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Final

Preliminary Assessment/Site Inspection Report 12 Consent Order Sites and 8 PI/PAOC Sites

Former Vieques Naval Training Range
Vieques, Puerto Rico

Prepared for

Department of the Navy
NAVFAC ATLANTIC

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VOLUME 2 - APPENDICES

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Prepared by

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Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID			E-AOC-F	E-AOC-F	E-AOC-F	E-AOC-F	E-AOC-F		E-AOC-G	E-AOC-G	E-AOC-G	E-AOC-G
Station ID	**Lowest**	**Highest**	CGAOCFSS001	CGAOCFSS002	CGAOCFSS003	CGAOCFSS004	CGAOCFSS005		CGAGSS01	CGAGSS02	CGAGSS03	CGAGSS04
Sample ID	**Detected**	**Detected**	NDD044	NDD045	NDD046	NDD047	NDD048	NDD049FD1	CGAGSS01-R01	CGAGSS02-R01	CGAGSS03-R01	CGAGSS04-R01
Sample Date	**Concentration**	**Concentration**	06/14/00	06/14/00	06/14/00	06/14/00	06/14/00	06/14/00	01/22/04	01/22/04	01/22/04	01/22/04
Chemical Name												
Pesticide/Polychlorinated Biphenyls (UG_KG)												
4,4'-DDD	0.16 J	940 J	3.6 UJ	3.1 UJ	4.2 UJ	3.5 UJ	3.9 UJ	3.4 UJ	0.17 J	0.31 J	0.33 J	0.93 J
4,4'-DDE	0.08 J	3400	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2 UJ	1.7 UJ	13 J	5.8 J	9.2 J	31 J
4,4'-DDT	0.22 J	67000	3.6 UJ	3.1 UJ	4.2 UJ	3.5 UJ	3.9 UJ	3.4 UJ	2.4 J	1.4 J	1.4 J	2 J
Chlordane	14	14	16 UJ	14 UJ	18 UJ	15 UJ	17 UJ	15 UJ	4.6 U	4.7 U	5.1 U	4.8 U
Dieldrin	0.37 J	0.79 J	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2 UJ	1.7 UJ	3.6 U	3.7 U	4 U	3.8 U
Endosulfan I	0.44 J	0.44 J	362 UJ	307 UJ	420 UJ	346 UJ	395 UJ	339 UJ	1.9 U	1.9 U	2.1 U	2 U
Endrin	0.78 J	2.4 J	3.6 UJ	3.1 UJ	4.2 UJ	3.5 UJ	3.9 UJ	3.4 UJ	3.6 U	3.7 U	4 U	3.8 U
Endrin ketone	4.9 J	4.9 J	NA	NA	NA	NA	NA	NA	3.6 U	3.7 U	4 U	3.8 U
Heptachlor	0.76 J	0.76 J	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2 UJ	1.7 UJ	1.9 U	1.9 U	2.1 U	2 U
beta-BHC			1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2 UJ	1.7 UJ	1.9 U	1.9 U	2.1 U	2 U
delta-BHC	0.41 J	0.84 J	1.8 UJ	1.5 UJ	2.1 UJ	1.7 UJ	2 UJ	0.73 J	1.9 U	1.9 U	2.1 U	2 U
gamma-Chlordane	0.52 J	1.9 J	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	2.1 U	2 U
Herbicides (UG_KG)												
2,4,5-T	5.2 J	5.2 J	79 UJ	67 UJ	5.2 J	75 UJ	86 UJ	73 UJ	11 UJ	11 UJ	12 U	12 U
2,4-D	14 J	14 J	394 UJ	336 UJ	460 UJ	376 UJ	432 UJ	366 UJ	11 UJ	11 UJ	12 U	12 U

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-AOC-G		E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1
Station ID	CGAGSS05		CGW1SS01	CGW1SS02	CGW1SS03	CGW1SS04	CGW1SS05	CGW1SS06	CGW1SS07	CGW1SS08	CGW1SS09
Sample ID	CGAGSS05-R01	CGAGSSFD01P-R01	CGW1SS01-R01	CGW1SS02-R01	CGW1SS03-R01	CGW1SS04-R01	CGW1SS05-R01	CGW1SS06-R01	CGW1SS07-R01	CGW1SS08-R01	CGW1SS09-R01
Sample Date	01/22/04	01/22/04	02/04/04	02/04/04	02/04/04	02/04/04	02/04/04	02/04/04	02/04/04	02/04/04	02/04/04
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	0.72 J	0.56 J	3.9 UJ	3.6 UJ	0.43 J	3.6 R	3.7 U	3.9 UJ	3.6 U	3.6 UJ	3.6 UJ
4,4'-DDE	12 J	15 J	3.9 UJ	0.29 J	6.1 J	0.83 R	0.34 J	8.8 J	0.21 J	1 J	0.7 J
4,4'-DDT	1.2 J	0.96 J	0.41 J	3.6 UJ	6.4 J	0.24 R	3.7 U	0.96 J	3.6 U	0.28 J	0.26 J
Chlordane	4.9 U	4.9 U	5 UJ	4.6 UJ	4.6 U	4.5 R	4.8 U	5 UJ	4.6 U	4.6 UJ	4.6 UJ
Dieldrin	3.9 U	3.8 U	3.9 UJ	3.6 UJ	3.6 U	3.6 R	3.7 U	3.9 UJ	3.6 U	3.6 UJ	3.6 UJ
Endosulfan I	2 U	2 U	2 UJ	1.8 UJ	1.9 U	1.8 R	1.9 U	2 UJ	1.9 U	1.8 UJ	1.9 UJ
Endrin	3.9 U	3.8 U	3.9 UJ	3.6 UJ	3.6 U	3.6 R	3.7 U	3.9 UJ	3.6 U	3.6 UJ	3.6 UJ
Endrin ketone	3.9 U	3.8 U	3.9 UJ	3.6 UJ	3.6 UJ	3.6 R	3.7 UJ	3.9 UJ	3.6 UJ	3.6 UJ	3.6 UJ
Heptachlor	2 U	2 U	2 UJ	1.8 UJ	1.9 U	1.8 R	1.9 U	2 UJ	1.9 U	1.8 UJ	1.9 UJ
beta-BHC	2 U	2 U	2 UJ	1.8 UJ	1.9 U	1.8 R	1.9 U	2 UJ	1.9 U	1.8 UJ	1.9 UJ
delta-BHC	2 U	2 U	2 UJ	1.8 UJ	1.9 U	1.8 R	1.9 U	2 UJ	1.9 U	1.8 UJ	1.9 UJ
gamma-Chlordane	2 U	2 U	2 UJ	1.8 UJ	1.9 UJ	1.8 R	1.9 UJ	2 UJ	1.9 UJ	1.8 UJ	1.9 UJ
Herbicides (UG_KG)											
2,4,5-T	12 UJ	12 UJ	12 UJ	11 UJ	11 U	11 U	11 UJ	12 UJ	11 UJ	11 U	11 U
2,4-D	12 UJ	12 UJ	12 UJ	11 UJ	11 U	11 U	11 UJ	12 UJ	11 UJ	11 U	11 U

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Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-1		E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1
Station ID	CGW1SS10		CGW1SS11	CGW1SS12	CGW1SS13	CGW1SS14	CGW1SS15	CGW1SS16	CGW1SS17	CGW1SS18	CGW1SS19
Sample ID	CGW1FD01P-R01	CGW1SS10-R01	CGW1SS11-R01	CGW1SS12-R01	CGW1SS13-R01	CGW1SS14-R01	CGW1SS15-R01	CGW1SS16-R01	CGW1SS17-R01	CGW1SS18-R01	CGW1SS19-R01
Sample Date	02/04/04	02/04/04	02/05/04	02/05/04	02/05/04	02/05/04	02/05/04	02/05/04	02/04/04	02/05/04	02/05/04
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.8 UJ	1.4 J	0.17 J	3.9 R	1.8 J	3.6 U	3.7 UJ	3.8 U	0.16 J	3.7 U	3.8 U
4,4'-DDE	29 J	25 J	1.3 J	4.1 J	130 J	0.33 J	1.3 J	1.4 J	3.2 J	7.5 J	3.8 U
4,4'-DDT	7 J	5.9 J	0.5 J	1.6 J	22 J	0.26 J	0.67 J	0.74 J	0.51 J	1.8 J	3.8 U
Chlordane	4.8 UJ	4.8 UJ	4.4 UJ	5 R	46 U	4.6 U	4.7 UJ	4.8 U	4.5 U	4.8 U	4.8 U
Dieldrin	3.8 UJ	3.8 UJ	3.5 UJ	3.9 R	36 U	3.6 U	3.7 UJ	3.8 U	3.5 U	3.7 U	3.8 U
Endosulfan I	1.9 UJ	2 UJ	1.8 UJ	2 R	18 U	1.9 U	1.9 UJ	2 U	1.8 U	1.9 U	2 U
Endrin	3.8 UJ	3.8 UJ	3.5 UJ	3.9 R	36 U	3.6 U	3.7 UJ	3.8 U	3.5 U	3.7 U	3.8 U
Endrin ketone	3.8 UJ	3.8 UJ	3.5 UJ	3.9 UJ	36 UJ	3.6 UJ	3.7 UJ	3.8 UJ	3.5 UJ	3.7 UJ	3.8 UJ
Heptachlor	1.9 UJ	2 UJ	1.8 UJ	2 R	18 U	1.9 U	1.9 UJ	2 U	1.8 U	1.9 U	2 U
beta-BHC	1.9 UJ	2 UJ	1.8 UJ	2 R	18 U	1.9 U	1.9 UJ	2 U	1.8 U	1.9 U	2 U
delta-BHC	1.9 UJ	2 UJ	1.8 UJ	2 R	18 U	1.9 U	1.9 UJ	2 U	1.8 U	1.9 U	2 U
gamma-Chlordane	1.9 UJ	2 UJ	1.8 UJ	2 UJ	18 U	1.9 U	1.9 UJ	2 U	1.8 UJ	1.9 U	2 U
Herbicides (UG_KG)											
2,4,5-T	11 UJ	12 U	11 U	12 UJ	11 UJ	11 U	11 U	12 U	11 U	11 U	12 U
2,4-D	11 UJ	12 U	11 U	12 UJ	11 UJ	11 U	11 U	12 U	11 U	11 U	12 U

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Site ID	E-SWMU-1		E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1
Station ID	CGW1SS20		CGW1SS21	CGW1SS22	CGW1SS23	CGW1SS24	CGW1SS25	CGW1SS26	CGW1SS27	CGW1SS28	CGW1SS29
Sample ID	CGW1FD02P-R01	CGW1SS20-R01	CGW1SS21-R01	CGW1SS22-R01	CGW1SS23-R01	CGW1SS24-R01	CGW1SS25-R01	CGW1SS26-R01	CGW1SS27-R01	CGW1SS28-R01	CGW1SS29-R01
Sample Date	02/05/04	02/05/04	02/05/04	02/05/04	02/09/04	02/09/04	02/09/04	02/09/04	02/09/04	02/09/04	02/09/04
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.5 U	3.5 U	3.9 U	3.6 UJ	2.9 J	2.3 J	3.7 UJ	3.7 U	0.22 J	3.5 U	3.8 UJ
4,4'-DDE	3.5 U	3.5 U	0.87 J	14 J	140 J	44 J	2.8 J	7.1 J	4.8 J	0.27 J	2.3 J
4,4'-DDT	3.5 U	3.5 U	0.53 J	3.8 J	47 J	31 J	0.83 J	3.7 U	0.55 J	3.5 U	0.7 J
Chlordane	4.4 U	4.5 U	5 U	4.6 UJ	4.8 U	4.8 UJ	4.7 UJ	4.7 U	4.7 UJ	4.5 U	4.8 UJ
Dieldrin	3.5 U	3.5 U	3.9 U	3.6 UJ	3.8 U	3.8 UJ	3.7 UJ	3.7 U	3.7 UJ	3.5 U	3.8 UJ
Endosulfan I	1.8 U	1.8 U	2 U	1.9 UJ	1.9 U	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ	1.8 U	1.9 UJ
Endrin	3.5 U	3.5 U	3.9 U	3.6 UJ	3.8 U	3.8 UJ	3.7 UJ	3.7 U	3.7 UJ	3.5 U	3.8 UJ
Endrin ketone	3.5 UJ	3.5 UJ	3.9 UJ	4.9 J	3.8 U	3.8 UJ	3.7 UJ	3.7 U	3.7 UJ	3.5 U	3.8 UJ
Heptachlor	1.8 U	1.8 U	2 U	1.9 UJ	1.9 U	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ	1.8 U	1.9 UJ
beta-BHC	1.8 U	1.8 U	2 U	1.9 UJ	1.9 U	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ	1.8 U	1.9 UJ
delta-BHC	1.8 U	1.8 U	2 U	1.9 UJ	1.9 U	1.9 UJ	1.9 UJ	1.9 U	1.9 UJ	1.8 U	1.9 UJ
gamma-Chlordane	1.8 U	1.8 U	2 U	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	1.9 UJ	1.8 UJ	1.9 UJ
Herbicides (UG_KG)											
2,4,5-T	10 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2,4-D	10 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U

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Site ID	E-SWMU-1		E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1
Station ID	CGW1SS30		CGW1SS31	CGW1SS32	CGW1SS33	CGW1SS34	CGW1SS35	CGW1SS36	CGW1SS37	CGW1SS38	CGW1SS39
Sample ID	CGW1FD03P-R01	CGW1SS30-R01	CGW1SS31-R01	CGW1SS32-R01	CGW1SS33-R01	CGW1SS34-R01	CGW1SS35-R01	CGW1SS36-R01	CGW1SS37-R01	CGW1SS38-R01	CGW1SS39-R01
Sample Date	02/09/04	02/09/04	02/09/04	02/09/04	02/04/04	02/09/04	02/04/04	02/10/04	02/10/04	02/10/04	02/10/04
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.6 U	3.4 U	3.7 U	3.4 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U	3.7 U
4,4'-DDE	3.6 U	3.4 U	3.7 U	19 J	0.31 J	0.28 J	3.7 U	3.7 U	2.4 J	0.1 J	24 J
4,4'-DDT	3.6 U	3.4 U	3.7 U	1.8 J	3.7 U	0.22 J	3.7 U	3.7 UJ	3.7 UJ	3.6 UJ	14 J
Chlordane	4.5 U	4.4 U	4.8 U	4.3 U	4.7 U	4.5 U	4.7 U	4.7 U	4.7 U	4.6 U	4.7 U
Dieldrin	3.6 U	3.4 U	3.7 U	3.4 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U	3.7 U
Endosulfan I	1.8 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Endrin	3.6 U	3.4 U	3.7 U	3.4 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U	3.7 U
Endrin ketone	3.6 U	3.4 U	3.7 U	3.4 U	3.7 UJ	3.6 U	3.7 UJ	3.7 U	3.7 U	3.6 U	3.7 U
Heptachlor	1.8 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
beta-BHC	1.8 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
delta-BHC	1.8 U	1.8 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
gamma-Chlordane	1.8 UJ	1.8 UJ	1.9 UJ	1.8 UJ	1.9 UJ	1.8 UJ	1.9 UJ	1.9 U	1.9 U	1.9 U	1.9 U
Herbicides (UG_KG)											
2,4,5-T	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U
2,4-D	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U

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Site ID	E-SWMU-1		E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1	E-SWMU-1
Station ID	CGW1SS40		CGW1SS41	CGW1SS42	CGW1SS43	CGW1SS44	CGW1SS45	CGW1SS46	CGW1SS47	CGW1SS48	CGW1SS49
Sample ID	CGW1FD04P-R01	CGW1SS40-R01	CGW1SS41-R01	CGW1SS42-R01	CGW1SS43-R01	CGW1SS44-R01	CGW1SS45-R01	CGW1SS46-R01	CGW1SS47-R01	CGW1SS48-R01	CGW1SS49-R01
Sample Date	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/10/04	02/04/04	02/10/04
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.8 U	3.8 U	3.6 U	3.4 U	3.7 U	3.9 U	3.7 U	3.6 U	3.7 U	3.6 UJ	3.8 U
4,4'-DDE	1.1 J	1.5 J	0.67 J	3.4 U	3.7 U	1.8 J	0.42 J	2.7 J	0.7 J	0.71 J	0.76 J
4,4'-DDT	0.44 J	0.64 J	0.54 J	3.4 UJ	3.7 UJ	1.2 J	0.67 J	2.7 J	3.7 UJ	3.6 UJ	0.39 J
Chlordane	4.8 U	4.8 U	4.6 U	4.4 U	4.7 U	5 U	4.8 U	4.6 U	4.8 U	4.6 UJ	4.8 U
Dieldrin	3.8 U	3.8 U	3.6 U	3.4 U	3.7 U	3.9 U	3.7 U	3.6 U	3.7 U	3.6 UJ	3.8 U
Endosulfan I	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.9 UJ	1.9 U
Endrin	3.8 U	3.8 U	3.6 U	3.4 U	3.7 U	3.9 U	3.7 U	3.6 U	3.7 U	3.6 UJ	3.8 U
Endrin ketone	3.8 U	3.8 U	3.6 U	3.4 U	3.7 U	3.9 U	3.7 U	3.6 U	3.7 U	3.6 UJ	3.8 U
Heptachlor	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.9 UJ	1.9 U
beta-BHC	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.9 UJ	1.9 U
delta-BHC	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.9 UJ	1.9 U
gamma-Chlordane	1.9 U	1.9 U	1.8 U	1.8 U	1.9 U	2 U	1.9 U	1.9 U	1.9 U	1.9 UJ	1.9 U
Herbicides (UG_KG)											
2,4,5-T	11 U	11 U	11 U	10 U	11 U	12 U	11 U	11 U	11 U	11 U	12 U
2,4-D	11 U	11 U	11 U	10 U	11 U	12 U	11 U	11 U	11 U	11 U	12 U

Notes:

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Site ID	E-SWMU-1		E-SWMU-2	E-SWMU-2	E-SWMU-2	E-SWMU-2	E-SWMU-2	E-SWMU-2	E-SWMU-2	E-SWMU-2	
Station ID	CGW1SS50		CGW2SS01	CGW2SS02	CGW2SS03	CGW2SS04	CGW2SS05	CGW2SS06	CGW2SS07	CGW2SS08	
Sample ID	CGW1FD05P-R01	CGW1SS50-R01	CGW2SS01-R01	CGW2SS02-R01	CGW2SS03-R01	CGW2SS04-R01	CGW2SS05-R01	CGW2SS06-R01	CGW2SS07-R01	CGW2FD01P-R01	CGW2SS08-R01
Sample Date	02/10/04	02/10/04	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04	01/21/04
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	5.6 J	6.2 J	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U	3.9 U	3.9 U
4,4'-DDE	180	190	3.7 U	3.9 U	0.4 J	0.28 J	0.73 J	3.8 U	0.16 J	3.9 U	3.9 U
4,4'-DDT	58 J	49 J	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U	3.9 U	3.9 U
Chlordane	4.6 U	4.6 U	4.7 U	4.9 U	4.9 U	4.7 U	4.7 U	4.8 U	5 U	5 U	5 U
Dieldrin	3.6 U	3.6 U	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U	3.9 U	3.9 U
Endosulfan I	1.9 U	1.9 U	1.9 U	2 U	2 U	1.9 U	1.9 U	2 U	2 U	2 U	2 U
Endrin	3.6 U	3.6 U	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U	3.9 U	3.9 U
Endrin ketone	3.6 U	3.6 U	3.7 U	3.9 U	3.9 U	3.7 U	3.7 U	3.8 U	3.9 U	3.9 U	3.9 U
Heptachlor	1.9 U	1.9 U	1.9 U	2 U	2 U	1.9 U	1.9 U	2 U	2 U	2 U	2 U
beta-BHC	1.9 U	1.9 U	1.9 U	2 U	2 U	1.9 U	1.9 U	2 U	2 U	2 U	2 U
delta-BHC	1.9 U	1.9 U	1.9 U	2 U	2 U	1.9 U	1.9 U	2 U	2 U	2 U	2 U
gamma-Chlordane	1.9 U	1.9 U	1.9 U	2 U	2 U	1.9 U	1.9 U	2 U	2 U	2 U	2 U
Herbicides (UG_KG)											
2,4,5-T	11 U	11 UJ	11 UJ	12 UJ	12 U	11 U	11 UJ	12 U	12 U	12 U	12 U
2,4-D	11 U	11 UJ	11 UJ	12 UJ	12 U	11 U	11 UJ	12 U	12 U	12 U	12 U

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-2	E-SWMU-2	E-SWMU-2	E-SWMU-2	E-SWMU-4	E-SWMU-4	E-SWMU-4	E-SWMU-4
Station ID	CGW2SS09	CGW2SS10	CGW2SS11	CGW2SS12	CGSWMU4SS001	CGSWMU4SS002	CGSWMU4SS003	CGSWMU4SS004
Sample ID	CGW2SS09-R01	CGW2SS10-R01	CGW2SS11-R01	CGW2SS12-R01	NDD021	NDD022	NDD023	NDD024
Sample Date	01/21/04	01/21/04	01/21/04	01/21/04	06/13/00	06/13/00	06/13/00	06/13/00
Chemical Name								
Pesticide/Polychlorinated Biphenyls (UG_KG)								
4,4'-DDD	3.4 U	3.4 U	3.5 U	3.4 U	3.4 UJ	34 UJ	3.7 UJ	36 UJ
4,4'-DDE	0.59 J	0.5 J	0.13 J	0.08 J	1.1 J	17 UJ	4.3 J	18 UJ
4,4'-DDT	3.4 U	3.4 U	3.5 U	3.4 U	1.2 J	34 UJ	2.2 J	36 UJ
Chlordane	4.4 U	4.4 U	4.5 U	4.4 U	15 UJ	150 UJ	16 UJ	159 UJ
Dieldrin	3.4 U	3.4 U	3.5 U	3.4 U	1.7 UJ	17 UJ	1.9 UJ	18 UJ
Endosulfan I	1.8 U	1.8 U	1.8 U	1.8 U	343 UJ	3,400 UJ	372 UJ	3,620 UJ
Endrin	3.4 U	3.4 U	3.5 U	3.4 U	3.4 UJ	34 UJ	3.7 UJ	36 UJ
Endrin ketone	3.4 U	3.4 U	3.5 U	3.4 U	NA	NA	NA	NA
Heptachlor	1.8 U	1.8 U	1.8 U	1.8 U	1.7 UJ	17 UJ	1.9 UJ	18 UJ
beta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.7 UJ	17 UJ	1.9 UJ	18 UJ
delta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.7 UJ	17 UJ	1.9 UJ	18 UJ
gamma-Chlordane	1.8 U	1.8 U	1.8 U	1.8 U	NA	NA	NA	NA
Herbicides (UG_KG)								
2,4,5-T	10 U	10 UJ	11 UJ	10 U	75 UJ	755 UJ	79 UJ	79 UJ
2,4-D	10 U	10 UJ	11 UJ	10 U	14 J	3,780 UJ	397 UJ	393 UJ

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-4	E-SWMU-4	E-SWMU-4	E-SWMU-4	E-SWMU-4	E-SWMU-4	E-SWMU-4	E-SWMU-4		E-SWMU-5
Station ID	CGSWMU4SS005	CGSWMU4SS006	CGSWMU4SS007	CGSWMU4SS008	CGSWMU4SS009	CGSWMU4SS010	CGSWMU4SS011	CGSWMU4SS012		CGW5SS01
Sample ID	NDD025	NDD026	NDD027	NDD028	NDD029	NDD030	NDD031	NDD032	NDD033FD1	CGW5SS01-R01
Sample Date	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	01/19/04
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	32 UJ	3.6 UJ	3.2 UJ	3 UJ	3.2 UJ	3.8 UJ	3.9 UJ	3.8 UJ	3.9 UJ	3.5 U
4,4'-DDE	16 UJ	1.8 UJ	2.3 J	3.2 J	4.5 J	3.8 J	1.9 UJ	1.9 UJ	2 UJ	3.5 U
4,4'-DDT	4.1 J	4.3 J	0.59 J	1.8 J	3.4 J	0.66 J	3.9 UJ	3.8 UJ	3.9 UJ	3.5 U
Chlordane	142 UJ	16 UJ	14 UJ	13 UJ	14 UJ	17 UJ	17 UJ	17 UJ	17 UJ	4.4 U
Dieldrin	16 UJ	1.8 UJ	1.6 UJ	1.5 UJ	1.6 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	3.5 U
Endosulfan I	3,230 UJ	356 UJ	320 UJ	297 UJ	322 UJ	378 UJ	387 UJ	379 UJ	393 UJ	1.8 UJ
Endrin	32 UJ	3.6 UJ	3.2 UJ	3 UJ	3.2 UJ	3.8 UJ	3.9 UJ	3.8 UJ	3.9 UJ	3.5 UJ
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.5 U
Heptachlor	16 UJ	1.8 UJ	1.6 UJ	1.5 UJ	1.6 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 U
beta-BHC	16 UJ	1.8 UJ	1.6 UJ	1.5 UJ	1.6 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 U
delta-BHC	16 UJ	1.8 UJ	1.6 UJ	1.5 UJ	1.6 UJ	1.9 UJ	1.9 UJ	1.9 UJ	2 UJ	1.8 U
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.8 U
Herbicides (UG_KG)										
2,4,5-T	71 UJ	78 UJ	69 UJ	69 UJ	70 UJ	84 UJ	84 UJ	82 UJ	86 UJ	11 U
2,4-D	354 UJ	392 UJ	345 UJ	345 UJ	351 UJ	418 UJ	420 UJ	408 UJ	431 UJ	11 U

Notes:

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J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-5	E-SWMU-5	E-SWMU-5	E-SWMU-6/7	E-SWMU-6/7	E-SWMU-6/7	E-SWMU-6/7	E-SWMU-6/7	E-SWMU-6/7	
Station ID	CGW5SS02	CGW5SS03	CGW5SS04	CGSWMU6/7SS001	CGSWMU6/7SS002	CGSWMU6/7SS003	CGSWMU6/7SS004	CGSWMU6/7SS005	CGSWMU6/7SS006	
Sample ID	CGW5SS02-R01	CGW5SS03-R01	CGW5SS04-R01	NDD034	NDD035	NDD036	NDD037	NDD038	NDD039	NDD043FD1
Sample Date	01/19/04	01/19/04	01/19/04	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00	06/13/00
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	3.6 U	3.6 U	3.6 U	3.2 U	3.2 U	3.4 U	3.9 U	3.3 U	3.8 UJ	6.6 J
4,4'-DDE	3.6 U	3.6 U	3.6 U	98	22	136	3.3	5.7	6.1 J	31 J
4,4'-DDT	3.6 U	3.6 U	3.6 U	24	7.5	146	0.81 J	4.8	3.2 J	54 J
Chlordane	4.6 U	4.5 U	4.5 U	14 U	14 U	15 U	17 U	14 U	17 U	17 U
Dieldrin	3.6 U	3.6 U	3.6 U	1.6 U	1.6 U	1.7 U	2 U	1.6 U	1.9 U	1.9 U
Endosulfan I	1.9 UJ	1.8 UJ	1.8 UJ	319 U	324 U	344 U	391 U	329 U	380 U	382 U
Endrin	3.6 UJ	3.6 UJ	3.6 UJ	3.2 U	3.2 U	3.4 U	3.9 U	3.3 U	3.8 U	3.8 U
Endrin ketone	3.6 U	3.6 U	3.6 U	NA	NA	NA	NA	NA	NA	NA
Heptachlor	1.9 U	1.8 U	1.8 U	1.6 U	1.6 U	1.7 U	2 U	1.6 U	1.9 U	1.9 U
beta-BHC	1.9 U	1.8 U	1.8 U	1.6 U	1.6 U	1.7 U	2 U	1.6 U	1.9 U	1.9 U
delta-BHC	1.9 U	1.8 U	1.8 U	1.6 UJ	1.6 UJ	1.7 UJ	2 UJ	1.6 UJ	0.84 J	1.9 UJ
gamma-Chlordane	1.9 U	1.8 U	1.8 U	NA	NA	NA	NA	NA	NA	NA
Herbicides (UG_KG)										
2,4,5-T	11 U	11 UJ	11 U	691 U	702 U	752 U	833 U	709 U	835 U	840 U
2,4-D	11 U	11 UJ	11 U	3,450 U	3,510 U	3,760 U	4,160 U	3,550 U	4,180 U	4,200 U

Notes:

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R - Unreliable result
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Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-6/7	E-SWMU-6/7	E-SWMU-6/7	E-SWMU-6/7	E-SWMU-8		E-SWMU-8	E-SWMU-8	E-SWMU-8	E-SWMU-8
Station ID	CGSWMU6/7SS007	CGSWMU6/7SS008	CGSWMU6/7SS009	CGSWMU6/7SS010	CGW8SS01		CGW8SS02	CGW8SS03	CGW8SS04	CGW8SS05
Sample ID	NDD058	NDD040	NDD041	NDD042	CGW8FD01P-R01	CGW8SS01-R01	CGW8SS02-R01	CGW8SS03-R01	CGW8SS04-R01	CGW8SS05-R01
Sample Date	06/13/00	06/13/00	06/13/00	06/13/00	01/19/04	01/19/04	01/19/04	01/19/04	01/19/04	01/19/04
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	3.2 U	3.8 U	3.1 U	26 J	3.6 U	3.6 U	4 U	3.5 U	3.4 U	3.4 U
4,4'-DDE	8.2	3.2	22	3.5	3.6 U	3.6 U	4 U	3.5 U	3.4 U	3.4 U
4,4'-DDT	4.8 J	3.8 U	3.1	3.1 U	3.6 U	3.6 U	0.46 J	0.31 J	3.4 U	3.4 U
Chlordane	14 U	17 U	14 U	14	4.6 U	4.6 U	5 U	4.5 U	4.3 U	4.4 U
Dieldrin	1.6 U	1.9 U	1.6 U	1.6 U	3.6 U	3.6 U	4 U	3.5 U	3.4 U	3.4 U
Endosulfan I	318 U	384 U	313 U	312 U	1.8 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ
Endrin	3.2 U	3.8 U	3.1 U	3.1 U	3.6 U	3.6 U	4 U	3.5 U	3.4 U	3.4 U
Endrin ketone	NA	NA	NA	NA	3.6 U	3.6 U	4 U	3.5 U	3.4 U	3.4 U
Heptachlor	1.6 U	1.9 U	1.6 U	0.76 J	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 U
beta-BHC	1.6 U	1.9 U	1.6 U	1.6 U	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 U
delta-BHC	1.6 UJ	1.9 UJ	1.6 UJ	1.6 UJ	1.8 UJ	1.9 UJ	2 UJ	1.8 UJ	1.8 UJ	1.8 UJ
gamma-Chlordane	NA	NA	NA	NA	1.8 U	1.9 U	2 U	1.8 U	1.8 U	1.8 U
Herbicides (UG_KG)										
2,4,5-T	702 U	826 U	678 U	688 U	11 U	11 U	12 U	11 U	10 U	114 U
2,4-D	3,510 U	4,130 U	3,390 U	3,440 U	11 U	11 U	12 U	11 U	10 U	114 U

Notes:

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UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10		E-SWMU-10	E-SWMU-10
Station ID	CGW10SS05	CGW10SS06	CGW10SS07	CGW10SS08	CGW10SS09	CGW10SS10	CGW10SS11	CGW10SS12		CGW10SS13	CGW10SS14
Sample ID	CGW10SS05-R01	CGW10SS06-R01	CGW10SS07-R01	CGW10SS08-R01	CGW10SS09-R01	CGW10SS10-R01	CGW10SS11-R01	CGW10FD01P-R01	CGW10SS12-R01	CGW10SS13-R01	CGW10SS14-R01
Sample Date	01/22/04	01/20/04	01/20/04	01/22/04	01/20/04	01/20/04	01/20/04	01/20/04	01/20/04	01/20/04	01/20/04
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	0.26 J	0.19 J	3.9 U	0.3 J	11 J	0.44 J	0.5 J	0.56 J	0.6 J	3.8 U	3.8 U
4,4'-DDE	110 J	74 J	28 J	47 J	120 J	70 J	100 J	20 J	40 J	5.8 J	12 J
4,4'-DDT	0.92 J	0.97 J	3.9 U	4 U	3.8 U	4 U	3.7 U	3.6 U	3.6 U	3.8 U	3.8 U
Chlordane	4.7 U	5.1 U	5 U	5.1 U	4.8 U	5.1 U	4.8 U	4.6 U	4.6 U	4.8 U	4.9 U
Dieldrin	3.7 U	4 U	3.9 U	4 U	0.37 J	4 U	3.7 U	3.6 U	0.74 J	3.8 U	3.8 U
Endosulfan I	1.9 U	2 U	2 U	2.1 U	1.9 U	2.1 U	1.9 U	1.9 U	1.8 U	1.9 U	2 U
Endrin	3.7 U	4 U	3.9 U	4 U	3.8 U	4 U	3.7 U	3.6 U	3.6 U	3.8 U	3.8 U
Endrin ketone	3.7 U	4 U	3.9 U	4 U	3.8 U	4 U	3.7 U	3.6 U	3.6 U	3.8 U	3.8 U
Heptachlor	1.9 U	2 U	2 U	2.1 U	1.9 U	2.1 U	1.9 U	1.9 U	1.8 U	1.9 U	2 U
beta-BHC	1.9 U	2 U	2 U	2.1 U	1.9 U	2.1 U	1.9 U	1.9 U	1.8 U	1.9 U	2 U
delta-BHC	1.9 U	2 UJ	2 UJ	2.1 U	1.9 UJ	2.1 UJ	1.9 UJ	1.9 UJ	1.8 UJ	1.9 UJ	2 UJ
gamma-Chlordane	1.9 U	2 U	2 U	2.1 U	1.9 U	2.1 U	1.9 U	1.9 U	1.8 U	1.9 U	2 U
Herbicides (UG_KG)											
2,4,5-T	11 UJ	12 U	12 U	12 UJ	11 UJ	12 UJ	11 UJ	11 UJ	11 UJ	11 UJ	12 U
2,4-D	11 UJ	12 U	12 U	12 UJ	11 UJ	12 UJ	11 UJ	11 UJ	11 UJ	11 UJ	12 U

