/10 1110
Type of Sampling Device trowel / shovel		Samples Collected 10120-1110 2-1/2 gallon plastic bags	
Geologist I. Stone		Checked by/Date [signature] 10/21/10	@ 4/27/11
Radiological Background 22	Radiological Equipment Used MR meter	PID Used Mini RAE 2000 (Background = 2.9 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5			4.6	22	Silty Sand, Dark Brown (7.5YR 3/2), 60% fine grained sand, 40% silt, trace cobbles, med dense, dry, fill. No odor or staining.	SM		
					TD: 0.5'			
					No GW encountered			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SL 3	Location ID 80
Drilling Company: Boart Longyear	Driller D. Hanson	Ground Elevation NA	Total Drilled Depth 8.5
Drilling Equipment: Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/17/10 0830	Date/Time Total Depth Reached 11/17/10 0838
Type of Sampling Device: 1 3/4" macrocore Acetate liners		Samples Collected 10121 - 0845 (Duplicates collected) 2 - 1/2 gallon bags 10237 (MS) 0845 ~~10238 (FieldDup) No time~~ 10216 (Lab Dup) 0845	
Geologist: I. Stone		Checked by/Date 4/27/11	
Radiological Background: 2597 / 36	Radiological Equipment Used: Downhole / 44-9 Pancake	PID Used: Mini RAE 2000	Background (0.0)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 2847 (CPM)
			0.1	63	Sandy Silt, Dark Brown (3/3 10YR)		0.5	3008
			0.1	102	70% silt, 30% very fine grained sand,	ML		4565
					Dry, low strength, low plasticity.	~~SM~~ SS		
1			0.1	36	no odor or staining. Trace roots in			5021
			0.1	52	top 3".			4851
								4752
2			0.2	51				
			0.1	36	Silty Clay, very dark grayish brown (3/2 10YR)			4804
					60% ~~silt~~ clay SS, 35% silt, 5% fine			
3			0.1	52	grained sand, dry, medium	CL		4802
					strength, medium plasticity.			
			0.2	59	dry, no odor or staining			4982
								4970
4			0.2	60				
					Silty Sand, Dark yellowish brown (4/6 10YR)			5330
			0.2	58	70% fine grained subrounded sand,			
					30% silt, low density, dry, no			
5			0.1	57	odor or staining	SM		5127
			0.2	82	Same as above, except			4848
					60% fine grained, 40% silt			
			0.2	84				4806
6								

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
2597 / 36	SSFL Area IV Radiological Study	EP9038.01.22.04.03	80

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6			0.2	88				4806
			0.1	43				4793
7			0.1	96	Same as above except yellowish brown (5/8 10YR) med dense,	SM		4928
			0.1	74				4979
8			0.2	104				5282
			0.1	78				5909
					TD = 8.5ft bgs No GW encountered			
9								
10								

5C_081

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 3	Location ID 81
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 4ft
Drilling Equipment: Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/17/10 1315	Date/Time Total Depth Reached 11/17/10 1317
Type of Sampling Device: 1 3/4" macrocore acetate liner		Samples Collected 10122- 1325 2-1/2 gallon bags	
Geologist: I. Stone		Checked by/Date: 4/27/11	
Radiological Background: 3520 / 55	Radiological Equipment Used: Downhole / 44-9 pancake	PID Used: Mini RAE 2000	Background (0.8)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings: Inches to 0.5' 3369 (CPM)
			0.9	81	Asphalt		5137
			1.1	83	Gravelly SAND, Yellowish Brown (5/4 10YR), Dry, loose 70% sand, 25% gravel, 5% silt, no odor or staining	SP	4767
1			1.0	84	Silty Clay Dark yellowish brown (4/4 10YR), 80% clay, 20% silt, (medium stiff, medium tough, medium plasticity, dry, no odor or staining, fill material		4693
			1.1	81		CL	4909
2			1.1	108			4941
			1.1	115			5063
3			1.1	52	Silty Sand, Yellowish Brown (5/6 10YR) 60% fine grained sand, 40% silt, dry, mod dense, no odor or staining		4825
			1.1	92		SM	4933
4			1.2	103	Silty SAND Brownish Yellow (6/8 10YR) 60% fine weathered bedrock 60% fine-medium grained sand, subrounded, 20% silt, dry, ~~rock dense~~ loose density, no odor or staining		5018
					TD = 4' bgs NO GW encountered		

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_082

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 4	Location ID: 82
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: 2.0 ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 11/16/10 0948		Date/Time Total Depth Reached: 11/16/10 1000
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10124 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: BRD 11/14/11		

Radiological Background: 47cpm / 2640cpm

Radiological Equipment Used: ~~Micro R~~ / Downhole / Pancake Meters

PID Used: Mini Rae 2000 - Background: 0.0 ppm

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			N/A		Surface sample was not collected due to 3" of asphalt on surface and shallow 2' bgs refusal. Subsurface soil sample collected from 0.5 to 2.0 bgs		1	
1.0								
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_082

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 4	Location ID 82
Drilling Company Boart Longyear	Driller Don Hansen	Ground Elevation —	Total Drilled Depth 1.9'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-16-10 0948	Date/Time Total Depth Reached 11-16-10 1000
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10125 (0855) 2-1/2 gal bags	
Geologist C. Knight		Checked by/Date [signature] 4/27/11	
Radiological Background 97 cpm / 2610 cpm	Radiological Equipment Used Pancake / Downhole logger	PID Used mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM)
			0.0	45	3" Asphalt at surface		+0.5 2489 / 3249
0.5			0.0	85	Poorly graded Sand: Brownish Yellow (10YR 6/6), moist, dense, no odor, 5% fine, 5% coarse, 90% medium sand	SP	4944
1.0			0.0	50			5675
1.5	1.5' bedrock		0.0	65	Chatsworth Formation; Sandstone Bedrock; Brownish Yellow (10YR 6/6), slightly moist, hard, no odor, 80% fine grained sand, 20% coarse grained sand	Kcs	5921 / 5854 @ 1.6' bgs
2.0			NM	NM	refusal @ 1.9' bgs		
					TD = 1.9' bgs		
					No GW encountered		
3.0							
4.0							
5.0							
6.0							

5C_083

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 4	Location ID 83
Drilling Company: Bort Longyear	Driller: Don Hansen	Ground Elevation: –	Total Drilled Depth: 3.5'
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4"	Date/Time Drilling Started: 11-16-10 1255	Date/Time Total Depth Reached: 11-16-10 1310
Type of Sampling Device: 1 3/4" Macrocore		Samples Collected: 10126 (1300) 2 1/2 gal bags	
Geologist: C. Knight		Checked by/Date: 4/27/11	
Radiological Background: 51 / 3516	Radiological Equipment Used: Pancake / Downhole logger	PID Used: Mini RAE 2000 (Background = 0.2 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.6	70	3" Asphalt surface		+0.5	3387
0.5			0.6	70	Fill Material: Clay: Yellowish brown (10YR 5/4), moist, stiff, no odor, 15% fine sand, 15% silt, 70% clay, cohesive, low plasticity, low toughness, heavily mottled, Asphalt chunks in upper surface	Af/CL		~~3263~~ 3953 (CR)
1.0			0.6	75				~~4817~~ 6228 (CR)
			0.5	70				~~5371~~ 5621 (CR)
2.0			0.5	70	Weathered Bedrock: Chatsworth Formation: Olive (5Y 5/3) dry, hard-dense, no odor, siltstone beds, friable, 80% silt (CR)	Kcs		~~5656~~ 6499 (CR)
			0.5	70	20% fine sand			~~5654~~ 6546 (CR)
3.0			0.5	80				~~5772~~ 6504 (CR)
			0.5	70	Sandstone for last 4" of core, weathered and fine to medium sand.			~~6021~~ 6293 (CR)
CLC 4.0					refusal in bedrock @ 3.5'			NM NM (CR)
					T.D. 3.5'			
CLC 5.0					No GW encountered			
6.0								

5C_084

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 4	Location ID 84
Drilling Company: Bort Longyear	Driller Don Hansen	Ground Elevation —	Total Drilled Depth 4.0'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-16-10 / 1020	Date/Time Total Depth Reached 11-16-10 / 1045
Type of Sampling Device 1-3/4" Macrocore		Samples Collected 10127 (1030) 2 - 1/2 gal bags	
Geologist C. Knight		Checked by/Date [signature] 4/28/11.	

Radiological Background	Radiological Equipment Used	PID Used
47 cpm / 3034 cpm	Pancake / Downhole logger	mini RAE 2000 (Background = 0.4 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM)
							+0.5 3322
			0.5	90	3" Asphalt Surface		4455
0.5			0.4	50			5010
1.0			0.4	45	Artificial fill: Clay w/sand: light yellowish brown (2.5Y 6/4), moist, med. stiff, no odor, 10% fine, 10% medium sand, 10% silt, 70% clay, cohesive, med. plasticity, trace 3/4" gravel in upper section, pockets of silt, mottled	Af / CL	4428
			0.5	86			5625
2.0	Sample		0.5	50	Weathered Sandstone bedrock: Chatsworth Formation: Pale yellow (2.5Y 7/4), dry, dense to hard, no odor, 60% fine sand, 20% medium sand, 20% silt, siltstone layers at 3.0' and 3.5' approx 4 inches thickness, trace iron oxide staining	Kcs	5782
			0.5	80			5700
3.0			0.5	NO			5684
			0.5	70	-increase medium sand content, little silt present		5413
4.0			0.5	110	refusal @ 4.0' bgs		NM
					T.D. 4.0' bgs No GW encountered		
5.0							
6.0							

5C_085

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C / 4	85
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	Don Hansen	–	3.5'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
6600 Geoprobe	1 3/4"	11-16-10 / 1416	11-16-10 / 1428
Type of Sampling Device		**Samples Collected**	
1 3/4" Macrocore		10120 (1430)	2 - 1/2 gal bags
Geologist		**Checked by/Date**	
C. Knight		4/28/11	
Radiological Background	**Radiological Equipment Used**	**PID Used**	
56 / 2613	Pancake / Bunkde Logger	mini RAE 2000	(Background = 1.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 2490 (CPM) 3263
0.0			1.0	60	3" Asphalt surface	AS		
0.5		1.1		85	Silt; dark yellowish brown (10YR 3/4), moist, med. stiff, noncoh., 10% fine sand, 90% silt, non cohesive, slow dilatancy, fill material	ML		4817
1.0		1.0		70	fill material; silty Sand: Yellowish brown (10YR 5/4), moist, medium dense, no odor, 35% silt, 15% coarse sand, 25% medium, 25% fine sand, mottled texture	SM		5371
		1.0		60				5656
2.0		0.9		60				5654
	Sample	1.0		70	Weathered Sandstone/siltstone bedrock: Chatsworth Formation Yellowish brown (10YR 5/4), dry, hard, no odor, 10% coarse sand, 30% medium sand, 50% fine sand, 10% siltstone beds that are friable	Kcs		5572
3.0		1.0		70				6021
		NM		NM	increase grain size at end of horiz			NM
					3.5' refusal on bedrock			
4.0					NO GW encountered			
5.0								
6.0								

5C_086

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study

Project Number: EP9038.01.22.04.03

Subarea ID: 5c, group 4

Location ID: 86

Drilling Company: HGL

Driller: P. Skeath

Ground Elevation: NA

Total Drilled Depth: 0.5ft

Drilling Equipment: trowel / shovel

Borehole Diameter: NA

Date/Time Drilling Started: 10/22/10 1442

Date/Time Total Depth Reached: 10/22/10 1455

Type of Sampling Device: trowel / shovel

Samples Collected: 10/29 – 1455 2. 1/2 gallon bags

Geologist: I. Stone

Checked by/Date: TB 10/28/10 @ 4/28/11

Radiological Background: 10

Radiological Equipment Used: μR meter

PID Used: Mini Rae 2000 (Background=0.8ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings: Inches	Borehole Gamma Readings: (CPM)
0.5	sample	X	0.9	12	Silty Clay w/sand, Dark yellowish brown (10YR 4/4), ~~60%~~ 55% clay, ~~30%~~ 30% silt, ~~10%~~ 15% fine grained sand, med plasticity, med hard, dry, no odor, no staining.	CL		

total depth 0.5ft
NO GW encountered

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5L 4	Location ID 86
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 8.0 ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/11/10 1352	Date/Time Total Depth Reached 11/11/10 1359
Type of Sampling Device Direct push - 1 3/4" acetate liner		Samples Collected 10:30 - 11/11/10 - 1405 2 - 1/2 gallon Plastic bags	
Geologist I. Stone		Checked by/Date 4/28/11	
Radiological Background 2599 / 58	Radiological Equipment Used Downhole / Pancake	PID Used mini RAE 2000 (Background = 0.1 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5' 2599 (CPM)
			0.1	67	Sandy silt, Brown (4/4 7.5YR)		3152
			0.1	69	60% silt, 40% very fine grained		4627
1			0.2	78	sand, dry, medium dense, no odor or staining.	IS SM	5173
			0.2	57		~~SM~~ IS	5501
						ML	
2			0.1	95			5330
			0.2	84			5145
							IS ~~5145~~ 5122
3			0.1	119	Silty clay, Strong Brown (4/6 7.5YR)		
			0.2	85	65% ~~70%~~ IS clay, ~~25%~~ ~~30%~~ 30% silt, 5% fine grained sand	CL	5209
4			0.1	61	dry, medium stiff, medium plasticity, no odor or staining		5219
			0.1	75	Silty Sand, Strong Brown (5/6 7.5YR)		5236
					70% fine grained subrounded sand, 30%	SM	
5			0.1	63	silt, medium dense, no odor or staining, dry.		5203
			0.1	80	Silty SAND, Reddish Brown (6/6 7.5YR) 75% fine grained sand, 25% silt, dry,	SM	5167
			0.2	63	dense, no odor or staining		5239

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2599 / 58	SSFL Area IV Radiological Study	EP9038.01.22.04.03	86

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6			0.1	63	Silty SAND, same as above			5239
			0.2	81				5364
7			0.3	110				5232
			0.3	70				5252
8			0.3	60				5121
					TD = 8.0 ft No gw encountered			
					Refusal @ 8.0 ft ~~No GW encd~~			

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_087

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 4	Location ID: 87
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: 2.0 ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 11/15/10 1445		Date/Time Total Depth Reached: 11/15/10 1510
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10131C NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: TBW 11/14/11		
Radiological Background: 343 cpm / 55 cpm	Radiological Equipment Used: ~~Micro~~ R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: 0.0 ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			N/A		No Surface soil sample collected due to 4" asphalt surface and shallow 2' bgs refusal. Sub surface soil sample collected from 0.5 to 2' bgs			
1.0							1	
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_087

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C/4	Location ID 87
Drilling Company Bort Longyear	Driller Dan Hanson	Ground Elevation –	Total Drilled Depth 2.0'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-15-10 1445	Date/Time Total Depth Reached 11-15-10 1510
Type of Sampling Device 1 3/4" Macrocore		Samples Collected L0132 (1450)	(2) 1/2 gal bags
Geologist C. Knight		Checked by/Date [signature] 4/28/11	
Radiological Background 55 / 3439	Radiological Equipment Used pancake/borehole logger	PID Used Mini RAE 2000	(Background = 1.3 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 3412 (CPM)
			1.3	21	4" Asphalt			4054
0.5			1.2	30	Bed rock sandstone; Chatsworth Formation: light yellowish brown (10YR 6/4), dry, hard, well cemented, 20% subangular coarse sand, 60% medium subangular sand, 20% fine sand	Kcs		6329
1.0			1.3	80				6037
			1.0	55				5830
2.0			1.3	60	refusal at 2.0' bgs on bedrock			NM
					TD : 2.0' bgs			
3.0					No GW encountered			
4.0								
5.0								
6.0								

5C_088

HGL HydroGeoLogic, Inc

BORING LOG

Surface Sample

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 74	Location ID 88
Drilling Company ~~Boart Longyear~~ HGL P.Skeath	Driller HGL (P. Skeath)	Ground Elevation —	Total Drilled Depth 0.5
Drilling Equipment trowel / slide hammer	Borehole Diameter NA	Date/Time Drilling Started 11-15-10 1135	Date/Time Total Depth Reached 11-15-10 1155
Type of Sampling Device trowel, shovel		Samples Collected 10133 (1145) (2) 1/2 gal bag	
Geologist C. Knight		Checked by/Date [signature] 4/28/11	
Radiological Background 81 / 2528	Radiological Equipment Used Pancake / Downhole logger	PID Used mini RAE 2000 (Background = 0.8 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	Sample		0.8	82	3" Asphalt; Silt w/ clay; Brown (10YR 5/4), moist, soft, no odor, 10% sand fine, 20% clay, 5% asphalt pieces, 65% silt, low plasticity	ML		
					TD 0.5' bgs			
					No GW encountered			
					Surface completion asphalt cold patch and compacted			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 4 5C	Location ID ~~1013~~ CC 88
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 9.5'
Drilling Equipment: Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-12-10/1300	Date/Time Total Depth Reached 11-12-10/1315
Type of Sampling Device: 1 3/4" macrocore		Samples Collected: 2 1/2 gall bags, #10134, 1310	
Geologist: C. Carmichael		Checked by/Date: 4/28/11	
Radiological Background: 0.2, 56, 2430	Radiological Equipment Used: pancake, downhole scanner	PID Used: mini RAE 2000 (Background = 0.2 ppm)	

Depth	Interval	Recovery	PID (ppm)	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.1	60	Asphalt makes up surficial 2" of core.			4602
			0.2	65	Asphalt rock fragments.			4891
					Gradational Contact			
1'			0.1	55	Sandy silt, dark brown, (10YR, 3/3), moist, medium stiff, 60% silt, 40% fine grained sand, low toughness, low plasticity.	ML		4975
			0.3	40				5060
2'			0.1	51				5020
			0.1	53				4897
								4937
3'			0.1	45	Sandy silt, same as above except dry and light brown (10YR, 5/4).	ML		
			0.0	65	Gradational Contact			4901
4'			0.1	65	Silt with sand and clay, brown, (10YR, 4/3), dry, medium stiff, 80% silt, 15% clay, 5% fine grained sand, medium toughness, low-medium plasticity.	ML		4720
			0.1	85	Silt with sand and clay, same as above, except appearance of iron-oxide staining (dotted throughout) and 65% silt, 30% fine grained sand, 5% clay, low toughness and plasticity.	ML		4761
5'			0.1	63				4698
			0.1	60				4574
6'			0.4	70				4648

0.5 - 2391

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
0.2, 56, 2430	SSFL Area IV Radiological Study	EP9038.01.22.04.03	88

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.1 ~~0.4~~	70	Gradational Contact Silty sand, reddish-brown, (10YR, 5/4), dry, medium dense sand, 65% fine to medium grained subrounded sand, 35% silt, low toughness, non-plastic.	SM		4832
7'			0.1	70				4711
					Silty sand, same as above except 80% medium grained and fine grained, well graded sand, 20% silt.	SM		4992
			0.1	60				
8'			0.0	60				5295
					Gradational Contact Sandy silt with clay, light reddish-brown, dry, medium stiff, 60% silt, 30% fine and medium grained sand, 10% clay, highly micaceous, low plasticity and low toughness.	ML		5163
			0.1 ~~0.0~~	60				
9'			0.3	70				5157
			0.4	65				No Measurement
10'					Refusal hit at 9.5 ft. No groundwater encountered.			