Notes:

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JN - Analyte present at approximate quantity
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U - Analyte not detected
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Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-12	E-SWMU-12	E-SWMU-12		E-SWMU-12
Station ID	CGW10SS15	CGW10SS16	CGW10SS17	CGW10SS18	CGW10SS19	CGW10SS20	CGW12SS01	CGW12SS02	CGW12SS03		CGW12SS04
Sample ID	CGW10SS15-R01	CGW10SS16-R01	CGW10SS17-R01	CGW10SS18-R01	CGW10SS19-R01	CGW10SS20-R01	CGW12SS01-R01	CGW12SS02-R01	CGW12FD01P-R01	CGW12SS03-R01	CGW12SS04-R01
Sample Date	01/20/04	01/22/04	01/22/04	01/22/04	01/20/04	01/22/04	01/19/04	01/19/04	01/19/04	01/19/04	01/19/04
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	0.23 J	3.8 U	10 J	0.16 J	0.54 J	0.33 J	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
4,4'-DDE	17 J	4.8 J	73 J	19 J	66 J	20 J	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
4,4'-DDT	3.8 U	0.3 J	84	0.39 J	3.8 U	0.44 J	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
Chlordane	4.8 U	4.9 U	4.8 U	5 U	4.9 U	4.8 U	4.5 U	4.5 U	4.3 U	4.4 U	4.4 U
Dieldrin	3.8 U	3.8 U	3.8 U	3.9 U	3.8 U	3.7 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
Endosulfan I	2 U	2 U	1.9 U	20 R	2 U	1.9 U	1.8 UJ	1.8 UJ	1.7 UJ	1.8 UJ	1.8 UJ
Endrin	3.8 U	3.8 U	3.8 U	3.9 U	3.8 U	3.7 U	3.5 UJ	3.5 UJ	3.4 UJ	3.5 UJ	3.5 UJ
Endrin ketone	3.8 U	3.8 U	3.8 U	3.9 U	3.8 U	3.7 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U
Heptachlor	2 U	2 U	1.9 U	2 U	2 U	1.9 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U
beta-BHC	2 U	2 U	1.9 U	2 U	2 U	1.9 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U
delta-BHC	2 UJ	2 U	1.9 U	2 U	2 UJ	1.9 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U
gamma-Chlordane	2 U	2 U	1.9 U	2 U	2 U	1.9 U	1.8 U	1.8 U	1.7 U	1.8 U	1.8 U
Herbicides (UG_KG)											
2,4,5-T	11 U	12 UJ	11 UJ	12 UJ	12 UJ	11 UJ	11 UJ	11 U	10 U	10 U	10 UJ
2,4-D	11 U	12 UJ	11 UJ	12 UJ	12 UJ	11 UJ	11 UJ	11 U	10 U	10 U	10 UJ

Notes:

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J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
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Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-12	PAOC-J	PAOC-J	PAOC-J	PAOC-J	PAOC-J		PAOC-J	PAOC-K	PAOC-K	PAOC-K
Station ID	CGW12SS05	EPAJ-SO01	EPAJ-SO02	EPAJ-SO03	EPAJ-SO04	EPAJ-SO05		EPAJ-SO06	EPAK-SO01	EPAK-SO02	EPAK-SO03
Sample ID	CGW12SS05-R01	EPAJ-SS01-0001	EPAJ-SS02-0001	EPAJ-SS03-0001	EPAJ-SS04-0001	EPAJ-SS05-0001	EPAJ-SS05P-0001	EPAJ-SS06-0001	EPAK-SS01-0001	EPAK-SS02-0001	EPAK-SS03-0001
Sample Date	01/19/04	03/02/06	03/01/06	03/01/06	03/01/06	03/02/06	03/02/06	03/01/06	03/01/06	02/28/06	03/02/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.5 U	2 J	3.6 U	4	6.8 J	3.5 U	3.6 U	3.8 U	3.8 U	3.9 U	3.5 U
4,4'-DDE	3.5 U	92	51	420	1,200	49	3 J	1.2 J	25	3.3 J	110
4,4'-DDT	3.5 U	28	8.5	46	990	11	21	1.7 J	8.7	3.9 U	27
Chlordane	4.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.5 U	3.6 U	3.6 U	3.4 U	17 U	3.5 U	3.6 U	3.8 U	3.8 U	3.9 U	3.5 U
Endosulfan I	1.8 UJ	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2 U	2 U	1.8 U
Endrin	3.5 UJ	3.6 U	3.6 U	3.4 U	17 U	3.5 U	3.6 U	3.8 U	3.8 U	3.9 U	3.5 U
Endrin ketone	3.5 U	3.6 U	3.6 U	3.4 U	17 U	3.5 U	3.6 U	3.8 U	3.8 U	3.9 U	3.5 U
Heptachlor	1.8 U	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2 U	2 U	1.8 U
beta-BHC	1.8 U	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2 U	2 U	1.8 U
delta-BHC	1.8 U	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2 U	2 U	1.8 U
gamma-Chlordane	1.8 U	1.8 U	1.9 U	1.8 U	8.9 U	1.8 U	1.9 U	1.9 U	2 U	2 U	1.8 U
Herbicides (UG_KG)											
2,4,5-T	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	PAOC-K		PAOC-K	PAOC-L		PAOC-L	PAOC-L	PAOC-L	PAOC-S		PAOC-S
Station ID	EPAK-SO04		EPAK-SO05	EPAL-SO01		EPAL-SO02	EPAL-SO03	EPAL-SO04	EPAS-SO01		EPAS-SO02
Sample ID	EPAK-SS04-0001	EPAK-SS04P-0001	EPAK-SS05-0001	EPAL-SS01-0002	EPAL-SS01P-0002	EPAL-SS02-0001	EPAL-SS03-0002	EPAL-SS04-0001	EPAS-SS01-0001	EPAS-SS01P-0001	EPAS-SS02-0001
Sample Date	02/28/06	02/28/06	02/28/06	02/27/06	02/27/06	03/08/06	02/27/06	03/08/06	02/02/06	02/02/06	02/02/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	6.1 J	7.9	3.4 U	6 JN	24	17 U	3.7 JN	940 J	7.9	4.6	1.8 J
4,4'-DDE	1,200	830	50	930	1,400	3,400	670 J	2,300	550	650	270
4,4'-DDT	490	320	16	910	2,800	530	300 J	67,000	110	100	70
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	17 U	3.4 U	3.4 U	3.5 U	3.6 U	17 U	0.79 J	350 U	3.8 U	3.6 U	3.7 U
Endosulfan I	8.8 U	1.8 U	1.8 U	1.8 UJ	1.8 U	8.7 U	1.9 UJ	180 U	1.9 U	1.8 U	1.9 U
Endrin	17 U	3.4 U	3.4 U	0.78 J	3.6 U	17 U	3.7 UJ	350 U	3.8 U	3.6 U	3.7 U
Endrin ketone	17 U	3.4 U	3.4 U	3.5 UJ	3.6 U	17 U	3.7 UJ	350 U	3.8 U	3.6 U	3.7 U
Heptachlor	8.8 U	1.8 U	1.8 U	1.8 UJ	1.8 U	8.7 U	1.9 UJ	180 U	1.9 U	1.8 U	1.9 U
beta-BHC	8.8 U	1.8 U	1.8 U	1.8 UJ	1.8 U	8.7 U	1.9 UJ	180 U	1.9 U	1.8 U	1.9 U
delta-BHC	8.8 U	1.8 U	1.8 U	1.8 UJ	1.8 U	8.7 U	1.9 UJ	180 U	1.9 U	1.8 U	1.9 U
gamma-Chlordane	8.8 U	1.3 J	1.8 U	1.8 U	1.8 U	8.7 U	1.9 UJ	180 U	1.9 U	1.8 U	1.9 U
Herbicides (UG_KG)											
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA - Not analyzed
J - Reported value is estimated
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R - Unreliable result
U - Analyte not detected
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Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	PAOC-S	PAOC-S	PAOC-S	PAOC-U	PAOC-U	PAOC-U	PAOC-U		PAOC-U	PAOC-U	PAOC-U
Station ID	EPAS-SO03	EPAS-SO04	EPAS-SO05	EPAU-SO01	EPAU-SO02	EPAU-SO03	EPAU-SO04		EPAU-SO05	EPAU-SO06	EPAU-SO07
Sample ID	EPAS-SS03-0001	EPAS-SS04-0001	EPAS-SS05-0001	EPAU-SS01-0001	EPAU-SS02-0001	EPAU-SS03-0001	EPAU-SS04-0001	EPAU-SS04P-0001	EPAU-SS05-0001	EPAU-SS06-0001	EPAU-SS07-0001
Sample Date	02/02/06	02/02/06	02/02/06	03/01/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.4 U	3.8 U	6.9	3.6 U	3.4 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U
4,4'-DDE	330	17	580	23	54	82	4.5 J	4.7	51	3.5 U	53
4,4'-DDT	15	5.4	270	31	8	10	1.7 J	2.1 J	3.7	3.5 U	18
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.4 U	3.8 U	3.6 U	3.6 U	3.4 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U
Endosulfan I	1.8 U	2 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Endrin	3.4 U	3.8 U	3.6 U	3.6 U	3.4 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U
Endrin ketone	3.4 U	3.8 U	3.6 U	3.6 U	3.4 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U
Heptachlor	1.8 U	2 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
beta-BHC	1.8 U	2 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
delta-BHC	1.8 U	2 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	1.8 U	2 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	0.52 J
Herbicides (UG_KG)											
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

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J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
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Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	PAOC-U	PAOC-U	PI 4	PI 4	PI 4	PI 4	PI 4		PI 4	PI 4	PI 4
Station ID	EPAU-SO08	EPAU-SO09	EPI04-SO01	EPI04-SO02	EPI04-SO03	EPI04-SO04	EPI04-SO05		EPI04-SO06	EPI04-SO07	EPI04-SO08
Sample ID	EPAU-SS08-0001	EPAU-SS09-0001	EPI04-SS01-0001	EPI04-SS02-0001	EPI04-SS03-0001	EPI04-SS04-0001	EPI04-SS05-0001	EPI04-SS05P-0001	EPI04-SS06-0001	EPI04-SS07-0001	EPI04-SS08-0001
Sample Date	03/01/06	03/03/06	01/26/06	01/26/06	01/26/06	01/26/06	01/26/06	01/26/06	01/26/06	01/25/06	01/25/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.4 U	3.8 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	2.1 J	3.1 J	3.5 U
4,4'-DDE	37	3.8 U	3.8	2.2 J	12	1.2 J	2.7 J	4.7	620	36	29
4,4'-DDT	2.9 J	3.8 U	1.4 J	3.6 U	3.1 J	3.5 U	1.4 J	27	100	7.8	3.1 J
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.4 U	3.8 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	7.3 U	3.7 U	3.5 U
Endosulfan I	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	3.7 U	1.9 U	1.8 U
Endrin	3.4 U	3.8 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	7.3 U	3.7 U	3.5 U
Endrin ketone	1.3 J	3.8 U	3.7 U	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	7.3 U	3.7 U	3.5 U
Heptachlor	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	3.7 U	1.9 U	1.8 U
beta-BHC	1.8 U	3.2 R	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	3.7 U	1.9 U	1.8 U
delta-BHC	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	0.75 J	1.9 U	1.8 U
gamma-Chlordane	1.8 U	1.9 U	0.69 J	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1 J	1.9 U	1.8 U
Herbicides (UG_KG)											
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

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Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	PI 4	PI 4	PI 4	PI 4	PI 4	PI 4	PI 7		PI 7	PI 7	PI 7
Station ID	EPI04-SO08	EPI04-SO09	EPI04-SO10	EPI04-SO11	EPI04-SO12	EPI04-SO13	EPI07-SO01		EPI07-SO02	EPI07-SO03	EPI07-SO04
Sample ID	EPI04-SS08P-0001	EPI04-SS09-0001	EPI04-SS10-0001	EPI04-SS11-0001	EPI04-SS12-0001	EPI04-SS13-0001	EPI07-SS01-0001	EPI07-SS01-0001P	EPI07-SS02-0001	EPI07-SS03-0001	EPI07-SS04-0001
Sample Date	01/25/06	01/24/06	01/24/06	01/25/06	01/24/06	01/25/06	03/13/06	03/13/06	03/13/06	03/13/06	03/13/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.5 U	3.7 U	3.6 U	3.6 U	3.6 U	3.7 U	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U
4,4'-DDE	27	9.1	84	26	180	5.9	7.5	6.4	4.9	12	3.4 U
4,4'-DDT	5.3	1.4 J	2.8 J	3.6	22	3.7 U	3.5 U	3.5 U	1.3 J	2.5 J	3.4 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.5 U	3.7 U	3.6 U	3.6 U	3.6 U	3.7 U	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U
Endosulfan I	1.8 U	1.9 U	0.44 J	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
Endrin	3.5 U	3.7 U	3.6 U	3.6 U	3.6 U	3.7 U	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U
Endrin ketone	3.5 U	3.7 U	3.6 U	3.6 U	3.6 U	3.7 U	3.5 U	3.5 U	3.7 U	3.6 U	3.4 U
Heptachlor	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
beta-BHC	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
delta-BHC	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	0.41 J	1.8 U
gamma-Chlordane	1.8 U	0.79 J	1.8 U	1.8 U	1.8 U	0.57 J	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U
Herbicides (UG_KG)											
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

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Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7
Station ID	EPI07-SO05	EPI07-SO06	EPI07-SO07	EPI07-SO08	EPI07-SO09	EPI07-SO10	EPI07-SO11	EPI07-SO12	EPI07-SO13	EPI07-SO14	EPI07-SO15
Sample ID	EPI07-SS05-0001	EPI07-SS06-0001	EPI07-SS07-0001	EPI07-SS08-0001	EPI07-SS09-0001	EPI07-SS10-0001	EPI07-SS11-0001	EPI07-SS12-0001	EPI07-SS13-0001	EPI07-SS14-0001	EPI07-SS15-0001
Sample Date	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/16/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U
4,4'-DDE	22	13	1.7 J	3.4 U	1.7 J	6.6	0.9 J	3.4 U	3.4 U	3.5 U	3.6 U
4,4'-DDT	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	1.6 J	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U
Endosulfan I	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U
Endrin	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U
Endrin ketone	3.5 U	3.5 U	3.5 U	3.4 U	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U	3.6 U
Heptachlor	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U
beta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U
delta-BHC	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.7 U	1.7 U	1.8 U	1.8 U	1.8 U
Herbicides (UG_KG)											
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
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Shading Indicates Detection

Table A-1
East Vieques Surface Soil Pesticide
and Herbicide Detections

Site ID	PI 7		PI 7	PI 7	PI 7	PI 7	PI 7	PI 7
Station ID	EPI07-SO16		EPI07-SO17	EPI07-SO18	EPI07-SO19	EPI07-SO20	EPI07-SO21	EPI07-SO22
Sample ID	EPI07-SS16-0001	EPI07-SS16P-0001	EPI07-SS17-0001	EPI07-SS18-0001	EPI07-SS19-0001	EPI07-SS20-0001	EPI07-SS21-0001	EPI07-SS22-0001
Sample Date	03/16/06	03/16/06	03/15/06	03/15/06	03/15/06	03/16/06	03/16/06	03/16/06
Chemical Name								
Pesticide/Polychlorinated Biphenyls (UG_KG)								
4,4'-DDD	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U	3.5 U	3.5 U
4,4'-DDE	3.5 U	3.5 U	3.4 U	150	1.4 J	3.5 U	3.5 U	3.5 U
4,4'-DDT	3.5 U	3.5 U	3.4 U	31	1.7 J	3.5 U	3.5 U	3.5 U
Chlordane	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U	3.5 U	3.5 U
Endosulfan I	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
Endrin	3.5 U	2.4 J	3.4 U	3.4 U	3.4 U	3.5 U	3.5 U	3.5 U
Endrin ketone	3.5 U	3.5 U	3.4 U	3.4 U	3.4 U	3.5 U	3.5 U	3.5 U
Heptachlor	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
beta-BHC	1.8 U	1.9 J	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
delta-BHC	1.8 U	1.8 U	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	1.8 U	1.9 J	1.7 U	1.8 U	1.7 U	1.8 U	1.8 U	1.8 U
Herbicides (UG_KG)								
2,4,5-T	NA	NA	NA	NA	NA	NA	NA	NA
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
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U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-2
East Vieques
Subsurface Soil Pesticide
and Herbicide Detections

Site ID			E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10
Station ID	**Lowest**	**Highest**	CGW10SB05	CGW10SB06	CGW10SB07	CGW10SB08	CGW10SB09	CGW10SB10	CGW10SB11	CGW10SB12
Sample ID	**Detected**	**Detected**	CGW10SB05-R01-5	CGW10SB06-R01-5	CGW10SB07-R01-5	CGW10SB08-R01-5	CGW10SB09-R01-5	CGW10SB10-R01-5	CGW10SB11-R01-5	CGW10SB12-R01-5
Sample Date	**Concentration**	**Concentration**	01/22/04	01/20/04	01/20/04	01/22/04	01/20/04	01/20/04	01/20/04	01/20/04
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	1.2 J	44	44 U	3.8 U	3.9 U	3.9 UJ	3.8 U	3.8 U	3.7 U	3.8 U
4,4'-DDE	0.076 J	540	140 J	2.9 J	12 J	6.1 J	13 J	18 J	2.4 J	9.4 J
4,4'-DDT	0.31 J	950	44 U	3.8 U	3.9 U	3.9 UJ	3.8 U	3.8 U	3.7 U	3.8 U
Endosulfan I	1.9	1.9	22 U	2 U	2 U	2 UJ	1.9 U	2 U	1.9 U	2 U
Endrin aldehyde	1.5 J	1.5 J	44 U	3.8 U	3.9 U	3.9 UJ	3.8 U	3.8 U	3.7 U	3.8 U
Endrin ketone	0.82 J	0.82 J	44 U	3.8 U	3.9 U	3.9 UJ	3.8 U	3.8 UJ	3.7 U	3.8 U
Methoxychlor	11 J	11 J	220 U	20 U	20 U	20 UJ	19 U	20 U	19 U	20 U
beta-BHC	0.77 J	2.2 JN	22 U	2 U	2 U	2 UJ	1.9 U	2 U	1.9 U	2 U
gamma-Chlordane	0.45 J	1.1 J	22 U	2 U	2 U	2 UJ	1.9 U	2 U	1.9 U	2 U

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-2
East Vieques
Subsurface Soil Pesticide
and Herbicide Detections

Site ID	E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10		E-SWMU-10	E-SWMU-10	E-SWMU-10	E-SWMU-10	
Station ID	CGW10SB13	CGW10SB14	CGW10SB15	CGW10SB16		CGW10SB17	CGW10SB18	CGW10SB19	CGW10SB20	
Sample ID	CGW10SB13-R01-5	CGW10SB14-R01-5	CGW10SB15-R01-5	CGW10FD02P-R01	CGW10SB16-R01-5	CGW10SB17-R01-5	CGW10SB18-R01-5	CGW10SB19-R01-5	CGW10FD04P-R01	CGW10SB20-R01-5
Sample Date	01/20/04	01/20/04	01/20/04	01/22/04	01/22/04	01/22/04	01/22/04	01/20/04	01/22/04	01/22/04
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	4 U	3.6 U	3.7 U	4 U	41 U	3.8 U	3.7 U	3.7 U	3.8 UJ	3.8 U
4,4'-DDE	0.076 J	2 J	1.4 J	0.21 J	2.5 J	4.6 J	4.5 J	2.2 J	1.5 J	0.87 J
4,4'-DDT	4 U	3.6 U	3.7 U	4 U	41 U	0.31 J	3.7 U	3.7 U	3.8 UJ	3.8 U
Endosulfan I	2 U	1.9 U	1.9 U	2 U	21 U	1.9 U	1.9 U	1.9 U	1.9 UJ	2 U
Endrin aldehyde	4 U	3.6 U	3.7 U	4 U	41 U	3.8 U	3.7 U	3.7 U	3.8 UJ	3.8 U
Endrin ketone	4 U	3.6 U	3.7 U	4 U	41 U	3.8 U	3.7 U	3.7 U	3.8 UJ	3.8 U
Methoxychlor	20 U	19 U	19 U	20 U	210 U	19 U	19 U	19 U	19 UJ	20 U
beta-BHC	2 U	1.9 U	1.9 U	2 U	21 U	1.9 U	1.9 U	1.9 U	1.9 UJ	2 U
gamma-Chlordane	2 U	1.9 U	1.9 U	2 U	21 U	1.9 U	1.9 U	1.9 U	1.9 UJ	2 U

Notes:

NA - Not analyzed
J - Reported value is estimated
JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-2
East Vieques
Subsurface Soil Pesticide
and Herbicide Detections

Site ID	PAOC-J	PAOC-J	PAOC-J	PAOC-J	PAOC-J		PAOC-J	PAOC-K	PAOC-K	PAOC-K	PAOC-K
Station ID	EPAJ-SO01	EPAJ-SO02	EPAJ-SO03	EPAJ-SO04	EPAJ-SO05		EPAJ-SO06	EPAK-SO01	EPAK-SO02	EPAK-SO03	EPAK-SO04
Sample ID	EPAJ-SB01-0405	EPAJ-SB02-0406	EPAJ-SB03-0406	EPAJ-SB04-0406	EPAJ-SB05-0406	EPAJ-SB05P-0406	EPAJ-SB06-0406	EPAK-SB01-0406	EPAK-SB02-0406	EPAK-SB03-0406	EPAK-SB04-0406
Sample Date	03/02/06	03/01/06	03/01/06	03/02/06	03/02/06	03/02/06	03/01/06	03/01/06	02/28/06	03/02/06	03/08/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.4 U	3.7 U	3.5 U	3.7 U	3.7 U	3.7 U	3.4 U	3.8 U	3.6 U	3.3 U	44
4,4'-DDE	3.1 J	3.7 U	2.1 J	48	2.5 J	3.1 J	1.3 J	0.89 J	3.6 U	21	540
4,4'-DDT	1.7 J	3.7 U	3.5 U	27	1.3 J	1.3 J	27	3.8 U	3.6 U	7.5	950
Endosulfan I	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2 U	1.9 U	1.7 U	1.8 U
Endrin aldehyde	3.4 U	3.7 U	3.5 U	3.7 U	3.7 U	3.7 U	3.4 U	3.8 U	3.6 U	3.3 U	3.6 U
Endrin ketone	3.4 U	3.7 U	3.5 U	3.7 U	3.7 U	3.7 U	3.4 U	3.8 U	3.6 U	0.82 J	3.6 U
Methoxychlor	18 U	19 U	18 U	19 U	19 U	19 U	18 U	20 U	19 U	17 U	18 U
beta-BHC	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	2.2 JN	1.8 U	2 U	1.9 U	1.7 U	1.8 U
gamma-Chlordane	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.9 U	1.8 U	2 U	1.9 U	1.7 U	0.76 J

Notes:

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JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-2
East Vieques
Subsurface Soil Pesticide
and Herbicide Detections

Site ID	PAOC-K	PAOC-L	PAOC-L	PAOC-L	PAOC-L	PAOC-S	PAOC-S	PAOC-S		PAOC-S	PAOC-S
Station ID	EPAK-SO05	EPAL-SO01	EPAL-SO02	EPAL-SO03	EPAL-SO04	EPAS-SO01	EPAS-SO02	EPAS-SO03		EPAS-SO04	EPAS-SO05
Sample ID	EPAK-SB05-0406	EPAL-SB01-0204	EPAL-SB02-0406	EPAL-SB03-0406	EPAL-SB04-0204	EPAS-SB01-0406	EPAS-SB02-0406	EPAS-SB03-0406	EPAS-SB03P-0406	EPAS-SB04-0406	EPAS-SB05-0406
Sample Date	02/28/06	02/27/06	03/08/06	03/08/06	03/08/06	02/02/06	02/02/06	02/02/06	02/02/06	02/02/06	02/02/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	4.3 U	3.8 UJ	3.6 U	3.6 U	3.7 U	3.9 U	3.5 U	3.8 U	3.8 U	3.8 U	3.6 U
4,4'-DDE	4.6	2.3 J	330	250	100	35	29	3.8 U	3.8 U	3.8 U	2.8 J
4,4'-DDT	4.3 U	1.2 J	180	25	12	6.7	13	3.8 U	3.8 U	3.8 U	1.8 J
Endosulfan I	2.2 U	1.9 UJ	1.9	1.8 U	1.9 U	2 U	1.8 U	2 U	2 U	1.9 U	1.9 U
Endrin aldehyde	4.3 U	3.8 UJ	3.6 U	3.6 U	3.7 U	3.9 U	3.5 U	3.8 U	3.8 U	3.8 U	3.6 U
Endrin ketone	4.3 U	3.8 UJ	3.6 U	3.6 U	3.7 U	3.9 U	3.5 U	3.8 U	3.8 U	3.8 U	3.6 U
Methoxychlor	22 U	19 UJ	19 U	18 U	19 U	20 U	18 U	20 U	20 U	19 U	11 J
beta-BHC	2.2 U	1.9 UJ	1.9 U	1.8 U	1.9 U	2 U	1.8 U	2 U	2 U	1.9 U	1.9 U
gamma-Chlordane	2.2 U	1.9 UJ	1.9 U	1.8 U	1.9 U	2 U	1.8 U	2 U	2 U	1.9 U	1.9 U

Notes:

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JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-2
East Vieques
Subsurface Soil Pesticide
and Herbicide Detections

Site ID	PAOC-U	PAOC-U	PAOC-U	PAOC-U	PAOC-U	PAOC-U	PAOC-U	PAOC-U	PAOC-U		PI 4
Station ID	EPAU-SO01	EPAU-SO02	EPAU-SO03	EPAU-SO04	EPAU-SO05	EPAU-SO06	EPAU-SO07	EPAU-SO08	EPAU-SO09		EPI04-SO01
Sample ID	EPAU-SB01-0406	EPAU-SB02-0406	EPAU-SB03-0406	EPAU-SB04-0406	EPAU-SB05-0406	EPAU-SB06-0406	EPAU-SB07-0406	EPAU-SB08-0406	EPAU-SB09-0406	EPAU-SB09P-0406	EPI04-SB01-0406
Sample Date	03/01/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/03/06	03/01/06	03/03/06	03/03/06	01/26/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U	3.5 U
4,4'-DDE	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U	3.5 U
4,4'-DDT	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U	3.5 U
Endosulfan I	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Endrin aldehyde	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U	3.5 U
Endrin ketone	3.6 U	3.5 U	3.5 U	3.5 U	3.5 U	3.8 U	3.5 U	3.4 U	3.5 U	3.5 U	3.5 U
Methoxychlor	18 U	18 U	18 U	18 U	18 U	20 U	18 U	18 U	18 U	18 U	18 U
beta-BHC	1.8 U	0.77 J	1.8 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
gamma-Chlordane	1.8 U	1.8 U	2.3 R	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.8 U	1.8 U	0.49 J

Notes:

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Shading Indicates Detection

Table A-2
East Vieques
Subsurface Soil Pesticide
and Herbicide Detections

Site ID	PI 4	PI 4	PI 4	PI 4	PI 4	PI 4	PI 4		PI 4	PI 4	PI 4
Station ID	EPI04-SO02	EPI04-SO03	EPI04-SO04	EPI04-SO05	EPI04-SO06	EPI04-SO07	EPI04-SO08		EPI04-SO09	EPI04-SO10	EPI04-SO11
Sample ID	EPI04-SB02-0406	EPI04-SB03-0406	EPI04-SB04-0406	EPI04-SB05-0406	EPI04-SB06-0406	EPI04-SB07-0406	EPI04-SB08-0406	EPI04-SB08P-0406	EPI04-SB09-0406	EPI04-SB10-0406	EPI04-SB11-0406
Sample Date	01/26/06	01/26/06	01/26/06	01/26/06	01/26/06	01/25/06	01/25/06	01/25/06	01/24/06	01/24/06	01/25/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.4 U	3.5 U	3.8 U	3.5 U	3.7 U	1.2 J	3.5 U	3.5 U	0.89 J	3.6 U	3.8 U
4,4'-DDE	3.4 U	1.5 J	3.8 U	3.5 U	2.7 J	1.1 J	71	47	44	50	0.79 J
4,4'-DDT	3.4 U	3.5 U	3.8 U	3.5 U	2.2 J	3.7 U	8.5	11	56	1.9 J	3.8 U
Endosulfan I	1.8 U	1.8 U	2 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U
Endrin aldehyde	3.4 U	3.5 U	3.8 U	3.5 U	3.7 U	3.7 U	1.5 J	3.5 U	3.5 U	3.6 U	3.8 U
Endrin ketone	3.4 U	3.5 U	3.8 U	3.5 U	3.7 U	3.7 U	3.5 U	3.5 U	3.5 U	3.6 U	3.8 U
Methoxychlor	18 U	18 U	20 U	18 U	19 U	19 U	18 U	18 U	18 U	18 U	19 U
beta-BHC	1.8 U	1.8 U	2 U	1.8 U	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.9 U
gamma-Chlordane	0.45 J	1.8 U	2 U	0.65 J	0.5 J	0.48 J	1.8 U	1.8 U	1.8 U	1.1 J	1.9 U

Notes:

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UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A-2
East Vieques
Subsurface Soil Pesticide
and Herbicide Detections

Site ID	PI 4	PI 4	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7
Station ID	EPI04-SO12	EPI04-SO13	EPI07-SO01	EPI07-SO02	EPI07-SO03	EPI07-SO04	EPI07-SO05	EPI07-SO06	EPI07-SO07	EPI07-SO08
Sample ID	EPI04-SB12-0406	EPI04-SB13-0406	EPI07-SB01-0406	EPI07-SB02-0406	EPI07-SB03-0406	EPI07-SB04-0406	EPI07-SB05-0406	EPI07-SB06-0406	EPI07-SB07-0406	EPI07-SB08-0406
Sample Date	01/24/06	01/25/06	03/13/06	03/13/06	03/13/06	03/13/06	03/14/06	03/14/06	03/14/06	03/14/06
Chemical Name										
Pesticide/Polychlorinated Biphenyls (UG_KG)										
4,4'-DDD	3.5 U	3.8 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U
4,4'-DDE	220	3.8 U	3.6 U	4.2	3.7 U	3.6 U	0.98 J	3.7 U	3.7 U	130
4,4'-DDT	6.1	3.8 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U
Endosulfan I	1.8 U	2 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Endrin aldehyde	3.5 U	3.8 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U
Endrin ketone	3.5 U	3.8 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.7 U	3.6 U
Methoxychlor	18 U	20 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
beta-BHC	1.8 U	2 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
gamma-Chlordane	1.8 U	2 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U

Notes:

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JN - Analyte present at approximate quantity
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U - Analyte not detected
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Shading Indicates Detection

Table A-2
East Vieques
Subsurface Soil Pesticide
and Herbicide Detections

Site ID	PI 7		PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7	PI 7
Station ID	EPI07-SO09		EPI07-SO10	EPI07-SO11	EPI07-SO14	EPI07-SO15	EPI07-SO16	EPI07-SO17	EPI07-SO18	EPI07-SO19	EPI07-SO21
Sample ID	EPI07-SB09-0406	EPI07-SB09P-0406	EPI07-SB10-0406	EPI07-SB11-0102	EPI07-SB14-0406	EPI07-SB15-0204	EPI07-SB16-0204	EPI07-SB17-0102	EPI07-SB18-0204	EPI07-SB19-0204	EPI07-SB21-0103
Sample Date	03/14/06	03/14/06	03/14/06	03/14/06	03/14/06	03/16/06	03/16/06	03/15/06	03/15/06	03/15/06	03/16/06
Chemical Name											
Pesticide/Polychlorinated Biphenyls (UG_KG)											
4,4'-DDD	3.7 U	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	3.4 U	3.4 U	3.5 U
4,4'-DDE	0.76 J	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	19	3.4 U	3.5 U
4,4'-DDT	3.7 U	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	2.2 J	3.4 U	3.5 U
Endosulfan I	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.7 U	1.7 U	1.7 U	1.8 U
Endrin aldehyde	3.7 U	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	3.4 U	3.4 U	3.5 U
Endrin ketone	3.7 U	3.6 U	3.7 U	3.4 U	3.5 U	3.6 U	3.7 U	3.4 U	3.4 U	3.4 U	3.5 U
Methoxychlor	19 U	18 U	19 U	18 U	18 U	18 U	19 U	17 U	17 U	17 U	18 U
beta-BHC	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.7 U	1.7 U	1.7 U	1.8 U
gamma-Chlordane	1.9 U	1.8 U	1.9 U	1.8 U	1.8 U	1.8 U	1.9 U	1.7 U	1.7 U	1.7 U	1.8 U

Notes:

NA - Not analyzed
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JN - Analyte present at approximate quantity
R - Unreliable result
U - Analyte not detected
UJ - Analyte not detected; quantitation limit may be imprecise
Shading Indicates Detection

Table A - 3
East Vieques Dioxin TEQ Values
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

SITE ID	SAMPLE ID	ANALYTE	RESULT	QUAL	2,3,7,8-TCDD Eq (ppt)
E-SWMU-1	CGW1SS08-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS08-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-1	CGW1SS08-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	5.37		
E-SWMU-1	CGW1SS08-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS08-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS08-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-1	CGW1SS08-R01	Total heptachlorodibenzo-p-dioxin	10.4		
E-SWMU-1	CGW1SS08-R01	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS08-R01	Octachlorodibenzo-p-dioxin	50.9		
E-SWMU-1	CGW1SS08-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-1	CGW1SS08-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**0.07**
E-SWMU-1	CGW1SS17-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS17-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-1	CGW1SS17-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	17.8		
E-SWMU-1	CGW1SS17-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS17-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS17-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-1	CGW1SS17-R01	Total heptachlorodibenzo-p-dioxin	33.2		
E-SWMU-1	CGW1SS17-R01	Total hexachlorodibenzo-p-dioxin	12.3		
E-SWMU-1	CGW1SS17-R01	Octachlorodibenzo-p-dioxin	130		
E-SWMU-1	CGW1SS17-R01	Total pentachlorodibenzo-p-dioxin	4.22		
E-SWMU-1	CGW1SS17-R01	Total tetrachlorodibenzo-p-dioxin	4.92		**0.22**
E-SWMU-1	CGW1SS33-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.75		
E-SWMU-1	CGW1SS33-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-1	CGW1SS33-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	141		
E-SWMU-1	CGW1SS33-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS33-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.2		
E-SWMU-1	CGW1SS33-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-1	CGW1SS33-R01	Total heptachlorodibenzo-p-dioxin	256		
E-SWMU-1	CGW1SS33-R01	Total hexachlorodibenzo-p-dioxin	31.5		
E-SWMU-1	CGW1SS33-R01	Octachlorodibenzo-p-dioxin	1120		
E-SWMU-1	CGW1SS33-R01	Total pentachlorodibenzo-p-dioxin	1.73		
E-SWMU-1	CGW1SS33-R01	Total tetrachlorodibenzo-p-dioxin	2.32		**2.44**
E-SWMU-1	CGW1SS35-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	12.8		
E-SWMU-1	CGW1SS35-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-1	CGW1SS35-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	236		
E-SWMU-1	CGW1SS35-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.99		
E-SWMU-1	CGW1SS35-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	7.26		
E-SWMU-1	CGW1SS35-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1.55		
E-SWMU-1	CGW1SS35-R01	Total heptachlorodibenzo-p-dioxin	456		
E-SWMU-1	CGW1SS35-R01	Total hexachlorodibenzo-p-dioxin	64.8		
E-SWMU-1	CGW1SS35-R01	Octachlorodibenzo-p-dioxin	2950		
E-SWMU-1	CGW1SS35-R01	Total pentachlorodibenzo-p-dioxin	8.49		
E-SWMU-1	CGW1SS35-R01	Total tetrachlorodibenzo-p-dioxin	3.5		**7.10**
E-SWMU-1	CGW1SS48-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS48-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-1	CGW1SS48-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	56.1		
E-SWMU-1	CGW1SS48-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS48-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-1	CGW1SS48-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-1	CGW1SS48-R01	Total heptachlorodibenzo-p-dioxin	99.1		
E-SWMU-1	CGW1SS48-R01	Total hexachlorodibenzo-p-dioxin	11.3		
E-SWMU-1	CGW1SS48-R01	Octachlorodibenzo-p-dioxin	512		
E-SWMU-1	CGW1SS48-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-1	CGW1SS48-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**0.71**
E-SWMU-2	CGW2SS03-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS03-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-2	CGW2SS03-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	12.7		
E-SWMU-2	CGW2SS03-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS03-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS03-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SS03-R01	Total heptachlorodibenzo-p-dioxin	28.3		
E-SWMU-2	CGW2SS03-R01	Total hexachlorodibenzo-p-dioxin	3.5		
E-SWMU-2	CGW2SS03-R01	Octachlorodibenzo-p-dioxin	173		
E-SWMU-2	CGW2SS03-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SS03-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**0.18**

Table A - 3
East Vieques Dioxin TEQ Values
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

SITE ID	SAMPLE ID	ANALYTE	RESULT	QUAL	2,3,7,8-TCDD Eq (ppt)
E-SWMU-2	CGW2SS07-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS07-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-2	CGW2SS07-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	5.4		
E-SWMU-2	CGW2SS07-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS07-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS07-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SS07-R01	Total heptachlorodibenzo-p-dioxin	14.4		
E-SWMU-2	CGW2SS07-R01	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS07-R01	Octachlorodibenzo-p-dioxin	70.6		
E-SWMU-2	CGW2SS07-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SS07-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**0.08**
E-SWMU-2	CGW2SS09-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	4.8		
E-SWMU-2	CGW2SS09-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-2	CGW2SS09-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	114		
E-SWMU-2	CGW2SS09-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS09-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.9		
E-SWMU-2	CGW2SS09-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SS09-R01	Total heptachlorodibenzo-p-dioxin	220		
E-SWMU-2	CGW2SS09-R01	Total hexachlorodibenzo-p-dioxin	52.9		
E-SWMU-2	CGW2SS09-R01	Octachlorodibenzo-p-dioxin	781		
E-SWMU-2	CGW2SS09-R01	Total pentachlorodibenzo-p-dioxin	9		
E-SWMU-2	CGW2SS09-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**2.14**
E-SWMU-2	CGW2SS12-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS12-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-2	CGW2SS12-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	3.7		
E-SWMU-2	CGW2SS12-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS12-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS12-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SS12-R01	Total heptachlorodibenzo-p-dioxin	10.3		
E-SWMU-2	CGW2SS12-R01	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SS12-R01	Octachlorodibenzo-p-dioxin	48.3		
E-SWMU-2	CGW2SS12-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SS12-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**0.05**
E-SWMU-2	CGW2SB01-R01-10	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SB01-R01-10	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-2	CGW2SB01-R01-10	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SB01-R01-10	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SB01-R01-10	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SB01-R01-10	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SB01-R01-10	Total heptachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SB01-R01-10	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-2	CGW2SB01-R01-10	Octachlorodibenzo-p-dioxin	5	U	
E-SWMU-2	CGW2SB01-R01-10	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-2	CGW2SB01-R01-10	Total tetrachlorodibenzo-p-dioxin	1	U	**0**
E-SWMU-5	CGW5SS01-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.2		
E-SWMU-5	CGW5SS01-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-5	CGW5SS01-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	107		
E-SWMU-5	CGW5SS01-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-5	CGW5SS01-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.7		
E-SWMU-5	CGW5SS01-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-5	CGW5SS01-R01	Total heptachlorodibenzo-p-dioxin	209		
E-SWMU-5	CGW5SS01-R01	Total hexachlorodibenzo-p-dioxin	33		
E-SWMU-5	CGW5SS01-R01	Octachlorodibenzo-p-dioxin	856		
E-SWMU-5	CGW5SS01-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-5	CGW5SS01-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**1.92**
E-SWMU-8	CGW8SS02-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	13.3		
E-SWMU-8	CGW8SS02-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-8	CGW8SS02-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	267		
E-SWMU-8	CGW8SS02-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.5		
E-SWMU-8	CGW8SS02-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	8.3		
E-SWMU-8	CGW8SS02-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	2		
E-SWMU-8	CGW8SS02-R01	Total heptachlorodibenzo-p-dioxin	582		
E-SWMU-8	CGW8SS02-R01	Total hexachlorodibenzo-p-dioxin	113		
E-SWMU-8	CGW8SS02-R01	Octachlorodibenzo-p-dioxin	2840		
E-SWMU-8	CGW8SS02-R01	Total pentachlorodibenzo-p-dioxin	13.2		
E-SWMU-8	CGW8SS02-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**8.03**

Table A - 3
East Vieques Dioxin TEQ Values
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

SITE ID	SAMPLE ID	ANALYTE	RESULT	QUAL	2,3,7,8-TCDD Eq (ppt)
E-SWMU-10	CGW10SS06-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS06-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SS06-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	49.5		
E-SWMU-10	CGW10SS06-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS06-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS06-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS06-R01	Total heptachlorodibenzo-p-dioxin	96.8		
E-SWMU-10	CGW10SS06-R01	Total hexachlorodibenzo-p-dioxin	14.7		
E-SWMU-10	CGW10SS06-R01	Octachlorodibenzo-p-dioxin	464		
E-SWMU-10	CGW10SS06-R01	Total pentachlorodibenzo-p-dioxin	3		
E-SWMU-10	CGW10SS06-R01	Total tetrachlorodibenzo-p-dioxin	7		**0.63**
E-SWMU-10	CGW10SS07-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS07-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SS07-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	70.5		
E-SWMU-10	CGW10SS07-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS07-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS07-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS07-R01	Total heptachlorodibenzo-p-dioxin	160		
E-SWMU-10	CGW10SS07-R01	Total hexachlorodibenzo-p-dioxin	24		
E-SWMU-10	CGW10SS07-R01	Octachlorodibenzo-p-dioxin	838		
E-SWMU-10	CGW10SS07-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS07-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**0.96**
E-SWMU-10	CGW10SS10-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	4		
E-SWMU-10	CGW10SS10-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SS10-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	154		
E-SWMU-10	CGW10SS10-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS10-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.1		
E-SWMU-10	CGW10SS10-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS10-R01	Total heptachlorodibenzo-p-dioxin	364		
E-SWMU-10	CGW10SS10-R01	Total hexachlorodibenzo-p-dioxin	50.9		
E-SWMU-10	CGW10SS10-R01	Octachlorodibenzo-p-dioxin	1410		
E-SWMU-10	CGW10SS10-R01	Total pentachlorodibenzo-p-dioxin	2		
E-SWMU-10	CGW10SS10-R01	Total tetrachlorodibenzo-p-dioxin	80.6		**2.67**
E-SWMU-10	CGW10SS11-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.7		
E-SWMU-10	CGW10SS11-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SS11-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	67.3		
E-SWMU-10	CGW10SS11-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS11-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS11-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS11-R01	Total heptachlorodibenzo-p-dioxin	147		
E-SWMU-10	CGW10SS11-R01	Total hexachlorodibenzo-p-dioxin	25.8		
E-SWMU-10	CGW10SS11-R01	Total pentachlorodibenzo-p-dioxin	5		
E-SWMU-10	CGW10SS11-R01	Total tetrachlorodibenzo-p-dioxin	25.4		
E-SWMU-10	CGW10SS11-R01	Octachlorodibenzo-p-dioxin	687		**1.15**
E-SWMU-10	CGW10SS13-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS13-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SS13-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.6		
E-SWMU-10	CGW10SS13-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS13-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS13-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS13-R01	Total heptachlorodibenzo-p-dioxin	5.4		
E-SWMU-10	CGW10SS13-R01	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS13-R01	Octachlorodibenzo-p-dioxin	23.4		
E-SWMU-10	CGW10SS13-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS13-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**0.03**
E-SWMU-10	CGW10SS15-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS15-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SS15-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	44.9		
E-SWMU-10	CGW10SS15-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS15-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS15-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS15-R01	Total heptachlorodibenzo-p-dioxin	90.5		
E-SWMU-10	CGW10SS15-R01	Total hexachlorodibenzo-p-dioxin	18.3		
E-SWMU-10	CGW10SS15-R01	Octachlorodibenzo-p-dioxin	435		
E-SWMU-10	CGW10SS15-R01	Total pentachlorodibenzo-p-dioxin	1		
E-SWMU-10	CGW10SS15-R01	Total tetrachlorodibenzo-p-dioxin	4		**0.58**
E-SWMU-10	CGW10SS19-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS19-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SS19-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	33.1		
E-SWMU-10	CGW10SS19-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS19-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SS19-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SS19-R01	Total heptachlorodibenzo-p-dioxin	107		
E-SWMU-10	CGW10SS19-R01	Total hexachlorodibenzo-p-dioxin	13.5		
E-SWMU-10	CGW10SS19-R01	Octachlorodibenzo-p-dioxin	381		
E-SWMU-10	CGW10SS19-R01	Total pentachlorodibenzo-p-dioxin	1		
E-SWMU-10	CGW10SS19-R01	Total tetrachlorodibenzo-p-dioxin	3		**0.45**

Table A - 3
East Vieques Dioxin TEQ Values
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

SITE ID	SAMPLE ID	ANALYTE	RESULT	QUAL	**2,3,7,8-TCDD Eq (ppt)**
E-SWMU-10	CGW10SB06-R01-5	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB06-R01-5	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SB06-R01-5	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB06-R01-5	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB06-R01-5	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB06-R01-5	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SB06-R01-5	Total heptachlorodibenzo-p-dioxin	3.2		
E-SWMU-10	CGW10SB06-R01-5	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB06-R01-5	Octachlorodibenzo-p-dioxin	12.4		
E-SWMU-10	CGW10SB06-R01-5	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SB06-R01-5	Total tetrachlorodibenzo-p-dioxin	1	U	**0.0037**
E-SWMU-10	CGW10SB11-R01-5	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB11-R01-5	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SB11-R01-5	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	7.4		
E-SWMU-10	CGW10SB11-R01-5	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB11-R01-5	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB11-R01-5	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SB11-R01-5	Total heptachlorodibenzo-p-dioxin	16.7		
E-SWMU-10	CGW10SB11-R01-5	Total hexachlorodibenzo-p-dioxin	2.8		
E-SWMU-10	CGW10SB11-R01-5	Octachlorodibenzo-p-dioxin	76.1		
E-SWMU-10	CGW10SB11-R01-5	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SB11-R01-5	Total tetrachlorodibenzo-p-dioxin	2		**0.10**
E-SWMU-10	CGW10SB13-R01-5	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB13-R01-5	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SB13-R01-5	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB13-R01-5	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB13-R01-5	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB13-R01-5	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SB13-R01-5	Total heptachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB13-R01-5	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB13-R01-5	Octachlorodibenzo-p-dioxin	5	U	
E-SWMU-10	CGW10SB13-R01-5	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SB13-R01-5	Total tetrachlorodibenzo-p-dioxin	1	U	**0**
E-SWMU-10	CGW10SB19-R01-5	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB19-R01-5	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-10	CGW10SB19-R01-5	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.9		
E-SWMU-10	CGW10SB19-R01-5	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB19-R01-5	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB19-R01-5	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SB19-R01-5	Total heptachlorodibenzo-p-dioxin	6		
E-SWMU-10	CGW10SB19-R01-5	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-10	CGW10SB19-R01-5	Octachlorodibenzo-p-dioxin	29.3		
E-SWMU-10	CGW10SB19-R01-5	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-10	CGW10SB19-R01-5	Total tetrachlorodibenzo-p-dioxin	1	U	**0.04**
E-SWMU-12	CGW12SS05-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-12	CGW12SS05-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-SWMU-12	CGW12SS05-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-12	CGW12SS05-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-12	CGW12SS05-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-12	CGW12SS05-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-12	CGW12SS05-R01	Total heptachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-12	CGW12SS05-R01	Total hexachlorodibenzo-p-dioxin	2.5	U	
E-SWMU-12	CGW12SS05-R01	Octachlorodibenzo-p-dioxin	8		
E-SWMU-12	CGW12SS05-R01	Total pentachlorodibenzo-p-dioxin	1	U	
E-SWMU-12	CGW12SS05-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**0.0024**
E-AOC-G	CGAGSS04-R01	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.6		
E-AOC-G	CGAGSS04-R01	2,3,7,8-TCDD (dioxin)	1	U	
E-AOC-G	CGAGSS04-R01	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	123		
E-AOC-G	CGAGSS04-R01	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.5	U	
E-AOC-G	CGAGSS04-R01	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.1		
E-AOC-G	CGAGSS04-R01	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	U	
E-AOC-G	CGAGSS04-R01	Total heptachlorodibenzo-p-dioxin	257		
E-AOC-G	CGAGSS04-R01	Total hexachlorodibenzo-p-dioxin	39.9		
E-AOC-G	CGAGSS04-R01	Octachlorodibenzo-p-dioxin	1400		
E-AOC-G	CGAGSS04-R01	Total pentachlorodibenzo-p-dioxin	2		
E-AOC-G	CGAGSS04-R01	Total tetrachlorodibenzo-p-dioxin	1	U	**2.32**

Notes:
Note: 1 pg/g = 1 trillionth
part per trillion = 10E-12

Table A-3a
East Vieques Dioxin TEF Values
Preliminary Assessment/Site Inspection Report
12 Conssent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Constituent	2005 WHO TEF
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.01
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.1
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.1
Octachlorodibenzo-p-dioxin	0.0003
Total heptachlorodibenzo-p-dioxin	0
Total hexachlorodibenzo-p-dioxin	0
Total pentachlorodibenzo-p-dioxin	0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.1
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1
Total tetrachlorodibenzo-p-dioxin	0

Table A-3b
East AOC-G SS - Dioxin Results, Sample CGAGSS04-R01 (AOC-G Surface Soil), Collected 1/22/2004 8:45:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
2,3,7,8-TCDD	0.0	1	U	0
1,2,3,4,7,8-HxCDD	0.0	0.1	U	0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	123	0.01		1.23
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.1	0.1		0.31
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.6	0.1		0.36
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	1,400	0.0003		0.42
Total heptachlorodibenzo-p-dioxin	257	0		0
Total hexachlorodibenzo-p-dioxin	39.9	0		0
Total TCDD	0.0	0	U	0
Total pentachlorodibenzo-p-dioxin	2	0		0
total 2,3,7,8-TCDD Equivalents in the sample				2.32
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

pg/g = 1 part per trillion

Table A-3c
East SWMU-1 SS - Dioxin Results, Sample CGW1SS08-R01 (SWMU 1 SS), Collected 2/4/2004 9:15:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	5.37	0.01		0.0537
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0	1	U	0
2,3,7,8-TCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	50.9	0.0003		0.01527
Total heptachlorodibenzo-p-dioxin	10.4	0		0
Total hexachlorodibenzo-p-dioxin	0	0	U	0
Total pentachlorodibenzo-p-dioxin	0	0	U	0
Total tetrachlorodibenzo-p-dioxin	0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.07
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3d
East SWMU-1 SS - Dioxin Results, Sample CGW1SS17-R01 (SWMU 1 SS), Collected 2/4/2004 9:30:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	17.8	0.01		0.178
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0	1	U	0
2,3,7,8-TCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	130	0.0003		0.039
Total heptachlorodibenzo-p-dioxin	33.2	0		0
Total hexachlorodibenzo-p-dioxin	12.3	0		0
Total pentachlorodibenzo-p-dioxin	4.22	0		0
Total tetrachlorodibenzo-p-dioxin	4.92	0		0
total 2,3,7,8-TCDD Equivalents in the sample				0.22
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3e
East SWMU-1 SS - Dioxin Results, Sample CGW1SS33-R01 (SWMU 1 SS), Collected 2/4/2004 9:50:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	141	0.01		1.41
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.2	0.1		0.32
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.75	0.1		0.375
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0	1	U	0
Octachlorodibenzo-p-dioxin	1120	0.0003		0.336
2,3,7,8-TCDD	0.0	1	U	0
Total heptachlorodibenzo-p-dioxin	256.0	0		0
Total hexachlorodibenzo-p-dioxin	31.5	0		0
Total pentachlorodibenzo-p-dioxin	1.73	0		0
Total tetrachlorodibenzo-p-dioxin	2.32	0		0
total 2,3,7,8-TCDD Equivalents in the sample				2.44
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3f
East SWMU-1 SS - Dioxin Results, Sample CGW1SS35-R01 (SWMU 1 SS), Collected 2/4/2004 10:10:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	236	0.01		2.36
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	2.99	0.1		0.299
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	7.26	0.1		0.726
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	12.8	0.1		1.28
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1.55	1		1.55
Octachlorodibenzo-p-dioxin	2950.0	0.0003		0.885
2,3,7,8-TCDD	0.0	1	U	0
Total heptachlorodibenzo-p-dioxin	456.0	0		0
Total hexachlorodibenzo-p-dioxin	64.8	0		0
Total pentachlorodibenzo-p-dioxin	8.49	0		0
Total tetrachlorodibenzo-p-dioxin	3.5	0		0
total 2,3,7,8-TCDD Equivalents in the sample				7.10
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample > PRG**

Table A-3g
East SWMU-1 SS - Dioxin Results, Sample CGW1SS48-R01 (SWMU 1 SS), Collected 2/4/2004 10:30:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	56.1	0.01		0.561
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0	1	U	0
Octachlorodibenzo-p-dioxin	512	0.0003		0.1536
2,3,7,8-TCDD	0.0	1	U	0
Total heptachlorodibenzo-p-dioxin	99.1	0		0
Total hexachlorodibenzo-p-dioxin	11.3	0		0
Total pentachlorodibenzo-p-dioxin	0	0	U	0
Total tetrachlorodibenzo-p-dioxin	0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.71
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3h
East SWMU-2 SS - Dioxin Results, Sample CGW2SS03-R01, Collected 1/21/2004 10:05:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	12.7	0.01		0.127
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
Octachlorodibenzo-p-dioxin	173	0.0003		0.0519
2,3,7,8-TCDD	0	1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Total heptachlorodibenzo-p-dioxin	28.3	0		0
Total hexachlorodibenzo-p-dioxin	3.5	0		0
Total pentachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.18
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3i
East SWMU-2 SS - Dioxin Results, Sample CGW2SS07-R01 (SWMU 2 SS)
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	5.4	0.01		0.054
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	70.6	0.0003		0.02118
2,3,7,8-TCDD	0	1	U	0
Total heptachlorodibenzo-p-dioxin	14.4	0		0
Total hexachlorodibenzo-p-dioxin	0.0	0	U	0
Total pentachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.08
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3j
East SWMU-2 SS - Dioxin Results, Sample CGW2SS09-R01, Collected 1/21/2004 12:00:00 PM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	114	0.01		1.14
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.9	0.1		0.29
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	4.8	0.1		0.48
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	781	0.0003		0.2343
Total heptachlorodibenzo-p-dioxin	220	0		0
Total hexachlorodibenzo-p-dioxin	52.9	0		0
Total pentachlorodibenzo-p-dioxin	9.0	0		0
total 2,3,7,8-TCDD Equivalents in the sample				2.14
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3k
East SWMU-2 SS - Dioxin Results, Sample CGW2SS12-R01, Collected 1/21/2004 12:20:00 PM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	3.7	0.01		0.037
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
Octachlorodibenzo-p-dioxin	48.3	0.0003		0.01449
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Total heptachlorodibenzo-p-dioxin	10.3	0		0
Total hexachlorodibenzo-p-dioxin	0.0	0	U	0
Total pentachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.05
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3l
East SWMU-2 SS - Dioxin Results, 'Sample CGW2SB01-R01
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0	0.01	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
Octachlorodibenzo-p-dioxin	0	0.0003	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Total heptachlorodibenzo-p-dioxin	0	0	U	0
Total hexachlorodibenzo-p-dioxin	0.0	0	U	0
Total pentachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample			no detections	0
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3m
East SWMU-5 SS - Dioxin Results, Sample CGW5SS01-R01 (SWMU 5 SS), Collected 1/19/2004 9:45:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	107	0.01		1.07
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	2.7	0.1		0.27
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.2	0.1		0.32
1,2,3,4,7,8-HxCDD	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	856	0.0003		0.2568
Total heptachlorodibenzo-p-dioxin	209	0		0
Total pentachlorodibenzo-p-dioxin	33.0	0		0
total 2,3,7,8-TCDD Equivalents in the sample				1.92
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3n
East SWMU-8 SS - Dioxin Results, Sample CGW8SS02-R01 (SWMU 8 SS), Collected 1/19/2004 11:25:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	267	0.01		2.67
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.5	0.1		0.35
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	8.3	0.1		0.83
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	13.3	0.1		1.33
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	2	1		2
Octachlorodibenzo-p-dioxin	2840	0.0003		0.852
2,3,7,8-TCDD	0	1	U	0
Total heptachlorodibenzo-p-dioxin	582	0		0
Total hexachlorodibenzo-p-dioxin	113	0		0
Total pentachlorodibenzo-p-dioxin	13.2	0		0
total 2,3,7,8-TCDD Equivalents in the sample				8.03
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample > PRG**

Table A-3o
East SWMU-10 SB - Dioxin Results, Sample CGW10SB06-R01-5 (SWMU 10 Soil Boring), Collected 1/20/2004 10:20:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0	0.01	U	0
1,2,3,7,8,9-HxCDD	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,6,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	12.4	0.0003		0.00372
Total heptachlorodibenzo-p-dioxin	3.2	0		0
Total hexachlorodibenzo-p-dioxin	0	0	U	0
Total tetrachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.0037
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3p
East SWMU-10 SB - Dioxin Results, Sample CGW10SB11-R01-5 (SWMU 10 Soil Boring), Collected 1/20/2004 9:00:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	7.4	0.01		0.074
1,2,3,7,8,9-HxCDD	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,6,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	76.1	0.0003		0.02283
Total heptachlorodibenzo-p-dioxin	16.7	0		0
Total hexachlorodibenzo-p-dioxin	2.8	0		0
Total tetrachlorodibenzo-p-dioxin	2.0	0		0
total 2,3,7,8-TCDD Equivalents in the sample				0.10
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3q
East SWMU-10 SB - Dioxin Results, Sample CGW10SB13-R01-5 (SWMU 10 Soil Boring), Collected 1/20/2004 9:30:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0	0.01	U	0
1,2,3,7,8,9-HxCDD	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,6,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	0	0.0003	U	0
Total heptachlorodibenzo-p-dioxin	0	0	U	0
Total hexachlorodibenzo-p-dioxin	0	0	U	0
Total tetrachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample			(no detections)	0
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3r
East SWMU-10 SB - Dioxin Results, Sample CGW10SB19-R01-5 (SWMU 10 Soil Boring), Collected 1/20/2004 11:25:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.9	0.01		0.029
1,2,3,7,8,9-HxCDD	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,6,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	29.3	0.0003		0.00879
Total heptachlorodibenzo-p-dioxin	6	0		0
Total hexachlorodibenzo-p-dioxin	0	0	U	0
Total tetrachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.04
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3s
East SWMU-10 SS - Dioxin Results, Sample CGW10SS06-R01 (SWMU 10 SS), Collected 1/20/2004 10:10:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	49.5	0.01		0.495
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	464	0.0003		0.1392
Total heptachlorodibenzo-p-dioxin	96.8	0		0
Total hexachlorodibenzo-p-dioxin	14.7	0		0
Total pentachlorodibenzo-p-dioxin	3	0		0
Total tetrachlorodibenzo-p-dioxin	7.0	0		0
total 2,3,7,8-TCDD Equivalents in the sample				0.63
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3t
East SWMU-10 SS - Dioxin Results, Sample CGW10SS07-R01 (SWMU 10 SS), Collected 1/20/2004 9:40:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	70.5	0.01		0.705
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	838	0.0003		0.2514
Total heptachlorodibenzo-p-dioxin	160	0		0
Total hexachlorodibenzo-p-dioxin	24	0		0
Total pentachlorodibenzo-p-dioxin	0	0	U	0
Total tetrachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.96
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3u
East SWMU-10 SS - Dioxin Results, Sample CGW10SS10-R01 (SWMU 10 SS), Collected 1/20/2004 10:45:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	154	0.01		1.54
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	3.1	0.1		0.31
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	4	0.1		0.4
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	1410	0.0003		0.423
Total heptachlorodibenzo-p-dioxin	364	0		0
Total hexachlorodibenzo-p-dioxin	50.9	0		0
Total pentachlorodibenzo-p-dioxin	2	0		0
Total tetrachlorodibenzo-p-dioxin	80.6	0		0
total 2,3,7,8-TCDD Equivalents in the sample				2.67
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3v
East SWMU-10 SS - Dioxin Results, Sample CGW10SS11-R01 (SWMU 10 SS), Collected 1/20/2004 8:55:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	67.3	0.01		0.673
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	2.7	0.1		0.27
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	687	0.0003		0.2061
Total heptachlorodibenzo-p-dioxin	147	0		0
Total hexachlorodibenzo-p-dioxin	25.8	0		0
Total pentachlorodibenzo-p-dioxin	5	0		0
Total tetrachlorodibenzo-p-dioxin	25.4	0		0
total 2,3,7,8-TCDD Equivalents in the sample				1.15
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3w
East SWMU-10 SS - Dioxin Results, Sample CGW10SS13-R01 (SWMU 10 SS), Collected 1/20/2004 9:15:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.6	0.01		0.026
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	23.4	0.0003		0.00702
Total heptachlorodibenzo-p-dioxin	5.4	0		0
Total hexachlorodibenzo-p-dioxin	0	0	U	0
Total pentachlorodibenzo-p-dioxin	0	0	U	0
Total tetrachlorodibenzo-p-dioxin	0.0	0	U	0
total 2,3,7,8-TCDD Equivalents in the sample				0.03
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3x
East SWMU-10 SS - Dioxin Results, Sample CGW10SS15-R01 (SWMU 10 SS), Collected 1/20/2004 11:40:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	44.9	0.01		0.449
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	435	0.0003		0.1305
Total heptachlorodibenzo-p-dioxin	90.5	0		0
Total hexachlorodibenzo-p-dioxin	18.3	0		0
Total pentachlorodibenzo-p-dioxin	1	0		0
Total tetrachlorodibenzo-p-dioxin	4.0	0		0
total 2,3,7,8-TCDD Equivalents in the sample				0.58
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3y
East SWMU-10 SS - Dioxin Results, Sample CGW10SS19-R01 (SWMU 10 SS), Collected 1/20/2004 11:05:00 AM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	33.1	0.01		0.331
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	381	0.0003		0.1143
Total heptachlorodibenzo-p-dioxin	107	0		0
Total hexachlorodibenzo-p-dioxin	13.5	0		0
Total pentachlorodibenzo-p-dioxin	1	0		0
Total tetrachlorodibenzo-p-dioxin	3.0	0		0
total 2,3,7,8-TCDD Equivalents in the sample				0.45
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

Table A-3z
East SWMU-12 SS - Dioxin Results, Sample CGW12SS05-R01, Collected 1/19/2004 1:00:00 PM
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

Congener	Conc (pg/g)	TEF	Qualifier	2,3,7,8-TCDD Eq
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0	0.01	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0	0.1	U	0
2,3,7,8-TCDD	0	1	U	0
1,2,3,4,7,8-HxCDD	0	0.1	U	0
1,2,3,7,8-PCDD	0	1	U	0
Octachlorodibenzo-p-dioxin	8	0.0003		0.0024
total 2,3,7,8-TCDD Equivalents in the sample				0.0024
R9 PRG for 2,3,7,8-TCDD (3.9e-6 mg/kg)				3.9

Conclusion: **sample < PRG**

TABLE 1
Summary of Norway Rat Exposure Doses

Chemical	Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	LOAEL HQ
Dioxin/Furans											
TEQ	8.03E-06	8.27E+00	6.64E-05	3.38E-01	2.71E-06	0.00E+00	2.86E-06	1.00E-06	1.00E-05	2.86E+00	2.86E-01

$$DI = \frac{[AFF[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0367 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.49 = Proportion of diet composed of food item (soil invertebrates, dry weight basis)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.49 = Proportion of diet composed of food item (terrestrial plants, dry weight basis)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.02 = Proportion of diet composed of soil (dry weight basis)
WIR = 0.0470 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.4375 = Body weight (kg wet weight)
AFF = 1 = Area foraging factor (Site Size/Home Range; Max. is 1.0)

TABLE 2
Summary of Indian Mongoose Exposure Doses

Chemical	Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	LOAEL HQ
Dioxin/Furans													
TEQ	8.03E-06	8.27E+00	6.64E-05	3.38E-01	2.71E-06	1.07E+00	8.57E-06	0.00E+00	2.41E-06	1.00E-06	1.00E-05	2.41E+00	2.41E-01

$$DI = \frac{[AFF[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0242 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.61 = Proportion of diet composed of food item (soil invertebrates, dry weight basis)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.10 = Proportion of diet composed of food item (terrestrial plants, dry weight basis)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 0.163 = Proportion of diet composed of food item (small mammals, dry weight basis)
FCxi = Chemical-specific = Concentration of chemical in food item (benthic invertebrates, dry weight basis)
PDS = 0.13 = Proportion of diet composed of soil (dry weight basis)
WIR = 0.0467 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.434 = Body weight (kg wet weight)
AFF = 1 = Area foraging factor (Site Size/Home Range; Max. is 1.0)

TABLE 3
Summary of Pearly-eyed Thrasher Exposure Doses

Chemical	Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	LOAEL HQ
Dioxin/Furans											
TEQ	8.03E-06	8.27E+00	6.64E-05	3.38E-01	2.71E-06	0.00E+00	6.22E-06	1.40E-05	1.40E-04	4.45E-01	4.45E-02

$$DI = \frac{[AFF[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0117 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.754 = Proportion of diet composed of food item (soil invertebrates, dry weight basis)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.2 = Proportion of diet composed of food item (terrestrial plants, dry weight basis)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.046 = Proportion of diet composed of soil (dry weight basis)
WIR = 0.0123 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.096 = Body weight (kg wet weight)
AFF = 1 = Area foraging factor (Site Size/Home Range; Max. is 1.0)

TABLE 4
Summary of Red-tailed Hawk Doses

Chemical	Surface Soil Concentration (mg/kg)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	LOAEL HQ
Dioxin/Furans									
TEQ	8.03E-06	1.07E+00	8.57E-06	0.00E+00	2.74E-07	1.40E-05	1.40E-04	1.96E-02	1.96E-03

$$DI = \frac{[AFF[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0360 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (small mammals, dry weight basis)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0 = Proportion of diet composed of soil (dry weight basis)
WIR = 0.0639 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 1.126 = Body weight (kg wet weight)
AFF = 1 = Area foraging factor (Site Size/Home Range)

Table A - 4
Background Soil Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs)
Preliminary Assessment/Site Inspection Report
12 Consent Order Sites and 8 PI/PAOC Sites
Vieques, Puerto Rico

	Concentrations (ug/kg)		
Compound	**Rural soil**	**Agricultural Soil**	**Urban Soil**
Acenaphthene	1.7	6	
Acenaphthylene		5	
Anthracene		11 – 13	
Benzo(a)anthracene	5 – 20	56 – 110	169 – 59,000
Benzo(a)pyrene	2 – 1,300	4.6 – 900	165 – 220
Benzo(b)fluoranthene	20 – 30	58 – 220	15,000 – 62,000
Benzo(e)pyrene		53 – 130	60 – 14,000
Benzo(g,h,i)perylene	10 – 70	66	900 – 47,000
Benzo(k)fluoranthene	10 – 110	58 – 250	300 – 26,000
Chrysene	38.3	78 – 120	251 – 640
Fluoranthene	0.3 – 40	120 – 210	200 – 166,000
Fluorene		9.7	
Ideno(1,2,3-c,d)pyrene	10 – 15	63 – 100	8,000 – 61,000
Phenanthrene	30.0	48 – 140	
Pyrene	1 – 19.7	99 – 150	145 – 147,000

Reference:

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. *Toxicological Profile for Polycyclic Aromatic Hydrocarbons*. August.