HGL HydroGeoLogic, Inc. Exceeding Expectations

SSFL BORING LOG

5C_089

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 7	Location ID: 89
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 2/4/11		Date/Time Total Depth Reached: 2/4/11
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10135 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: 11/14/11 TBD		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			NA		No sample collected in storm drain due to insufficient material volume		1	No down hole Gamma logging Collected
1.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_090

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 4	Location ID #90, 10136
Drilling Company HGL	Driller M. Engle	Ground Elevation —	Total Drilled Depth 0.5'
Drilling Equipment trowel, shovel	Borehole Diameter —	Date/Time Drilling Started 10-22-19 1440	Date/Time Total Depth Reached 10-22-19 1450
Type of Sampling Device trowel, shovel		Samples Collected ID 10136 2 - 1/2 gallon bags	1445
Geologist C. Carmichael		Checked by/Date TBS 10/28/10 / @ 5/19/14	
Radiological Background 21, 0.4 ppm	Radiological Equipment Used Model 19 µR meter	PID Used Mini Rae 2000 (Background = 0.4 ppm)	

Depth	Interval	Recovery	PID (ppm)	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5'	0-0.5'	0.5'	0.4	21	Sandy silt (10YR, 3/4), brown, moist, loose, trace sub-rounded gravel and 75% silt, 25% fine-grained sand, trace rootlets, no bedding observed (massive).	SM/ML		

TD = 0.5' bgs

No groundwater encountered.

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5L / 4	Location ID 90
Drilling Company: Bort Longyear	Driller Don Hanssen	Ground Elevation —	Total Drilled Depth ~~8.5'~~ 8.0' (CR)
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-15-10 1300	Date/Time Total Depth Reached 11-15-10 1320
Type of Sampling Device 1 3/4" Macrocore acetate liner		Samples Collected 10137 (1310) 2-1/2 gal bags	
Geologist C. Knight		Checked by/Date 4/28/11	
Radiological Background 51 / 2638	Radiological Equipment Used pancake / downhole logging	PID Used mini RAE 2000	(Background = 0.7 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings 10:5 2525 (CPM)
			0.7	40	ground surface: soil			2859
0.5			0.8	25	Fill Material clayey silt w/ sand: Brown (10YR 4/3), moist, med. stiff, no odor, 10% coarse sand, 10% medium sand, 5% fine sand, 35% clay, 40% silt, trace asphalt and concrete pieces, trace rootlets, trace siltstone fragments, trace angular fine gravel	AF/ ML		3989
1.0			0.7	65				4840
			0.8	75				4874
2.0			0.9	65				4885
			1.1	70				4966
					- siltstone fragment @ 2.9' bgs			
3.0			0.8	50				4961
			0.9	45				5104
4.0	Sample		0.6	75	Sandy Silt: Yellowish brown (10YR 5/6), moist, med. stiff, no odor, 5% coarse sand, 5% medium sand, 15% fine sand, 10% clay, 65% silt, low plasticity	ML		5016
			0.9	45				5044
5.0			0.9	45				5202
			0.8	60				4674
					contact			
6.0			0.8	75				4792

HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
51/2638	SSFL Area IV Radiological Study	EP9038.01.22.04.03	90

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	75	Bedrock weathered: Chatsworth Fm: weathers to silt and siltstone: light olive brown (2.5Y 5/4), dry, very dense, cohesive, low plasticity 35% siltstone gravel angular, 65% silt	Kcs		4742
			0.7	40				5056
7.0			0.9	20				5618
			0.8	60				5745
8.0			0.8	100	8.0' refusal in bedrock			5855
9.0					T. Depth: 8.0' bgs No Gw encountered			
10.0								

CK

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_091
Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 4	Location ID: 91
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 2/4/11		Date/Time Total Depth Reached: 2/4/11
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10138 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: TBD 1/11/14/11		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			NA		No Sample collected in storm drain due to insufficient material volume		1	No down hole Gamma logging Collected
1.0								
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_092

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 4	Location ID: 92
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 11/15/10		Date/Time Total Depth Reached: 11/15/10
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10139 (No Sample)		
Geologist: Cliff Knight		Checked By / Date: TSW 11/14/11		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			N/A		#92 location is inside a concrete V-ditch. The concrete is not allowed to be broken to access soil beneath, No soil sample collected		1	NA
1.0								
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_093

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C/4	Location ID 93
Drilling Company: Bort Longyear	Driller Don Hansen	Ground Elevation —	Total Drilled Depth 9.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/15/10 0840	Date/Time Total Depth Reached 11/15/10 0915
Type of Sampling Device 1 3/4" Macrocore acetate sleeve/liner		Samples Collected 10/40 (0850) 2-1/2gal bags	
Geologist C. Knight		Checked by/Date 5/19/11	
Radiological Background 42 / 3396	Radiological Equipment Used Pancake / Downhole	PID Used mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
			0.3	75	Surface ~~asphalt~~ asphalt 3" thick		3274
0.5			0.4	55	Silt: dark brown (10YR 3/3), moist, medium stiff, no odor, 10% fine sand, 10% clay, 80% silt, cohesive, low plasticity,	ML	4902 = 0.0' bgs
1.0			0.4	55			5215 = 0.5' bgs
			0.3	85			5406 = 1.0' bgs
2.0			0.3	60			5417 = 1.5' bgs
			0.5	70	Clay w/ silt (Brown (10YR 4/3), moist, medium stiff, no odor, 5% medium sand, 5% fine sand, 25% silt, 65% clay, cohesive low plasticity, medium toughness	CL	5286 = 2.0
3.0	Sample		0.4	55			5091 = 2.5
			0.4	48			4998 = 3.0
4.0			0.4	90			5037 = 3.5
			0.4	60	gradational change to ML		4915 = 4.0
5.0			0.3	60	Silt w/ Sand; Yellowish brown (10YR 5/4), moist, medium stiff, no odor, ~~10% silt~~, 10% clay, 5% medium sand, 20% fine sand, 65% silt, cohesive, low toughness, low plasticity	ML	5025 = 4.5
			0.3	40			5063 = 5.0
6.0			0.5	65	Poorly graded Sand w/ silt: Yellowish brown (10YR 5/4), moist, medium dense, no odor, 15% silt, 15% medium sand, 70% fine sand, rapid dilatancy, non cohesive	SP	5273 = 5.5

6.0' bgs = 5211

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Radiological Background	Project Name: SSFL Area IV Radiological Study	Project Number: EP9038.01.22.04.03	Location: 93

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.5	65	Same as above	SP		~~5273~~ 6.0 = 5211
			0.5	50				6.5 = 5217
7.0			0.4	30				7.0 = 4924
			0.4	65				7.5 = 4881
8.0			0.3	65				8.0 = 4962
			0.5	65	Weathered Chatsworth Formation (sandstone bedrock), weathers to; well graded sand; Yellowish brown (10YR 5/6), slightly moist, very dense, no odor, 5% silt, 25% fine sand, 40% medium sand, 30% coarse sand	Kcs / SW		8.5 = 4914
9.0			0.4	75	refusal at 9.0'			9.0 = 4775
10.0					Total depth 9.0' No GW encountered			

5C_094

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 74	Location ID 94
Drilling Company Boart Longyear	Driller Don Hansen	Ground Elevation —	Total Drilled Depth 9.5' bgs
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/15/10 1010	Date/Time Total Depth Reached 11/15/10 1025
Type of Sampling Device 1-1/3" Macrocore acetate liner		Samples Collected 1014) (1015)	(2) 1/2 gal bags
Geologist C. Knight		Checked by/Date [signature] 4/28/11	

Radiological Background	Radiological Equipment Used	PID Used
59 / 3413	Pancake / Downhole	mini RAE 2000 (Background=0.7 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM) 1015 ~~3275~~ 3316 CK
			0.4	65	Asphalt surface 2.5" thickness		~~4902~~ 4480 CK
0.5			0.8	100	Clay: Very dark grayish brown (10YR 3/2), moist, medium stiff, no odor, 10% silt, 5% fine sand, 5% medium sand, 80% clay, medium plasticity, medium toughness	CL	~~4480~~ 5050 CK
1.0			0.4	70			~~5050~~ 4895 CK
			0.7	100			~~4895~~ 5072 CK
2.0			0.9	88			~~5072~~ 5005 CK
			0.8	80			~~5005~~ 5043 CK
3.0			0.8	58			~~5043~~ 4937 CK
	Sample 1014		0.9	45	Clay w/ Sand: ~~very~~ dark yellowish brown (10YR 4/4), moist, medium stiff, no odor, 15% fine sand, 5% silt, 80% clay, med. toughness, low plasticity, pinhole pores (CK)	CL	~~4937~~ 4877 CK CK
4.0			0.8	35			~~4877~~ 5120 CK
			0.8	68			~~5120~~ 4977 CK
5.0			0.7	50			~~4961~~ 4961 CK
			0.9	45			~~4902~~ 4902 CK
				SP	Poorly graded Sand w/ silt: Brown (10YR 5/3), moist, med. dense, no odor, 25% silt, 75% fine sand, non cohesive, no toughness, rapid dilatancy	SP	
6.0			0.8	80			5043

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
59 / 3413	SSFL Area IV Radiological Study	EP9038.01.22.04.03	94

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.0	80	Same as above	SP		5043
			1.0	85				5450
7.0			1.1	110				5663
			1.1	65				5184
					Sandy Silt: Dark yellow brown (10YR4/4) moist, medium stiff, no odor, 35% fine sand, 5% medium sand, 50% silt, 10% clay, low plasticity.	ML		5049
8.0			1.1	85				5094
			0.9	85				
9.0			1.0	100	Silt w/ clay: Dark yellowish brown (10YR4/4), moist, medium stiff, no odor, trace coarse, 10% fine sand, 25% clay, 65% silt, trace gravel, low toughness, low plasticity	ML		5024
			1.2	100	@ refusal @ 9.5' bgs			5112
10.0								

Total Depth 9.5' bgs

No GW encountered

5C_095

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group SE / 4	Location ID #95, 10142
Drilling Company HGL	Driller M. Engle	Ground Elevation –	Total Drilled Depth @ 0.5' 1.5'
Drilling Equipment trowel, shovel	Borehole Diameter –	Date/Time Drilling Started 10-22/1409	Date/Time Total Depth Reached 10-22/1430
Type of Sampling Device trowel, shovel		Samples Collected ID 10142 1415 2 - 1/2 gallons bags	
Geologist C. Carmichael		Checked by/Date TSW 10/28/10 / @ 4/28/11	
Radiological Background 21, 0.0 ppm	Radiological Equipment Used Model 19 µR meter	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID (ppm)	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'	Sample				Gravel	GW		
1.0'					Gravel ↑			
1.5'			0.3	19	(1 ft of gravel (3/4") fill underlain by soil)	ML		
					Silt (10 YR, 3/2), 90% silt, ~~10~~ 5% fine grained sand, 5% clay, brown, moist, low-medium plasticity, ~~dense~~ stiff, poorly graded.			
					TD = 1.5' bgs No GW encountered			

HGL HydroGeoLogic, Inc

BORING LOG

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / group 5C / 4	Location ID 95
Drilling Company HGL	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth -0-
Drilling Equipment 6600 Geoprobe ~~@ trowel / shovel~~	Borehole Diameter ~~@ AJA~~ 1 3/4"	Date/Time Drilling Started ~~11-15-10~~ (SW) 11/12/10 /1225	Date/Time Total Depth Reached 11-15-10 (SW) 12 /1239
Type of Sampling Device ~~@ trowel / shovel~~ 1 = 3/4" Macrocore		Samples Collected NA	
Geologist C. Wright		Checked by/Date [signature] 5/19/11	
Radiological Background 29 / 2442	Radiological Equipment Used ~~@ Ratemeter~~ Pancake / Downhole gamma	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
					refusal @ 2.0' bgs on concrete conduit slurry. Red concrete near former transformer. No advancement of sampler			

5C_096

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5c Group 4	Location ID 96
Drilling Company HGL	Driller P. Skrasek	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/22/10 1409	Date/Time Total Depth Reached 10/22/10 1420
Type of Sampling Device trowel / shovel		Samples Collected 10/14 - 1420 2 - 1/2 gallon bags	
Geologist I. Strom		Checked by/Date 4/28/11	
Radiological Background 10	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		0.6	12	Silty Sand, Dark brown (7.5YR 3/2) w/ clay 70% fine grained sand, 20% silt, 10% clay lenses, trace rock fragments (granite), med dense, dry, (clay is non plastic and hard), no odor or staining. fill material. total depth = 0.5 ft Ambient PID = 0.3 ppm	SM		

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 4	Location ID 96
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 10'
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-12-10/0948	Date/Time Total Depth Reached 11-12-10/0955
Type of Sampling Device 1 3/4" macrocore		Samples Collected 2 1/2 gall bags, #10145, 0950	
Geologist C. Carmichael		Checked by/Date 5/19/11	
Radiological Background 0.0, 49, 2621	Radiological Equipment Used pancake, downhole scanner	PID Used mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.2	35	Surface is dominantly soil with sporadic asphalt rock fragments.		0.5	2389
			0.3	45	Sandy silt, brown, (10YR, 4/3), dry, loose, 75% silt, 25% very fine grained sand, common rootlets, low toughness, low plasticity.	ML		3001
1'			0.3	60				4769
			0.2	75				5235
								5045
2'			0.2	45	..... Gradational Contact			5075
			0.2	55	Silt with ~~sand and~~ clay, brown (10YR, 4/3), dry, medium stiff, 80% silt, 15% clay, 5% fine grained sand, medium toughness, low-medium plasticity.	ML CL ML		5094
3'	Sample		0.3	65	.....			5052
			0.3	65	Silt with sand and clay, same as above except iron-oxide staining is present and 75% silt, 10% clay, 15% fine grained, subrounded sand, low plasticity, low toughness.			5048
4'			0.2	65				5074
			0.3	45				5110
5'			0.2	70	.....			5146
			0.3	85	Same as above, except fine-grained white inclusions are common (probable precipitation of carbonate in cracks within soil) - cementation.			4904
6'			0.3	80				4263

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BORING LOG (cont'd)

Radiological Background		Project Name	Project Number	Location
49	2621	SSFL Area IV Radiological Study	EP9038.01.22.04.03	96

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.2	50	Same as above, except 80% fine-grained sand and 20% silt (clay has disappeared).	SM		5237
7'			0.2	50				5220
			0.2	60	..... Gradational Contact			5326
8'			0.2	50	Sand with silt, light brown, (10 YR, 6/4), dry, loose, 80% fine grained sand, 20% silt, very low plasticity, low toughness.	SM		5463
			0.3	50				5277
9'			0.3	60	..... Strong iron-oxide staining			4274
			0.2	60				5023
10'			0.4	55				5150

Goal depth (10') reached.
No groundwater encountered.