Appendix B
Archaeological Survey

ARCHAEOLOGICAL SURVEY OF ENVIRONMENTAL RESTORATION LAND PARCELS AT THE FORMER VIEQUES NAVAL TRAINING RANGE PUERTO RICO

REVISED DRAFT

by

Timothy R. Sara, RPA
David M. Franz, M.S.

for

CH2M HILL, Inc.
Virginia Beach, Virginia

and

Department of the Navy, Atlantic Division
Naval Facilities Engineering Command
(NAVFAC Atlantic)

CH2M HILL SUBCONTRACT NUMBER 911838
PROJECT NUMBER 183719
NAVY CONTRACT NUMBER N62470-02-D-3053

MISCELLANEOUS REPORTS OF INVESTIGATIONS
NUMBER 353

Geo-Marine, Inc.
2713 Magruder Blvd., Suite D,
Hampton, VA 23666

April 2006

ARCHAEOLOGICAL SURVEY OF ENVIRONMENTAL RESTORATION PROGRAM LAND PARCELS AT THE FORMER VIEQUES NAVAL TRAINING RANGE PUERTO RICO

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April 2006

CONTRACT DATA PAGE

The archaeological investigations described herein and preparation of this document were accomplished under Subcontract Number 911838, Project No. 183719, issued by CH2M HILL to Geo-Marine, Inc. (GMI Project No. 35000.37.01). The work was conducted under overall U.S. Navy/CH2M HILL Contract Number N62470-02-D-3053, Task Order Number 0039, Department of the Navy, Atlantic Division, Naval Facilities Engineering Command (NAVFAC Atlantic), 6506 Hampton Boulevard, Norfolk, Virginia 23508–1278.

ABSTRACT

Land parcels located on the former Vieques Naval Training Range in and around Camp García were investigated for the presence or absence of archaeological resources. These parcels will be subject to environmental investigation by the U.S. Navy as part of the Comprehensive Long-Term Environmental Action Navy Program. Prior to fieldwork, Geo-Marine determined that a number of the subject parcels had been previously surveyed according to professional archaeological standards and these were eliminated from the current survey. The parcels eliminated consisted of all of PI-4, 39 acres of PI-7, all of PAOC-J, PAOC-K, and PAOC-L, and the eastern 600-m portion of PAOC-S. No historically of culturally significant resources were identified in those areas during the previous surveys. However, numerous Historical and Precolumbian archaeological resources are known to exist in the vicinity of Camp García and the previously unsurveyed areas were subjected to systematic archaeological survey during this study. These areas consisted of: (1) PI-7 – former Radar Facility northwest of Camp García (1 acre); (2) PAOC-S, PAOC-N, and PAOC-U – a 7-acre block located in eastern portion of Camp García; and (3) PAOC-S – the western 900 meters of a former petroleum pipeline located on the northern fringe of Bahía Tapón (Figure 3).

In total, 93 shovel test pits were systematically excavated at 10 or 20-meter intervals in all areas of less than 10 percent slopes. One isolated artifact find was recorded in shovel tests but no archaeological sites were recorded. The recovered artifact is a metal alloy religious pendant recovered from ST A-5 at Camp García that is not considered to be archaeologically significant. Other materials observed in shovel tests included glass, metal, and rubber fragments of modern origin and were not collected. Geo-Marine recommends that no additional archaeological investigations are warranted in the environmental restoration project areas and that program activities can proceed without concern of impact to archaeological resources.

TABLE OF CONTENTS

ABSTRACT iii

ACKNOWLEDGMENTS viii

CHAPTER 1 INTRODUCTION 1

CHAPTER 2 ENVIRONMENTAL OVERVIEW 5
- Introduction 5
- Modern Land Use 7
- Present Day Environment 7
- Former Environmental Conditions 13

CHAPTER 3 CULTURAL OVERVIEW AND PREVIOUS RESEARCH 14
- Prehistoric Period 14
  - Lithic Age and Archaic Period (Period I) 14
  - Early Ceramic Period (Period II—Saladoid and La Hueca) 18
  - Transitional or Intermediate Ceramic Period (Period III—Ostionoid) 19
  - Late Ceramic Period (Period IV—Chican Ostionoid, Taino to Spanish Contact) 19
  - Archaic and Saladoid Settlement in the Former EMA 20
    - Archaic/Aceramic Period Sites 21
    - Saladoid Period Sites 21
- Historic Period 22
  - Contact Period (A.D. 1493–1599) 22
  - Early Colonial Period (A.D. 1600–1800) 22
  - Nineteenth and Early Twentieth Centuries 26
  - U.S. Navy, World War II to Present 31
- Previous Archaeological Investigations in Vicinity of Current Survey Areas 34
  - Ecology and Environment 1978 to 1984 34
  - R. Christopher Goodwin & Associates 34
    - Area Agri-Vieques (Current Project PI-7, PAOC-J, PAOC-K, and PAOC-L) .. 34
    - Area OOO 34
    - Area DD (Current Project PI-4 and PAOC-S former pipeline) 36
    - Area JJJ 36
    - Area Y (Current Project PAOC-S former pipeline) 36
    - Area BB 36

Area Z 36
Area RR 37
Area UU 37
Area KKK 37
Area LLL 37
Area MMM 37
Area NNN 37

CHAPTER 4 FIELD AND LABORATORY METHODS 38
Field Methods 38
Metal Detector Sweeps 39
Shovel Test Strategy 39
Project Area Documentation 40
Laboratory Methods 41
Artifact Processing and Analysis 41

CHAPTER 5 FIELD RESULTS 42
Introduction 42
Land Parcel/Survey Areas 44
Land Parcel PI-4 44
Land Parcel PI-7 44
Land Parcels PAOC J, PAOC-K, and PAOC-L 48
Land Parcels (PAOC-S, PAOC-N, and PAOC-U) 48
Land Parcel PAOC-S (1500-m Former Pipeline) 54

CHAPTER 6 SUMMARY AND RECOMMENDATIONS 59

REFERENCES CITED 61

APPENDICES:
A: Profiles of Key Researchers 72
B: Artifact Inventory 74

LIST OF FIGURES

1. Detail of Eastern Puerto Rico, Vieques Island, and the Virgin Islands 2
2. General map of Vieques Island showing the former EMA..... 3
3. Aerial photograph showing environmental restoration Land Parcels..... 4
4. Map of general Caribbean region showing the location of Vieques Island..... 6
5. 1951 USGS 7.5 Minute Series topographic map of study area showing 8 environmental restoration land parcels..... 8
6. Overview facing southeast of Camp García from former Radar Facility (PI-7) 9
7. Soils of Vieques Island within the former EMA 11
8. PAOC-S (former pipeline), mangrove fringe in eastern portion 12
9. Cultural chronology of the Greater and Lesser Antilles: series and subseries..... 15
10. Several regional archaeological sites mentioned in this study..... 17
11. Eighteenth century sketch map showing location of British fortification near Punta Vaca ... 24
12. 1791 Map of *Isla de Bieque* (Vieques Island) 25
13. 1823 to 1840 record of Le Guillou's holdings on Vieques Island..... 27
14. 1915 Map of Vieques showing sugar *centrales*..... 29
15. Map showing early twentieth century land holdings on Vieques..... 30
16. 1950s era photograph of U.S. Marine at Camp García..... 31
17. A comparison of 1930s and 1970s aerial photos of Bahía Tapón 32
18. 1970s aerial photograph of Camp García 33
19. Location of previously recorded archaeological sites and areas near Camp García previously surveyed by Goodwin & Associates 35
20. General view of shovel testing..... 38
21. UXO clearance team employing magnetometer prior to shovel test excavation..... 39
22. Project Archaeologist recording shovel test soil profile..... 40
23. Detail of measuring soil profile in shovel test, (ST A-5, Camp García)..... 41
24. Current project survey areas depicted on 2000 aerial of the former VNTR..... 43
25. View of former Radar Facility showing current conditions 45
26. Former Radar Facility (PI-7) plan showing shovel test locations..... 46
27. Former Radar Facility (PI-7), selected shovel test profiles 47
28. View facing northeast of Camp García..... 49
29. View facing east of disturbed area in southeastern portion of Camp García..... 49
30. Camp García (PAOC-S, PAOC-N, and PAOC-U) plan showing shovel test locations 51
31. Camp García (PAOC-S, PAOC-N, and PAOC-U), selected shovel test profiles..... 52
32. Photograph of isolated find: religious pendant recovered from Camp García, ST A-5..... 53
33. View of shovel testing in PAOC-S (former pipeline) showing current conditions 54
34. Former pipeline (PAOC-S) plan showing shovel test locations 55
35. Former pipeline (PAOC-S), selected shovel test profiles..... 56
36. Concrete pipeline support post located along PAOC-S (former pipeline) corridor..... 58

LIST OF TABLES

1. Generalized Cultural Chronological Chart of Prehistoric Puerto Rico 16
2. Principal Archaic Period Sites on Puerto Rico and Vieques 18
3. Archaic Age or Aceramic Sites within the Former EMA 21
4. Sites within the Former EMA with Saladoid Component 22
5. Plantation Holdings on Vieques, 1880 28

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Fieldwork for Geo-Marine was directed by Mr. Timothy Sara, RPA, Principal Investigator/Project Manager and supervised by Mr. David Franz, M.S. The Field Technicians included Mr. Miguel Arturo Cortéz Santigo and Mr. Heriberto Soto Martínez. This report was prepared by Mr. Sara and Mr. Franz. Digital maps and images included as figures in this report were produced by Mr. Pete Gehring, Geo-Marine Senior GIS Specialist, and Mr. Franz.

CHAPTER 1
INTRODUCTION

This report describes the results of archaeological survey conducted in portions of the former Eastern Maneuver Area (EMA) within the boundary of the former Vieques Naval Training Range (VNTR), Vieques Island, Puerto Rico (Figures 1 and 2). The research was conducted by Geo-Marine, Inc. (Geo-Marine), under a subcontract with CH2M HILL, Inc. which has been contracted by the U.S. Navy to conduct environmental sampling and restoration tasks on the former VNTR under the Comprehensive Long-term Environmental Action Navy (CLEAN) III Contract. The overall purpose of the archaeological survey was to determine the presence or absence of National Register-eligible sites that could be impacted from vegetation removal and soil sampling activities associated with this work.

Nine land parcels have been identified in and around Camp García that will be subject to environmental investigations. The parcels are located in the former Eastern Maneuver Area (EMA) and consist of PI-4 (44 acres), PI-7 (40 acres), PAOC-J (2 acres), PAOC-K (2 acres), PAOC-L (2 acres), PAOC-N (2 acres), PAOC S (2 acres), PAOC-U (1 acre), and PAOC-S (1500-meter former pipeline) (Figure 3). Prior to initiation of this work, Geo-Marine determined that all of PI-4, 39 acres of PI-7, all of PAOC-J, PAOC-K, and PAOC-L, and the eastern 600-m of POC-S (former pipeline) had been previously surveyed according to professional archaeological standards. No historically or culturally significant archaeological sites were identified in these areas from the previous surveys. During the present study, systematic subsurface testing for archaeological resources was conducted where no previous survey had been conducted; these areas are: PI-7 (former Radar Facility – approximately 1 acre); PAOC-S, PAOC-N, and PAOC-U (a 7-acre block located in eastern portion of Camp García); and PAOC-S (the western 900 m of former pipeline located on northern fringe of Bahía Tapón).

The archaeological investigation was conducted in compliance with Section 106 of the National Historic Preservation Act (NHPA), as amended through 1992 (Public Law 89-665 *et seq.*), and in conformance with the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (Federal Register 1983). Also applicable are OPNAVINST 5090.1B, Chapter 23, *Historic and Archaeological Resources Protection,* and 36 CFR Part 800, *Protection of Historic Properties*. The investigation included a review of known previous archaeological work and relevant studies associated with the project area and fieldwork. Background research was conducted through review of documents held at the Office of Naval Facilities Engineering Command, Norfolk, Virginia and Naval Station Roosevelt Roads, Ceiba, Puerto Rico.

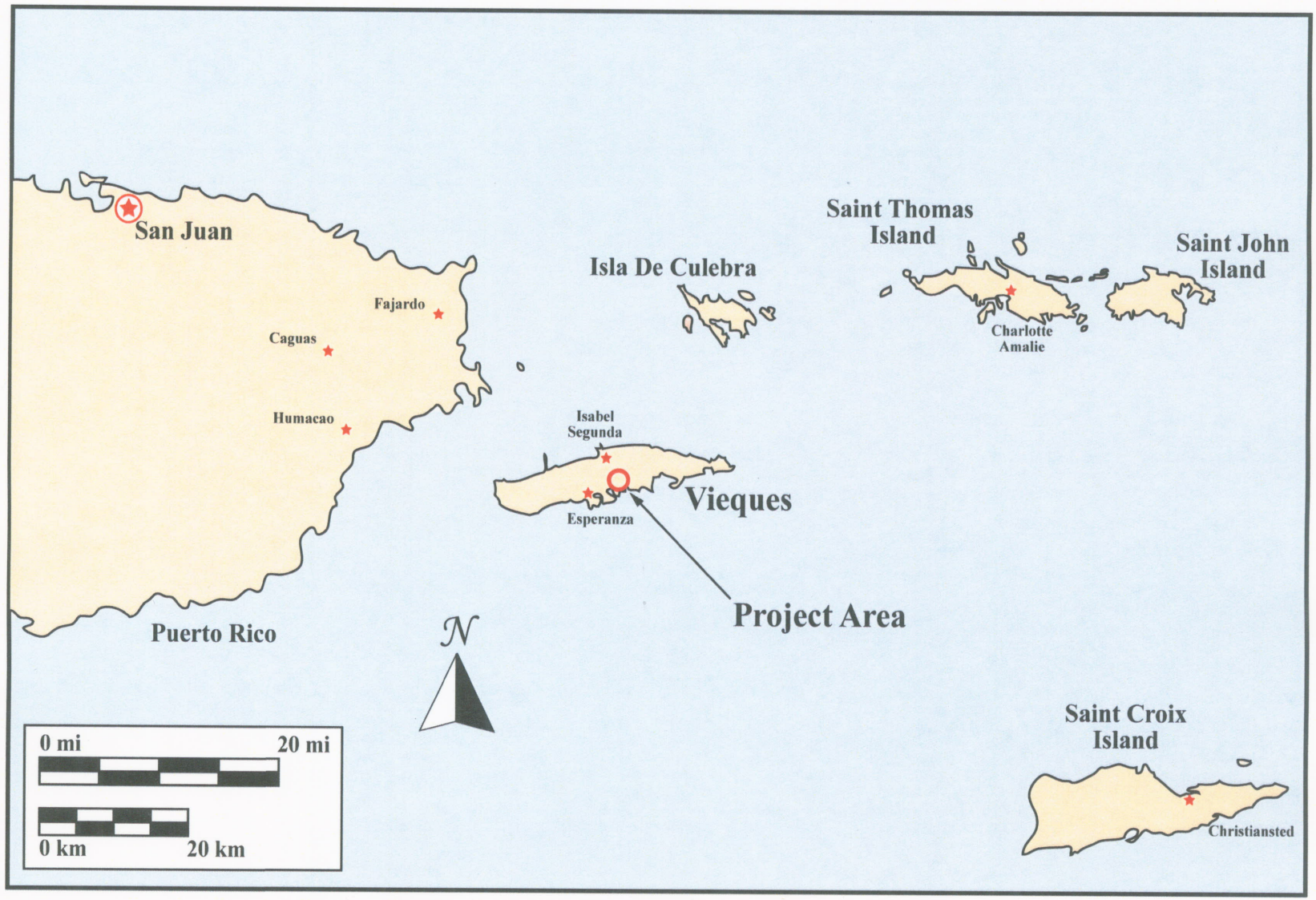


Figure 1. Detail of Eastern Puerto Rico, Vieques Island, and the Virgin Islands.

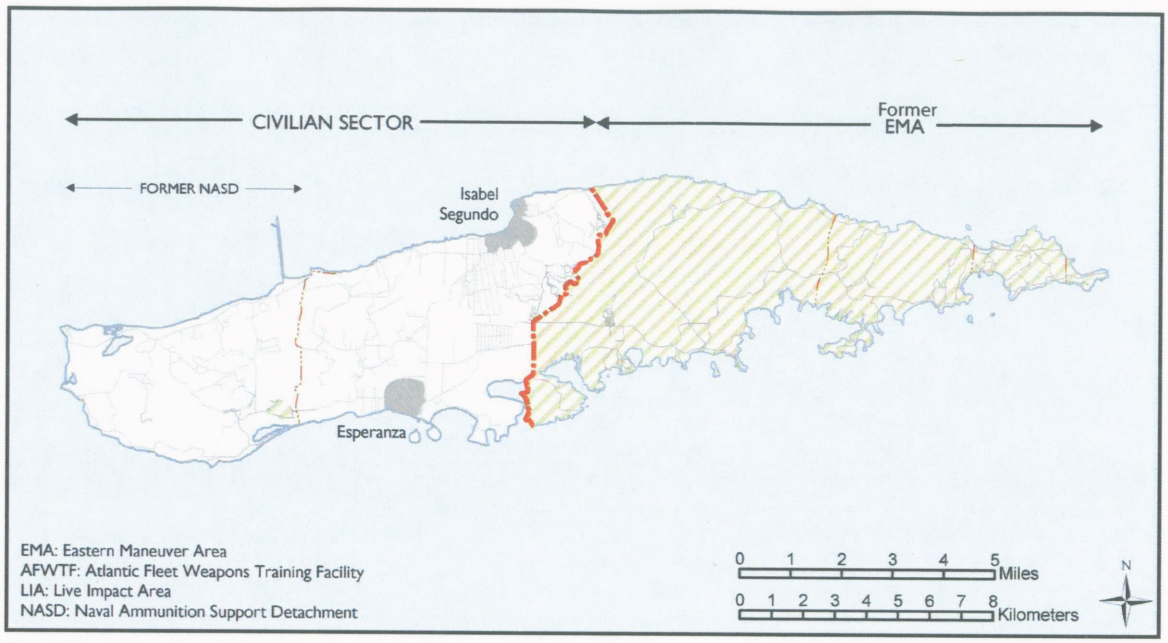


Figure 2. General map of Vieques Island showing the former EMA.

Archaeological site files, previous reports, maps, historic aerial photography, digital orthophotography, and other documents were examined.

Research and cultural resource management reports prepared previously for the former VNTR served as important reference documents for this study. Specifically, background research, predictive archaeological modeling, and results of a multiyear archaeological survey conducted of the former VNTR by Ecology and Environment, Inc. (E&E) between 1978 and 1983 (Tronolone et al. 1984) served as primary documents. A volume of more recent surveys conducted by R. Christopher Goodwin & Associates, Inc. between 1997 and 2001 (Sanders et al. 2001) was also an important source. In addition, various environmental studies of the former VNTR by E&E and Geo-Marine provided important information on existing environmental conditions.

Fieldwork for the project was conducted by Geo-Marine from November 14–18, 2005, by Tim Sara, RPA, Principal Investigator/Project Manager; David Franz, M.S., Project Archaeologist; Miguel Arturo Córtez Santiago, Archaeologist; and Heriberto Soto Martínez, Archaeologist. Following this Introduction, Chapter 2 provides a description of the existing physical environment of Vieques Island and the study area. Chapter 3 presents an overview of the cultural chronology of the Puerto Rico and Vieques Island. Chapter 4 presents the field and laboratory methods utilized for this study. Chapter 5 presents the results of the field investigations and Chapter 6 provides a summary of the work and recommendations. Appendix A provides a brief profile of the key researchers for this study. Appendix B provides the artifact inventory.

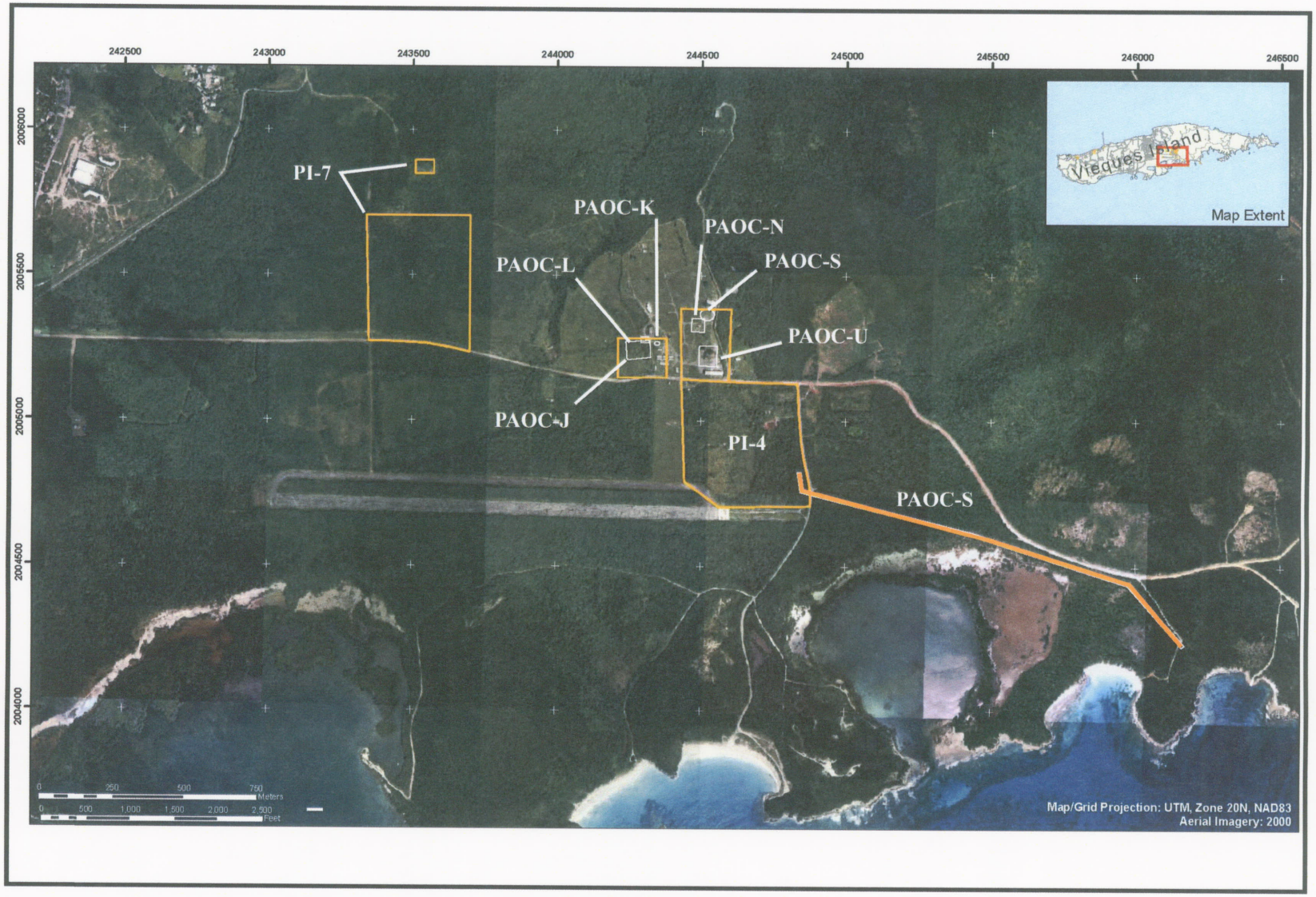


Figure 3. Aerial photograph showing Navy/CH2M HILL environmental restoration Land Parcels.

CHAPTER 2
ENVIRONMENTAL OVERVIEW

INTRODUCTION

Vieques Island, the westernmost island of the small island chain of the Lesser Antilles, is a long, narrow island located approximately six miles off the southeastern coast of Puerto Rico in the Caribbean Sea. It measures 20 miles long and 4.5 miles wide at its widest point. To the west, the island of Puerto Rico is considered to be the easternmost island of the Greater Antilles, and thus the Vieques Passage—the narrow strait between Puerto Rico and Vieques Island—marks the boundary of the two physiographic units of the Antilles (see Figures 1 and 2; Figure 4). As part of the Commonwealth of Puerto Rico, Vieques Island has an area of about 33,300 acres or 51 square miles of land. It lies approximately 21 miles west-southwest of St. Thomas, U.S. Virgin Islands and 38 miles northwest of St. Croix. The small island of Culebra, also part of the Commonwealth, lies approximately 9 miles to the north.

During World War II, the U.S. Navy purchased 26,000 acres of the total land area of Vieques Island from Puerto Rico with the intention of building a base for allied fleets. The island was divided into three large sectors with the Navy owning the eastern and western sectors; the eastern sector was referred to as the Vieques Naval Training Range (VNTR). The central portion of the island was referred to as the civilian area. The former VNTR had been used for military training and contained, from east to west, the Eastern Maneuver Area (EMA), the Surface Impact Area (SIS), the Live Impact Area (LIA), and the Eastern Conservation Area (ECA). At the easternmost tip of the island is the former Live Impact Area (LIA). The western sector, which was turned over to the U.S. Fish and Wildlife Service in 2001, formerly contained the Naval Ammunition Support Detachment (NASD). The present study is within the former EMA, an 11,000-acre area centrally located within the island. This area was turned over to the U.S. Fish and Wildlife Service in 2003.

The vast majority of the former EMA is undeveloped and supports a variety of habitat types. Currently, secondary growth thorn scrub communities comprise most of the vegetation type with interspersed forested narrow stream valleys (*quebradas*) and other upland forest types. Mangrove swamps, lagoons, coconut flats, and salt/sand flats occur along the north and south coastal areas, although most are situated along the southern coast. These habitats form important terrestrial and marine ecosystems that have supported human populations at different times in prehistory. Prior to Navy acquisition, much of the EMA had been cleared for sugar cane

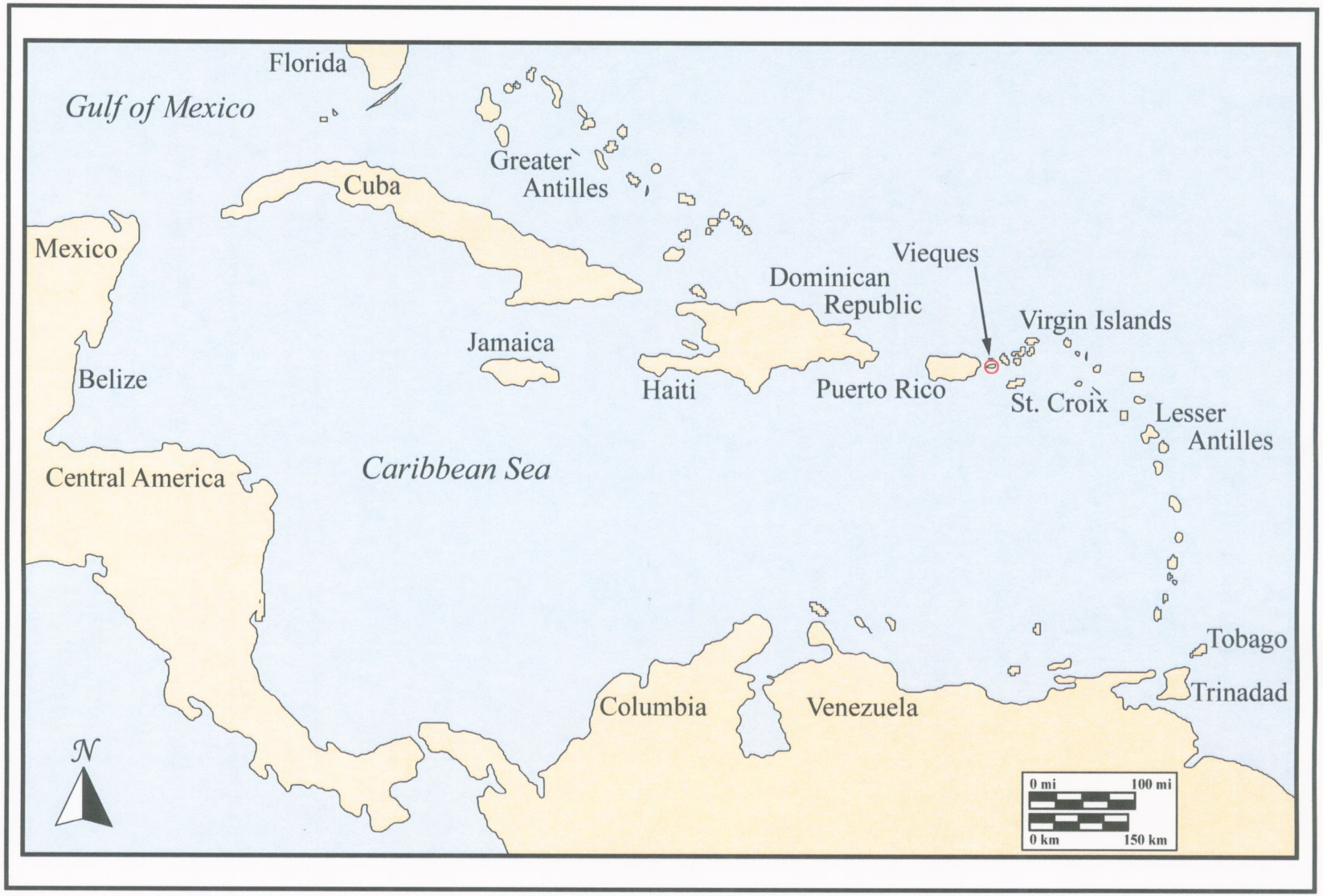


Figure 4. Map of the Carribean region showing the location of Vieques Island.

and pasture for cattle ranching. During their tenure, the Navy did some land maintenance that allowed continued pasturage, but with the Navy's departure, pastures have been largely covered by dense thorn scrub, composed mostly of acacia (*Acacia farnesiana*) and mesquite (*Prosopis glandulosa*). As a result, many of the inland areas of the island are nearly impenetrable. There are however, some extant stands of native species largely confined to the *quebradas*. The following environmental overview provides a more detailed description of the physiography, geology, soil, hydrology, flora and fauna of the study area highlighting the resources that have been critical to human survival and subsistence on Vieques Island over the past 3,500 years.

Information for this overview is derived from several baseline environmental documents prepared for the Navy, including: *Land Use Management Plan for U.S. Naval Facilities, Vieques, Puerto Rico* (Geo-Marine 1996); *Environmental Assessment for Transfer of the NASD Property, Vieques, Puerto Rico* (Ecology and Environment 2000); and *Integrated Natural Resource Management Plan, Vieques Island, Puerto Rico, Plan Years 2003-2012* (Geo-Marine 2002).

MODERN LAND USE

Until 2003, the EMA was used by Fleet Marine Force, Atlantic (FMFLANT) and occasionally other military forces to conduct training for marine amphibious units, battalion landing teams, and combat engineering units. Approximately 10,275 acres of the former EMA are largely undeveloped. Although decommissioned in 1978, Camp García, a military base camp, is located in the western portion of the former EMA and was used occasionally during military training exercises. Transportation routes within the former EMA include approximately 64 km (39.8 mi) of improved dirt roads and 24 km (14.9 mi) of limited-access or historic roads.

During the past few years, civilian uses on the former EMA have had varying levels of restriction, but in past decades, civilians have used the land for cattle grazing, beach-oriented activities, recreational activities, land crabbing, and fishing. Environmentally sensitive areas within the former EMA include extensive mangrove forests and lagoons, three bioluminescent bays (Puerto Mosquito, Puerto Ferro, and Bahía Tapón), seagrass beds located in most of the bays and near-shore coastal waters, and zones of lowland/upland gallery forests. Seven Conservation Zones have been established by the Navy around the coastal areas of the former VNTR to ensure preservation of vital marine and terrestrial resources. As described below, these areas provide habitat for several species of endangered or threatened sea turtles, reptiles, plants, and birds.

PRESENT-DAY ENVIRONMENT

The physiography of Vieques Island is dominated by a backbone of rolling hills which attain heights of several hundred feet. The highest mountain is Monte Pirata (elevation 984 feet above mean sea level [amsl]), located in the west, and in the east, it is Cerro Matias at 450 feet amsl. Gently rolling hills are located in the southcentral portion of the island in proximity to the southern coast where Camp García and the current study area is located (Figures 5 and 6).

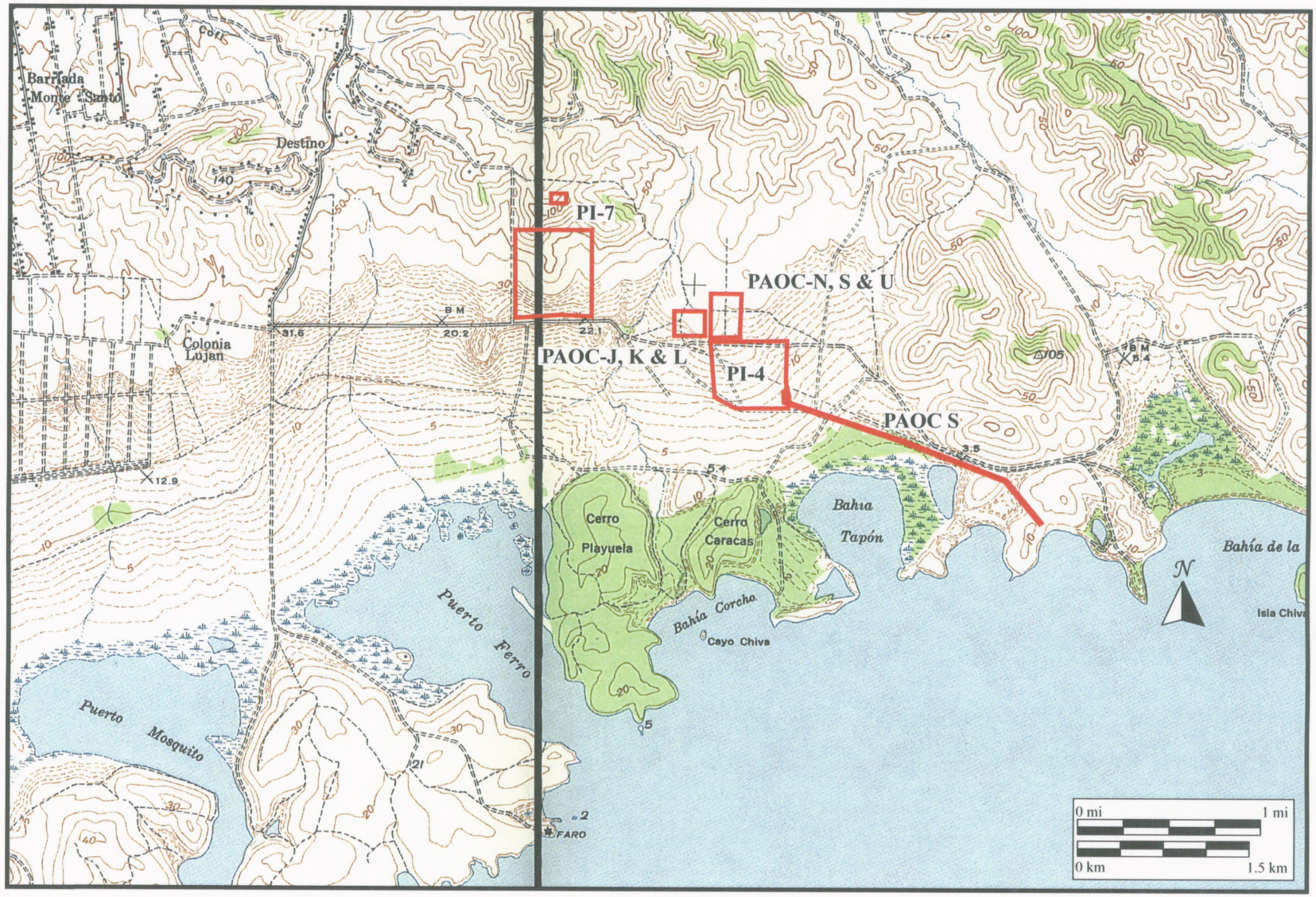


Figure 5. 1951 USGS 7.5 Minute Series topographic map of study area, showing environmental restoration land parcels.

Figure 6. Overview facing southeast of Camp García from former Radar Facility (PI-7)

Vieques Island lies in the path of the prevailing easterly trade winds that control the climate of the region. The island has a mean average temperature of 77.9 degrees Fahrenheit (ºF) and an annual rainfall average ranging from 25 to 45 inches (64 to 114 cm), most of which is concentrated in the central and western areas (Jordan and Fisher 1977). Strong offshore surface currents, which can flow up to an average of 20 miles per hour, were historically important to the transport of humans and terrestrial animals to the island (Collier 1964:123-127).

The general geologic profile for Vieques Island is described as granitic volcanic rock and marine sedimentary rocks overlaid by alluvial deposits. In general, there are three major rock types occupying the upland areas, and unconsolidated sedimentary deposits occur in the lowlands; these consist of (1) Upper Cretaceous volcanic rocks composed of mostly andesites, tuffs, and conglomerates; (2) Upper Cretaceous or Lower Tertiary intrusive rocks of mostly grandiorites and quartz diorites; and (3) Upper Tertiary and Quaternary sedimentary rocks of mostly limestones (Torres-Gonzalez 1989). The unconsolidated sedimentary deposits are Quaternary in age and consist of alluvial, beach and dune, and swamp and marsh deposits (Glover 1971). Unconsolidated beach and dune deposits are also found in the southern coastal areas (Miller et al. 1999). Prehistoric inhabitants of Vieques Island made use of a select number of lithic materials for stone tool manufacture and of clay resources for pottery manufacture during different periods in prehistory.

Sources of fresh surface water are very limited on Vieques Island and have thus influenced past human use and habitation on the island. There are currently no permanent fresh-water lakes or streams; all streams are classified as "ephemeral" and, as such, only flow for a maximum of a few days after a rainfall. From higher elevations along the east-west axis of the island, small, normally dry, *quebradas* (intermittent drainages) flow either north or south toward the Caribbean Sea. During the rainy season, the *quebradas* can accommodate relatively high flows. One unnamed *quebrada* flows into Bahía de la Chiva on the south coast near the study area. The

location of a semipermanent or reliable water source would have been an important factor for Precolumbian settlement on the island.

Soils on the island are mapped as part of three different soil associations; in order of frequency, they are the Descalabrado-Guayama association; Coamo-Guamani-Vives association; and Swamps-Marshes association (Boccheciamp 1977). The Descalabrado-Guayama association is the dominant soil association, covering approximately 90 percent of the former EMA. The Coamo-Guamani-Vives association is located in the southwestern portion of the former EMA from Puerto Ferro eastward to Bahía de la Chiva. The soils within the former EMA have developed in place and consist of material derived from volcanic rocks, plutonic rocks, and weathered sedimentary rocks. In ridgetop and side-slope areas, normal weathering materials have developed shallow to moderately shallow soils. In the valleys where the eroded soil materials have been transported and deposited by water, the soils are moderately deep to deep. Approximately 20 individual soil mapping units are within the EMA (Figure 7).

The dominate soils are Descalabrado clay loam, 20–40 percent slopes (DgF2) and Coamo clay loam 2–5 percent slopes (ClB). Soils mapped as Tidal Swamps (Ts) and Tidal Flats (Tf) are located principally within and around lagoons and bayheads, principally on the south coast, but also occurring at some locations on the north coast. Soil type would not have been a critical site selection factor during the earliest period (Archaic age) of human occupation of Vieques Island. However, characteristics of soils became more critical in human settlement during the later Ceramic-age occupation, as soils suitable for horticulture would have been sought.

The vegetation on Vieques Island is typical of a Caribbean island with low population density but with unique features in different parts of the island. Native vegetation communities that existed during prehistory are represented at very few locations. The present-day island flora is in large part determined by the various humidity zones as well as past and present land use. Plant communities are found within two life zones as classified by the Holdridge system: (1) the Subtropical Dry Forest; and (2) the Subtropical Moist Forest at higher elevations (Ewel and Whitmore 1973; Holdridge 1967; Holdridge et al. 1971). The Subtropical Dry Forest is the driest zone found in the region that has nearly complete cover of deciduous vegetation. Vegetation in this dry zone is characterized as having spines or thorns and having succulent, coriaceous, or small leaves. The Subtropical Moist Forest zone covers the largest area in the Caribbean and has been deforested intermittently since Postcolumbian habitation.

Historically, a subtropical moist coastal forest is believed to have covered much of the island (Little and Wadsworth 1964; Little et al. 1974). During the half-century or so prior to Navy use of the island, all but the highest, steepest slopes, and the mangroves and adjacent wetland lowlands were used for sugarcane production. Many of the back-beach areas were converted to coconut plantations. By the 1950s, however, almost all of the former VNTR reserved for agriculture was used for cattle pasturage rather than sugarcane. The subsequent abandonment of almost all agricultural activity on the former VNTR resulted in the development of dense thickets and secondary forest growth, which contain a mixture of native and exotic species. As indicated, this does not reflect the Precolumbian or historical distribution of vegetation on the island, although some of the *quebradas* still support historically native species of trees.

The mangroves forests located principally on the north and south coasts of the island were important to Precolumbian inhabitants. More than 35 mangrove forests are present (Lewis 1985). The largest stands of coastal mangroves are in the vicinity of Punta Arenas in the west, and surrounding Puerto Mosquito, Puerto Ferro, and Ensenada Honda on the south coast (Figure 8).

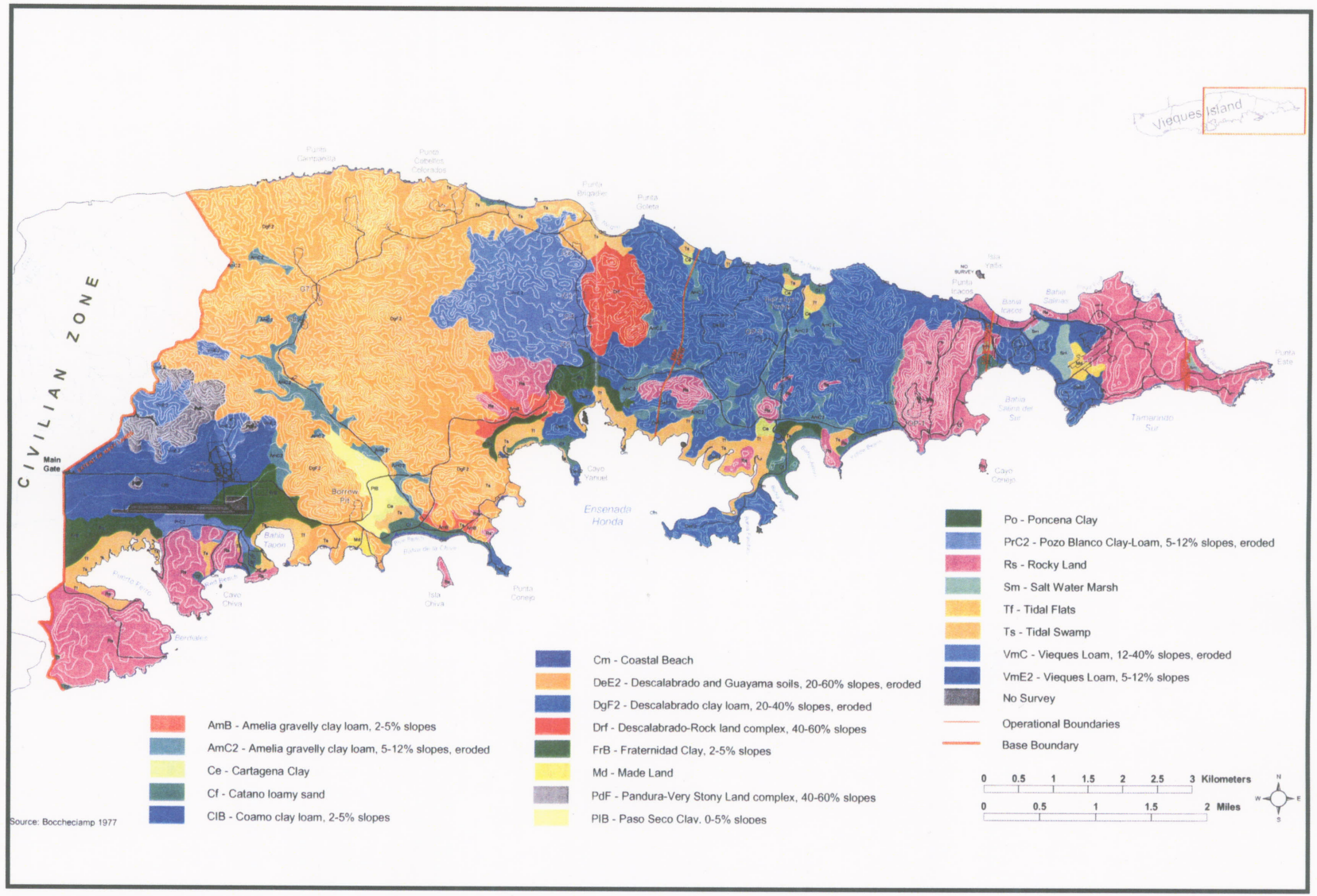


Figure 7. Soils of Vieques Island within the EMA/AFWTF.

Figure 8. POC-S (former pipeline), mangrove fringe in eastern portion.

In general, Vieques Island is typical of most island ecosystems and does not support an abundance or diversity of terrestrial vertebrates because the oceanic barrier impedes natural dispersion. Birds are the wildlife species least restricted by the oceanic barrier and are the most abundant and diverse group of vertebrates on the island. Approximately 120 species of birds have been reported on or around the island (Ecology and Environment 2000:3–27). In addition, there are four species of amphibians, 14 species of terrestrial reptiles, and seven species of terrestrial mammals. Bats constitute the largest group of mammals on Vieques Island, and although the red fruit bat is reported to be the only surviving endemic mammal on the island, bats of the genus Tadarida have been frequently observed. All other mammals, including various species of house mouse, rat, mongoose, domestic animals, wild horses, and feral cats and dogs, were introduced by humans. The 18 reptile and amphibian species reported to occur on the island include frog, toad, lizard, snake, and freshwater turtle species.

Valuable marine resources found in the waters surrounding Vieques Island critical to Precolumbian subsistence consist of coral reefs, fish and shellfish communities, and seagrass beds. Many areas of the ocean floor in the immediate offshore areas are covered with stands of seagrasses. Primarily of the *Thalassia* variety, the largest concentrations start west from Punta Caballo on the north coast and fan around Punta Arenas to the southwest. There are also large seagrass areas in the south in Ensenada Honda and Bahía Salinas del Sur along the southeastern coast. More than one-third of roughly 800 species of fish known to inhabit the waters around Puerto Rico have been documented in Vieques Island waters (Causey et al. 2000). These include open water or pelagic fish, fish inhabiting grassbeds or sandflats, and reef fish. At least six species of mollusks are known to occur in nearshore marine habitats off Vieques Island (Raffaele et al. 1973). Marine animals were important food sources for early human inhabitants of the island.

FORMER ENVIRONMENTAL CONDITIONS

Much of the present natural terrestrial environment of Vieques Island is likely to be substantially different from the environment that existed during prehistory. Historic and modern land-use patterns have changed the face of the landscape, and even areas that appear untouched by development have been affected by broad-scale factors. Physical evidence of the process of long-term environmental change is provided in drainage and soil characteristics, and coastline morphology. As discussed in this study, the presence of beach ridges and coral mounds along the shoreline may also represent land-altering environmental events, such as historic fluctuations in sea level.

Extensive forest clearing, known to have occurred during the historic period and likely during the Precolumbian period, has also contributed to alteration of the hydrologic cycle and, in turn, local climate. Heavy precipitation that falls on unvegetated land induces rapid sheet runoff rather than gradual downward seepage that would normally resupply the water table and feed springs and streams. As a result, landforms are altered from erosion and flooding, river channels remain dry for long periods, and patterns of regular, predictable overflow on flood plains are lost. These processes have a significant impact on the preservation of archaeological sites.

Large-scale clearing, especially on slopes, has resulted in accelerated erosion. Erosion has lowered the quantity and quality of upland soils and disrupted water retention. Much of the soil that is removed from slopes is added to the sediment load carried by rivers and streams, contributing to silting. This ultimately decreases the depth of stream channels and the ability to recharge aquifers. It is possible therefore, that during Precolumbian occupation of the island, streams regularly carried larger amounts of water and provided reliable sources of freshwater for human settlement.

With the clearing of vegetation, evaporation rates on ground surface increase and consequently reduce available soil moisture, ultimately affecting the local or regional climate. Revegetation is affected as certain species are unable to regenerate, possibly contributing to a drier climate. As discussed in the following chapter, sediment coring of terrestrial lakes in Haiti has revealed a general pattern in the Caribbean that is characterized by a xeric environment from 10,400–8,200 before present (B.P.) that gave way to increasing mesic clime from 8,200–2,500 B.P. The environment then reverted to a dry setting from 2,500 B.P. to the present (Higuera-Gundy 1989, 1991; Hodell et al. 1991). Siegel et al. (1999:282) suggest that numerous anomalies in the climate curve reflect short-term environmental fluctuations.

CHAPTER 3
CULTURAL OVERVIEW AND PREVIOUS RESEARCH

PREHISTORIC PERIOD

Puerto Rico is the easternmost and smallest island of the Greater Antilles and is strategically located as a migratory gateway to the larger islands of Hispaniola and Cuba to the west, and smaller islands of the Bahamian Archipelago to the north. Since the beginning of the twentieth century, archaeological investigations have resulted in the formulation of a prehistoric cultural history that is divided into four major *Periods* that are linked to a corresponding series of radiocarbon dates. Period I is called the Lithic and Archaic age; Period II constitutes the Ceramic age; Period III is Transitional; and Period IV is the Formative age. The periods are further divided into subperiods based chiefly upon ceramic series and chronology (Table 1; Figure 9). Period IV is marked by the first appearance of public architecture in the form of ball courts and dance plazas locally known as *bateys*. The peoples of Period IV are considered to be the direct descendants of the Taíno people who were present on the Island of Puerto Rico at the time of Columbus' voyages to the New World. Date ranges for the four periods are generally defined:

- Period I (3000 B.C. – A.D. 300) Lithic and Archaic age
- Period II (300 B.C. – A.D. 600) beginning of the Ceramic age
- Period III (A.D. 600 – A.D. 1200) Transitional age
  - Period IV (A.D. 1200 – A.D. 1500) Formative age

Archaeologists primarily responsible for early work in the region include Mason (1917, 1941); Rainey (1940); Rouse (1940, 1941, 1952a, 1952b, 1960, 1964, 1982); Alegría (1965); Alegría et al. (1955); and Rouse and Alegría (1990). More recent researchers of Puerto Rican prehistory include Chanlatte Baik (1979, 1983); Curet (1992, 1996); Curet and Oliver (1998); Lundberg (1985, 1989a, 1989b); Oliver (1990, 1992a, 1992b, 1995, 1998); Ortiz Aguilú et al. (1991, 2001); Pantel (1988); Robinson et al. (1985); Rodriguez (1989, 1991, 1992); Siegel (1989, 1991a, 1991b, 1992, 1996, 1999); Tronolone et al. (1984); and Walker (1993).

Lithic Age and Archaic Period (Period I)

The first inhabitants of the Greater Antilles made their appearance in Cuba, Haiti, and the Dominican Republic during the Lithic and Archaic period around 6,000 years ago. Rouse (1992) has proposed two migrations: the first involving the Casimiroid Indians from Middle America around 4,000 B.C.; and the second involving the Ortoiroids from South America beginning around 2,000 B.C. Each group is identified with characteristic stone tool technology—the

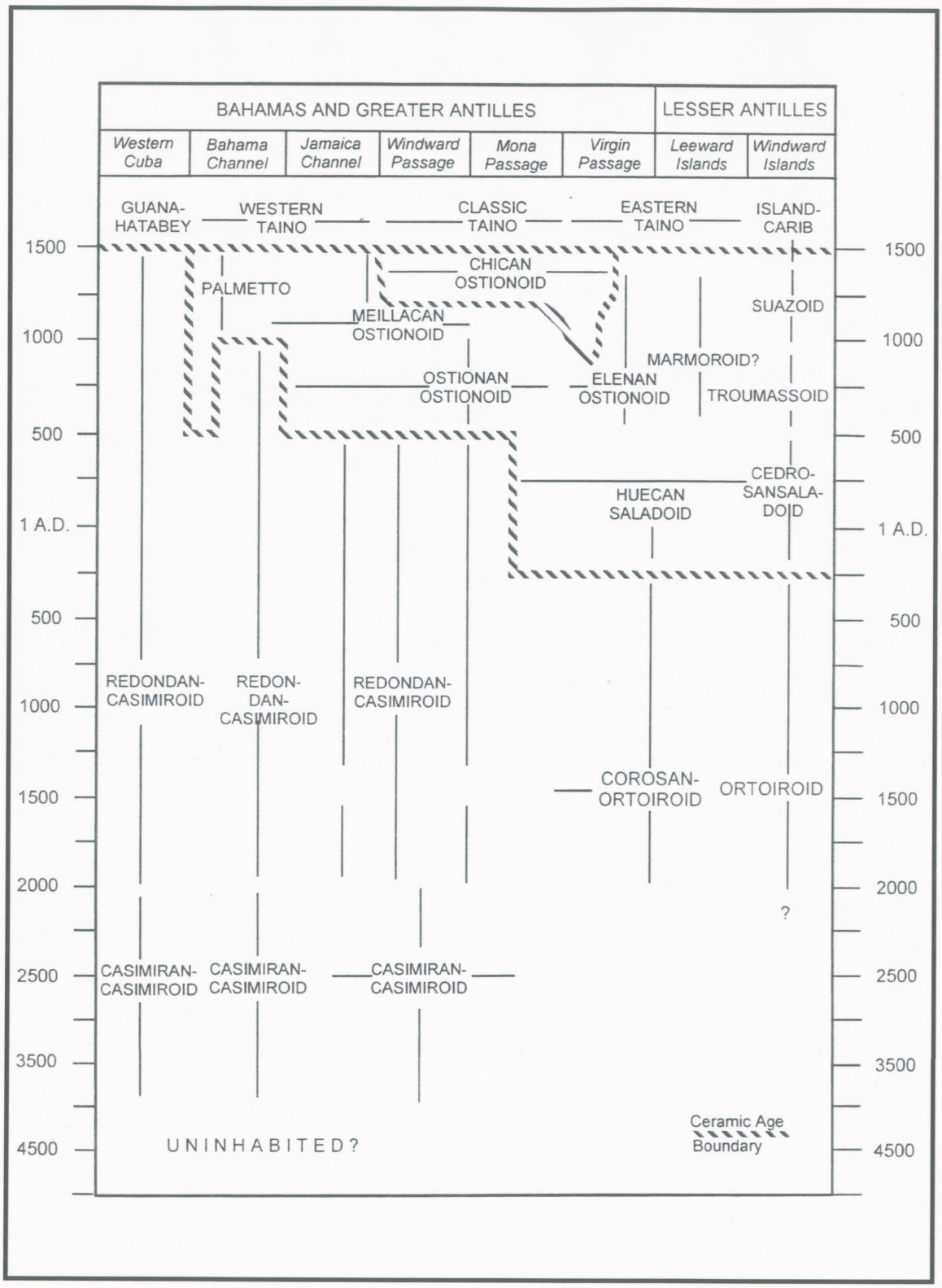


Figure 9. Chronology of the Greater and Lesser Antilles: series and subseries.

Table 1
Generalized Cultural Chronological Chart of Prehistoric Puerto Rico

PERIOD	DATE	WESTERN PUERTO RICO	EASTERN PUERTO RICO
IVa	1500	CAPA	ESPERANZA
IIIb	1200	LATE OSTIONES	SANTA ELENA
IIIa	900	EARLY OSTIONES	MONSERRATE
IIb	600	CUEVAS	
IIa	400 1AD	HACIENDA GRANDE	HACIENDA GRANDE LA HUECA
I	300 B.C. 2000 B.C. 4000 B.C.	ARCHAIC LITHIC	

after Rouse 1992; Curet and Oliver 1998

Casimiroids with a flaked stone industry (referred to as Lithic age, or Paleo-Indian), and the Ortoiroids with a groundstone industry (referred to as Archaic age). In Puerto Rico, there are fewer than 20 known Archaic-age sites and all occur in coastal areas that would have provided access to a broad range of shellfish and other maritime resources. The beginning of the Archaic period in Puerto Rico is generally considered to be 2,000 B.C. (Rouse 1992:49).

The Archaic-age people in Puerto Rico and the Virgin Islands have been grouped into the *Coroso* complex based principally upon artifact assemblages (Lundberg 1989a and b; Rouse 1992). The complex is named after the Coroso type site in southwestern Puerto Rico, and characterized by the use of stone pestles and edge grinders, in addition to shell, wood, and bone tools (Rouse and Alegría 1990; Rouse and Allaire 1978). The Coroso complex of Puerto Rico is best documented from the sites of Cayo Cofresí, Papayos, Jobos, Playa Blanca, and María de la Cruz cave on the mainland, and Caño Honda from Vieques Island (Figure 10). The complex is marked by the general absence of flint points, knives, and scrapers of the Casimiroid cultures (Rouse and Allaire 1978; Rouse and Alegría 1990).

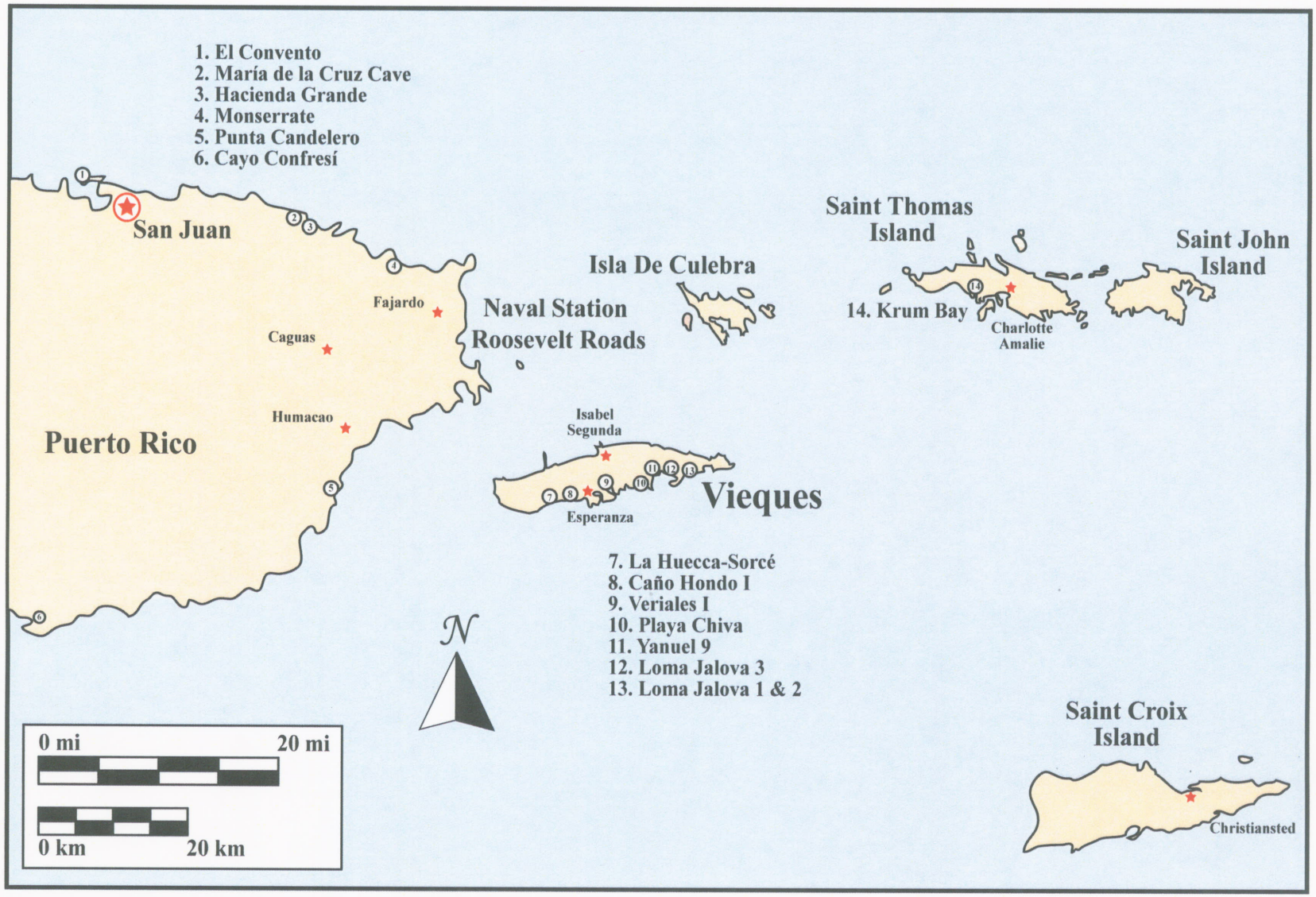


Figure 10. Several regional archaeolgical sites mentioned in this study.

Table 2
Principal Archaic Period Sites on Puerto Rico and Vieques

Site	Location	Reference
Angostura	North coast	Ayes-Suárez 1990
María de la Cruz cave	North coast	Alegría et al. 1955; Rouse and Alegría 1990
Cayo Cofresí	South coast	Pina et al. 1974; Veloz Maggiolo et al. 1975
Caño Hondo	Vieques Island	Rouse 1952b: 556-57; Figueredo 1976
Coroso	West coast	Rouse and Alegría 1990:77
Maruca	South coast	Rodríguez 1997
Papayos and Jobos	South coast	Rouse 1952b: 538-539
Playa Blanca	East coast	Rouse 1952b: 550
Verdiales I	Vieques Island	Tronolone et al. 1984

Archaic-age sites recorded within the former VNTR have made an important contribution to our understanding of the Archaic period. Artifact assemblages with associated radiocarbon dates have been described from several sites including Caño Hondo, Verdiales I (circa 3500 B.P.), and Yanuel 9 (circa 2100 B.P.), the latter two of which are located within the former EMA (Tronolone et al. 1984). Also on Vieques Island, the site of Caño Hondo I near Puerto Mosquito in the civilian sector, yielded faceted pebble grinders, hammerstones, basalt flakes, possibly utilized *Strombus* tips, ochre, and quartz fragments with associated radiocarbon dates of 3030+-70 B.P., and 2855 +- 65 B.P. (Figueredo 1976). Caño Hondo I, which is located on a small rise above a tidal swamp, also yielded ground stone celts, which are lacking in the other Archaic assemblages on Puerto Rico, but present in the Krum Bay complex (Lundberg 1989a). Marine shell at the site consists of *Cittarium pica* followed by mangrove-dwelling oyster (*Crassostrea rhizophorae),* with lesser representation of *Lucina sp.*, *Murex sp.*, and Atlantic Pearl Oyster (*Pinctada imbricata)*, as well as conch (*Strombus sp.*).

Early Ceramic Period (Period II—Saladoid and La Hueca)

Possibly as early as 400 B.C. the first ceramic and agricultural peoples arrived in Puerto Rico following migratory routes from the Orinoco River valley of northern South America and across the Lesser Antillean island chain. Known as the Saladoid period (or *series* based upon ceramic typology), a name taken from the site of Saldero on the Orinoco River in Venezuela, the Saladoid people brought with them ceramic technology thus marking the beginning the Ceramic age in the West Indies (Curet and Oliver 1998; Rouse 1992).

During the course of his Venezuelan research, Rouse (1964) introduced the concept of *series,* which he defined as a set of ceramic styles that have developed one from another representing different ceramic "subseries" within a single overarching Saladoid ceramic series. In Rouse's view the Saladoid was first represented in the West Indies as the Cedrosan Saladoid, named for the Cedros site in Trinidad. The Cedrosan Saladoid is associated with a material culture that included plain pottery and two decorated wares, one characterized by white-on-red painted designs, the other by zoned-incised-crosshatched designs. The former is referred to by the acronym "WOR" and latter is referred to by the acronym "ZIC." Modern-era surveys of the former VNTR have recorded a number of sites that contain Saladoid manifestations (Tronolone et al. 1984; Sanders et al. 2001).

Saladoid people lived in villages containing small oval or circular houses. Although few Saladoid settlements have been extensively excavated, the houses appeared in a semicircular or horseshoe pattern with extensive midden deposits. Several researchers have theorized that a distinctive group of Huecan Saladoid people (versus Cedrosan Saladoid) were responsible for a separate and nearly

contemporaneous migration from South America. This individual group is represented from material remains at the La Hueca-Sorcé site on Vieques Island and at Punta Candelero across the Vieques Passage (Chanlatte Baik and Narganes Stordes 1983; Rodríguez 1991). By the end of the early Ceramic period, the elaborate multicolor painting and the modeling and incision of the Cedrosan and Huecan Saladoid ceramics had declined, thus marking the end of the Saladoid series in Puerto Rico and the beginning of the Ostionoid series. There are very few sites that can be solely attributed to the early Saladoid period on Vieques Island, including within the study area of the former VNTR.

Transitional or Intermediate Ceramic Period (Period III—Ostionoid)

By A.D. 600, major shifts in ceramic assemblages, an increase in diversification of ceramic styles, and changes in settlement patterns mark the emergence of the Ostionoid series (Curet and Oliver 1998; Rouse 1992; Siegel 1989). Two new ceramic styles developed out of the Cuevas style: Early Ostiones in the west, and Monserrate in the east, which evolved respectively into the Late Ostiones and Santa Elena styles (Oliver 1990, 1995; Rodríguez 1992; Rouse 1992). The Ostionoid ceramic series were first found at Punta Ostiones, the type site on the south coast of Puerto Rico. The Ostionoid ceramic style is divided into four subseries: Ostionan, Elenan, Meillacan, and Chican. The Ostionan Ostionoid subseries developed in the Mona passage area around A.D. 600. The Elenan Ostionoid subseries developed in the Vieques Sound area and Leeward Islands around the same time. The Meillacan Ostionoid subseries evolved from the Ostionan Ostionoid around A.D. 800.

Early in the Ostionoid period houses tended to be large for extended families but later decreased in size dramatically, possibly for nuclear families. House arrangements in villages varied greatly, in some cases with structures arranged around a central plaza (Curet and Oliver 1998; Siegel 1999). Populations increased rapidly and continued to expand to the interior of the island (Curet and Oliver 1998; Ortiz Aguilú et al. 2001; Rouse 1952b). The first appearances of ball courts possibly signified a trend toward sociopolitical consolidation accompanying population increase. The powerful paramount chieftainships called *cacicazgos* (a Spanish word derived from the Taíno language) may have undergone their early stages of development during Period III. By A.D. 800-900 the coastal plains had been inhabited for at least 1000 years and were largely deforested. Agricultural needs were intense and large tracts of land were planted for the production of food crops, such as cassava and manioc. The distribution of Ostionoid period sites on Vieques Island reflects this general trend of the mainland. Most of the recorded prehistoric sites on Vieques Island are from this period and occupy most geographic zones of the island.

Late Ceramic Period (Period IV—Chican Ostionoid, Taino to Spanish Contact)

This period lasts from ca. A.D. 1200 to the arrival of the Spaniards, ca. 1500. It corresponds to the historically documented Taíno groups and is marked by the presence of stone-demarcated precincts of which many contain iconographic petroglyphs. This public architecture was used as ball courts/plazas, locally known as *bateys*. The Ceramic-age frontier is expanded throughout the Antilles (with the exception of the far western end of Cuba) and into the Bahamian islands. Another Ostionoid pottery style – Chican, which is diagnostic of the period, is found in Puerto Rico during this time. This pottery was first identified in an earlier context at the type site of Boca Chica in the Dominican Republic. Local potters copied the style and developed their own variations, called Capá, in the western part of the island, and Esperanza in the east both of which are grouped as Chican subseries (Rouse 1982, 1992:111-113).

Hierarchical arrangements of sites tied into regional centers may have signaled the coalescence of territories into chiefdoms or *cacizagos* during this period (Curet 1992, 1996; Oliver 1992b, 1995;

Rodríguez 1992; Rouse 1992; Siegel 1991a). The early chroniclers, including Bartolomé de las Casas and Gonzalo Fernández de Oviedo, testify to the extensive planted fields on the coastal plains and the presence of large, permanent villages, each governed by a chief or *cacique*. Villages contained an average of one to two thousand people and ranged in size from several to more than 50 houses, all made of wood and thatch (Rouse 1992).