5C_097

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID/Group 5C/4	Location ID 97
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 1/4/11 / 1108	Date/Time Total Depth Reached 1/4/11 / 1113
Type of Sampling Device trowel / shovel		Samples Collected 2 1/2 gall bags (#10146)(1112)	
Geologist C. Carmichael		Checked by/Date [signature] 4/28/11	
Radiological Background 0.1, 14	Radiological Equipment Used ug Rmeter	PID Used Mini Rae 2000 (Background= 0.1ppm)	

Depth	Interval	Recovery	PID (PID)	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5'			0.1	14	Top 3" is asphalt. Clayey silt, (10 YR, 4/2), greyish-brown, 55% silt, 40% clay, 5% fine grained sand, some rootlets, stiff, ~~moist~~ cc semi-moist, trace gravel, no odor. No groundwater encountered.	ML		

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 4 5C	Location ~~ID~~ ~~10147~~ Ce 97
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 10 ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-12-10/0807	Date/Time Total Depth Reached 11-12-10/0811
Type of Sampling Device 1 3/4" macrocore		Samples Collected 2 1/2 gall bags, 10147, 0810	
Geologist C. Carmichael		Checked by/Date [signature] 4/28/11	
Radiological Background 0.0, 48, 2503	Radiological Equipment Used Pancake, downhole scanner	PID Used mini RAE 2000 (Background = 0.0 ppm)	

(PID)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM) 0.5 – 2526
			0.0	70	Surface has grass and trace rootlets. Silt with sand, brown, (10YR, 4/3), moist, soft, 85% silt, 15% fine-grained subrounded sand, trace rootlets and small subrounded pea gravel, low toughness and low-medium plasticity.	ML		2911
			0.0	70				4176
1'			0.0	70				5042
					Gradational Contact			
			0.0	65	Silty Sand, brown (10YR, 5/4), dry, medium dense, 65% fine to medium grained subrounded sand, 35% silt, low toughness, non-plastic, iron-oxide inclusions and sand-sized white particles.	SM		5168
2'			0.0	55				5303
			0.0	50				5287
3'			0.0	50				5133
			0.0	50				5228
4'			0.0	50				5452
			0.0	45	Silty sand, same as above, except 75% fine to medium grained, subrounded, well-graded sand, 25% silt.	SM		5385
5'			0.0	60	Sand with silt, light reddish-brown, (10YR, 6/3), dry, loose, 90% fine grained sand, 10% silt, apparent slough.	SP		5186
			0.0	60				5129
6'			0.0	65	Sandy silt, light reddish-brown (10YR, 6/3), dry, medium dense, 60% silt, 40% fine grained,	ML		4954

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BORING LOG (cont'd)

97

Radiological Background	Project Name	Project Number	Location
0.0, 48, 2503	SSFL Area IV Radiological Study	EP9038.01.22.04.03	~~10147~~ TSA

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.0	70	subrounded sand, low toughness, low plasticity.			5087
7'			0.0	65				5360
			0.0	70				5261
					..... Gradational Contact			
8'			0.0	60	Silty sand, reddish-brown, (10 YR, 4/6), dry, medium dense sand, 70% fine to medium grained subrounded sand, 30% silt, iron-oxide stained,	SM		5205
			0.0	75				4966
9'			0.0	60	..... Silty sand, same as above, except 60% fine grained sand, 40% silt.			5277
			0.0	40				5475
10'			0.0	60				5625
					No groundwater encountered. Goal depth (10') reached.			

5C_098

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, group 6	Location ID 098
Drilling Company HGL	Driller C-Carmichael C-Knight @	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 0910	Date/Time Total Depth Reached 10/21/10 0920
Type of Sampling Device trowel / shovel		Samples Collected 10150 0915 2-1/2gal bags	
Geologist C-Knight		Checked by/Date TRW 10/28/10 / @ 4/28/11	
Radiological Background 10 uR	Radiological Equipment Used uR meter	PID Used Mini Rae 2000 (Background = 1.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample	X	1.5	11 uR	Sand w/ silt: dark yellowish brown (10YR 4/4), moist, med. dense, no odor, 20% silt, 10% coarse gravel subangular, 30% fine sand, 20% coarse sand, 20% medium ~~coarse~~ subangular sand, trace rootlets and asphalt (CK)	SW		

TD: 0.5'

No GW encountered

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 3	Location ID 98
Drilling Company Bart Longyear	Driller Don Hansen	Ground Elevation —	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 3 3/4"	Date/Time Drilling Started 11-9-10 1205	Date/Time Total Depth Reached 11-9-10 1240
Type of Sampling Device 3 3/4" Macrocore		Samples Collected 10151 (1215)	2 - 1/2 gal bags
Geologist C. Knight		Checked by/Date	4/28/11
Radiological Background 50 / 2399	Radiological Equipment Used pancake / downhole gamma logger	PID Used mini RAE 2000	(Background = 0.3 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.3	90	Ground surface & grass		0.5'	1660
0.5			0.3	90	Sandy silt: dark yellowish brown (10YR 4/6), dry, soft, no odor, 10% medium, 25% fine sand, 10% clay, 55% silt, trace rootlets, cohesive, low plasticity	ML		2305 2624
1.0			0.3	90				2725
			0.3	90				2669
2.0			0.3	100				2528
			0.3	50				2471
3.0	Sample		0.3	70	Silty Sand: dark yellowish brown (10YR 4/4), moist, med. dense, no odor, 5% clay, 30% silt, 10% coarse subrounded sand, 15% medium sand, ~~50%~~ 40% fine sand (CK)	SM		2478
			0.3	75				2644
4.0			0.4	70				2661
			0.4	80				2772
5.0			0.3	95	$CaCO_3$ stringer @ 5.0' - trace			2737
			0.3	55				2825
6.0			0.3	60				2866

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
50 / 2399	SSFL Area IV Radiological Study	EP9038.01.22.04.03	98

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.0			0.3	50	Silty Sand : Yellowish brown (10YR 5/8), moist, dense, no odor, 40% silt, 5% clay, 10% medium subangular sand, 5% coarse sand, 40% fine sand, slow dilatancy, low toughness, cohesive	SM		2866
			0.4	45				2790
7.0			0.4	40				2788
			0.4	35				3022
8.0			0.3	45				2857
			0.3	25				2782
9.0			0.3	75				2624
			0.3	50	Same as above			NM
10.0			0.3	45				NM

TD : 10.0'
No GW encountered
The 2624 CPM measurement is closer to 9.5' than 9.0' and the remainder of the borehole Gamma readings shift slightly down w/ equal spacing.

5C_099

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BORING LOG

Sheet 1 of 1

Project Name: SSFL, Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 5	Location ID 99
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 0855	Date/Time Total Depth Reached 10/21/10 0910
Type of Sampling Device trowel / shovel		Samples Collected 10152-0900 2 - 1/2 gallon plastic bags	
Geologist I. Stone		Checked by/Date Cliff Knight 10/21/10 / @ 4/28/11	
Radiological Background 22	Radiological Equipment Used MR meter	PID Used mini RAE 2000 (Background = 6.1 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	0.5 ft		6.1	22	Silty sand, dark reddish brown (5YR 3/2) 70% sand fine grained, 25% silt, ~~Extra~~ 5% gravel, med dense, dry.	SM	
					total depth 0.5 ft Ambient PID is at 6.1 ppm No GW encountered		

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC / 5	Location ID 99
Drilling Company: Bort Longyear	Driller Don Hansen	Ground Elevation –	Total Drilled Depth 10.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-5-10 1340	Date/Time Total Depth Reached 11-5-10 1445
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10153 (1355) (2) 1/2 gal bag	Dups: 10236 (MS) 1355; 10225 (Field Dup) no time; 10215 (Lab Dup) 1355
Geologist C. Knight		Checked by/Date 4/28/11	
Radiological Background 50 / 800	Radiological Equipment Used Pancake / Downhole gamma logger	PID Used Mini RAE 2000 (Background = 0.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 (CPM)
0.5	1-5 Sample		0.5	70	Surface: grass Silt: Brown (10YR 4/3), moist, soft, no odor, 10% fine sand, 90% silt, trace rootlets, non cohesive, no dilatancy	ML	1564
			0.6	70			1957
1.0			0.4	55			2157
			0.6	75			2279
2.0			0.5	70			2214
			0.5	55	Clay: dark yellowish brown (10YR 4/4), dry, med. stiff, no odor, 5% coarse, 5% medium sand, 10% silt, 80% clay, cohesive, medium plasticity, high-med. dry strength	CL	2134
3.0			0.6	70			1910
			0.5	45			2164
4.0			0.5	40	Sandy Silt: yellowish brown (10YR 5/4), moist, stiff, no odor, 20% fine sand, 5% coarse, 10% medium sand, 10% clay, 55% silt, cohesive, low plasticity	ML	2093
			0.5	65			2191
5.0			0.6	100			2111
			0.4	70			2119
6.0			0.6	75			2002

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
50 / 800	SSFL Area IV Radiological Study	EP9038.01.22.04.03	99

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.6	75	Same as above	ML		2002
			0.6	75				2020
7.0			0.7	60				2013
			0.5	45				2051
			0.7	45 (CK)				2043
8.0					Silty Sand: light yellowish brown (10YR 6/4), moist, dense, no odor, 5% clay, 30% silt, 5% coarse, 10% medium sand, 50% fine sand, slow dilatancy	SM		2203
			0.7	80				2241
9.0			1.1	60				
			0.6	75 (CK)				2206
			0.6	75	Poorly graded Sand: light yellowish brown (10YR 6/4), moist, dense, no odor, 5% coarse subangular sand, 20% medium sand, 75% fine sand.	SP		
10.0			0.6	55				2253
					TD: 10.0'			
					No GW encountered			

5C_100

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 5	Location ID 100
Drilling Company HGL	Driller C.Carmichael ~~C.Knight~~ (CR)	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 0805	Date/Time Total Depth Reached 10/21/10 0830
Type of Sampling Device trowel / shovel		Samples Collected 10154 / 0815 (2) 1/2 gal bags	
Geologist C.Knight		Checked by/Date TBW 10/28/10 / @ 4/28/11	
Radiological Background 10	Radiological Equipment Used MP Rmeter	PID Used Mini Rae 2000 (Background=1.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	0.5'	0.5'	3.8	11 μR	Silt w/ Sand : Dark brown (10YR 3/3), moist, med. stiff, no odor, 5% subangular coarse gravel and asphalt pieces, 15% fine sand, 80% silt, trace rootlets, non cohesive, no plasticity, fill material	ML		
					TD: 0.5'			
					No GW encountered			

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5L 6	Location ID 100
Drilling Company: Boart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 9.5ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4	Date/Time Drilling Started 11/11/10 1155	Date/Time Total Depth Reached 11/11/10 1203
Type of Sampling Device Direct Push - Acetate liner 1 3/4 macrocore		Samples Collected 10155 - 11/11/10 - 1205 2 - 1/2 gallon bags	
Geologist I. Stone		Checked by/Date 4/28/11	
Radiological Background 2622 / 50	Radiological Equipment Used Downhole / Pancake	PID Used Mini RAE 2000	(Background=0.6)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches 5.5 2700 (CPM)
			0.3	37	Silty Sand, Brown (5/4 7.5YR)		3621
			0.3	60	60% fine grained subrounded sand, 40% silt		4766
1			0.3	53	Dry, ~~loose~~ IS medium dense, no odor or staining	SM	5159
			0.3	130			5332
2			0.4	72	Silty Sand, Brown (4/4 7.5YR)		5278
			0.3	66	60% fine grained sand, 20% medium grained sand, ~~30%~~ 20 IS silt.		5081
3			0.5	85	Dry, medium dense, no staining or odor.	SM	5016
			0.3	92			5035
							5269
4			0.3	70	Silty clays w/sand, Dark brown (3/2 7.5YR)		
			0.4	75	IS ~~70%~~ · 65% clay, 25% silt, 10% medium grained subrounded sand,	CL	5163
5			0.3	62	Dry, medium stiff, medium plasticity no odor or staining		5396
			0.2	51	Silty Sand, Reddish Yellow (6/6 7.5YR 80% fine grained sand subrounded, 20% silt,	SM	5279
6			0.2	74	dry, medium dense, no odor or staining, some mottling.		5320

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2622 / 50	SSFL Area IV Radiological Study	EP9038.01.22.04.03	100

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6			0.2	74	~~see above~~ 2)			5320
			0.2	109	Silty Sand, same as above			5467
7			0.1	76		SM		5418
			0.2	50				5268
8			0.2	40				5180
			0.2	76				5085
9			0.2	94				5330
			0.2	85				5190
					9.5' refusal			
10					No GW encountered			

5C_101

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5c / 5	Location ID 101
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 0810 10/21/10	Date/Time Total Depth Reached 10/21/10 0826
Type of Sampling Device trowel / shovel		Samples Collected 2 - 1/2 gallon plastic bags	CR 10156/0820
Geologist I. Stone		Checked by/Date [signature] 10/21/10 / @ 4/28/11	
Radiological Background 21	Radiological Equipment Used µR meter	PID Used Mini Rae 2000	(Background = 2.1 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	0.5 sample	0.5	2.0	21	Silty Sand, Dark brown (7.5 YR 3/3), 65% fine grained sand, med. dense, dry, 35% silt, dry,	SM		
					total depth 0.5 ft No GW encountered			

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 6	Location ID 101
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 8Ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/11/10 0946	Date/Time Total Depth Reached 11/11/10 0952
Type of Sampling Device Direct Push - Acetate liner 1 3/4" macrocore		Samples Collected 10157 - 11/11/10 - 1000 2- 1/2 gallon bags	
Geologist I. Strom		Checked by/Date 4/28/11	
Radiological Background 2736 / 38	Radiological Equipment Used Downhole / pancake	PID Used mini RAE 2000 (Background=0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 2551 (CPM)
			0.0	83	Silty Sand, shows Brown ~~(3/6 7.5YR)~~ (3/3 7.5YR) is	SM	2921
			0.0	75	60% fine grained subrounded sand, 40% silt		4436
1			0.0	52	Dry, medium dense, no odor or staining		4872
			0.0	50			4861
			0.0	91	Silty Clay, Brown (4/2 7.5YR)	CL	5095
2					70% clay, 25% silt, 5% fine grained sand		
			0.0	111	Dry, medium stiff, medium plasticity, medium dry strength, no odor or staining		4909
3			0.0	57			5056
			0.0	45			5310
4			0.0	78			5759
					Brownish yellow (6/6 7.5YR)		5804
			0.0	54			
5			0.0	96	Silty SAND, ~~Strong~~ Reddish Yellow (6/6 7.5YR)	SM	5862
			0.0	75	70% fine grained sand, 30% silt		5831
6			0.0	101	Dry, loose sand, no odor or staining		5618

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
2736 / 38	SSFL Area IV Radiological Study	EP9038.01.22.04.03	101

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6			0.0	101	SAND, ~~red-brown~~ (IS Strong Brown (5/6 7.5YR)	SP		5618
			0.0	93	~~90%~~ IS 95% fine grained sand, 5% silt, dry, loose, no odor or staining.			5591
7			0.0	94				5975
			0.0	93				6588
8			0.0	70				6394
					Refusal @ 8.0ft			
9					No GW encountered			
10								

5C_102

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C / 4	Location ID 102
Drilling Company Bort Longyear	Driller Don Hansen	Ground Elevation –	Total Drilled Depth 8.0'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 0835 11-9-10	Date/Time Total Depth Reached 11-9-10 0900
Type of Sampling Device 1-3/4" Macrocore		Samples Collected 10158 (0840) 2-1/2gal bags	
Geologist C. Knight		Checked by/Date 4/28/11	
Radiological Background 1771 / 2455	Radiological Equipment Used Pancake / downhole gamma meter	PID Used mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5 892 (CPM)
			0.5	60			1113
0.5			0.3	60	Silty Sand: Brown (10YR 5/3), moist, dense, no odor, 10% clay, 30% silt, ~~60%~~ 40% fine sand, 20% medium sand, trace coarse sand. (CLC)	SM	1750
1.0			1.0	80			1872
			0.0	70			1864
2.0			0.1	45			1909
			0.1	40			1907
					few (CLC) ~~Some~~ angular sandstone fine gravel fragments from 2-5 to 4.0' bgs in Poorly graded sand: Yellowish brown (10YR 5/6), moist, med. dense, no odor, ~~35%~~ 5% silt, 15% medium sand, 70% fine sand 10% sandstone gravel		
3.0			0.1	40			1818
			0.0	55			1772
4.0			0.2	50			1703
			0.2	60	note: driller has hard drilling encountered		1670
5.0			0.2	50	Poorly graded sand: yellowish brown (10YR 5/4), moist, very dense, no odor, weathered sandstone, 5% silt, 15% medium sand subangular, 80% fine sand	SP	1722
			0.1	45			1787
6.0			0.1	50	Silty sand: Yellowish brown (10YR 5/6), moist, very dense, no odor, 35% silt, 5% clay, 10% coarse, 20% medium, 30% fine sand	SM	1747

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
44 / 2555	SSFL Area IV Radiological Study	EP9038.01.22.04.03	102

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.1	30	same as above	SM		174
			0.2	50	Weathered Sandstone: Chatsworth Fm; weathers to Poorly graded sand: brownish yellow (10YR 6/8), dry, very dense, no odor, 10% coarse, 25% medium, 65% fine sand.	SP		NM
7.0			0.1	70				NM
			0.2	50				NM
8.0			0.1	75	refusal @ 8.0' bgs			NM
9.0					TD sampled 8.0' w/ 1 3/4" macrocore TD gamma scanned: 6' No GW encountered Hand auger attempt was performed to a refusal ~6.5' bgs to downhole gamma log			
10.0								

5C_103

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C group 5	Location ID 103
Drilling Company HGL	Driller C Knight CK C Knight C Gamache	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 0840	Date/Time Total Depth Reached 10/21/10 0855
Type of Sampling Device trowel / shovel		Samples Collected 10159 0850 2 - 1/2 gal bags	
Geologist C Knight		Checked by/Date TGW 10/28/10 / @ 4/28/11	
Radiological Background 11	Radiological Equipment Used uR meter	PID Used Mini Rae 2000 (Background = 3.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5			3.4	11uR	Silt w/ Sand: Brown (10YR 4/3), moist, med. stiff, no odor, 10% clay, 10% fine to coarse subrounded sand, 5% gravel up to 3/4" diameter, 75% silt, cohesive, low plasticity, possible fill material near surface	ML		

TD: 0.5'