Period IV ended soon after contact with the Spanish settlers. Slavery, disease, and warfare led to the rapid decimation of the aboriginal population. The early chroniclers of the colonization of the Antilles provide accounts of the religion, politics, society, and subsistence practices of the people that had come to be known as the Taínos. *Historia de las Indias*, and *Brevísima Relación de la Destrucción de Indias*, by Fray Bartolomé de las Casas; *Historia General y Natural de las Indias, Islas y Tierre Firme del Mar Océano*, by Gonzalo Fernández de Oviedo; the works of Ramón Pané in *Apologética Historia de las Indias*; and the logs and letters of Columbus and his crew are the most noteworthy sources for information on the historic Taínos.

Archaic and Saladoid Settlement in the Former EMA

This section reviews information on the known Archaic and aceramic and early Ceramic-age sites and settlement patterns within the former EMA. Vieques has more known Archaic/aceramic sites than any island in the nearby Virgin Island group. As discussed previously, Rouse's early work (1952b:556-557) resulted in the discovery of three Archiac/aceramic sites, and the surveys by E&E during 1978-80 (Tronolone et al. 1984) led to discovery of at least five Archaic/aceramic sites. Two sites of the sites (Cano Honda and Verdiales I) area located in the civilian sector. In attempting to elucidate settlement and subsistence systems during different periods of prehistory on Vieques, Tronolone et al. (1984) assigned prehistoric sites within the former VNTR to one of six basic site types. Although 91 prehistoric sites were recorded on within the former VNTR during their survey, the researchers conducted settlement analysis on 53 of the sites (isolated finds, surface scatters, and certain special sites were excluded from analysis):

- Isolated Find n=18
- Scatter/locality n=19
- Special sites (quarry, petroglyph) n=2
- Camps n=32
- Hamlet n=14
- Village n=7

The researchers further assigned the recorded prehistoric sites specific landform types consisting of:

- Inland
- Valley slope
- Stream terrace
- Knoll
- Coastal
- Peninsular lowland
- Bluff
- Terrace
- Lowland
- Nearby Island

Within the former VNTR, five aceramic sites of definitive or probable Archaic age (Vi-019, Vi-020, Vi-025, Vi-032, and Vi-041) recorded from the surveys yielded radiocarbon dates of circa 3500 BP to 2200 BP (1500 - 200 B.C.). The Verdiales I site (Vi032) has reported dates ranging from 3460+-70 BP to 2160 BP with an associated artifact assemblage that includes a mano, hammer-grinders, battering tool, flakes and debitage, a shell pick, other shell tools, an ochre or hematite fragment, and a bone tool (Tronolone et al. 1984:6-5). The Yanuel 9 site (Vi020), which may be

an example of a Coroso complex site (Tronolone et al. 1984), has been radiocarbon-dated to 2150+-70 BP and 2290+-60BP, placing it at approximately the same time range as Cayo Cofresí and María de la Cruz cave on the mainland of Puerto Rico. As described in Chapter 3, the Caño Hondo site at Puerto Mosquito in the civilian sector yielded an Archaic assemblage similar to the Krum Bay Corosan complex on St. Thomas. Also in the civilian sector, Chanlatte Baik and Narganes Stordes (1983) have suggested that the La Hueca-Sorcé site on the south-central coast of the island contains an Archaic-age Corosan component. At that site, irregularly shaped flake tools, groundstone percussors, hammerstones, and shell remains similar in type to those found in the Krum Bay and Coroso complexes were recovered. All Archaic age sites on Vieques Island are located on the south and southeastern coasts in proximity to mangroves and adjacent mudflats.

Archaic/Aceramic Period Sites

As indicated, there are five sites within the former EMA that have been recorded as aceramic sites of probable Archaic period occupation (Table 3). All five sites are located on the southern coast and most are most within 100 meters of present-day coastline, mangroves, or lagoons. No aceramic sites of probable Archaic age have been recorded on the northern coast of Vieques Island.

Saladoid Period Sites

A total of eight sites recorded from previous survey within the former EMA has been identified as having definitive Saladoid period components (Table 4). As with the Archaic/aceramic sites, all of these sites were formally recorded during the E&E survey of 1978-80 (Tronolone et al. 1984). As described below, the sites vary in size and some are multicomponent. Based upon material remains recovered from the sites during the E&E survey, they have been classified as "camps," one "hamlet", and three "villages." Six of the sites are recorded on or in proximity to the south coast; one site on the north coast, and one site is more inland, approximately one kilometer south of the north coast. Material remains from the latter site (Vi015), however, demonstrate a clear maritime adaptation. No radiocarbon dating has been conducted of the Saladoid sites and further study of the sites would be required to determine exact periods of occupation.

Table 3
Archaic Age or Aceramic Sites within the Former EMA

Site Number	Other Number/ Name	Radiocarbon Dates	Landform	Elevation (m. amsl)	Distance to Coast/ Mangrove or Lagoon	Notes
Vi019	12VPr2-219/ Loma Jalova 3	1360 BC +- 70	Knoll	10 m	150 m/ 40 m	
Vi020	12VPr2-220/ Yanuel 9	200 BC +- 70 340 BC +- 60	Coastal terrace	15 m	225 m	
Vi025	12VPr2-45/ Loma Jalova 1, and 12VPr2-81/ Loma Jalova 2		Knoll	5 m	250 m/ 100 m	Calendric date 1100--300 BC; site bulldozed
Vi032	12VPr2-33/ Verdiales 1	210 BC +- 70 1510 BC +- 70	Coastal terrace	1 m	180 m/ 20 m	Now outside former VNTR
Vi041	12VPr2-51/ Playa Chiva	-	Coastal lowland	5 m	100 m/ 400 m	beneath ceramic layer

Table 4 Sites within Former EMA with Saladoid Component						
Site Number	Other Number/ Name	Site Type (E&E)	Landform	Elevation (amsl)	Distance to coast / mangrove or lagoon	Notes
Vi015	12VPr2-204/ Algodones 2	Hamlet	Valley slope	20 m	1000 m / 1,100 m	Stratifed
Vi024	12VPr2-173/ Yanuel 8	Camp	Coastal lowland	5 m	500 m/ 300 m	Stratified midden
Vi033	12VPr2-034/ Verdiales 2	Camp	Coastal lowland	1 m	20 m/ 0 m	Fishing/shell fishing station, thin surface scatter
Vi043	12VPr2-053/ Isla Chiva	Camp	Island - coastal bluff	10 m	20 m/ 900 m	Midden
Vi044	12VPr2-54/ Playa Grande	Village	Coastal terrace	7 m	75 m/ 600 m	Dense midden
Vi049	12VPr2-59/ Punta Caracas	Village	Coastal bluff	10 m	20 m/ 150 m	Dense midden
Vi059	12VPr2-072/ Punta Carenero	Village	Peninsula	1-7 m	20 m / 500 m	Dense midden, burials RCG visit
Vi070	12VPr2-087/ El Tablon	Camp	Knoll saddle	10 m	400 m/ 250 m	Midden

HISTORIC PERIOD

Contact Period (A.D. 1493–1599)

Columbus landed his ships on the western coast of Puerto Rico on November 19, 1493, during his second voyage to the New World. Permanent European settlement of the island began in 1508 under the direction of Juan Ponce de León. This included the island of "Bieque," variously identified as "baby island" and as Crab island. On Puerto Rico, initial settlements were at Caparra, inland across the Bahía de San Juan, south of the city of San Juan, and south and east of the present town of Cataño (Crampsey 1975:32). Soon after the arrival of the Spanish, the Taíno succumbed to diseases, rebellion, emigration, and outmarriage and by 1524, ceased to exist as a separate population group (Rouse 1992). During the early years of Spanish colonization, gold mining was the primary focus of economic activity on the main island of Puerto Rico and the native Taíno population was enslaved alongside African natives to serve as the work force (Williams 1973). During this time, native populations from Puerto Rico and St. Croix, Virgin Islands moved to Vieques Island to escape the Spanish conquest. The Spanish forces sent to conquer Vieques Island had little influence on the native population living there and no attempt was made by Spain to colonize the island at that point. No official Spanish settlements were established on Vieques until the beginning of the nineteenth century.

Early Colonial Period (A.D. 1600–1800)

During the next three centuries, Spanish settlers spent much time defending the island from attacks from the Spanish Empire's traditional enemies, principally the Dutch in 1625, and the English in 1595, 1598, and 1797. The city of San Juan, originally known as the present island name of *Porto Rico* (Rich Port), was established in 1521; the seat of government has remained in

that city to this day. With its large bay and readily defensible access to the sea, San Juan provided a convenient anchorage for Spanish ships en route from the New World to Spain, and the island served as an outpost for Spanish trade. With colonization, the native population declined rapidly and the few remnants that survived became rapidly assimilated into the main Spanish population. By the mid-sixteenth century, agricultural and livestock production became the primary economic activities in Puerto Rico with an internal economy based primarily on the raising of cattle and cultivation of sugar cane (Harring 1963).

During the seventeenth and eighteenth centuries the French, English, Dutch, and Danes all attempted to establish footholds on Vieques Island. As early as 1647, the British claimed that Vieques was part of their Virgin Islands territory, a claim they continued to make well into the nineteenth century. In the same year, settlers from Anguilla requested permission from the Governor to settle on Vieques, and more petitions were made by the occupants of Anguilla and Tortola in 1687 (Morales Carrión 1983). At that time, more than 150 settlers moved from the Leeward islands to Vieques, which was now occupied by more than 300 English settlers and slaves from various places including Anguilla and Tortola. In 1673 the Spanish attacked the colonial population and in 1689 sent troops to remove the settlers to either Puerto Rico or to Santo Domingo. However within ten years, additional attempts were made to settle on Vieques by various groups, including Scots who claimed the island for the Company of Scotland, and Danes.

Early in the early eighteenth century, another attempt was made by the British to colonize Vieques, apparently without official British sanction. In August 1717, 40 white colonists and 20 to 30 slaves migrated from Anguilla to escape prolonged droughts (Dookhan 1973:5). In February 1718, Governor Hamilton reported that the Spaniards with one man of war and six sloops came to Crab Island and demanded the surrender of the King of Spain. The Spanish destroyed a fortification and plantation where sugarcane, maize, cotton, and tobacco were cultivated. An eighteenth century sketch map shows a British fortification in the vicinity of Punta Vaca and a lookout tower in the northeastern hills (Figure 11).

In the eighteenth century, Puerto Rico became the center of European armed struggle for trade and power in the Caribbean (Morales Carrión 1983; Nettles 1975). Coffee was introduced to the island in 1736 and by the nineteenth century, surpassed sugar in economic importance on the island. Economic development in Puerto Rico was however limited by trade restrictions imposed by the Spanish Crown, including allowing the purchase of goods from the Spanish ports of Seville and Cadiz (Santana 1983). During this time, the Spanish Crown focused on protecting fleets that transported treasure and goods from the colonies to Spain and largely left inhabitants of the Antilles to fend for themselves. In response, island communities were forced to become self-sufficient and to participate in local trade with neighboring islands regardless of nationality. Trading in contraband goods became widespread and Vieques beaches were used for transferring of contraband goods to Puerto Rico (Rabin Siegal and Santiago Cazull 1992:3). A 1791 map of the "Isla de Bieque" shows ship anchorages on the western and southern coasts (Figure 12). In an attempt to reduce the resulting high frequency of black-marketing and contraband activities, the Crown authorized in 1756 the *Compania de Barcelona* to trade with ports of Puerto Rico (Torres Ramírez 1968). Through the *Real Cédula* of 1765 trade was authorized between the West Indies and with additional Spanish ports (Nettles 1975). A third commercial enterprise – *La Factoría* – was established in 1785 to attend to the demands of commerce between Puerto Rico and Spain (Torres Ramírez 1968).

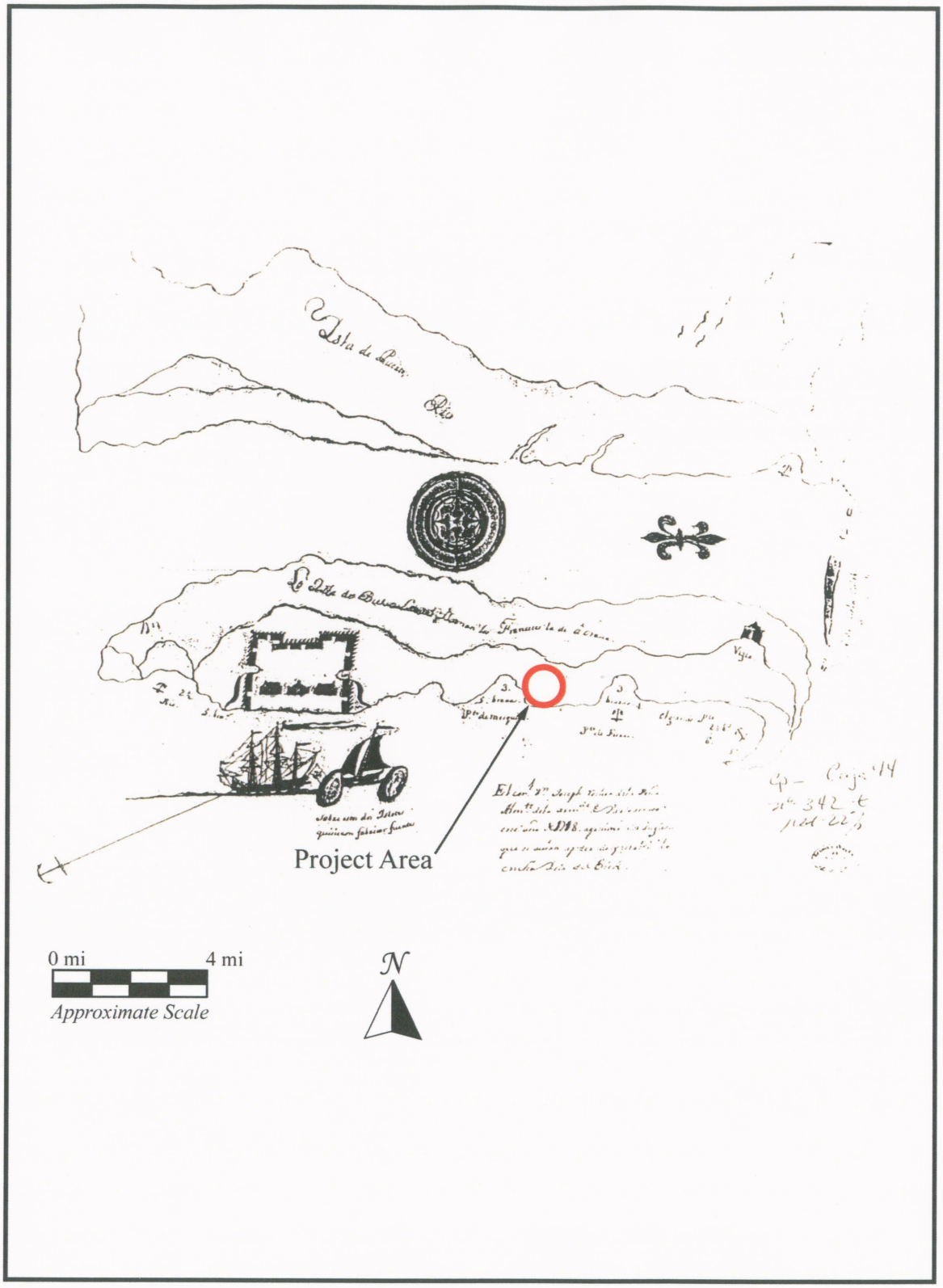
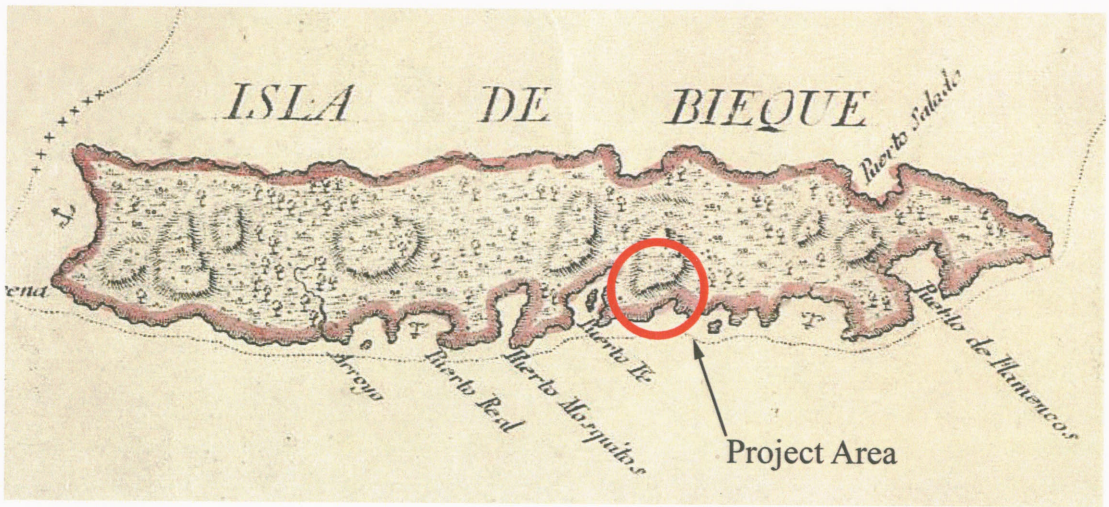


Figure 11. Eighteenth century sketch map showing location of British fortifications near Punta Vaca.



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Approximate Scale

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Figure 12. 1791 Map of *Isla de Bieque* (Vieques Island).

Nineteenth and Early Twentieth Centuries

The nineteenth century was a period of significant change in Puerto Rico. The 1815 *Cedula de Gracias* offered many advantages to immigrants from Spain and new Latin American republics. Agriculture, industry, and commerce continued to increase and the *hacienda* (or plantation) system expanded (Harring 1963). Industrial development centered on sugar, molasses, and rum production. In 1816 colonists from St. Thomas and St. Croix asked and received permission to establish a livestock industry on Vieques Island, and thus began what is now the island's dominant agricultural activity. One year later, the Governor of Puerto Rico delegated authority to one of the colonists and thereafter a fort was built at Isabela Segunda, the capital of Vieques. By 1828 most of the population was engaged in timber harvesting for export to the Virgin Islands, and in the growing of crops and livestock, and in fishing. After 1869, economic activity increased and sugar cane became the leading crop.

Due to its geographic position, Vieques was a link between the Spanish in Puerto Rico and British in Anguilla, Antigua, St. Kitts-Nevis, Tortola, and Virgin Gorda; with the Danes in St. Thomas, St. Croix, and St. John; and with the French in Martinique and Guadeloupe. England continued to claim Vieques as a British territory well into the 1860s, although the island attracted French settlers from Martinique and Guadeloupe, including Don Teophile Jaime Jose Maria Le Guillou, referred to as the "founder of Vieques." When Le Guillou arrived in 1828 from Guadeloupe, he reported that the English had built a fort "behind a small island that did not command the port" (Langhorne 1987). Le Guillou also found horse thieves, slave traders, contrabandists, and pirates in residence in Isabel Segundo (Rabin Siegal and Santiago Cazull 1992:4), indicating that settlers already inhabited the island despite Spanish attempts to remove them. Le Guillou served as Military and Political Governor of Vieques from 1832 to his death in 1843. Wealthy plantation owners, mainly from the French islands of Martinique and Guadeloupe, invested in the early stages of construction, established plantations, and brought large numbers of slaves to provide labor.

Le Guillou established a plantation known as La Pacience, which included 10 cuerdas (1 curdea= 0.97 ac) planted in sugarcane (Langhorne 1987). Development appeared to focus along the western portion of the north coast, with settlement centered around Puerto Real, Puerto Ferro, and Enseñada Honda. Following a pattern similar to that of Puerto Rico, early plantations focused on crops other than sugar and emphasis was also placed on livestock, especially cattle, but included pigs, sheep or goats, and chicken; tobacco, coffee and provision crops were also important. A record kept by Le Guillou for the years 1823 to 1840 indicates that sugarcane was not planted until 1828 when he planted his ten cuerdas at La Pacience (Figure 13). That same year he listed 68 head of cattle, 16 horses, 95 sheep, 642 barnyard fowl, 250 pigs, 95 cuerdas of provisions, 26 cuerdas of pasture, 219 fruit trees, 750 coffee bushes, and two cuerdas each of coffee and cotton. Sugar became more important in subsequent years and La Pacience eventually included a distillery and two mills (Langhorne 1987:27). Le Guillou eventually owned a number of other plantations, including Experience, Le Reussite, Quittance, La Chere, and La Palma.

Belatedly, Spain realized the importance of securing Vieques from a strategic military standpoint as well as an economic one, and by the time Spanish officially recognized Vieques as a dependency of Puerto Rico, twelve 12 plantations of various sizes were in operation (Rabin Siegal and Santiago Cazull 1992). During the second half of the century, the Spanish government provided incentives to individuals willing to settle on Vieques. These incentives included tax exemptions and appropriation of additional land for bring slaves and applied to Spanish and foreign settlers alike, although the latter had to proclaim their allegiance to Spain. Slavery was

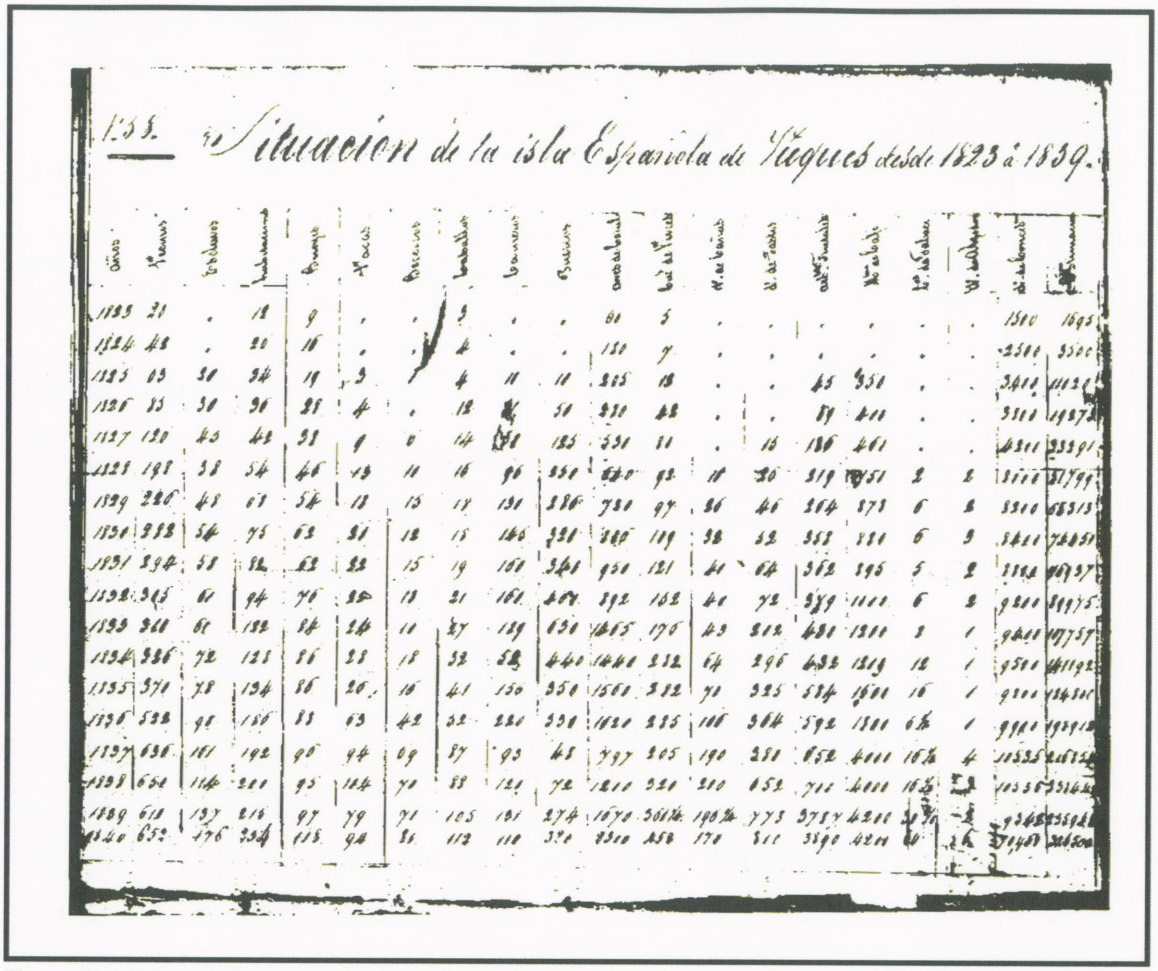


Figure 13. 1823 to 1840 record of Le Guillou's holdings on Vieques Island.

abolished in the British Islands in the 1830s, after which time a number of newly freed individuals emigrated to Vieques to work as laborers and mill workers in the sugar industry. Many others worked as servants, laundresses, cooks, fishermen, and carpenters, contributing the the multicultural development of the island. The varied cultural heritage of Vieques is still evident in the architecture and family place names on the island.

By 1844, when Vieques was officially made a Spanish colony, a strong plantation economy was in place with more than 250 plantations contributing the Puerto Rican economy. The overall evaluation of the eleven largest sugar plantations on the island in 1866 came to more than a half a million pesos (Archivo General de Puerto Rico n.d.). The majority of these haciendas were still owned by the families of French settlers, including Le Brun, Boulogne, Longpré, Delerme, and Moraille families. The 1880 census shown in Table 5 indicates the major land holdings.

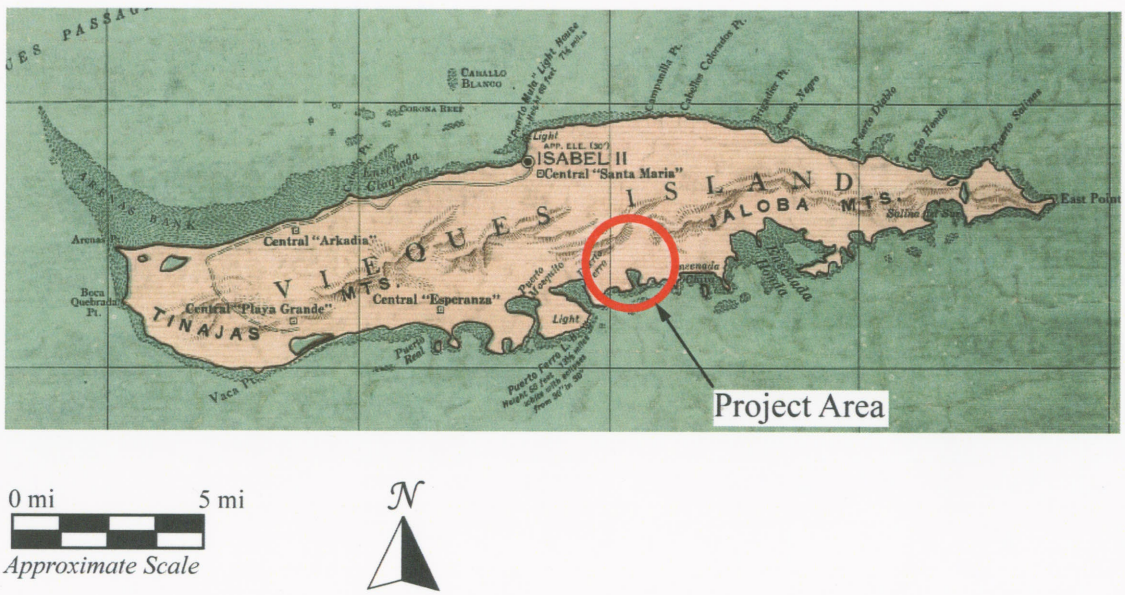
In 1873 slavery was abolished in Puerto Rico, and this change in labor system, as well as increasing mechanization, prompted the development of the sugar *centrale*—a new system of management for the sugar industry on the island. The *centrale azucarera* was a processing facility to which individual cane growers brought their sugar cane to be processed, thus eliminating the need for multiple small processing centers. The first processing center was established at Naguabo on the main island in 1894 and this set the stage for the development of a

Table 5 Plantation Holdings on Vieques, 1880		
Plantation	Cuerdas (=0.97 acres)	Value (Pesos)
Puerto Real	9,000	30,000
Campo Asilo	2,639	60,000
Campaña	2,580	70,000
Santa María	2,300	Not listed
Cabeza del Este	1,704	Not listed
Ensenda Honda	1,200	Not listed
San Juan Bautista	800	Not listed
Lapen	700	Not listed
Delicias	640	Not listed
Barrancón	500	Not listed
Puerto Ferro	500	Not listed
Monte Santo	450	Not listed
Piedra Hueca	400	Not listed
La Viuda	400	Not listed
Le Retrait	380	Not listed
Luján	300	Not listed
Encarnación	253	Not listed
Destino	220	Not listed
Lepinard	206	Not listed
Blaidín	144	Not listed
Resolucíon	Not listed	100,000
Playa Grande	4000	70,000
Sant Elena	Not listed	50,000
Marquesado	Not listed	50,000
Resignación	Not listed	50,000
Perseverancia	Not listed	30,000
Esperanza	Not listed	13,000
Río Urbano	Not listed	4,000

Source: Archivo General de Puerto Rico, 1880

major twentieth-century sugar industry. By the turn of the century on Vieques, sugar was cultivated and processed at four central locations: Arkadia, Santa Maria, Playa Grande, and La Esperanza (Puerto Real) (Figure 14). The smaller hacienda, Arkadia, was located on the north coast of the island, while the other three were on the south coast. In 1898, Spanish-controlled Puerto Rico was invaded by the American military during the Spanish-American War and Spain ceded the island along with rest of the present-day Commonwealth of Puerto Rico to the U.S.

In the early twentieth century, the production of sugar rocketed upward as the United States capitalists invested in and began to dominate the industry (Dietz 1986:103). Sugar quickly regained the predominant export crop over coffee and became the largest sector of the economy. Under American control, the *centrales* not only became processing plants, but also major landholding corporations, buying up individual *haciendas* at a staggering rate and applying mechanized methods of mass production at new holdings. Most former hacienda owners simply sold out or became employees of the modern *centrales*. On Vieques, the Eastern Sugar Associates, as American corporation, bought the Esperanza property and exported its sugar cane crop to its processing facility in Humacao (Figure 15). Although the sugar industry on Vieques increased each year a decline was experienced in the 1920s. By the 1930s, Playa Grande was the only central operation facility.



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Approximate Scale

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Figure 14. 1915 map of Vieques showing sugar *centrales*.

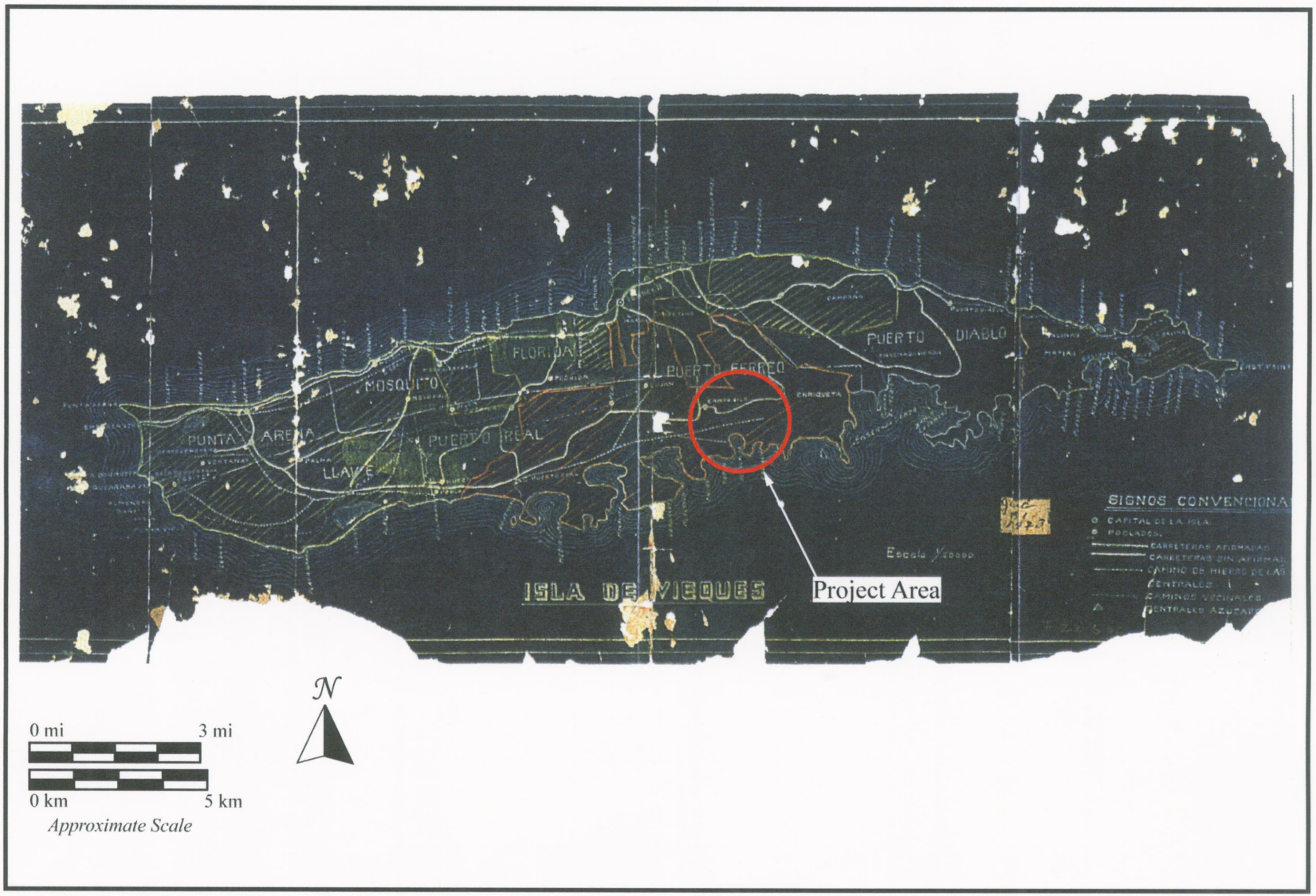

Figure 15. Map showing early twentieth century land holdings on Vieques.

In 1917, Puerto Ricans became U.S. citizens and Commonwealth status was adopted in 1952. Throughout the early 1940s, the principal activities on Vieques Island were the growing of sugar cane and livestock, and fishing. In contrast, the main island of Puerto Rico saw an intensive industrialization program, developing into a major producer and exporter of manufactured goods, high technology, and pharmaceuticals. Vieques Island was established as a civilian municipality of the Commonwealth of Puerto Rico and divided into seven wards (barrios): Puerto Diablo, Puerto Ferro, Puerto Real, Florida, Mosquito, Llave, and Punta Arenas. In more recent times, sugar cane cultivation is no longer of any relevance, and the principal agricultural endeavors are related to the planting of minor crops, and to livestock, as well as fishing.

U.S. Navy, World War II to Present

During the period from 1939 to 1944, the U.S. Navy acquired title to purchase 26,000 of the 33,000 total acres of Vieques Island. The island was physically divided into three sectors with the Navy owning the eastern and western sectors and the central portion remaining civilian area. Within the eastern sector, the Navy established a Marine Corps facility, known as Camp García (Figure 16), a 500-foot airstrip, a heliport, a field ammunitions depot, an observation post on top of Cerro Matias, and various ordnance impact zones with related targets (Figures 17 and 18). The bulk of beaches were used for amphibious landing training. The western sector was mainly used for the storage of ammunition in bunkers spread throughout the area, as well as for quarrying, some amphibious operations, and some small unit training.

The former Navy properties on Vieques Island were once part of the large and inclusive military complex, which included four ranges: an inner range at the eastern end of Vieques Island (Live Impact Area); the outer range, which is an ocean range extending both north and south of Puerto Rico and to the east; an underwater tracking range at St. Croix, Virgin Islands; and an electronic warfare range. Prior to the transfer of the former VNTR, all of the operations of these various ranges were directed from a center located at Naval Station Roosevelt Roads located across the Vieques Passage in Ceiba, Puerto Rico.

Figure 16. 1950s era photograph of a U.S. Marine at Camp García (Hunter 2005).

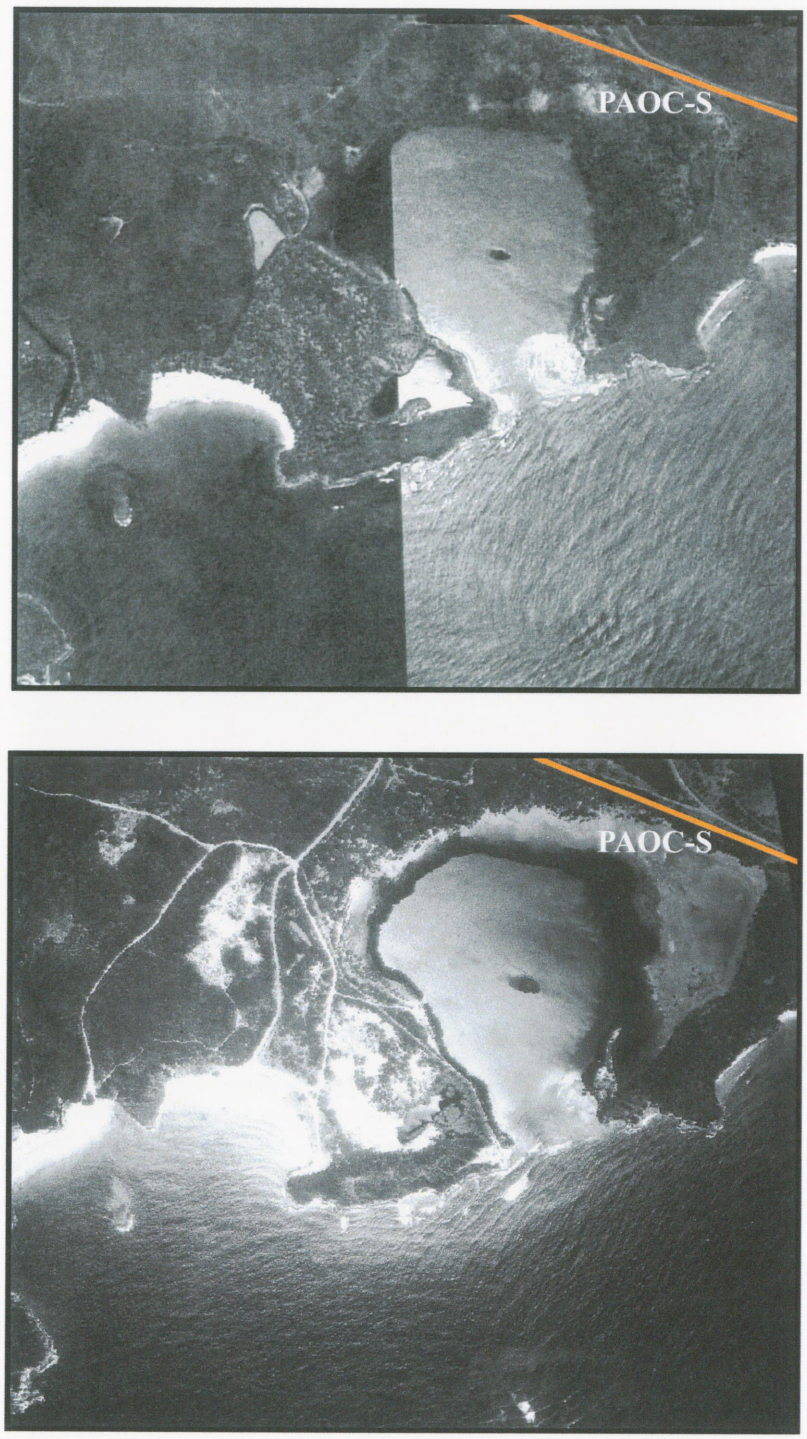

Figure 17. A comparison of 1930s (top) and 1970s (bottom) aerial photos of Bahía Tapón showing the development of the land by the U. S. military.

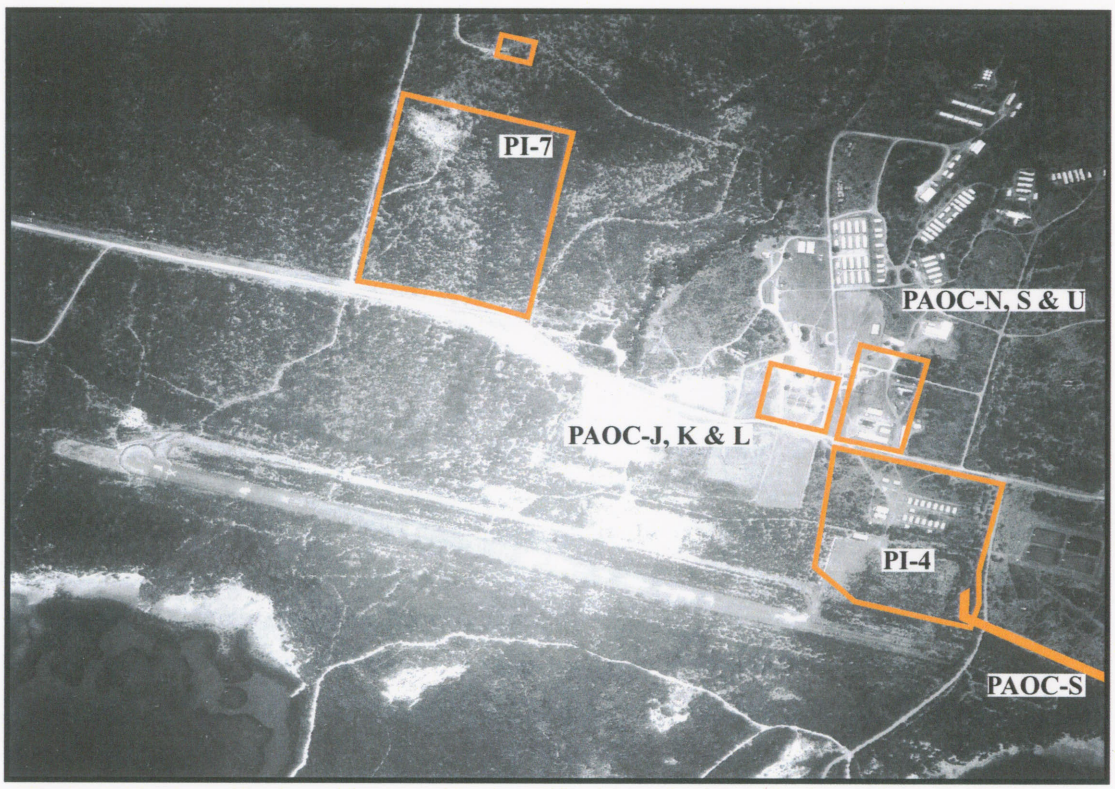

Figure 18. 1970s aerial photograph of Camp García.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Ecology and Environment 1978 to 1984

The current inventory of archaeological sites within the former VNTR is the result of phased sample surveys conducted by Ecology and Environment (E&E) between 1978 and 1984 under the stipulations of the MOU of 1981, as well as from subsequent surveys conducted by R. Christopher Goodwin & Associates, Inc. (Goodwin & Associates) between 1997 and 1999. The E&E sample surveys were all surface surveys and focused on areas of the former that were considered to have a moderate or high potential for containing archaeological sites. The results of field survey in 1979, 1982, and 1983 were the recording of 218 archaeological sites within the former VNTR. These included 54 prehistoric sites, 19 prehistoric scatters, 18 isolated prehistoric finds, 46 historic sites, and 49 historic scatters, and 37 isolated historic finds. The historic period archaeological sites documented in the surveys represent Spanish colonial haciendas and associated *quintas* and *centrales* (sugar processing factories), as well as domestic and other sites including a nineteenth century lighthouse.

R. Christopher Goodwin & Associates 1995 to 2000

Subsequent surveys by Goodwin & Associates between 1995 and 2000 included intensive surveys of the former NASD and some additional survey work within the former EMA; this augmented the total number of sites within the former VNTR to 331 (Sanders et al. 2001). Because the majority of Goodwin's work was concentrated within the NASD, there has been little additional data gathered from the former EMA since the E&E surveys. As such, the E&E report (Tronolone et al. 1984) remains the most comprehensive study of prehistoric cultural occupation of the former EMA and present study area. However, a portion of Goodwin's work was focused in and in the vicinity of Camp García (Figure 19). Therefore, this section reviews the survey areas conducted by Goodwin in the former EMA, specifically focusing on the Camp García area, which lies in proximity to the current survey areas.

Area Agri-Vieques (Current Project PI-7, PAOC-J, PAOC-K, and PAOC-L)

Goodwin Survey Area *Agri-Vieques* was located in their D-17 study unit (Puerto Ferro) immediately west of and adjacent to Camp García (see Figure 19). The survey area consisted of an approximate 80-acre parcel that encompasses the entire main 39-acre parcel of PI-7 on the west, and PAOC-J, PAOC-K, and PAOC-L to the east, which are currently proposed for environmental restoration. Three archaeological sites (Vi018, Vi187, and Vi233) were identified in the survey, two from the previous E&E surveys (Tronolone et al. 1984), and one from the Goodwin 1995 survey (Sanders et al. 1997).

Site Vi018 is identified as a Precolumbian petroglyph site and is listed on the National Register of Historic Places (Sanders et al. 1997:304). Vi187 is a Historic-age archaeological site associated with the former Hacienda Puerto Ferro, but was found to be disturbed during the Goodwin 1995 survey. Vi233 was identified during the 1995 Goodwin survey as a large scatter of Precolumbian artifacts dating to the Ceramic age. The three archaeological sites are all located to the west and outside of land parcels PI-7, PAOC-J, PAOC-K, and PAOC-L.

Area OOO

Goodwin Survey Area OOO was located in their D-17 study unit (Puerto Ferro) south of Camp García and just to the north of Puerto Ferro (see Figure 19). The survey area corresponded to the

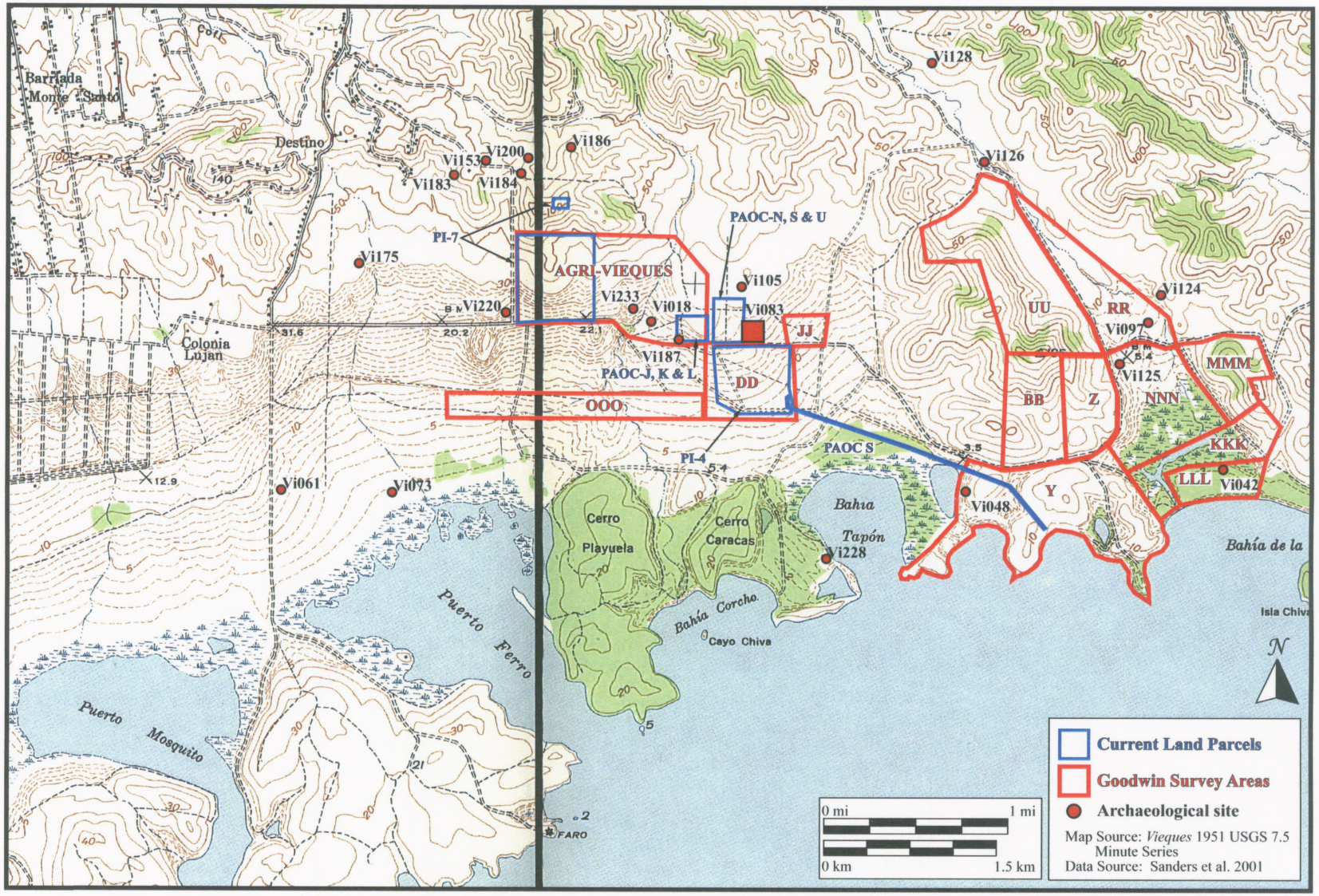

Figure 19. Location of previously recorded archaeological and areas near camp García previously surveyed by Goodwin and Associates.

former east-west airstrip south of Camp García. No previously recorded archaeological sites were located in that survey area and no sites were identified during the Goodwin 1999 survey (Sanders et al. 2001).

Area DD (Current Project PI-4 and PAOC-S former pipeline)

Goodwin Survey Area DD was located in their D-15 study unit (Bahía Tapón) southeast of Camp García and to the northwest of Bahía Tapón eastern side of the airstrip, and immediately west of and adjacent to the Red Beach access road (see Figure 3-10). The survey area corresponded to a former area used by the U.S. military and consists of the entire PI-4 land parcel and the westernmost portion of the PAOC (former pipeline) for the current project. No previously recorded archaeological sites were located in that survey area by E&E and no archaeological sites were identified during the Goodwin 1999 survey (Sanders et al. 2001). However, numerous concrete foundations, remnants of subsurface utilities, and a large tarmac area were identified.

Area JJJ

Goodwin Survey Area DD was located in their D-15 study unit (Bahía Tapón) east of Camp García and to the north of Bahía Tapón and directly north of the Red Beach access road (see Figure 3-10). No previously recorded archaeological sites were located in that survey area by E&E and no archaeological sites were identified during the Goodwin 1999 survey (Sanders et al. 2001).

Area Y (Current Project PAOC-S former pipeline)

Goodwin Survey Area Y was located in their D-14 study unit (Pata Negra) on the southern coast between Bahía de la Chiva and Bahía Tapón (see Figure 3-10). The survey area includes the approximate eastern third of the PAOC-S (former pipeline) for the current project.

Three previously recorded archaeological sites have been located in that survey area (Vi047, Vi095, and Vi308). Archaeological sites Vi047 and Vi095 were identified during the E&E surveys and consist of a Precolumbian Ceramic-age midden and a Historic-period archaeological site, respectively. Vi047 is considered eligible for the National Register. Vi308 was recorded during the 1999 Goodwin survey and identified as a small scatter of Precolumbian ceramics (Sanders et al. 2001). However, none of these archaeological sites is located in direct proximity to the PAOC-S (former pipeline).

Area BB

Goodwin Survey Area BB was located in their D-13 study unit (Bahía de la Chiva) on the southern coast north of Bahía de la Chiva (see Figure 3-10). No previously recorded archaeological sites were located in that survey area and no archaeological sites were identified during the Goodwin 1999 survey (Sanders et al. 2001).

Area Z

Goodwin Survey Area Z was located in their D-13 study unit (Bahía de la Chiva) on the southern coast north of Bahía de la Chiva (see Figure 3-10). No previously recorded archaeological sites were located in that survey area and no archaeological sites were identified during the Goodwin 1999 survey (Sanders et al. 2001).

Area RR

Goodwin Survey Area RR was located in their D-13 study unit (Bahía de la Chiva) on the southern coast north of Bahía de la Chiva (see Figure 3-10). Two archaeological sites are located in the parcel (Vi097 and Vi124). Vi097 was recorded as a small Precolumbian archaeological site and Vi125 was recorded as a Historic archaeological site of military origin (Tronolone et al. 1984). No additional archaeological sites recorded during the Goodwin 1999 survey (Sanders et al. 2001).

Area UU

Goodwin Survey Area UU was located in their D-13 study unit (Bahía de la Chiva) on the southern coast north of Bahía de la Chiva (see Figure 3-10). No previously recorded archaeological sites were located in that survey area and no archaeological sites were identified during the Goodwin 1999 survey (Sanders et al. 2001).

Area KKK

Goodwin Survey Area KKK was located in their D-13 study unit (Bahía de la Chiva) on the southern coast adjacent to Bahía de la Chiva (see Figure 3-10). One site (Vi042) had been previously recorded in the area. The archaeological site was recorded by Tronolone et al. (1984) and consists of a multicomponent archaeological site of undetermined National Register status, containing both Precolumbian and Historic artifacts. The archaeological site was not relocated during the Goodwin 1999 survey (Sanders et al. 2001).

Area LLL

Goodwin Survey Area LLL was located in their D-13 study unit (Bahía de la Chiva) on the southern coast adjacent to Bahía de la Chiva (see Figure 3-10). No previously recorded archaeological sites were located in that survey area and no archaeological sites were identified during the Goodwin 1999 survey (Sanders et al. 2001).

Area MMM

Goodwin Survey Area MMM was located in their D-13 study unit (Bahía de la Chiva) on the southern coast north of Bahía de la Chiva and immediately the northeast of survey area KKK (see Figure 3-10). No previously recorded archaeological sites were located in that survey area and no archaeological sites were identified during the Goodwin 1999 survey (Sanders et al. 2001).

Area NNN

Goodwin Survey Area NNN was located in their D-13 land parcel (Bahía de la Chiva) on the southern coast north of Bahía de la Chiva and immediately north of survey area KKK (see Figure 3-10). One previously recorded archaeological site (Vi125) was identified in the survey area, recorded by E&E (Tronolone et al. 1984). The archaeological site consists of historical ruins which were not relocated during the Goodwin 1999 survey (Sanders et al. 2001).

CHAPTER 4
FIELD AND LABORATORY METHODS

FIELD METHODS

Survey of the land parcels on the former VNTR was conducted following a review of previous survey reports, environmental and soils data, and historic aerial photographs. The survey consisted of visual examination of ground surfaces in each parcel as well as excavation of standard shovel tests placed along survey transects (Figure 20). The archeological survey methods developed for this investigation were prepared in accordance with the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (Federal Register 1983) and guidelines set forth by the Puerto Rico State Historic Preservation Office (SHPO).

Figure 20. General view of shovel testing.

Figure 21. UXO clearance team employing magnetometer prior to shovel test.

Metal Detector Sweeps

Metal detector sweeps were conducted at each shovel test location prior to excavation in order to minimize the potential for encountering unexploded ordnance (UXO). The UXO team consisted of two UXO technicians employed by USA Environmental, Inc. working under subcontract to CH2M HILL and dedicated to the archaeological survey. Metal detecting was conducted using two *Schonstedt GA-52C* model magnetometers with Auto GEB and high and low mineral modes (Figure 21). In cases where a positive reading from the metal detector was located at the proposed shovel test location, the shovel test was moved to an area where negative readings were obtained.

Shovel Test Strategy

Field methods included examination of all ground surfaces within the land parcels as well as excavation of shovel tests along regularly spaced survey transects. A standard interval of 20 m between shovel tests and transects was utilized; however this interval was shortened to 10 m in areas where the topographic setting made use of a 20–m interval impractical. Shovel tests were placed systematically across a 20-m (65.6-ft) grid established by a compilation of measuring tape, pacing, and compass bearings, while in other areas, shovel testing was focused on specific landforms within the parcel. In areas with obvious ground disturbance, slopes exceeding 10 percent, or poorly drained marsh, shovel tests were excavated on a judgmental basis to confirm ground conditions.

All shovel test transects received individual alphabetical designations, and individual shovel tests along each transect were incorporated in a numbered sequence for that transect (eg. ST A-1).

Figure 22. Project Archaeologist recording shovel test profile.

Shovel tests typically measured 35 cm in diameter and were excavated by natural horizons until sterile soils (Pleistocene-age deposits) or bedrock were reached. Soils were screened through 0.635-cm (0.25-in) hardware cloth and replaced in the test pit after recording the soil profile. Soil profiles were recorded on standardized field forms noting the depth of natural soil horizons (Figures 22 and 23). Soil colors and textures were described using Munsell color charts and USDA texture classification schemes.

Project Area Documentation

The field crew recorded the results of individual tests on standardized field forms. The Project Archaeologist recorded daily notes describing the progress of the survey in terms of the number and locations of shovel tests excavated and pertinent environmental information. The only recovered artifact was bagged according to shovel test stratum and was assigned a unique catalog number that was used for laboratory tracking.

Geo-Marine generated a project-specific field map to record essential survey area and site detail. The field map was tied into existing landmarks, and includes survey area boundaries, local physiographic and cultural features, survey transects, positive and negative shovel tests, positive metal detector readings, surrounding vegetation, and roads or other non-archaeological cultural features. Modern refuse was noted in the field records but not collected. The survey area was photographed from several angles and photographs were keyed into the survey field maps.

Figure 23. Detail of measuring shovel test soil profile (ST A-5, Camp García).

LABORATORY METHODS

Artifact Processing and Analysis

In total, only one artifact – a metal alloy religious pendant was recovered from this survey. The artifact was bagged in a 4-mil, resealable plastic bag, along with an artifact card bearing provenience information. A catalog number was assigned to the unique provenience, and this number appears with the provenience information. The artifact was transported from the project area to Geo-Marine's laboratory facility and washed in tap water using a soft toothbrush, air-dried, and analyzed by the Principal Investigator and material specialists. After analysis, the artifact was placed in clean, 4-mil, resealable plastic bags with air holes. An acid-free artifact card with provenience information and bag number was included in the bag. The artifact and original field records generated from this survey will be curated with the U.S. Navy (NAVFAC Atlantic).

CHAPTER 5
RESULTS OF FIELDWORK

INTRODUCTION

This chapter presents the results of the Phase I archaeological field investigations performed at the former VNTR in November 2005 by Geo-Marine. Environmental restoration activities will be conducted by CH2M HILL on behalf of the U.S. Navy within nine land parcels in and around Camp García (see Figure 3; Figure 24). Because environmental restoration activities have the potential to impact archaeological resources, an archaeological survey was conducted to determine their presence or absence in the land parcel areas. The land parcels are all located in the former Eastern Maneuver Area (EMA) and consist of:

- PI-4 (44 acres);
- PI-7 (40 acres);
- PAOC-J (2 acres);
- PAOC-K (2 acres);
- PAOC-L (2 acres);
- PAOC-N (2 acres);
- PAOC-S (2 acres);
- PAOC-U (1 acres); and
- PAOC S (1500-m former pipeline)

Prior to initiation of the archaeological survey, Geo-Marine determined that several of these land parcels had been previously surveyed between 1995 and 2000 by R. Christopher Goodwin Associates, Inc., according to professional archaeological standards (Sanders et al. 1997, 2001). These previously surveyed areas include all of PI-4, 39 acres of PI-7, all of PAOC-J, PAOC-K, and PAOC-L, and the eastern 600-m of PAOC-S (former pipeline) and western end of the former pipeline (see Figure 19). The previous surveys did not identify any historically or culturally significant archaeological sites in the land parcels and were thus not included in the current survey.

During the present study, systematic subsurface testing for archaeological resources was conducted at PI-7 (a one-acre former Radar Facility located northwest of Camp García); PAOC-S, PAOC-N, and PAOC-U (a 7-acre block located in eastern portion of Camp García); and PAOC-S (the western 900 m of former oil supply pipeline located on northern fringe of Bahía Tapón). As described in Chapter 4, the present Phase I survey of these land parcels consisted of

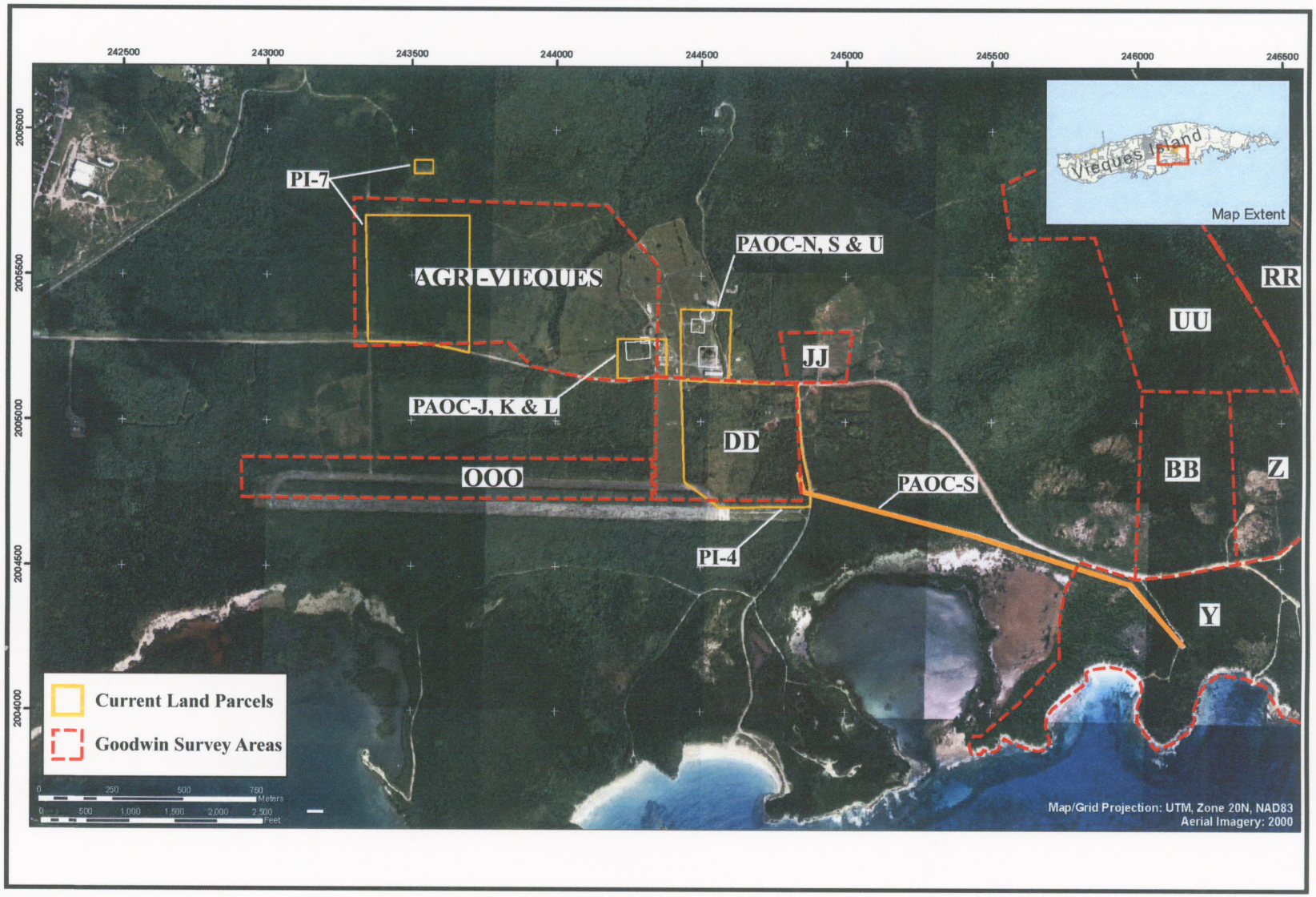

Figure 24. Current project survey areas depicted on 2000 aerial of VNTR.

examination of historic aerial photographs and modern digital orthophotography, pedestrian survey along transects closely examining ground exposures, and systematic excavation of shovel tests on undisturbed landforms suitable for past human use or occupation. The following text provides descriptions of these survey areas, work conducted, and results obtained.

LAND PARCEL/SURVEY AREAS

Land Parcel PI-4

Land Parcel PI-4 consists of a 44-acre parcel located directly south of Camp García and formerly used by the U.S. military as a Helicopter Maintenance and Fuel Bladder Storage Area. As described in Chapter 3, the area corresponding to PI-4 was surveyed previously by Goodwin & Associates in 1999, recording no archaeological sites (see Figure 19). No previously recorded archaeological sites were located in that survey area by E&E during surveys conducted in the 1980s (Tronolone et al. 1984), and no archaeological sites were identified during the Goodwin & Associates 1999 survey (Sanders et al. 2001). Numerous concrete foundations, remnants of subsurface utilities, and a large tarmac were identified during the Goodwin survey and attributed to modern-era military use of the land.

Land Parcel PI-7

Land Parcel PI-7 consists of both a 39-acre block and a one-acre block located to the west and northwest of Camp García, respectively (see Figure 24). The 39-acre block of PI-7 consists of a former Tar and Construction Debris Disposal Area used by the U.S. military between 1954 and 1978, and the one-acre block consist of a former Radar Facility in operation during the U.S. Naval presence. As described in Chapter 3, the 39-acre block located to the south of former Radar Facility was previously systematically surveyed for archaeological resources as part of an approximate 80-acre survey (referred to the as the *Agri-Vieques* survey) conducted by Goodwin & Associates in 1995 (Sanders et al. 1997). No archaeological sites were recorded by Goodwin during that survey nor were any archaeological sites previously recorded in that area during the 1980s E&E surveys (Tronolone et al. 1984). The 39-acre PI-7 parcel was thus eliminated from the current project. The one-acre PI-7 parcel located to the north of the 39-acre parcel had not been subject to previous survey and was thus investigated during the present study.

The one-acre parcel former Radar Facility is located on a hilltop approximately 2000 m northwest of Camp García at a maximum elevation of 100 ft amsl in rugged terrain (see Figures 5 and 24). The hilltop offers a commanding view of the southern plain of Vieques Island, Camp García, and the Caribbean Sea (see Figure 6). The hilltop is surrounded by steeply sloping terrain to the north, south and east. Soils on the hilltop and surrounding slopes are mapped by the USDA as Pandura-Very Stony Land complex (PdF) (40–60 percent slopes) (see Figure 7). The hilltop is accessed by a northwest-southeast trending road that was maintained by the U.S. military for construction and maintenance of the Radar Facility. Vegetation consists of scrub, thorny bushes, grassy areas along the access road, small trees and vines (Figure 25).

Background research found that there are no previously recorded archaeological sites on the PI-7 hilltop parcel. However, four archaeological sites (Vi153, Vi184, Vi186, and Vi200) have been previously recorded in the vicinity of the parcel (see Figure 19). These archaeological sites are all located to the north, within a maximum distance of 300 m. Vi153 consists of a twentieth-

Figure 25. View of former Radar Facility showing current conditions.

century domestic residential archaeological site, and Vi184, Vi186, and Vi200 all consist of a scatters of nineteenth- to twentieth-century artifacts, none of which has been recommended eligible for the National Register.

The one-acre parcel includes both the hilltop proper where radar structures were once positioned as well as surrounding steeply sloped, rocky terrain. Three parallel transects (A, B, and C) spaced 10 m apart were surveyed across the hilltop in a north-south direction (Figure 26). No shovel tests were excavated in the steeply sloped areas, thus limiting subsurface testing to the flat portion of the hilltop. Shovel test were excavated at 10-m intervals, with the exception of ST C-3 which was placed on a lower shelf approximately 20 m north-northeast of ST C-2. Transect A was surveyed along the southern edge of the ridge, Transect B across the center, and Transect C along the northern edge and a lower shelf off the northern slope.