No GW encountered

LocID = 103

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C	Location ID (ID 10160) 103
Drilling Company: Bart Longyear	Driller B-G D. Hansen	Ground Elevation —	Total Drilled Depth 10.5'
Drilling Equipment: Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-10-10 / 0909	Date/Time Total Depth Reached 11-10-10 / ~~10~~ cc 0939
Type of Sampling Device: 1 3/4" macrocore		Samples Collected ID 10160 2 1/2 gall bags 0920	
Geologist: C. Carmichael		Checked by/Date: 4/28/11	
Radiological Background: 0.1 ppm, 47, 2681	Radiological Equipment Used: Pancake, Downhole scanner	PID Used: mini RAE 2000 (Background = 0.1 ppm)	

Depth (ft)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM) 0.5 - 2561
			0.2	45	Sandy silt with gravel, brown, (10 YR, 4/4), 65% silt, 25% fine-grained, subangular sand, 10% gravel fill (mostly granite), subangular clasts, low toughness, low plasticity, No odor, dry.	ML	4165
			0.2	60			~~2561~~ cc 4869
1'			0.2	55			5066
			0.2	65			5329
2'			0.2	55	..... Gradational contact		5306
			0.2	55	Sandy silt, same as above, except fill gravel disappears and 75% silt, 25% fine to medium grained sand, dry.	ML	4962
3'			0.2	75			5040
			0.2	65			5165
4'			0.2	65	..... Gradational Contact ..... Sand with silt, reddish-brown (10 YR, 4/4), 90% fine to medium grained, subangular sand, 10% silt, dry, very low plasticity and toughness, medium-dense sand.	SM	5188
			0.2	65			5324
5'			0.2	60	Sandy silt (same as lithologic bed from 2'-4') - probable Slough.	ML	5348
			0.1	40	..... Gradational Contact ..... Sand with silt (same as SM layer above) except light brown in color (10 YR, 5/4),	SM	5494
6'			0.3	55			5461

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
0.1 ppm, 47, 268	SSFL Area IV Radiological Study	EP9038.01.22.04.03	103

Depth	Interval	Recovery	PID (PID)	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.2	50	poorly graded, subangular, ~~medium~~ fine grained sand.	SM		5304
7'			0.3	45	Sand is a reddish-brown (probable higher oxidized iron content) and sand becomes medium-well graded-			5255
			0.2	50	fine to medium grained.			4771
8'			0.2	55				4930
			0.2	60	Percentages become about 85%			4878
9'			0.2	50	fine to medium grained subangular sand, 15% silt.			5177
			0.2	55				5677
10'			0.2	50	Target depth (10') reached. No groundwater encountered.			5909

5C_104

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C / 5	Location ID 104
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 0830	Date/Time Total Depth Reached 10/21/10 0850
Type of Sampling Device trowel / shovel		Samples Collected 2-1/2 gallon bags 10161/0845	
Geologist I. Stone		Checked by/Date Cliff Knight 10/21/10 / @ 4/28/11	
Radiological Background 22	Radiological Equipment Used uR meter	PID Used Mini Rae 2000 (Background = 1.5 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	0.5ft	0.5ft	6.0	22	Silty Sand, Reddish Brown (5YR 4/4), 75% fine grained sand, 25% silt, med dense, dry, no odor or staining.	SM		5.7

total depth = 0.5 ft
ambient PID is approx. 6.1
No GW encountered

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 5	Location ID 104
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 10 ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/11/10 0815	Date/Time Total Depth Reached 11/11/10 0825
Type of Sampling Device Direct Push – Acetate liner 1 3/4" macrocore		Samples Collected 10162 – 11/11/10 : 0830 2 – 1/2 gallon plastic bags	
Geologist I. Stone		Checked by/Date [signature] 4/28/11	
Radiological Background 2931 / 48	Radiological Equipment Used Downhole / Pancake	PID Used mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +0.5' 2474 (CPM)
			0.0	42	Silty Sand, Brown (4/4 7.5YR) 60% fine grained subrounded sand, 40% silt. Dry, med dense, no odor or staining		3101
			0.0	65			4342
1			0.0	53		SM	5115
			0.0	64			5380
2			0.0	75			5348
			0.0	90			5204
					Sandy Silt, Brown (4/3 7.5YR) 70% silt, 25% fine grained sand, 5% clay Dry; low-medium dry strength, no odor or staining low plasticity	ML	5201
3			0.0	50			5245
			0.0	51	Silty Clay, Dark Brown (3/2 7.5YR) 60% clay, 35% silt, 5% fine grained sand. Dry, medium strength, medium plasticity, no odor, no staining, some mottling		5410
4			0.0	80		CL	5329
			0.0	61			5307
5			0.0	77	5% medium grained sand, 60% clay, 35% silt		5155
			0.0	114	Sandy Clay, Brown (4/2 7.5YR)		5053
			0.0	117	60% clay, 30% fine-medium grained sand, 10% silt cont'd	CL	

6

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
2931 / 48	SSFL Area IV Radiological Study	EP9038.01.22.04.03	104

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6			0.0	117	dry, medium stiff, medium plasticity, no odor or staining	CL		5053
			0.0	56				5151
					Silty Sand, yellowish brown (5/4 10YR)			
7			0.0	65	~~60~~ 70% fine grained subrounded sand, 30% silt. Dry, medium dense, no odor, or staining	SM		5252
			0.0	60				5176
								5118
8			0.0	33				
					80% fine grained sand, 20% silt			5203
			0.0	59				
								5238
9			0.0	66				
					SAND w/ silt, light yellowish brown (6/4 10YR)	SP/SM		5003
			0.0	74	90% fine grained sand, 10% silt, (weathered sandstone)	SP/SM		IS
10			0.0	62				5062
					TD: 10.0			
					No GW encountered			

HGL HydroGeoLogic, Inc Exceeding Expectations

SSFL BORING LOG

5C_105

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 5	Location ID: 105
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 2/4/11		Date/Time Total Depth Reached: 2/4/11
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10163 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: BW 11/14/11		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5					Storm drain did not have sufficient material volume to collect a sample		1	No down hole Gamma logging Collected
1.0							2	
2.0							3	
3.0							4	
4.0							5	
5.0							6	
6.0								

5C_106

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c, 5	Location ID 106
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth 10.0 ft
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/08/10, 1450	Date/Time Total Depth Reached 11/08/10, ~~1460~~ 1500
Type of Sampling Device 1 3/4" macro core		Samples Collected 10164, 1455	ID 10164 (2) 1/2 gal bags
Geologist P. Sxxxx		Checked by/Date [signature] 4/28/11	
Radiological Background 48cpm, 2525cpm	Radiological Equipment Used pancake meter, downhole & scanner	PID Used Mini RAE 2000 (Background = 0.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	+0.5 2282 (CPM)
0			0.4	30	clayey sand, dark yellowish brown (10 YR 4/6), dry, stiff, 50% medium sand, 10% silt, 40% clay, (PS) common ~~5%~~ rock fragments, no odor, medium plasticity	SC	0	3195
0.5			0.4	75			0.5	4357
1.0			0.4	90			1.0	4813
1.5			0.4	70	poorly graded sand w/ clay, yellowish brown (10YR 5/6), dry, loose sand, 65% medium sand, 10% silt, 25% clay, 0% rock fragments, no odor	(SC) ~~SP~~ SC	1.5	5004
2.0			0.4	80			2.0	5043
2.5	random samples		0.5	70			2.5	5147
3.0			0.4	42			3.0	5121
3.5			0.4	75			3.5	5055
4.0			0.4	55			4.0	4997
4.5			0.4	75			4.5	4889
5.0			0.4	50			5.0	4928
5.5			0.4	65	clayey sand, dark yellowish brown (10YR 4/6), dry, loose sand, 55% fine to medium sand, ~~35%~~ (PS), 10% silt, 35% clay, 0% rock fragments, no odor ~~stiff~~ (PS)	SC	5.5	4986
6.0			0.4	60			6.0	5206

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
48 cpm, 2525 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	106

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.4	60	from 6.25 to 7 ft 70% nonnative gravel rock fragments mixed in w/ clayey sand layer from above.	SC	6.0	5206
6.5			0.5	45			6.5	5366
7.0			0.4	65	same as above for soil description		7.0	5358
7.5			0.5	85			7.5	
8.0			0.4	50			8.0	
8.5			0.5	70			8.5	
9.0			0.4	50			9.0	
9.5 (6")			0.5	60			9.5	
10.0			0.5	50	T.D 10.0 ft Groundwater not encountered		10.0	

not measured due to pvc unable to sit down hole due to continuous collapse of hole.

5C_107

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, Group 5	Location ID 107
Drilling Company HGL	Driller C. Carmichael	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 0940	Date/Time Total Depth Reached 10/21/10 0955
Type of Sampling Device trowel / shovel		Samples Collected 10165 0945 2 1/2 gal bags	
Geologist C. Knight		Checked by/Date TSW 10/28/10 / JQ 4/28/11	
Radiological Background 10 µR/h	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0	Sample		1.9	10	well graded sand w/ silt : yellowish brown (10YR 5/4), moist, med. dense, no odor, 15% silt, 35% sub angular course sand, 20% medium sand, 30% fine sand, trace asphalt and sandstone gravel, likely fill material	SW		
0.5					TD: 0.5' No GW encountered			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c + 5	Location ID 107
Drilling Company Bart Longyear	Driller D. Hewson	Ground Elevation —	Total Drilled Depth 10.0 ft
Drilling Equipment 6600 Geoprobe	Borehole Diameter 13/4"	Date/Time Drilling Started 11/08/10 ; 1020	Date/Time Total Depth Reached 11/08/10 ; 1030
Type of Sampling Device 13/4" macro core		Samples Collected 1016, 1025 (2) 1/2 gal bags	
Geologist P. Steadh		Checked by/Date 4/28/11	
Radiological Background 443 cpm (B5), 2588 cpm (B3)	Radiological Equipment Used gamma meter, downhole gamma scanner	PID Used Mini RAE 2000 (Background = 0.5 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings + 0.5 2374 Inches	(CPM)
0			0.5	40	silt w/ clay, dark yellowish brown (10 YR 4,4), dry, medium stiff, v no odor (C1C), 10 % (P1) 15 fine sands, 65 % silt (P3), 20 % clay (P2), common roots, few non-native gravel fragments.	ML	0 3554	
0.5			0.5	70			0.5 4775	
1.0			0.5	60			1.0 5300	
1.5			0.4	80			1.5 5369	
2.0			0.5	50	clayey silt w/ sand, dark yellowish brown (10 YR 4,4), dry, stiff, v no odor (C1C), 25 % fine sands, 40 % silts, 35 % clay, medium plasticity, roots less, 0 % rock fragments.	ML	2.0 5179	
2.5			0.5	50			2.5 5196	
3.0			0.5	60			3.0 5084	
3.5			0.5	70			3.5 5050	
4.0			0.5	65			4.0 5091	
4.5			0.5	75			4.5 5112	
5.0			0.5	80	concrete rock fragments (30 %) from 5.0 to 5.5 ft bgs layered in with the above clayey silt w/ sand.		5.0 5181	
5.5			0.5	63			5.5 5294	
6.0			0.5	45			6.0 5293	

Sample Interval

BORING LOG (cont'd)

Sheet 2 of 2

HGL HydroGeoLogic, Inc

Radiological Background	Project Name	Project Number	Location
2588 cpm (PID) (Rad) 45 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	107

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.5	45	Same as previous soil layer		6.0	5293
6.5			0.5	45		ML	6.5	5313
7.0			0.5	70			7.0	5285
7.5			0.5	55			7.5	5108
8.0			0.5	45			8.0	4857
8.5			0.4	50			8.5	5035
9.0			0.5	50			9.0	4946
9.5			0.5	50			9.5	4925
10.0			0.5	60	target depth reached TD : 10.0 ft Groundwater not reached		10.0	not measured due to BTC end

5C_108

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 2 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group 5C/5	Location ID 108
Drilling Company HGL	Driller C. Garcia	Ground Elevation NA	Total Drilled Depth 0.5ft
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/21/10 0930	Date/Time Total Depth Reached 10/21/10 0939
Type of Sampling Device trowel/shovel		Samples Collected 2 - 1/2 gallon plastic bags 10/07-0940	
Geologist I. Strom		Checked by/Date Cliff Knight 10/21/10 / @ 4/28/11	
Radiological Background 21	Radiological Equipment Used rad meter	PID Used Mini Rae 2000 (Background = 5.9 ppm) IS	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM) 3.5
0.5	Sample		3.4	21	Silty Sand, Brown (7.5YR 4/3), 70% fine grained sand, 30% silt, med dense dry.	SM	
					total depth 0.5ft NO GW encountered		

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	Sc, 5	104
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	D. Hansen	—	10.0 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
6600 Geoprobe	1 3/4"	11/08/10, 1300	11/08/10, 1310
Type of Sampling Device		**Samples Collected**	
1 3/4" macro core		10168, 1305 (2) 1/2 gal bags	
Geologist		**Checked by/Date**	
P. Sheath		[signature] 4/28/11	

Radiological Background	Radiological Equipment Used	PID Used
57 cpm, 2537 cpm	pancake detector, downhole & scanner	Mini RAE 2000 (Background = 0.3 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings + 0.5 2761 (CPM)
0			0.3	38	Silt w/ fine sand, dark yellowish brown (10 YR 4/4), dry, very soft, 25 % fine sands, 70 % silt, 5 % clay, rootless, 0 % rock fragments, low plasticity	ML		4107
0.5			0.3	60			0.5	5057
1.0			0.4	70			1.0	5474
1.5			0.4	45			1.5	5110
2.0			0.3	70	Sandy clay, dark yellowish brown (10 YR 3/4), dry, very stiff, 35 % medium sand, 25 % silt, 40 % clay, rootless, 0 % rock fragments, high plasticity	CL	2.0	5043
2.5			0.3	60			2.5	5097
3.0			0.3	90			3.0	5218
3.5			0.3	80			3.5	5146
4.0			0.3	80	Clayey silt, dark yellowish brown (10 YR 4/6), dry, stiff, 15 % fine sand, 45 % silts, 40 % clay, rootless, 0 % rock fragments, medium plasticity	ML	4.0	5215
4.5			0.4	45			4.5	5239
5.0			0.3	55			5.0	5301
5.5			0.4	40			5.5	5455
6.0			0.3	45			6.0	5230

HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
57 cpm, 2537 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	108

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.3	45	same as previous layer of soil		6.0	5230
6.5			0.3	60		ML	6.5	5174
7.0			0.3	60			7.0	5225
7.5			0.3	50			7.5	5047
8.0			0.3	55			8.0	4954
8.5			0.4	60			8.5	4867
9.0			0.4	55			9.0	4939
9.5			0.4	65	Silty sand, dark yellowish brown (10YR 4/6) dry, loose sandy, moderate (CL) 70 % medium poorly graded sand, 25 % silt fines (FS), 5 % clay, nonplastic, 0 % Rock fragments	SM	9.5	4904
10.0			0.3	60	target soil sample depth reached		10.0	not measured due to PVC

TD = 10.0 ft

Groundwater not reached

5C_109

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c, 5	Location ID 109
Drilling Company: Bort Longyear	Driller: D. Hanson	Ground Elevation: —	Total Drilled Depth: 10.0 ft
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4"	Date/Time Drilling Started: 11/08/10, 0840	Date/Time Total Depth Reached: 11/08/10, 0850
Type of Sampling Device: 1 3/4" macro core		Samples Collected: 10169, 0845 (2) 1/2 gal bags	
Geologist: P. Skeath		Checked by/Date: 4/28/11	

Radiological Background: 3400 cpm, 2725 cpm (2)

Radiological Equipment Used: pancake meter, downhole gamma scanner

PID Used: Mini RAE 2000 (Background = 0.0 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings + 0.5 2618 (CPM)
0			0.0	55	sand w/ silt, dark yellowish brown (10YR 4/6), dry, medium dense, no odor	SM		3450
0.5			0.0	65	55 60 % fine well graded sand, 25 % silt, (85)		0.5	4994
1			0.0	65	20 % clay, rootless, 0 % rock fragments		1.0	5219
1.5			0.0	80			1.5	5267
2.0			0.0	60			2.0	5370
2.5			0.0	85			2.5	5016
3.0	Sample Interval		0.0	50	clayey silt, dark yellowish brown (10YR 3/6), dry, very stiff, v no odor, 20 % fine sands, 35 % clay, 45 % silt, rootless, 0 % rock fragments, medium plasticity	ML	3.0	5300
3.5			0.0	45			3.5	5183
4.0			0.1	45			4.0	5494
4.5			0.0	50			4.5	5330
5.0			0.0	85			5.0	5365
5.5			0.1	45			5.5	5209
6.0			0.1	55			6.0	5373

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
34 cpm, 2725 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	109

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.1	55	Silty sand, dark yellowish brown (10YR 4,6), med. dense, no odor (CL)	SM	6.0	5373
6.5			0.1	60	dry, 40% medium to fine subangular sand, 35% silt, 25% clay, rootless, 0% rock fragments		6.5	5227
7.0			0.1	90			7.0	5384
7.5			0.1	60			7.5	5202
8.0			0.1	40			8.0	5005
8.5			0.1	90			8.5	514
9.0			0.1	90			9.0	528
9.5			0.1	60			9.5	not measured due to pvc
10.0			0.1	70	target depth reached		10.0	

TD = 10.0 ft

Groundwater not reached

5C_110

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C	Location ID 110
Drilling Company Bart Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth ~~10.5~~ 10'
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-10-10/1113	Date/Time Total Depth Reached 11/10/1140
Type of Sampling Device Geoprobe 6600 - 1 3/4" macrocore		Samples Collected 2 1/2 gall bags ID 10170 1115	
Geologist C. Carmichael		Checked by/Date 4/28/11	
Radiological Background 0.7 ppm, 2777, 48	Radiological Equipment Used pancake, downhole scanner	PID Used mini RAE 2000 (Background = 0.7 ppm)	

Depth	Interval	Recovery	PID (PID)	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.7	25	Sandy silt, light brown, (10YR, 5/4), dry, loose, 70% silt, 30% fine-grained, subrounded sand, trace rock fragments (granite and asphalt) - pea gravel sized, common rootlets in surficial 0.5', low toughness and low plasticity.	ML	0.5	2688
			0.7	30				3779
1'			0.8	40				5221
			0.7	50	..... Gradational Contact			5587
					Silt with sand, same as above except trace rock fragments/gravel disappear and no rootlets, 90% silt and 10% fine grained, subrounded sand.			5652
2'			0.7	60				5544
			0.7	50				5368
3'			0.7	55				5255
			0.7	65	..... Gradational Contact			5103
					Silty clay with sand, light brown (10YR, 5/4), dry, stiff, 60% clay, 30% silt, 10% fine grained sand, medium toughness, medium/high plasticity, slow dilatancy.	CL		4911
4'			0.7	65				4932
			0.7	65				
5'			0.8	60	..... Gradational Contact			5810
					Silty clay with sand, same as above, except mottling appears, 50% clay, 35% silt, 15% fine to medium grained sand.			5207
			0.8	45				
6'			0.8	50	Apparent slough at 5'-5.5'			5042

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
0.7 ppm, 2777, 48	SSFL Area IV Radiological Study	EP9038.01.22.04.03	110

(110)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.8	75	Sandy silt, brown with white mottling, (10YR, 4/4), dry, medium dense, 65% silt, 30% fine to medium grained, well-graded subangular sand, 5% clay, low toughness and low plasticity.	ML		4950
7'			0.9	65				4875
			0.8	60				5048
8'			0.9	65	Iron-oxide, red tint to silt and sand appears.			4956
			0.7	65	Same as above, except 60% silt, 40% fine to medium grained sand, and only trace mottling.			4737
9'			0.8	55				4894
			0.8	65				5029
10'			0.9	70				5153

Goal depth (10') reached.

No groundwater apparently reached.

5C_111

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C	Location ID 111
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation —	Total Drilled Depth ~~10.5~~ 10'
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-10-10/1355	Date/Time Total Depth Reached 11-10-10/1350
Type of Sampling Device 1 3/4" macrocore		Samples Collected ID 10171 1340 2 1/2 gall bags	
Geologist C. Carmichael		Checked by/Date 4/28/11	

Radiological Background: 0.7 ppm, 44, 2697

Radiological Equipment Used: pancake, downhole scanner

PID Used: mini RAE 2000 (Background = 0.7 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.7	44	Background			3481
			0.8	45	Sandy silt with gravel, brown, dry, loose, (10 YR, 4/4), 60% silt, 30% fine grained, subrounded sand, 10% pea gravel, rootlets exist, low plasticity.	~~SM~~ ML		4747
1'			0.8	55	..... Gradational Contact ..... Silt with sand, brown, dry, medium-dense, (10 YR, 4/4), 90% silt, 10% fine to medium grained, subrounded sand, low plasticity and toughness, trace pea gravel.	ML		5411
			0.8	55				5406
2'			0.9	80				5377
			0.8	45				5212
3'			0.8	85	..... Gradational Contact ..... Clayey silt with sand, brown, (10 YR, 4/4), dry, stiff, 60% silt, 35% clay, 5% fine grained sand, medium toughness, medium-high plasticity, slow dilatancy.	~~ML~~ ML		4935
			0.9	50				5008
4'			0.8	55				4778
			1.0	45	→ slight amounts of white mottling begins.			4477
5'			0.9	80				4521
			0.9	65	Silt with clay and sand, brown, (10 YR, 4/4), dry, medium stiff, 80% silt, 10% clay, 10% fine grained sand, medium plasticity, low-medium toughness, trace mottling.			4470
6'			0.9	40				4803

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
0.7 ppm, 44, 2697	SSFL Area IV Radiological Study	EP9038.01.22.04.03	III

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
		(6)	0.9	50				4946
7'			1.0	50	..... Gradational Contact	ee SM ML		4793
		(7)	0.9	45	Sandy silt, brown (10YR, 5/4), moist, medium dense, 60% silt, 40% fine grained, subrounded sand, low toughness and plasticity.			4826
8'			1.0	70				5191
		(8)	0.9	75				5232
					Sand with silt, reddish brown, (10 YR, 5/6), dry, medium dense, 75% fine grained sand (subrounded), 25% silt, thread cannot be formed, non-plastic.	SM		
9'			1.0	50				5126
		(9)	1.0	100				4854
10'			1.0	75				5011
		(10)	1.0	45	Goal depth (10') reached.			
					No groundwater encountered.			

5C_112

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BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID / Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	HSA 5C / 5	112
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	~~S.C.~~ C. Knight	NA	0.5 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	NA	10.20.10 / ~~14:50~~ 14:45	10.20.10 / 15:05 / 0.5 ft
Type of Sampling Device		**Samples Collected**	
trowel / shovel		(0172, 14:50, (2) 1/2 gal bags	
Geologist		**Checked by/Date**	
D. Straith		ASW 10/28/10 / CB 4/28/11	

Radiological Background	Radiological Equipment Used	PID Used
12 nR	µR meter	Mini Rae 2000 (Background = 1.7 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
ft								
0.5	0.5		1.7 ppm	9 nR	Silt (ML), dark greyish brown (10YR 4/2), moist, medium stiff, 80% silt, 15% clay, 5% fine sand, trace rootlets, trace rock fragments.	ML		
					TD 0.5 ft			
					water table not reached			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5e / 5	Location ID 112
Drilling Company Bort Longyear	Driller Don Hansen	Ground Elevation –	Total Drilled Depth 7'4" (7.3')
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-5-10 1340	Date/Time Total Depth Reached 11-5-10 1355
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10173 (1345)	2-1/2gal bags
Geologist C. Knight		Checked by/Date 5/19/11	
Radiological Background 44 / 2631 cpm	Radiological Equipment Used Pancake / downhole	PID Used mini RAE 2000	(Background = 0.4 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 = 2707 (CPM)
			0.4	66	surface: grass			3990
0.5			0.4	70	Sandy Silt: dark yellowish brown (10YR 4/4), moist, med. stiff to soft, no odor, 5% coarse, 5% medium sand, 20% fine sand, 70% silt, trace roots <5, cohesive, low plasticity	ML		4624
1.0			0.4	50				5275
			0.5	60	~~same as above~~ (EK) Silt w/ sand: Brown (10YR 4/3), moist, med. stiff, no odor, 10% clay, 5% coarse sand, 5% medium sand, 10% fine sand, 75% silt, cohesive, low plasticity	ML		5332
2.0			0.4	60				5468
			0.4	55				5144
3.0	Sample 10173		0.4	65				4914
			0.5	65				5062
4.0			0.4	65				4830
			0.4	70				5116
5.0			0.4	75				5076
			0.4	66		ML		5012
6.0			0.4	65	contact @ 6.0'			NM

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
44 / 263 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	112

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.4	65	well graded Sand w/ silt: dark yellowish brown (10YR 4/6) moist, medi dense, no odor, 15% angular coarse sand stone grains, 40% medium sand, 30% fine sand, 15% silt	SW		NM
			0.5	55				NM
7.0			0.5	60	@ 6'2" roots and bark (burrow hole?)			NM
			0.5	55	Poorly graded Sand: light olive brown (2.5Y 5/6), dry, dense, no odor, 95% fine sand, 5% medium sand.	SP		NM
8.0								

TD 7.4' bgs (refusal)

No GW encountered

HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

5C_113

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 5	Location ID: 113
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: ~~2/4/11~~ 11/05/10		Date/Time Total Depth Reached: 2/4/11 11/05/10
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) · 10174 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: TBW 11/14/11		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5			NA		Storm drain did not have sufficient material volume to collected a sample			No down hole Gamma logging Collected
1.0							1	
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_114

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, Group5	Location ID 114, 10175
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-27-10/0845	Date/Time Total Depth Reached 10-27-10 / 0903
Type of Sampling Device trowel / shovel		Samples Collected 2 - 1/2 gall bags (10175) 0850	
Geologist C. Carmichael		Checked by/Date [illegible] 10/28/10 / @ 4/28/11	
Radiological Background (PID) 0.0, 10	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		0.0	10	Well-graded gravel with coarse to medium grained sand (10YR, 2/2), very moist, loose, 75% subangular cobbles (2-5 inches diameter), 25% sand (subrounded) and trace silt. Obvious fill gravel. An animal bone found in top 1 inch. Cobbles are sandstone and asphalt. Silt screen exists ~6 inch depth. TD = 0.5' No groundwater encountered.	GW		

5C_115

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C/6	Location ID SB 115
Drilling Company HGL	Driller I Stone	Ground Elevation NA	Total Drilled Depth 0.5ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/19/10 1051	Date/Time Total Depth Reached 10/19/10 1100
Type of Sampling Device trowel / shovel		Samples Collected ID 101716 1110 1-4oz jar, 2- 1/2 gallon gallons	
Geologist I. Stone		Checked by/Date TDW 10/29/10 / DB 4/28/11	
Radiological Background 11	Radiological Equipment Used dpRmeter	PID Used Mini Rae 2000 (Background = 0.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	0.5'	0.5'	0.4	11	Sandy s.H, Dark brown (7.5YR 3/3), fine to medium grained sand, sub angular, medium dense, damp-wet, 70% s.H, 30% sand. some mottling.	ML		
					TD: 0.5'			
					No GW encountered			

5C_116

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID HSA-5C, 6	Location ID 10177 ~~(116)~~ (116)
Drilling Company HGL	Driller I. Stone	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-19 / 1428	Date/Time Total Depth Reached 10-19 / 1444
Type of Sampling Device trowel / shovel		Samples Collected 1 4-oz jar, 2-½ gal bags 10177/1428	
Geologist Chelsea Carmichael		Checked by/Date TMS 10/29/10 / [illegible] 4/28/11	
Radiological Background 0.0 ppm, 12 µR/hr	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID (PID)	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5			0.0	12	Silty Sand (10YR, 3/2) 30% silt, ~~70%~~ 65% sand of medium sand-size, 5% medium, non-native gravel, dark brown, no odor, loose, high water content (wet).	SM		
					TD: 0.5'			
					~~Groundwater~~ Surface water existant at time of sample.			

5C_117

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID Group 6 / 5C	Location ID 117
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started ~~@1400~~ 10-19/1350	Date/Time Total Depth Reached 10-19 / 1410
Type of Sampling Device trowel / shovel		Samples Collected 10178 ; @1400 ; 1 4-oz jar, 2 ½ gal bags	
Geologist Chelsea Carmichael		Checked by/Date TSW 10/29/10 / @ 4/28/11	
Radiological Background PID: 0.0, 11 uR/hr	Radiological Equipment Used uR meter	PID Used Mini Rae 2000 - (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	0.5'	0.5'	0.0	12	(10 YR, 3/2), Sandy Silt, 25% medium sand, 75% silt), dark brown, very moist, loose / soft, no odor, no bedding or mottling, very few medium rootlets, not cohesive.	ML		

TD: 0.5'

No groundwater encountered.

5C_118

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C, 6	Location ID 118
Drilling Company: Bort Longyear	Driller: Don Hansen	Ground Elevation: —	Total Drilled Depth: 10 ft
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4"	Date/Time Drilling Started: 11/03/10, 1025	Date/Time Total Depth Reached: 11/03/10, 1040
Type of Sampling Device: 1 3/4" macro core		Samples Collected: 10179, 1030 (2) 1/2 gal bags	
Geologist: P. Skeats		Checked by/Date: [signature] 5/19/11	
Radiological Background: 50 cpm / 2765 cpm	Radiological Equipment Used: Pancake meter, Down-hole gamma scaler	PID Used: Mini RAE 2000 (Background = 1.0 ppm)	

Description: (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)

Borehole Gamma Readings +0.5 = NM (CPM)

Depth	PID	Radiological	Description	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			Silt, very dark greyish brown (10YR 3/2), moist, soft, 10% fine sand, 80% silt, 10% clay, low plasticity, rootless, no rock fragments	ML		3086
0.5	0.6	60			0.5	4262
1.0	0.6	55			1.0	4770
1.5	0.6	50	- - - - - - - - - - - -		1.5	4048
			Clayey silt, dark greyish brown (10YR 4/2), dry, very stiff, ~~25~~ 30 (PS) % clay, ~~60~~ 55 (PS) % silt, 15% fine sand, medium plasticity, rootless, no rock fragments	ML		
2.0	0.6	60			2.0	4910
2.5	0.6	80			2.5	5012
3.0	0.6	80			3.0	4969
3.5	0.6	65	gradational change		3.5	4453
			Poorly graded sand, olive yellow (2.5Y 6/6), dry, medium dense sand, ~~90~~ (PS) % sand (65% medium, 35% fine), 10% silt, rootless, no rock fragments	SP		
4.0	0.6	60			4.0	5137
4.5	0.6	70			4.5	5020
5.0	0.6	55			5.0	4993
5.5	0.6	66			5.5	4780
6.0					6.0	

Interval: Sample Interval (approx. 2.5–3.5)

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
50 cpm, 2765 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	118

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.6	60			6.0	4921
6.5			0.6	70			6.5	4513
7.0			0.6	70		SP	7.0	4384
7.5			0.6	70			7.5	4428
8.0			0.6	75	gradational change		8.0	4472
8.5			0.6	90	poorly graded sand, light olive brown (2.5 5/4), dry, loose sand, 95% sand (medium sand @ 90%, fine sand @ 10%) (SP), 5% fines, rootless, 0% rock fragments		8.5	4260
9.0			0.6	55		SP	9.0	PVC pipe unable to reach total depth
9.5			0.6	40			9.5	
10.0			0.6	55	Reached goal depth		10.0	

TD @ 10.0 ft
groundwater not reached

5C_119

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c, 6	Location ID 119
Drilling Company Boart Longyear	Driller Boart Don Longyear	Ground Elevation —	Total Drilled Depth 8 ft
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-3-10, 0837	Date/Time Total Depth Reached 11-3-10, 0850
Type of Sampling Device DPT 1 3/4 macro core		Samples Collected 10180 (0840), 1/2 gal bags (2)	
Geologist P. Streat		Checked by/Date [signature] 4/28/11	
Radiological Background 2694 cpm/52	Radiological Equipment Used Pancake meter, Down hole gamma scanner	PID Used Mini RAE 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.1	65	silt w/ sand, dark yellowish brown (10YR 4/4) dry, medium, 20% fine sand, 75% silt, 5% clay, some rootlets, trace gravel rock fragments	ML		
0.5							0.5	4380
			0.1	75				
1							1.0	4650
			0.1	45				
1.5							1.5	4612
			0.1	65	clayey silt, dark yellowish brown (10YR 3/4) dry, stiff, 15% fine sands, 50% silt, 35% clay, medium plasticity, rootless, 0% rock fragments	ML		
2.0	Sample 1						2.0	4825
			0.1	40				
2.5							2.5	4723
			0.1	50				
3.0							3.0	4813
			0.1	50				
3.5							3.5	5098
			0.1	50				
4.0							4.0	5144
			0.1	45	silty sand, dark yellowish brown (10YR 4/6) dry, medium dense, 5% clay, 40% silt, 55% medium sand, rootless, 0% rock fragments	SM		
4.5							4.5	5144
			0.1	50				
5.0							5.0	5143
			0.2	45				
5.5							5.5	4926
6.0			0.2	85			6.0	4753

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
2694 / 57	SSFL Area IV Radiological Study	EP9038.01.22.04.03	119

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.5			0.2	40	gradational change Poorly graded sand, olive yellow (2.5Y 6/6)	SP	6.5	PVC pipe
7.0			0.2	45	dry, very loose, 10 % coarse, 70 % medium,		7.0	unable to
7.5			0.2	75	20 % fine, rootless, 0 % rock fragments.		7.5	reach total depth
8.0			0.2	65	Refusal @ 8.0		8.0	

Refusal @ 8.0 ft (TD)
water table not reached

5C_120

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID/Group 5C / 6	Location ID 120
Drilling Company HGL	Driller P. Sheath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/18/10 1343	Date/Time Total Depth Reached 10/18/10 1410
Type of Sampling Device trowel/shovel		Samples Collected 10181 1346	1-4oz Jar, 2-1/2 gal bags
Geologist Cliff Knight		Checked by/Date TBW 10/28/10	CK 4/28/11
Radiological Background 13µR	Radiological Equipment Used µR	PID Used Mini Rae 2000 (Background = 0.9 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
	1346	75%	0.9	12	Silty Sand: Dark yellowish brown (10YR 4/4), moist, med. dense, no odor, 10% angular cobbles ~~pebble~~ or gravel (CK) pea size 2-6", 35% silt, 55% fine sand (CK)	SM	
0.5							
					TD: 0.5' No GW encountered		

HGL HydroGeoLogic, Inc

BORING LOG

Project Name: SSFL Area IV Radiological Study	Project Number: EP9038.01.22.04.03	Subarea ID & Group: 5c, 6	Location ID: 120
Drilling Company: Bort Longyear	Driller: Don Hensen	Ground Elevation: —	Total Drilled Depth: 10 ft
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4 macro core	Date/Time Drilling Started: 11/03/10, 1300	Date/Time Total Depth Reached: 11/03/10, 1320
Type of Sampling Device: 1 3/4 macro core		Samples Collected: 10.0 ft, 1315 (2) 1/2 gal bags	
Geologist: P. Scearn		Checked by/Date: [signature] 4/28/11	
Radiological Background: cpm 85, 2745	Radiological Equipment Used: pancake meter, downhole gamma scanner	PID Used: Mini RAE 2000 (Background = 0.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
					Silt w/ sand, dark yellowish brown (10YR 4/4)			
0.5			0.5	55	dry, soft, 30% fine sand, 60% silt, 10% clay, low plasticity, rootless, 0% rock fragments	ML	0.5	5225
1.0			0.5	65	- - - - - - - - - -		1.0	5371
					Silt, dark yellowish brown (10YR 4,4),			
1.5			0.5	65	dry, soft, 20% fine sands, 65% silt, 15% clay, low plasticity, rootless, 0%		1.5	5152
2.0			0.5	60	rock fragments.		2.0	5315
2.5	Sample 1-5		0.4	60			2.5	5196
3.0			0.5	45			3.0	5171
3.5			0.5	70			3.5	5096
4.0			0.4	110			4.0	48 5044 (PS)
4.5			0.5	Resampled due to compositing	(PS) ~~Clay~~ silty clay, dark brown (10YR 3/3),		4.5	5874
5.0			0.5		dry, very stiff, medium plasticity, 10% fine sands, 40% silt, 50% clay, rootless,	CL	5.0	4857
5.5			0.5	(PS)	0% rock fragments		5.5	5043
6.0			0.5	80			6.0	5192

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
85 ; 2795 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	120

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.5	80		CL	6.0	
6.5			0.5	78			6.5	5206
					sand w/ silt, yellowish brown (10YR 5/6), dry; medium dense sand, 15 % clay, 25 % silt, 60 % fine sand; roots, 0 % Rock fragments	SM		
7.0			0.4	55			7.0	5087
7.5			0.5	70			7.5	5033
8.0			0.5	58			8.0	4733
8.5			0.5	80			8.5	4774
9.0			0.5	60			9.0	no measurements
9.5			0.5	60			9.5	
10.0			0.5	65	sample depth reached		10.0	
					TD : 10 ft			
					Groundwater not reached			

5C_121

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID (Group) 5C/6	Location ID 121
Drilling Company HGL	Driller I. Stone	Ground Elevation NA	Total Drilled Depth 0.5ft
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/19/10 1020	Date/Time Total Depth Reached 10/19/10 1048
Type of Sampling Device trowel/shovel		Samples Collected ID 10183 1040 1-4oz jar, 2 1/2 gallon bags	
Geologist I. Stone		Checked by/Date TSW 10/29/10 / @ 4/29/11	
Radiological Background 11	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	Grab		0.3	13	Silty Sand, brown (10YR 4/3), 60% fine grained sand, 40% silt. Subangular, med dense, dry. fine grained (silt) at top 2 inches. TD = 0.5' No GW encountered	SM	

5C_122

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C/6	Location ID 122
Drilling Company HGL	Driller I. Stam	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/19/10 0840	Date/Time Total Depth Reached 10/19/10 0850
Type of Sampling Device trowel/shovel		Samples Collected 10184 0850 1-4oz Jar/2 plastic bags.	
Geologist I. Stam		Checked by/Date RZW 10/29/10 / @ 4/28/11	
Radiological Background 12	Radiological Equipment Used μR meter	PID Used Mini Rae 2000 (Background=0.0ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Grab	X	0.1	11	Silty sand, 65% fine grained sand, 35% silt med dense, (10YR 3/3) dark brown, thin roots, dry.	SM		
					TD= 0.5'			
					No GW encountered			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	SC / 6	122
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	Don Hansen	~	10.0'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
6600 Geoprobe	1 3/4"	11-5-10 1050	11-5-10 1115
Type of Sampling Device		**Samples Collected**	
1 3/4" Macrocore		10185 (1055)	2 - 1/2 gal bags
Geologist		**Checked by/Date**	
C. Knight			4/28/11
Radiological Background	**Radiological Equipment Used**	**PID Used**	
GM 12746	Pancake / Downhole	mini RAE 2000	(Background = 0.5 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.4	65	Surface: Grass			2916
0.5			0.5	65	Silt w/ Sand: dark yellowish brown (10YR 4/4), dry, soft - med. dense, no odor, 15% fine sand (DK), 5% clay, 80% silt, non cohesive, low plasticity, low toughness, trace root and rootlets (CR)	ML		4234
1.0			0.4	60				4762
			0.4	65				4724
					Silty Clay: Brown (10YR 4/3), dry, stiff, no odor, 30% silt, 10% medium sand, 60% clay, cohesive, medium plasticity, medium toughness	CL		4590
2.0			0.5	65				
			0.5	65				4578
	Sand 4/1-5/1							4306
3.0			0.6	40	Sandy Silt: yellowish brown (10YR 5/4), moist, med. stiff, no odor, 5% coarse, 15% medium, 20% fine sand, 60% silt, cohesive, low toughness, trace subangular fine gravel	ML		4194
			0.6	40				
4.0			0.6	45	Poorly graded Sand: light yellowish brown (10YR 6/4), moist, med. dense, no odor, 5% coarse subangular sand, 10% silt, 15% medium sand, 70% fine sand, pinhole pores in sand.	SP		3985
			0.5	58				4264
5.0			0.6	65				4614
			0.5	48				4548
6.0			0.5	48	Same as above			4650

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
67./2746 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	122

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.5	48	Same as above : 80% fine sand, 15% medium sand, 5% silt,	SP		4650
			0.5	53				4829
7.0			0.6	44				4841
			0.6	60	- trace $CaCO_3$ pockets			4925
8.0			0.4	70				5059
			0.4	50	Same as above : 10% angular coarse grained sand, 10% medium sand, 80% fine sand, trace $CaCO_3$ pockets	SP		5285
9.0			0.5	65				4971
			0.5	55				5084
10.0			0.5	50				NM
					TD : 10.0'			
					No GW encountered			

5C_123

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID Group 6/5C	Location ID ~~10186~~ CC 123
Drilling Company HGL	Driller I. Stone	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-19 / 1505	Date/Time Total Depth Reached 10-19 / 1515
Type of Sampling Device trowel / shovel		Samples Collected 1 4-oz jar, 2 ½ gall bags 10186/1505	
Geologist Chelsea Carmichael		Checked by/Date RW 10/29/10 / CC 4/28/11	
Radiological Background 0.0 ppm, 13 µR/hr	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.9ppm)	

Depth (PID)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5'	0.5'	0.5'	0.0	=	Silty sand (10 YR, 3/2), 30% silt, 70% sand, trace (>5%) organic matter/leaf litter, dark brown, loose, moist, debris of plastic and asphalt encountered.	SM		
					No groundwater encountered TD: 0.5'			

5C_124

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID HSA 5C / Group 6	Location ID 124
Drilling Company HGL	Driller Chris Knight	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/20/10, 09:17	Date/Time Total Depth Reached 10/20/10, 9:35, 0.5 ft
Type of Sampling Device trowel / shovel		Samples Collected 10187, 09:17, 1 4oz jar, 2 ½ gal bags	
Geologist P. Sterath		Checked by/Date RBW 10-28-10 / @ 4/29/11	

Radiological Background	Radiological Equipment Used	PID Used
11	µR meter	Mini Rae 2000 (Background = 1.1 ppm)

Depth (ft)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		1.1	11	Silt (ML), dark brown 10YR 3/3, moist, soft, 70% silt, 15% fine sand, 15% clay, some roots, some subangular gravel	ML		
					T.D. 0.5 ft No ground water record			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, group 6	Location ID 124
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 5.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 1-5-11 / 1354	Date/Time Total Depth Reached 1-5-11 / 1435
Type of Sampling Device trowel / shovel		Samples Collected 2 1/2 gall bags (#10188) (1500)	
Geologist C. Carmichael		Checked by/Date 5/19/11	
Radiological Background (PID) 0.0 / 12 / 25	Radiological Equipment Used pancake / ukR meter / Downhole gamma	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Downhole 2817

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
			0.0	25				0.5 - 2817
								0 - 2928
			0.0	80	Silt with clay, (10 YR, 3/2), dark brown, 75% silt, 20% clay, 5% fine grained sand, trace pea gravel; semi-moist, soft, low-medium plasticity, no odor.	ML	3480	
1'			0.0	80			4153	
			0.0	70			4724	
2'			0.1	45	Same as above, except consistency is medium-stiff.		5022	
			0.1	75			5009	
3'			0.1	70			4700	
	Sample		0.1	70	Same as above, except (10 YR, 3/4) brown and ~10% fine grained sand (20% clay, 70% silt).		4716	
4'			0.1	65	Sandy clay with silt, (10 YR, 3/4), brown, 50% clay, 35% fine to medium grained subrounded sand, 15% silt, dry, stiff, no odor, low plasticity.	CL	4831	
			0.1	60			5027	
5'			0.1	65			4831	
			0.1	70			n/a	
6'					Refusal hit at 5'6" No GW encountered			

5C_125

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 6	Location ID 125
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment Trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/18/10 0844	Date/Time Total Depth Reached 10/18/10 0905
Type of Sampling Device Trowel / shovel		Samples Collected 10189 / 0846 1 4oz Jar, 2 - 1/2 gal Ziplocks	
Geologist Clifford Knight		Checked by/Date TBW 10/29/10 / @ 4/28/11	
Radiological Background 12 μR/hr	Radiological Equipment Used μRmeter	PID Used Mini Rae 2000 (Background = 2.7 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	Sample		1.5	BMR	Silty Sand : dark yellowish brown (10YR 4/4), moist, med. dense, no odor 30% non cohesive silt, 60% fine sand, 10% pea size gravel sub angular, some mottled soil ~5" in depth	SM	
					TD : 0.5' No Gw encountered		

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC / 6	Location ID 125
Drilling Company Bort Longyear	Driller Bart Don Longyear	Ground Elevation —	Total Drilled Depth 9.0
Drilling Equipment 6600 Geoprobe	Borehole Diameter 13/4"	Date/Time Drilling Started 11/1/10 0915	Date/Time Total Depth Reached 11/1/10 0955
Type of Sampling Device 13/4" Macrocore		Samples Collected 10190 (0920) 1-5' (CR) 4 bags (2) 1/2 gal bags	
Geologist C. Knight		Checked by/Date 5/19/11	
Radiological Background 56 cpm / 2400	Radiological Equipment Used 44-9 Pancake, ~~44-2~~ downhole ~~holding~~ (CR)	PID Used mini RAE 2000 (Background = 0.1 ppm)	

Depth	Interval	Recovery	PID	Radiological 44-9 open	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +6" 2522 (CPM)
			0.2	50			2933
0.5			0.2	"	Silty Sand: Brown (10YR 4/3), moist, med. dense, no odor, 10% fill gravel subangular and coarse, 10% coarse sand,	SM	4087
1.0			0.2	"	15% medium sand, 30% silt, 35% fine sand,		5187
			0.2	"			5167
					Silt w/ sand: Brown (10YR 4/3), moist, med. dense,	ML	
2.0			0.2	"	no odor, 5% coarse, ~~20~~ 65% fine sand, 5% fine subangular gravel, ~~70%~~ silt, 5% clay, low plasticity, cohesive (CR)		5097
			0.3	"			4920
3.0			0.2	"			5050
			0.2	"			4877
4.0			0.2	80			5122
			0.2	50			5077
5.0			0.3	50	- medium angular gravel		5063
			0.6	70			5271
					Poorly graded Sand: yellowish brown (10YR 5/4), dry, medium dense, no odor, 85% fine sand, 5% medium sand, 10% silt	SP	
6.0			0.3	50			5302

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
55 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	125

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0			0.3	50	Same as above			5302
			0.3	50				5387
7.0			0.3	70				5233
			0.4	60				5224
8.0			0.3	85				5243
			0.3	70				5212 (8'2")
					Poorly Graded Sand : Very pale brown (10YR 7/4), dry, med. dense, no odor, 85% fine sand, 15% medium sand subrounded grains	SP		
9.0			0.3	65				
					- Refusal @ 9.0'			
					- TD : 9.0'			
					- No GW encountered			
					- Multiple advancements for 1-4' sample interval to collect needed volume			

5C_126

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 6 SC	Location ID 126
Drilling Company: Bort Longyear	Driller: Boart Longyear Don Hansen	Ground Elevation —	Total Drilled Depth 10'
Drilling Equipment 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/2/10 0840	Date/Time Total Depth Reached 11/2/10 0950
Type of Sampling Device 1 3/4 Macrocore		Samples Collected 10191 (0845) (2) 1/2 gal bag	DUPs: 10235 (MS) 0845; 10224 (Field DUP) no time; 10214 (Lab DUP) 0845
Geologist C. Carmichael		Checked by/Date 5/19/11	
Radiological Background (PID) 0.1ppm, 51 cpm, 2776 cpm	Radiological Equipment Used Pancake, downhole scanner	PID Used mini RAE 2000 (Background = 0.1 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings +0.5 = 2276 (CPM)
								0.0 = 3097
			0.4	80	Silt with sand (10YR, 2/2), 90% silt, 10% fine grained sand (poorly graded, subrounded), brown, moist, grass & rootlets in top 4 inches, low toughness, non-plastic.	SM ML		4334
1'			0.4	60				4837
					..... Gradational contact			
			0.4	50	Clayey Silt, 75% silt, 25% clay, medium toughness and plasticity, brown (10YR, 2/2).	ML CL		4999
2'			0.4	60				5193
			0.4	80	→ Gradational contact			5399
3'	Sample		0.4	60	Sandy silt (10YR, 4/4), brown, dry, non-plastic, low toughness, 70% silt, 30% fine grained sand (subrounded, poorly graded).	SM ML		5503
			0.5	60				5410
4'			0.4	75				5218
			0.4	70				5031
5'			0.4	43				4986
			0.5	55	..... Gradational contact			5089
6'			0.5	60	Silty sand (10YR, 4/6), reddish-brown, with cemented clasts of white mottled silt, 40% silt,			5064

HGL HydroGeoLogic, Inc

BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
51 cpm, 2776cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	126

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.5			0.5	70	55% fine to medium grained sand, 5% cemented silt clasts, medium dense, medium dilatancy, low toughness.	SM		4853
7.0			0.5	50				4886
7.5			0.5	62				4916
8.0			0.5	70				4789
8.5			0.5	60				4872
9.0			0.5	60				4864
9.5			0.5	75				nm
10.0			0.6	65				nm

No groundwater encountered.
No refusal, 10' goal depth reached.

5C_127

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 6	Location ID 127
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/18/10 0934	Date/Time Total Depth Reached 10/18/10 0.5 1000
Type of Sampling Device trowel / shovel		Samples Collected 10192 / 0934 1 4oz Jar 2-1/2 gal Ziplocks	
Geologist C. Knight		Checked by/Date TRW 10/29/10 / 4/29/11	
Radiological Background 13 µR	Radiological Equipment Used µR Meter	PID Used Mini Rae 2000 (Background 2.2 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	0.5'	0.5'	2.0	13µR	Silt: dark brown (10YR 3/3), moist, soft, no odor, 15% clay, 10% fine sand, 75% silt, low plasticity, no dilatancy, trace roots, trace gravel	ML		
					TD: 0.5' No GW encountered			

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC / 6	Location ID 127
Drilling Company: Bort Longyear	Driller Boart Don Longyear	Ground Elevation —	Total Drilled Depth 8.5'
Drilling Equipment: 6600 Geoprobe	Borehole Diameter: 1 3/4"	Date/Time Drilling Started 11/1/10 / 1310	Date/Time Total Depth Reached 11/1/10 / 1355
Type of Sampling Device: 1 3/4 Macrocore		Samples Collected: 10193 (1320) 1-5' bgs collected (2) 1/2 gal bags	
Geologist: C. Knight		Checked by/Date: 4/29/11	
Radiological Background: 2548 / 6 cpm	Radiological Equipment Used: 44-9 Pancake, 44-2 downhole	PID Used: mini RAE 2000	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches +6" 2448 (CPM)
			0.1		Partial no recovery 0-1' bgs, very compacted in acetate liner		2509
0.5							3318
1.0			0.8	80	Silt: Very dark brown (10YR 2/2), moist, soft, no odor, 5% fine sand, 15% clay, 80% silt, cohesive, low plasticity, some grass and roots	ML	4539
1.5			0.7	50			4801
2.0			0.6	50	Clay w/ sand: Very dark brown (10YR 2/2), moist, stiff, no odor, 5% coarse sand, 5% medium sand, 10% fine sand, 30% silt, 60% clay, cohesive, low plasticity, trace rootlets	CL	4860
			0.6	50			5148
3.0			0.6	70	~~Sandy Silt~~ Silty Sand: Yellowish brown (10YR 5/4), moist, med. dense, no odor 10% clay, 5% coarse, 10% medium, 15% fine sand, 60% silt, non cohesive, no plasticity	SM ML CL	5281
			0.6	80			5365
					Silty Sand: yellowish brown (10YR 5/4), moist, med. dense, no odor, 30% silt, 10% coarse subrounded sand, 20% medium sand, 40% fine sand	SM	
4.0			0.6	60			5296
			0.6	50			5455
5.0			0.6	70			5547
			0.5	45	same as above: dry		5636
6.0			0.6	60			5693

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2548 / 61	SSFL Area IV Radiological Study	EP9038.01.22.04.03	127

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.6	60	Same as above : dry	SM		5693
			0.6	70				5665
7.0			0.6	80	Poorly graded Sand w/ silt : Brownish yellow (10YR 6/6), dry, med. dense, no odor, 15% silt, 15% medium sand, 70% fine sand, trace Fe staining	SP		5588
			0.7	100				5391
								5058 (7'8")
8.0			0.6	70				
			0.6	65				
9.0								
10					TD : 8.5'			
					No GW encountered			
					Refusal at 8.5' bgs			

5C_128

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 6	Location ID 128
Drilling Company HGL	Driller P. Sheath	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/18/10 1300	Date/Time Total Depth Reached 10/18/10 1330
Type of Sampling Device trowel / shovel		Samples Collected 10194 10194(1307) 1-4oz Jar, 2-1/2oz bags	
Geologist C. Knight		Checked by/Date TBS 10/29/10 / e 4/20/11	
Radiological Background 12 µR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.5 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	3oz		0.7	12µR	Silty Sand: Brown (10YR 5/3), moist, medium dense, no odor, 40% silt, 55% fine sand, 5% gravel ~1/2" trace concrete fragments	SM	
					TD: 0.5' No GW encountered		

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BORING LOG

Sheet 1 of 2

Project Name:	Project Number	Subarea ID & Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	5C	# 128
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
Bort Longyear	Boart Longyear Don Hansen	—	9.5'
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
Geoprobe 6600	1 3/4"	11-2-10 / 1240	11-2-10 / 1340
Type of Sampling Device		**Samples Collected** 1-5'	
1 3/4" macrocore		10195 1245	(2) 1/2 gal bags
Geologist C. Carmichael		**Checked by/Date**	5/19/11

Radiological Background	Radiological Equipment Used	PID Used
2790, 64 cpm	Pancake, downhole scanner	mini RAE 2000 (Background = 0.7 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches + 0.5 = 2691 (CPM)
0.5			0.7	55	Silty sand (10YR, 4/2) brown, 70% fine to medium grained, subrounded, well graded sand, 30% silt, low toughness, non-plastic, dry.	SM	0.0 = 2994
1.0			0.7	60			4043
1.5			0.7	65			5107
2.0			0.7	70			5244
2.5			0.1	63			5174
					Silt with sand, (10YR, 3/2), dark brown, 90% silt, 10% fine grained sand, low plasticity, low toughness	ML	5358
3.0			0.7	65	Silty sand (10YR, 4/3), brown, 60% fine grained sand, 40% silt, low toughness, non-plastic, dry.	SM	~~5144~~ 5353
3.5			0.7	55			~~5042~~ 5144
4.0			0.7	55			~~4938~~ 5042
4.5			0.7	60	Silt with sand, (10YR, 3/4), brown, 90% silt, 10% fine grained sand. (Very similar to soil from 2.5-3')	ML	~~5067~~ 4938
5.0			0.8	65			~~5297~~ 5067
5.5			0.8	60			~~5044~~ 5297
					..... Gradational contact		~~4909~~ 5044
6.0			0.8	65			

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
0.7, 2790, 64 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	128

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.5			0.8	65	Silty sand (10YR, 4/6), reddish brown, mottled texture with white, cemented silt, 60% fine sand, 40% silt, medium dense, low toughness.	SM		4909
7.0			0.8	65				4798
7.5			0.8	65	..... Gradational Contact			4970
8.0			0.8	65	Silty sand (10YR, 4/6), beige/light brown, 15% silt, 85% fine to medium grained subrounded sand, loose, low toughness, non-plastic.	SM		NM
8.5			0.8	55				
9.0			0.8	65				
9.5			0.8	55				
10.0					Refusal at 9.5 ft.			

No groundwater encountered.

Widened hole for PVC pipe and downhole gamma readings hit refusal at 8 ft, readings only down to 7.5 ft bgs.

5C_129

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 6	Location ID 129
Drilling Company HGL	Driller P.Sleath	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/18/10 / 1048	Date/Time Total Depth Reached 10/18/10 / 1100
Type of Sampling Device trowel/shovel		Samples Collected 10196 1050 4oz Jar 2-1/2gal Ziplocks	
Geologist C.Knight		Checked by/Date TSV 10/29/10 / CK 4/28/11	
Radiological Background 12 µR	Radiological Equipment Used µR Meter	PID Used Mini Rae 2000 (Background=2.6ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	Sample		0.3	12µR	Silty sand; Dark yellowish brown (10YR 3/4), moist, med dense, no odor, 30% Silt, 60% fine sand, 10% angular gravel sandstone, trace roots	SM		
					TD 0.5'			
					No GW encountered			

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group SC 6	Location ID 129
Drilling Company: Bort Longyear	Driller (Boart D. Hansen Longyear)	Ground Elevation —	Total Drilled Depth 10.0'
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11-5-10 0840	Date/Time Total Depth Reached 11-5-10 0855
Type of Sampling Device 1 3/4" Macrocore		Samples Collected 10197 (0845) 2-1/2 gal bags	
Geologist C. Knight		Checked by/Date [signature] 5/19/11	
Radiological Background 2887 / 55 cpm	Radiological Equipment Used pancake / downhole	PID Used mini RAE 2000 (Background=0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings +0.5 = MM Inches (CPM)
0.5			0.1	30	Silty Sand: very dark grayish brown (10YR 3/2), moist, loose, no odor, 25% silt, 5% clay, 60% fine sand, 10% medium sand, trace ~~rootlets~~ CA rootlets, trace bark debris	SM	3100
			0.1	40			4197
1.0			0.1	55			4813
			0.1	40	Silt w/ Sand: dark yellowish brown (10YR 4/4), slightly moist, med. stiff, no odor, 15% fine sand, 5% medium sand, 80% silt, cohesive, low plasticity	ML	5496
2.0			0.1	45			5284
			0.1	30			5114
3.0	Sample 1-5 ft		0.1	35	Clay w/ Silt: dark yellowish brown (10YR 4/4), dry, stiff, no odor, 25% silt, 10% fine sand, 5% medium sand 60% clay, cohesive, med. plasticity, low-med. toughness	CL	4839
			0.1	40			4929
4.0			0.2	50	Sandy Silt: yellowish brown (10YR 5/8), dry, medium dense, no odor, 5% coarse grains, 10% medium sand, 10% fine sand, 5% clay, 70% silt, low toughness, low plasticity	ML	4870
			0.1	55			4806
5.0			0.1	65			4792
			0.1	40			4751
6.0			0.2	45			4675

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
2887 / 55 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	125

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6.0			0.2	45	Same as above : ;	ML		4675
			0.2	60				4754
7.0			0.3	65				4863
			0.3	65	Sand with silt : Yellowish brown (10YR 5/6), moist, medium dense, no odor, 5% clay, 15% silt, 60% fine sand, 20% medium sand, iron oxide staining, $CaCO_3$ stringers	SP		4698
8.0			0.2	50				4657
			0.2	45	Same as above : 5% silt, 40% medium sand, 55% fine sand subrounded, $CaCO_3$ development	SP		4884
9.0			0.2	65				4781
			0.2	60	Same as above : 10% silt, 15% medium subrounded sand, 75% fine sand			NM
10.0			0.2	40				NM

TD : 10.0' bgs

No GW encountered

5C_130

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 6	Location ID 130
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment Trowel/shovel	Borehole Diameter 4"	Date/Time Drilling Started 10/19/10 1420	Date/Time Total Depth Reached 10/18/10 1445
Type of Sampling Device Trowel/shovel		Samples Collected 10198 1427 (1) 4oz jar, (2) 1/2 gal bags	
Geologist Cliff Knight		Checked by/Date TBD 10/29/10	
Radiological Background 12μR	Radiological Equipment Used μR meter	PID Used Mini Rae 2000 (Background = 1.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	0.5'	0.5'	1.0	12μR	Silty Sand: Brown (10YR 4/3), moist, med. dense, moderate 5%, sandstone gravel large, 25% silt, 70% fine sand, trace roots and rootlets.	SM		
					TD: 0.5' NO GW Encountered			

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C, 6	Location ID 130
Drilling Company Boart Longyear	Driller Dan Hansen	Ground Elevation —	Total Drilled Depth 10.0 ft
Drilling Equipment 6600 Geoprobe	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/03/10, 1445	Date/Time Total Depth Reached 11/03/10, 1500
Type of Sampling Device 1 3/4" macro core		Samples Collected 10199, 1450 (2) 1/2 gal bags	
Geologist P. Skeath		Checked by/Date [signature] 5/19/11	
Radiological Background 40 @ 2751 @ 85 cpm, 2745 cpm	Radiological Equipment Used pancake meter, downhole gamma Scanner	PID Used Mini RAE 2000 (Background = 0.6 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings +0.5 = 3886 Inches (CPM)
					Sandy silt, brown (10YR 4/3), moist, soft, 40 % fine sands, 55 % silt, 5 % clay, low plasticity, few rootlets, 0 % rock fragments		0.0 = NM
0.5			0.6	95		ML	0.5 4799
1.0			0.6	80	Silt w/ fine sands, dark yellowish brown, (10YR 4/4) dry, 25 % fine sands, 70 % silts, 5 % clay, low plasticity, rootletless, 0 % rock fragments		1.0 5195
1.5			0.6	60		ML	1.5 5089
2.0			0.7	45			2.0 5366
2.5	Sample interval		0.6	80			2.5 5456
3.0			0.7	70			3.0 5158
3.5			0.7	50	Silty clay, dark greyish brown (10YR 4/2), dry, stiff, 40 % clay, 35% silt, 25 % fine sands, medium plasticity, rootletless, 0 % rock fragments		3.5 4959
4.0			0.7	70		CL	4.0 4881
4.5			0.6	80			4.5 4990
5.0			0.6	60			5.0 4997
5.5			0.5	45	gradation		5.5 4749
6.0			0.5	65	Poorly graded sand, yellowish brown (10YR 5/6) dry, medium dense, 80 % fine sands, 20 % silts, rootletless, 0 % rock fragments	SP	6.0 4891

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
95 cpm, 2745 cpm	SSFL Area IV Radiological Study	EP9038.01.22.04.03	130

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.5	65		SP		4891
6.5			0.6	60			6.5	4958
7.0			0.6	65	poorly graded sand, yellowish brown (10YR 5/6) dry, loose, 85 % sand (80 % medium, 20 % fine), 15 % silt, non-plastic, 0 % rock fragments		7.0	4786
7.5			0.5	62		SP	7.5	4934
8.0			0.5	65			8.0	4953
8.5			0.6	75			8.5	4875
9.0			0.6	65			9.0	not measured
9.5			0.6	65			9.5	
10.0			0.6	70	target ~~sample~~ depth reached (RS)		10.0	

TD 10.0 ft

Groundwater not reached

5C_131

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C grp. 6	Location ID 131
Drilling Company Boart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 9.5 ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/4/10 1006	Date/Time Total Depth Reached 11/4/10 1012
Type of Sampling Device 1 3/4" macrocore Direct push - acetate liner		Samples Collected 10200-1020 2 - 1/2 gallon bags	
Geologist I. Stone		Checked by/Date [signature] 4/29/11	

Radiological Background	Radiological Equipment Used	PID Used
2799 / 50	Pancake / ~~ratemeter~~ IS Downhole	mini RAE 2000 (Background = 0.8 ppm)

Borehole Gamma Readings: +0.5' 2652

Depth	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings (CPM)
	0.9	50			3392
	0.9	65	Silty Sand, Brown (5/3 10YR) 70% fine-medium subrounded grained sand, 30% silt, trace coarse sand/~~fine~~ IS, dry, loose, no odor, no staining	SM	4855
1.0	0.8	70			5126
	0.8	45			5197
2.0	0.8	40			5331
	0.8	65			5271
			Clayey silt, Brown (4/3 10YR) ~~70%~~ silt, 30% clay, low plasticity,	ML	
3.0	0.8	60	Silt w/ sand, Yellowish brown (5/4 10YR) 90% silt, 10% fine grained sand, low plasticity, medium stiff, no odor or staining	ML	5459
	0.8	75			5627
4.0	0.8	50			5579
	0.8	75			5187
5.0	0.7	65	Clay w/silt, very dark grayish brown (3/2 10YR) 80% clay, 20% silt, dry, medium stiff medium plasticity	CL	4941
	0.8	50			5011
	0.8	50	Silt w/ Sand, dark brown (3/3 10YR) 80% silt, 15% sand, 5% clay low-med tough, low strength, low-med plasticity, dry, no odor or staining	ML	5141

Recovery: 5'

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
2799 / 50	SSFL Area IV Radiological Study	EP9038.01.22.04.03	131

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
			0.8	50	Silt w/ Sand, cont'd.			5141
			0.9	45				4930
						ML		
7.0			0.8	40				4746
			0.9	40				4894
					SAND, Brownish Yellow (6/6 10YR)			
8.0			0.7	55	95% fine grained sand, sub rounded,			4900
			0.8	65	5% silt, dry, ~~loose~~ Dense, no odor,	SP		4909
					no staining. Medium dense			
9.0			0.9	60				NM
			0.8	45				NM
					TD=9.5ft			
10					No GW encountered			
					TD=9.5ft			

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HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 6	Location ID CIK 102132
Drilling Company HGL	Driller P. Sheath	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/18/10 1320	Date/Time Total Depth Reached 10/18/10 1540
Type of Sampling Device trowel/shovel		Samples Collected 10201 1525 (1) 4-oz jar, (2) 1/2 gal bags	
Geologist Cliffknight		Checked by/Date TRS 10/29/10 / RG 4/25/11	
Radiological Background 11 µR	Radiological Equipment Used µR	PID Used Mini Rae 2000 (Background = 1.3 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0	0.5	1/2	1.2	13 µR	Silty Sand: Brown (10YR 4/3), moist, loose, no CIK odor, trace large angular gravel, 40%, non plastic silt, 50%, fine sand, 10% medium sand, trace rootlets.	SM	
0.5					0.5 = TD No GW encountered		

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 6	Location ID 132
Drilling Company Bart Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 8ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 0827 11/4/10	Date/Time Total Depth Reached 11/4/10 0836
Type of Sampling Device 1 3/4" Macrocore Direct Push - Acetate liner		Samples Collected 0202 - 0845 2 - 1/2 gallon bags	
Geologist I. Stone		Checked by/Date [signature] 4/29/11	
Radiological Background 2813 / 38	Radiological Equipment Used ~~down hole~~ 44 ; ~~surface~~ 35 pancake	PID Used mini RAE 2000 (Background = 0.1 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings 4" 2951 (CPM)
			0.3				3892
			0.2	50	Silty Sand, Dark grayish brown (4/2 10YR), 65% fine grained subrounded sand, 35% silt, Dry, med dense, no odor or staining, ~~trace~~ roots.	SM	4885
1.0			0.3	50	Clayey Silt ~~with Clay~~ Very dark grayish brown (3/2 10YR), 70% silt, 25% clay, 5% sand, Dry, low plasticity, low dry ~~strength~~	ML	4815
			0.3	40			4982
2.0			0.3	70	Silty Clay, Dark brown (3/2 7.5YR) 70% clay, 30% silt, medium plasticity, medium dry strength	CL	4884
			0.3	65			4974
3.0			0.2	80	Silty SAND, Strong Brown (5/6 7.5YR), 75% fine grained subrounded sand, 25% silt, dry, med dense, no odor some mottling, no staining.	SM	4866
			0.4	55			4907
4.0			0.3	50			4835
			0.3	50			4577
5.0			0.2	45			4508
			0.4	50			4774
6.0			0.5	55	Clayey Silt Brown (4/4 7.5YR), 5% fine sand, 35% clay, 60% silt low-medium dry strength, dry, no odor or staining	ML	4999

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 2 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C & 6	Location ID 132
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 8ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 7 3/4"	Date/Time Drilling Started 11/4/10 0827	Date/Time Total Depth Reached 11/4/10 0836
Type of Sampling Device 1 3/4" macrocore Direct Push - Acetate liner		Samples Collected SO202 0845 2-1/2 gallon bags	
Geologist S. Shaw		Checked by/Date	

Radiological Background 2813 / 38 | Radiological Equipment Used downhole 44 ; ~~MR~~ meter | PID Used mini RAE 2000 (Background = 0.1 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6.0					See previous	ML	6.0 = 4999	
			0.4	55			4916	
					SAND, Brownish Yellow (6/6 10YR)			
7.0			0.4	60	95% fine grained subrounded sand, 5% silt,	SP	NM	
					~~loose~~ loose - low density, dry, no odor,			
			0.4	65	no staining.		NM	
8.0			0.3	45			NM	
					Total Depth 8.0 ft bgs			
					No GW encountered			
			~~0.4~~	~~45~~ 75				
					Refusal @ 8ft bgs			

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HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C / Group 6	Location ID 133
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5
Drilling Equipment Trowel/shovel	Borehole Diameter NA	Date/Time Drilling Started 10/18/10 1453	Date/Time Total Depth Reached 10/18/10 1510
Type of Sampling Device Trowel/shovel		Samples Collected 10203 1458 (1) 4oz jar, (2) 1/2 gal bag	
Geologist Cliff Knight		Checked by/Date TBW 10/29/10	
Radiological Background 12 µR	Radiological Equipment Used µR	PID Used Mini Rae 2000 (Background = 1.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
0.5	0.5	0.5	1.3	BKG	Sand w/ Silt: Brown (10YR 4/3), moist, loose, no odor, 25% silt, 5% angular gravel, 70% fine sand, trace root and rootlets	SM		
					TD = 0.5'			
					GW not encountered			

HGL HydroGeoLogic, Inc

BORING LOG

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C 6	Location ID 133
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 9ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/4/10 1255	Date/Time Total Depth Reached 11/4/10 1305
Type of Sampling Device 1 3/4" macrocore Direct Push - Acetate liner		Samples Collected 10204-1310 2 - 1/2 gallon bags	
Geologist I. Stone		Checked by/Date 4/29/11	
Radiological Background 2921 / 54	Radiological Equipment Used Downhole / Pancake - IS	PID Used Mini RAE 2000 (Background=0.4 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches / @0.5' 2682 (CPM)
			0.5	40	Silty Sand, Very Dark Grayish Brown (3/2 10YR), 70% fine grained sand, subrounded, 30% silt. Dry, med dense, no odor, no staining.	SM	2840
			0.5	50			4168
1			0.4	40	~~Sandy Silt~~, Clayey Silt, Brown (4/3 10YR) IS ~~Silt w/ Sand~~ IS ~~85% silt, 15% fine grained, subrounded sand, dry~~, 60% silt, 30% clay, 10% sand Dry, medium plastic, low dry strength low toughness, no odor, no staining	ML	4689
			0.5	45			5059
2			0.6	65			5313
			0.5	65			5419
3			0.5	70			5385
			0.6	80			IS ~~5485~~ 5412
4			0.6	60	Silty Clay, Dark yellowish brown (4/4 10YR) 65% clay, 30% silt, 5% fine grained Sand, dry, medium plasticity, no odor, no staining	CL	4904
			0.5	50			4961
5			0.6	60			4938
			0.6	52			5091
6			0.7	77			4889

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BORING LOG (cont'd)

Radiological Background	Project Name	Project Number	Location
2921 / 54	SSFL Area IV Radiological Study	EP9038.01.22.04.03	133

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches	(CPM)
6			0.7	77	See previous			4889
			0.6	46				4993
7			1.0	42	SAND, Yellowish Brown (5/6 10YR) 90% fine grained sand, subrounded, 10% silt, dry, med dense	~~IS~~ SP		4817
			0.7	57				NM
8			0.8	50	Clay, light brownish gray (6/2 10YR) 80% Clay, 10% silt, 10% Sand (fine), dry	CL		NM
			0.7	64	SAND, Yellowish Brown (5/8 10YR) 95% fine-medium grained sand, 5% silt, Subrounded, dry, low dense, no odor, no staining	~~IS~~ SP		NM
9			0.8	56				NM
10					9ft. Refusal No gw encountered			

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C/6	Location ID 134
Drilling Company HGL	Driller I. Stone	Ground Elevation NA	Total Drilled Depth 0.5ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/19/10 0945	Date/Time Total Depth Reached 10/19/10 1010
Type of Sampling Device trowel / shovel		Samples Collected 10205 1000 1-4oz jar, 2-gallon plastic bags	
Geologist I. Stone		Checked by/Date TJW 10/29/10 / [illegible] 4/29/11	
Radiological Background 11	Radiological Equipment Used ukR meter	PID Used Mini Rae 2000 (Background = 0.2 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	0-0.5'		0.2	13	Silty sand, dark brown (10YR 3/3), 65% fine grained sand, 30% silt, 5% weathered sandstone (1-3"), dry, med dense, dry, fill material.	SM		
					TD = 0.5'			
					NO GW encountered			

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BORING LOG

Sheet 1 of 2

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5C & 6	Location ID 134
Drilling Company: Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 7Ft
Drilling Equipment Geoprobe 6600	Borehole Diameter 1 3/4"	Date/Time Drilling Started 11/4/10 1449	Date/Time Total Depth Reached 11/4/10 1500
Type of Sampling Device 1 3/4" Macrocore Direct Push - Acetate liner		Samples Collected 10206 - 1505 2-1/2 gallon bags	
Geologist I. Stone		Checked by/Date [signature] 4/29/11	
Radiological Background 2843 / 52	Radiological Equipment Used Duncake / ~~MR Meter~~ ID	PID Used Mini RAE 2000 (background = 0.8 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches 10.5' 2483 (CPM)
			0.8	57	Clayey Silt, Very dark grayish brown (3/2 10YR)	ML	2832
			0.9	60	60% silt, 35% clay, 5% fine		4433
1			0.9	65	grained sand, subrounded,		5131
			0.9	66	medium plasticity, soft, dry, no odor, no staining	ML	5342
					Clayey Silt w/sand, Brown (4/3 10YR)		
2			0.8	73	15% fine grained sand, 35% clay, 55% silt, dry, medium plasticity, no odor, no staining		5162
			0.9	56	Silty Clay, Yellowish Brown (5/4 10YR)		4901
					70% clay, 25% silt, 5% fine		
3			0.8	61	grained sand, med-high		4957
			0.9	63	plasticity, dry, no odor		4797
					no staining	CL	
4			0.9	71			4859
			0.9	59			4844
5			0.9	52			5105
					Clayey Sand, Yellowish Brown (5/6 10YR)		
			0.9	41	50% ~~45%~~ fine grained, subrounded sand, ID		5713
					35% clay, ~~15~~% silt, dry, med dense,	SC	
6			0.9	63	no odor or staining		5486

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BORING LOG (cont'd)

Sheet 2 of 2

Radiological Background	Project Name	Project Number	Location
2843/52	SSFL Area IV Radiological Study	EP9038.01.22.04.03	134

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
6			0.9	63	See previous	SC		5486
			0.9	60				NM
7			0.9	63	SAND, Brownish Yellow (5/6 10YR) 90% fine-med. grained sand, 10% s.lt, dry	SP		NM
					TD = 7.0 Ft			
					NO GW encountered			
8								
9								
10					Refusal @ 7Ft			

5C_135

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C/6 Group	Location ID 135
Drilling Company HGL	Driller I. Stone	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10/19/10 0919	Date/Time Total Depth Reached 10/19/10 0928
Type of Sampling Device trowel / shovel		Samples Collected 0930 10207	1 4oz jar, 2 - plastic bags
Geologist I. Stone		Checked by/Date TBW 10/29/18	@ 4/29/11
Radiological Background 13	Radiological Equipment Used µR meter	PID Used Mini Rae 2000	(Background = 0.2 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	0.5'	0.5'	0.4	12	Silty Sand, dark brown (5YR 3/3), 60% fine grained sand, 35% silt, 5% weathered sandstone, med dense, dry. Some mottling. TD = 0.5' NO GW encountered	SM		

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID / Group HSA 5C / 6	Location ID 136
Drilling Company HGL	Driller C. Knight	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10.20.10 / 10:25	Date/Time Total Depth Reached 10.20.10 / 10:40 / 0.5 ft
Type of Sampling Device trowel / shovel		Samples Collected (MS) (lab DUP) (Field DUP) 10208, 10232, 10211, 10221, 10:30, 4oz jar (4)	
Geologist P. Sxxxx		Checked by/Date TDW 10/29/10 ½ gal bag (8)	
Radiological Background 12 µR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.0 ppm)	

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	Sample		1.3 ppm	13 µR	sand w/silt, dark yellowish brown (10YR 4/4), wet, very loose sand, well graded, 55% med to fine sand, 25% silt, 20% clay, rootless, common (10%) angular asphalt gravel.	SM	
					T.D. 0.5 ft		
					watertable not reached		

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HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	WSA 5C	134 137 (CK)
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	C. Knight	NA	0.5 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	NA	10/20/10, ~~0:45~~ 9:40	10/20/10, ~~9:45~~ 9:40, 0.5 ft
Type of Sampling Device		**Samples Collected**	
trowel / shovel		10209 (CK) ~~10245~~ / 8:45, 1 402 jar, 2 1/2 gal bags	
Geologist		**Checked by/Date**	
Preston Stecah		RSW 10/28/10 / @ 4/28/11	

Radiological Background	Radiological Equipment Used	PID Used
11 mR/hr	µR meter	Mini Rae 2000 (Background = 1.1 ppm)

Depth (ft)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches (CPM)
0.5	Sample		1.1	11 µR/hr	Silt ~~clay~~ (ML) w/ sand (ML), 10YR 3/3 dark brown, [moist]; soft, 15% medium sands, 60% silts, 25% clay, trace roots,	ML	
1					TD = 0.5 ft No ground water encountered		

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, group 6	Location ID 137
Drilling Company HGL	Driller H. Thompson	Ground Elevation NA	Total Drilled Depth 5.5'
Drilling Equipment hand auger ~~trowel / shovel~~	Borehole Diameter NA	Date/Time Drilling Started 1-5-11 / 1052	Date/Time Total Depth Reached 1-5-11 / 1127
Type of Sampling Device ~~trowel / shovel~~ hand auger		Samples Collected 2 ½ gall bags (#10210) (1200)	
Geologist C. Carmichael		Checked by/Date 5/19/11	
Radiological Background (PID) 0.0, 14 micro R/h	Radiological Equipment Used 30 pancake µR meter / pancake	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
							1.5	2909
							0	3145
			0.0	30	Sandy silt with rock fragments, (10 YR, 3/3),	ML		3679
			0.0	60	65% silt, 25% fine grained subrounded			
1'			0.0	45	sand, 10% rock fragments (pea gravel), semi-moist, soft, few rootlets, no odor, low plasticity.			4150
			0.0	50				4559
2'			0.0	65	Same as above, but silt with sand and rock fragments, 70% silt, 15% fine grained sand, 10% rock fragments, 5% clay.			4651
			0.1	70				4920
3'			0.1	60	Clayey silt with sand, (10 YR, 3/3), 65% silt, 25% clay, 10% fine grained subrounded sand, low-medium plasticity, medium stiff, semi-moist, no odor.			5204
	Sample		0.1	75				5183
4'			0.0	60	Clayey silt, same as above except 60% silt, 40% clay, medium plasticity, stiff, dry.			4967
			0.0	60				5052
5'			0.1	55	Sandy clay with silt, (10 YR, 3/4), brown, 50% clay, 30% fine to medium grained subrounded sand, 20% silt, low plasticity, medium hardness, stiff, dry, no odor.	CL		5027
			0.1	65				n/a
6'					Refusal hit at 5.5' - cemented No GW encountered			

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HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 4	Location ID: 138
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 11-15-10		Date/Time Total Depth Reached: 11-15-10
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10148 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: TBW 11/14/11		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5					Boring location inaccessable in concrete gunite detention basin. No sample collected		1	
1.0								
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

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HGL HydroGeoLogic, Inc
Exceeding Expectations

SSFL BORING LOG

Sheet _1_ of _1_

Project Name: SSFL Area IV Radiological Study	Project Number: EP038.01.22.04.03	Subarea: 5C	Group: 4	Location ID: 139
Drilling Company: Boart Longyear	Driller: Don Hansen	Ground Elevation: NA		Total Depth Drilled: NA ft bgs.
Drilling Equipment: Geoprobe 6600	Borehole Diameter: 1.75 inches	Date/Time Drilling Started: 11-15-10		Date/Time Total Depth Reached: 11-15-10
Type of Sampling Device: 1.75 inch Macrocore		Samples Collected: One 1/2 Gallon Bag (Appox 8 lbs.) 10149 (NO SAMPLE)		
Geologist: Cliff Knight		Checked By / Date: A. Stanfield 11/14/11		
Radiological Background: NA	Radiological Equipment Used: Micro R / Downhole / Pancake Meters	PID Used: Mini Rae 2000 - Background: NA ppm		

Depth (ft bgs)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Feet bgs.	Borehole Gamma Readings (CPM)
0.5					Boring location inaccessible in concrete gunite detention basin. No Sample collected		1	
1.0								
2.0							2	
3.0							3	
4.0							4	
5.0							5	
6.0							6	

5C_140

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID & Group 5c 3	Location ID 140
Drilling Company Bort Longyear	Driller D. Hansen	Ground Elevation NA	Total Drilled Depth 4ft
Drilling Equipment Geoprobe	Borehole Diameter 13/4"	Date/Time Drilling Started 12/14/10 1345	Date/Time Total Depth Reached 12/14/10 1352
Type of Sampling Device 13/4" Macrocore acetate liner		Samples Collected 1023 - 1400 2 - 1/2 gallon bags	
Geologist I. Jones		Checked by/Date 4/27/11	
Radiological Background 64 / 3096	Radiological Equipment Used Pancake / Downhole	PID Used Mini RAE 2000	Bkgd: 0.0 ppm

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, mineralogy, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings Inches 0.5 = 2967 (CPM)
			0.0	44	ASPHAULT (3")		3994
			0.0	82	Silty Clay, Dark brown (3/3 10YR) 60% clay, 35% silt, 5% fine sand, medium plasticity, med. tough, med strength, dry, no odor or staining	CL	3275
1			0.0	53			4022
			0.0	60			4773
			0.0	71	Silty Sand, Yellowish Brown (5/6 10YR) 70% fine grained sand, 30% silt, dry, med dense, no odor or staining	SM	4864
2	Sample		0.0	64			4950
3			0.0	90			5255
			0.0	62			5432
4			0.0	48			5426
					TD = 4 ft bgs no gw encountered		

5C_141

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID HSA 5C	Location ID 141
Drilling Company HGL	Driller C. Knight	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-20-10 / 14:15	Date/Time Total Depth Reached 10-20-10 / 14:30 / 0.5 ft
Type of Sampling Device trowel / shovel		Samples Collected 10242, 14:20, (2) 1/2 gal bag	
Geologist P. Skrath		Checked by/Date TDW 10/28/10 /@ 4/20/11	
Radiological Background 11 µR	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 1.5 ppm)	

Depth ft	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	X Sample	X	1.5 ppm	11 µR	Silt (ML), very dark grayish brown (10 YR 3/2), moist, medium stiff, 70% silt, 25% clay, 5% fine sand, 0% RF, common roots	ML		
					TD: 0.5 ft water table not reached			

5C_142

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID 5C, Group 4	Location ID 142, 10243
Drilling Company HGL	Driller P. Skeath	Ground Elevation NA	Total Drilled Depth 0.5'
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-27-10 / 0930	Date/Time Total Depth Reached 10-27-10 / 0944
Type of Sampling Device trowel / shovel		Samples Collected 2 ½ gall bags (10243) 0935	
Geologist C. Carmichael		Checked by/Date YSW 10/29/10	
Radiological Background (PID) 0.0 ppm, 14	Radiological Equipment Used µR meter	PID Used Mini Rae 2000 (Background = 0.0 ppm)	

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5'			0.1	14	Sand with silt, (10YR, 4/2), brown, 85% medium-grained sand (subrounded), 15% silt, moist, loose. Top 2 inches consists of dark silt, overlaying weathered sandstone – sand with intermittent clasts of weakly cemented sand.	SM		

No groundwater encountered.

5C_143

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BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number EP9038.01.22.04.03	Subarea ID HSA 5C / Group 10	Location ID 143
Drilling Company HGL	Driller C. Knight	Ground Elevation NA	Total Drilled Depth 0.5 ft
Drilling Equipment trowel / shovel	Borehole Diameter NA	Date/Time Drilling Started 10-20-10 / 13:55	Date/Time Total Depth Reached 10-20-10 / 14:05 / 0.5 ft
Type of Sampling Device trowel / shovel		Samples Collected 10244, 14:00, (2) ½ gal bags	
Geologist P. Smith		Checked by/Date TRW 10/28/10 / @ 4/29/11	

Radiological Background	Radiological Equipment Used	PID Used
11 μR	Micro R meter	Mini Rae 2000 (Background = 1.3 ppm)

Depth	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		1.5	12	Silt (ML), dark brown (10YR 3/3), moist, soft, 75% silt, 15% clay, 10% fine sand, common roots, < 5% rock fragments	ML		
					T.D. 0.5 ft water table not reached			

5C_144

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BORING LOG

Sheet 1 of 1

Project Name:	Project Number	Subarea ID / Group	Location ID
SSFL Area IV Radiological Study	EP9038.01.22.04.03	HSA 5c / 6	144
Drilling Company	**Driller**	**Ground Elevation**	**Total Drilled Depth**
HGL	C. Knight	NA	0.5 ft
Drilling Equipment	**Borehole Diameter**	**Date/Time Drilling Started**	**Date/Time Total Depth Reached**
trowel / shovel	NA	10.20.10 / 13:25 (PS)	10.20.10 / 13:50 / 0.5 ft
Type of Sampling Device		**Samples Collected**	
trowel / shovel		10245, 13:25, (2) ½ gal bag	
Geologist		**Checked by/Date**	
P. Skeam		TBW 10/28/10 / @ 4/28/11	

Radiological Background	Radiological Equipment Used	PID Used
13	µR meter	Mini Rae 2000 (Background = 1.4 ppm)

Depth (ft)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Inches	Borehole Gamma Readings (CPM)
0.5	Sample		1.4	13 µR	~~silty~~ sand (SM), brown (10YR 4/3), ~~dry~~ medium dense sand, 55% medium to fine sand, 30% silt, 15% clay; few roots, ~~5%~~ (PS) asphalt gravel trace	SM		

T.D.: 0.5 ft

water table not reached

5C_145

HGL HydroGeoLogic, Inc

BORING LOG

Sheet 1 of 1

Project Name: SSFL Area IV Radiological Study	Project Number: EP9038.01.22.04.03	Subarea ID: HSA 5C / Group 6	Location ID: 145
Drilling Company: HGL	Driller: C. Knight	Ground Elevation: NA	Total Drilled Depth: 0.5 ft
Drilling Equipment: trowel / shovel	Borehole Diameter: NA	Date/Time Drilling Started: 10/20/10, 9:35	Date/Time Total Depth Reached: 10/20/10, 10:00, 0.5 ft
Type of Sampling Device: trowel / shovel		Samples Collected: 1024b, 9:40, 1 4oz jar, 2 ½ gal bags	
Geologist: P. Skeech		Checked by/Date: TBW 10/28/10 / @ 4/28/11	
Radiological Background: 11 µR	Radiological Equipment Used: µR meter	PID Used: Mini Rae 2000 (Background: 1.1 ppm)	

Depth (ft)	Interval	Recovery	PID	Radiological	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	USCS Symbol	Borehole Gamma Readings: Inches	(CPM)
0.5	Sample		1.1 ppm	11 µR	clayey silt with sand (ML), brown (10 YR 4/3), moist, soft, 25% fine sand, 40% silt, 35% clay, rootless, trace subangular gravel	ML		

T.D.: 0.5 ft

Groundwater not met