Soils on the hilltop were generally recorded as 25 to 45 cm of yellowish to dark brown sand or sandy loam overlying very compact brownish yellow sandy loam. lay subsoil was recorded along the northern side of the hilltop and along the lower shelf. Representative soil profiles are provided in Figure 27 and described as follows:

ST A-1 located near the southern edge of the landform was described as a 7-cm deposit of very dark gray (10YR 3/2) sand and humus, overlying a 9-cm-thick deposit of light olive brown (2.5Y 5/4) sand. This overlies a 9-cm-thick deposit of very dark grayish brown (2.5 Y 3/2) sand. Subsoil was recorded as a brownish yellow (10YR 6/8) compact sand. ST B-3 located near the center contained a 22-cm deposit of yellowish brown (10YR 5/4) sandy loam overlying 10 cm of very pale brown (10YR 8/3) decaying limestone. This overlies a 13-cm-thick deposit of yellowish brown (10YR 5/4) sandy loam. Subsoil was recorded as compact brownish yellow (10YR 6/8) sandy loam.

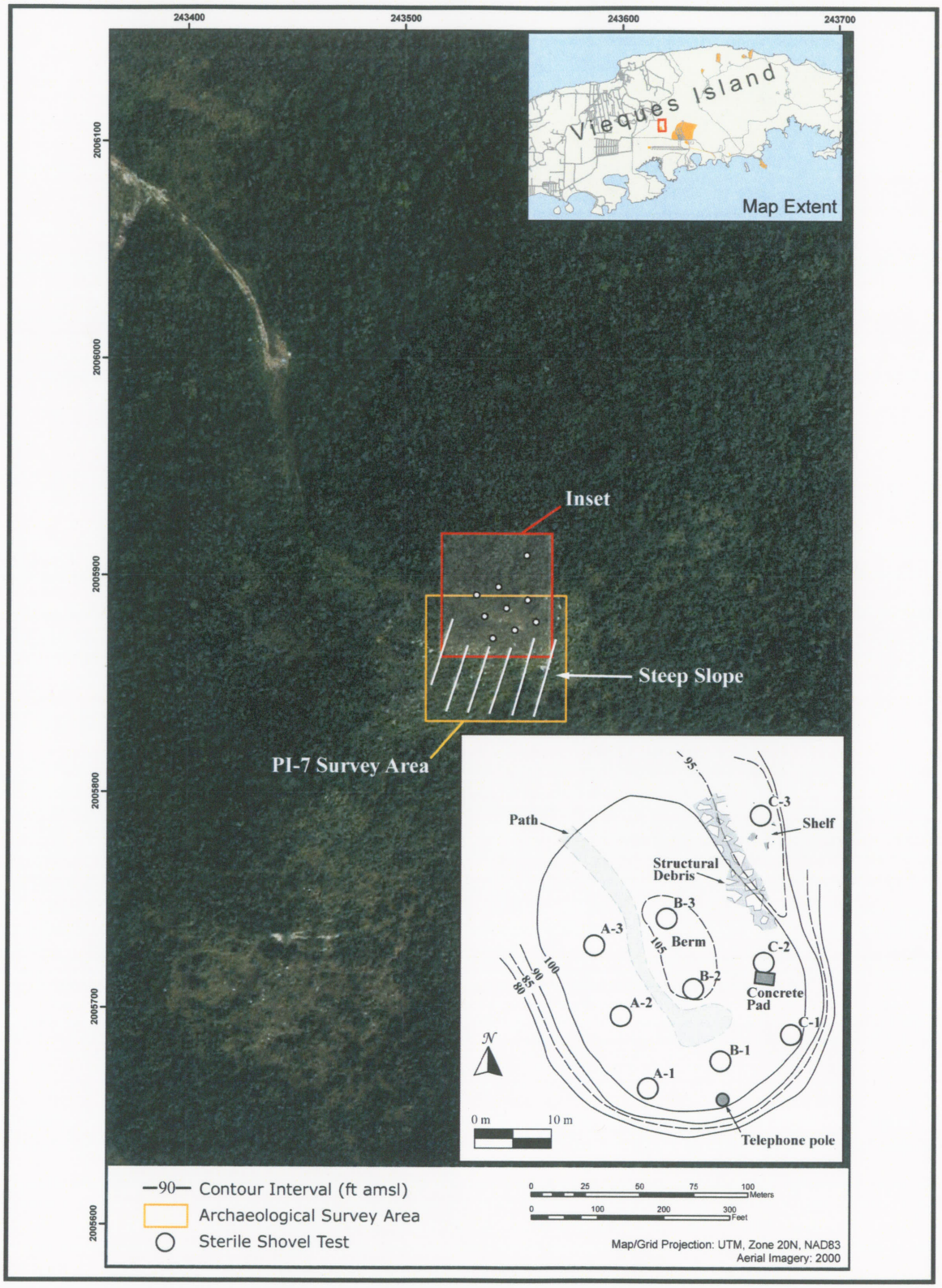

Figure 26. Former Radar Facility (PI-7) plan showing shovel test locations.

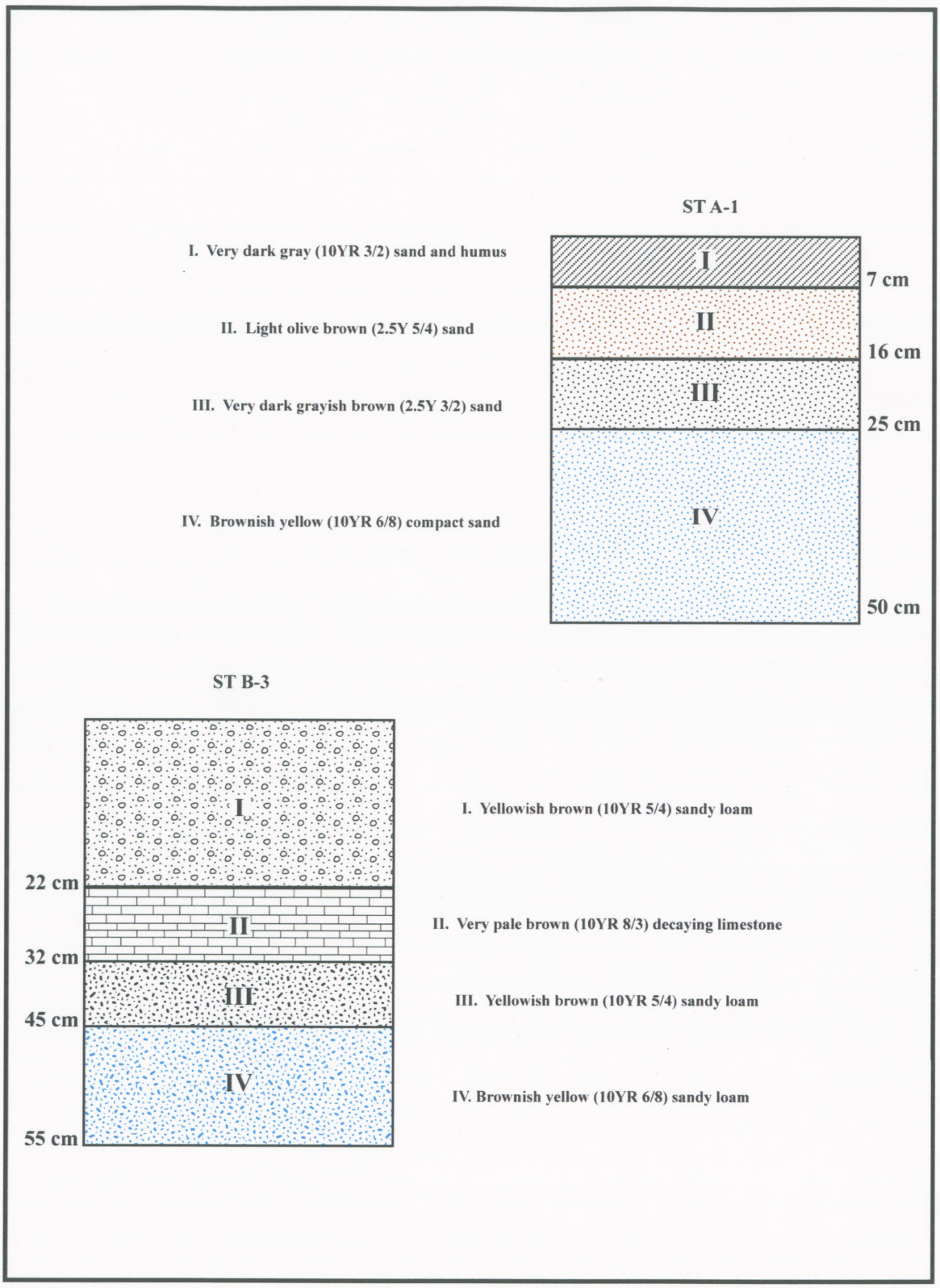

Figure 27. Representative shovel test profiles (ST A-1 and ST B-3) showing soils at site PI-7.

The northern slope above the shelf where C-3 was excavated contained concrete cinder block rubble, as well as other construction debris associated with demolition of old radar structures. On the hilltop a mounded area of artificial fill where a former radar structure once stood was recorded. A small concrete foundation was also recorded on the hilltop. The lower shelf contained military debris, including old metal parts, a truck muffler, and a large vehicle bodypart. No artifacts were recovered from nine shovel tests excavated along the three transects in PI-7 and no Precolumbian or Historic-age artifacts were observed on ground surfaces. Examination of the surrounding slopes yielded no evidence of former Precolumbian activity, such as petroglyphs or refuse middens. In sum, no artifacts or archaeological sites were identified from the archaeological survey of this land parcel.

Land Parcels PAOC-J, PAOC-K, and PAOC-L

Land Parcels PAOC-J (2 acres), PAOC-K (2 acres), and PAOC-L (2 acres) all consist of parcels located within Camp García on its western side. PAOC-J is a former Vehicle Maintenance Area, PAOC-K is a former Wash Rack, and PAOC-L is a former Paint and Transformer Storage Area. As indicated in Chapter 3, all three of these parcels were previously systematically surveyed for archaeological resources as part of the 80-acre *Agri-Vieques* survey area conducted by Goodwin & Associates in 1995 (Sanders et al. 1997) (see Figure 19). No archaeological sites were recorded by Goodwin during that survey nor were any archaeological sites previously recorded in that area during the 1980s E&E surveys (Tronolone et al. 1984). These three parcels were thus eliminated from the current project survey.

Land Parcels PAOC-S, PAOC-N, and Parcel PAOC-U

Land Parcels PAOC-S, PAOC-N, and PAOC-U are all located in close proximity to each other in the eastern portion of Camp García (see Figure 24). PAOC-S consists of a former Power Plant, PAOC-N consists of a former Fuel Farm and Filling Station, and PAOC-U consists of a former Vehicle Maintenance Area (Figure 28). Both PAOC-S and PAOC-N consist of two-acre parcels and PAOC-U consists of a one-acre parcel. Based on their close proximity, the three parcels were lumped in one larger rectangular-shaped, seven-acre survey area that included the three parcels and surrounding buffer areas within the fenced area of Camp García. The survey area was located between the north-south Camp García access road to the west, and the eastern boundary fence line of the camp.

Background research found that there are no previously recorded archaeological sites within the seven-acre parcel. However, two archaeological sites (Vi083 and Vi105) have been previously recorded in close proximity to the parcel, to the northeast and east of Camp García, respectively (see Figure 19). Vi083 consists of a historic archaeological site that encompasses the ruins of Hacienda Puerto Ferro located to the east of Camp García. The archaeological site was first identified during the 1980s E&E surveys and classified as significant Historic-age site eligible listing in the National Register (Tronolone et al. 1984). The archaeological site was revisited by Goodwin & Associates in 1999 who recorded historic period structural ruins and archaeological deposits dating from the mid-nineteenth to early twentieth centuries. To the northeast of the current parcel, and also outside of Camp García, Vi105 has been recorded as a large scatter of Precolumbian Chican Ostionoid period ceramics associated with marine shell. This archaeological site was identified during the 1980s E&E survey but was not revisited during the Goodwin 1999 survey; its potential significance remains unknown.

Soils within the Camp García survey area are mapped by the USDA as Vieques Loam (VmE2) (5–12 percent slopes) and elevations in the survey area range from approximately 25 ft amsl in

Figure 28. View facing northeast of Camp García.

Figure 29. View facing east of disturbed area in southeastern portion of Camp García.

the north to 21 ft amsl in the south (see Figures 5 and 7). The survey area supports open areas of grasses and shrubs and the terrain slopes slightly to the south toward the main east-west accessroad. Several modern-era structural remnants are present in the survey area in addition to former gravel access roads and driveways (now overgrown). Masonry ruins associated with former military buildings and structures are also present. The southeastern quadrant of the survey parcel contains two large extant buildings which are currently being used by the U.S. Fish & Wildlife Service for storage of boats, equipment, and vehicles (Figure 29). This area also contains several large concrete pads corresponding to former U.S. military building locations.

Shovel tests were systematically excavated on a 20-m grid across the PAOC-N, S, & U survey area within Camp García (Figure 30). Parallel transects were established in an east-west direction and labeled Transects A through K. In addition, two shovel tests placed at judgmental locations were excavated in the southeastern quadrant and labeled L-1 and L-2. In total, 47 shovel tests were excavated in the Camp García survey area.

Shovel tests placed in the eastern and central portion generally revealed 10 to 15 cm of compact, manufactured gravel overlying a 15 to 20-cm deposit of compact mixed soil, representing fill and grading deposits. In some areas a 15-cm deposit of decomposing limestone fill was also observed beneath mixed soil deposits. The fill identified in the Camp García area is attributed to past grading and leveling activities conducted by the Navy during construction of the camp. However, naturally formed soils were recorded beneath fill and graded soils in much of the survey area. These soils consist of dark brown, organically rich, silty loam overlying compact silty clay subsoil and are consistent with the USDA soil classification of the area. Natural soils without fill overburden were identified in shovel tests in the northwestern quadrant along Transects A and B, and in the southwestern quadrant. Representative soil profiles recorded in the survey area are depicted on Figure 31 and described as follows:

The soil profile from ST A-5 excavated in the northwest was described an 8-cm-thick very dark grayish brown (10YR 3/2) humic silty loam overlying an 8-cm deposit of brown (10YR 5/3) fine sand with some natural gravel. This overlies a fill deposit of light brownish gray (2.5Y 6/2) decomposing limestone and silty clay. Naturally deposited very dark brown (2.5Y 2/2) loam was recorded between 31 and 41 cmbs, overlying a dark brown (7.5Y 3/4) compact sandy clay subsoil (see Figures 23 and 5-5). As discussed below, a metal alloy religious pendant–an isolated find–was recovered from Stratum II, a fill deposit from this shovel test.

The soil profile from ST D-2 excavated in the eastcentral portion of the survey area was described as 10 cm of very dark grayish brown (10YR 2/2) clayey silt overlying a 6-cm-thick grading deposit of very compact very dark grayish brown (10YR 3/2) clayey silt mottled with yellowish brown (10YR 5/8) clayey silt and manufactured gravel. A modern-era rubber hose fragment was contained in this fill deposit. This overlies a 13-cm-thick deposit of naturally occurring dark brown (10YR 3/3) silty loam which overlies a very compact dark brown (10YR 3/3) silty clay with mottles of yellowish brown (10YR 5/4) silty clay (see Figure 5-5).

The soil profile from ST K-5 excavated in the southwestern quadrant of the survey area revealed natural soils with some modern-era debris. These soils were described as a 12-cm deposit of very dark grayish brown (10YR 3/2) humic silty loam overlying a 25-cm-thick deposit of very dark grayish brown (10YR 3/2) silty loam with some limestone fragments; this deposit contained a piece of modern glass. The subsoil consisted of dark brown (7.5YR 3/2) silty clay (see Figure 5-5).

Figure 30. Camp García (PAOC-S, PAOC-N, and PAOC-U) plan showing shovel test locations.

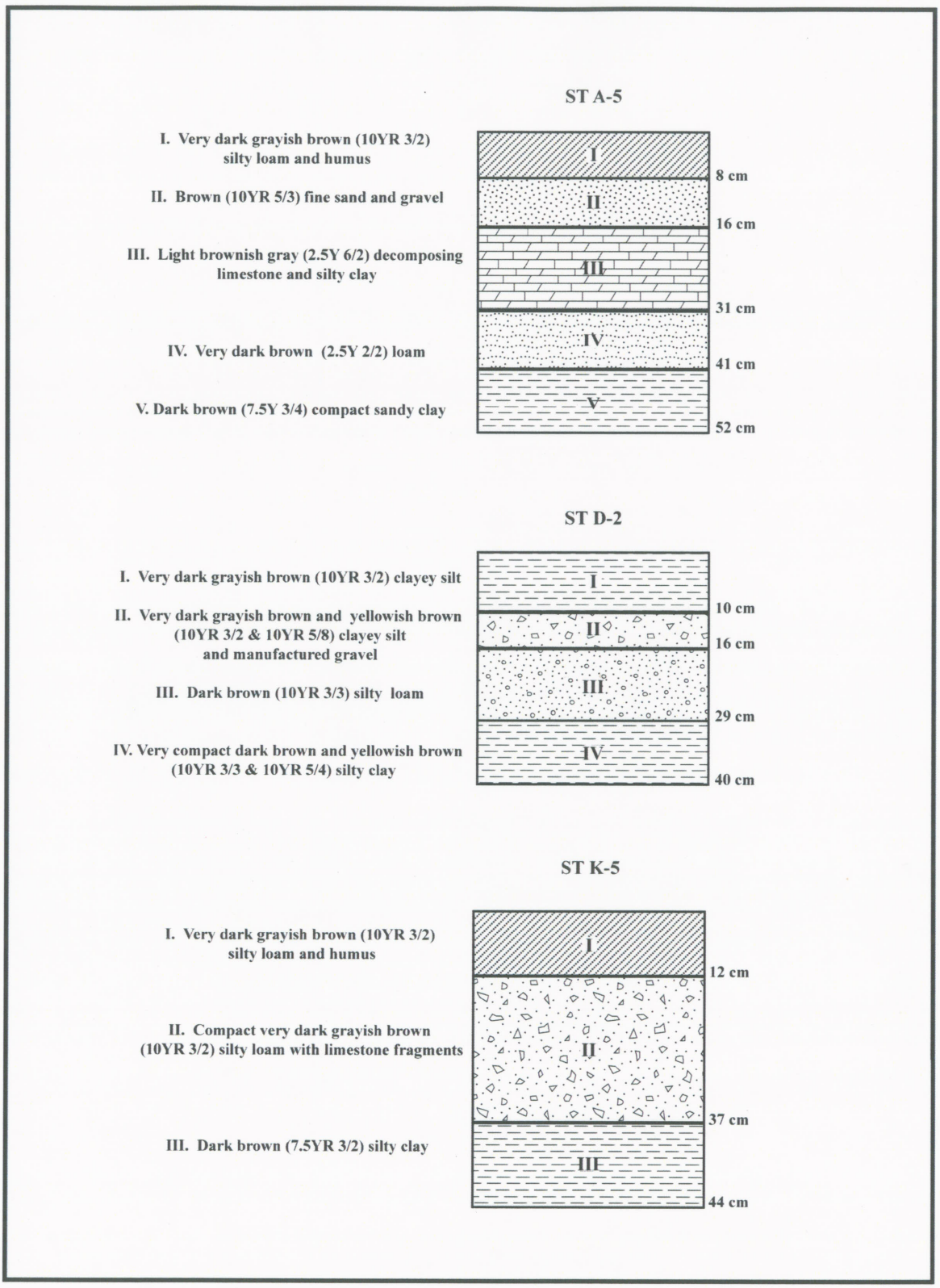

Figure 31. Representative shovel test profiles (ST A-5, ST D-2, and ST K-5) showing soils at Camp García.

Figure 32. Photograph of isolated find: religious pendant recovered from Camp García, ST A-5.

As a result of the shovel testing in the Camp García survey area, one isolated find was recorded in shovel tests but no archaeological sites were recorded. The recovered artifact consists of a Historic-age (post-1910) metal alloy religious pendant recovered from an upper fill deposit (Stratum II) in ST A-5 (Figure 32). Information on the origin of this artifact was obtained from *The New Advent Catholic Encyclopedia* (Knight 2005), which indicated that the pendant is referred to as a "scapular medal." The reference source further indicates that:

> *...since 1910, and the regulation of the Holy Office of 16 December of that year (Acta Apost. Sedis, III, 22 sq.), it is permitted to wear, instead of one or more of the small scapulars, a single medal of metal. This medal must have on one side a representation of Jesus Christ with His Most Sacred Heart and on the other an image of the Mother of God the medal is to be worn instead of a number of different scapulars, it must receive.... This medal must also be worn constantly, either about the neck or in some other seemly manner...Only the small (not the large) scapulars may be validly replaced by such medals.*

This artifact is considered to be a casual loss by an individual present in the area post-1910, and is not considered part of a larger archaeological site. Other materials observed in shovel tests included glass, metal, and rubber fragments of modern origin but were not collected. The two shovel tests excavated in the southeastern quadrant of the survey area (L-1 and L-2) both identified disturbed deposits and/or modern-era structural remains. A concrete pad was identified 15 cm below surface in ST L-1, and a deep deposit of crushed limestone was identified in ST L-2.

In sum, excavation of 47 shovel tests with the Camp García survey area encompassing land parcels PAOC-N, PAOC-S, and PAOC-U indicated the presence of both fill deposits associated with the construction and maintenance of Camp García, as well as undisturbed naturally occurring soils. Fill soils were found principally in the east-central portion of the survey area and naturally occurring soils without fill overburden were found in the northwestern and southeastern quadrants and beneath fill deposits in other areas. One isolated find, consisting of a metal alloy religious pendant dating to post-1910, was recovered from the survey but no archaeological sites were recorded.

Land Parcel POC-S (1500-m Former Pipeline)

Land Parcel PAOC-S consists of an approximate 1500-m-long former POL pipeline located between Camp García to the west and a near-shore location east of Bahía Tapón to the east (see Figures 5 and 24). The purpose of the pipeline was to convey fuel oil to Camp García from offshore ships during the U.S. military use of the island. As described in Chapter 3, the western end of the PAOC-S land parcel located on the western side of the Red Beach access road was previously surveyed by Goodwin & Associates in 1999 within "Survey Area DD", and the eastern portion east of Bahía Tapón was surveyed by Goodwin as "Survey Area Y" (Sanders et al. 2001) (see Figures 19 and 24). No archaeological sites were recorded by Goodwin during those surveys nor were any archaeological sites previously recorded within the pipeline parcel during the 1980s E&E surveys (Tronolone et al. 1984). As such, the current survey was limited to an approximate 900-m segment of the former pipeline located between the Red Beach access road and the eastern side of Bahía Tapón.

The survey parcel traverses the northern fringe of Bahía Tapón and is located between 20 and 30 m south of an overgrown road that parallels the former pipeline. Soils within the survey area are mapped by the USDA as Tidal Flats (Tf) in the eastern portion, and as Fraternidad Clay in the western portion (FrB) (2–5 percent slopes) (see Figure 7). Elevations in the survey area range from approximately 4 ft amsl in the west to approximately 1 ft amsl in the east. Vegetation consist of scrub plants, saplings, and vines in the west while fringe mangroves are located to the east (Figure 33).

Background research found that there are no previously recorded archaeological sites within the survey parcel although two Precolumbian sites (Vi228 and Vi048) have been recorded on the western and eastern sides of Bahía Tapón, respectively (see Figure 19). Vi228 was recorded during the 1980s E&E surveys as a scatter of Precolumbian Cedrosan Saladoid ceramics,

Figure 33. View of shovel testing in POC-S (former pipeline) showing current conditions.

Figure 34. Archaeological testing along the PAOC-S pipeline.

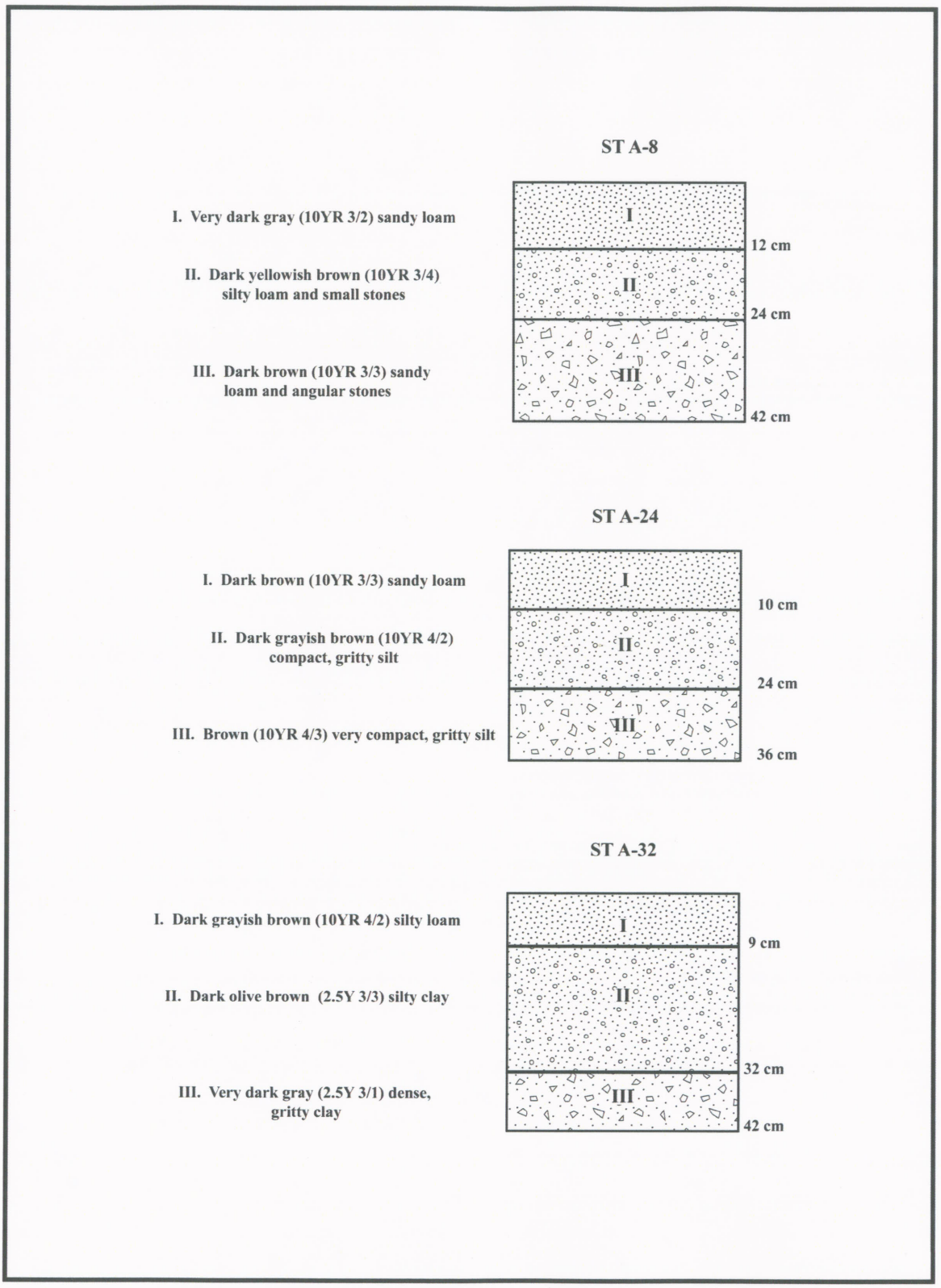

Figure 35. Representative shovel test profiles (ST A-8, A-24, and A-32) showing soils along the PAOC-S pipeline.

however, the significance of this archaeological site has not been evaluated in terms of National Register eligibility (Tronolone et al. 1984). Vi048 was also recorded during the 1980s survey by E&E as a late Saladoid and early Ostionoid ceramic scatter. The archaeological site was relocated during the 1999 survey by Goodwin & Associates who found that the archaeological site possessed poor integrity and recommended no additional investigations (Sanders et al. 2001:297).

During the current survey, a total of 39 shovel tests was excavated along a single transect (Transect A) at 20 m intervals along the former pipeline location (see Figure 34). Shovel testing proceeded from west to east commencing on the eastern side of the Red Beach access road and terminating on the eastern side of Bahía Tapón corresponding to the 1999 Goodwin Survey Area "Y" as well as a large artificial berm that had been constructed on the south side of the main east-west access road. Soils in the western portion of the survey transect generally consisted of brown silty loam, stony in some locations, overlying brown gritty clay. Wetland soils associated with the fringe mangrove were identified in the east, where numerous land crab burrows were also observed. Representative soil profiles recorded in the survey area are depicted on Figure 35 and described as follows:

Near the western end of the transect, the soil profile of ST A-4 was described as a 12-cm deposit of very dark gray (10YR 3/2) sandy loam overlying a 12-cm-thick deposit of compact dark yellowish brown (10YR 3/4) silty loam with small stones. The subsoil was described as a very compact dark brown (10YR 3/3) sandy silt with angular stones. Within the mid-section, at ST A-24, the soil profile consisted of a 10-cm deposit of dark brown (10YR 4/2) sandy loam, overlying 14 cm of dark grayish brown (10YR 4/2) compact gritty silt. Subsoil was described as brown (10YR 4/3) very compact gritty silt. In the east, the ST-34 soil profile consisted of 9 cm of dark grayish brown (10YR 4/2) silty loam overlying 23 cm of dark olive brown (2.5Y 3/3) silty clay. Subsoil was identified as a very dark gray (2.5Y 3/1) dense gritty clay.

At ST A-24, a concrete support post to the former POL pipeline was observed confirming its former presence in this area (Figure 36). No artifacts were however identified in any shovel tests or on ground surfaces in the survey area. As indicated, shovel testing was terminated at ST A-39, where it intersected with the main east-west former military access road. The mangrove fringe in this eastern area has been disturbed from past construction of an approximate 6-ft-high artificial berm running parallel to the main road. The berm is approximately 30 ft wide in some locations and has old cinder blocks, concrete, and metal parts embedded in its banks. The berm was constructed by the U.S. military to prevent flooding of the east-west access road and is possibly related to the former POL pipeline. In sum, no artifacts or archaeological sites were identified from the archaeological survey of this land parcel.

Figure 36. Concrete pipeline support post located along POC-S (former pipeline) corridor

CHAPTER 6
SUMMARY AND RECOMMENDATIONS

A Phase I Archaeological Survey of land parcels at the former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico was completed by Geo-Marine on November 14-18, 2005. The overall purpose of the survey was to determine the presence or absence of National Register-eligible archaeological sites that could be impacted from activities associated with environmental restoration being conducted by CH2M HILL for the U.S. Navy, under the Comprehensive Long-term Environmental Action Navy (CLEAN) program on Vieques Island. CH2M HILL has identified nine land parcels in and around Camp García that will be subject to environmental investigations. These parcels are located in the former Eastern Maneuver Area (EMA) and consist of:

PI-4 (44 acres)
PI-7 (40 acres)
PAOC-J (2 acres)
PAOC-K (2 acres)
PAOC-L (2 acres)
PAOC-N (2 acres)
PAOC-S (2 acres)
PAOC-U (1 acre)
POC-S (1500-m former POL pipeline)

Prior to initiation of this work, Geo-Marine determined through background research that all of PI-4, 39 acres of PI-7, PAOC-J, PAOC-K, PAOC-L and the eastern 600-m of the POC-S former pipeline and its western end, had been previously surveyed according to professional archaeological standards in 1995-1998 by R.C. Goodwin & Associates. No archaeological sites were found in the survey areas corresponding to the subject land parcels, and these areas were eliminated from the current survey. However, numerous Historical and Precolumbian archaeological resources are known to exist in the vicinity of Camp García and unsurveyed areas are thus considered sensitive for archaeological resources. Pedestrian archaeological survey and systematic subsurface testing was therefore conducted in the following parcels:

- PI-7 – former Radar FAcility northwest of Camp García (1 acre);
- PAOC-S, PAOC-N, PAOC-U – a seven-acre block located in eastern portion of Camp García; and
- PAOC-S – the western 900 m of a former petroleum pipeline located on the northern fringe of Bahía Tapón

In total, 93 shovel test pits were systematically excavated at 20-m or 10-m intervals in all undisturbed areas of less than 10 percent slope. One isolated find was recorded in shovel tests but no archaeological sites were recorded. The recovered artifact consists of an Historic-age (post 1910 metal alloy religious pendant recovered from ST A-5 at Camp García. Other materials observed in shovel tests included glass, metal, and rubber fragments of modern origin and were not collected. The artifact find is considered to be a casual loss and is not part of a larger archaeological site. No evidence of Precolumbian activities was identified in the surveyed land parcels. GMI recommends that no additional archaeological investigations are warranted in the project areas and that the proposed Navy environmental restoration activities will have no impact to National Register-eligible archaeological resources.

REFERENCES CITED

Alegría, R. E.

1965 On Puerto Rican Archaeology. *American Antiquity* 31(2):246–249.

1979 *Apuntes para el estudio de los Caciques de Puerto Rico*. Revista del Instituto de Cultura Puertorriqueña, San Juan.

1983 *Ball Courts and Ceremonial Plazas in the West Indies*. Yale University Publications in Anthropology No. 79. Yale University Press, New Haven.

Alegría, R. E., H. B. Nicholson, and G. R. Willey

1955 The Archaic Tradition in Puerto Rico. *American Antiquity* 21(2):113–121.

Archivo General de Puerto Rico

n.d. Fondos Municipales, Vieques: Caja No. 7, Expediente No. 56A

Ayes Suárez, C.

1990 *Angostura: Un campamento arcaico temprano del valle de Mantauabón, Barrio Florida Afuera*. Ayes: Investigaciones Arqueológicas e Históricas. Barceloneta, Puerto Rico.

Boccheciamp, R. A.

1977 *Soil Survey of the Humacao Area of Eastern Puerto Rico*. U.S. Department of Agriculture, Soil Conservation Service, in cooperation with University of Puerto Rico College of Agriculture Sciences.

Boomert, A.

1999 Saladoid Sociopolitical Organisation. In *Proceedings of the 18th International Congress for Caribbean Archaeology*, pp. 55–77. St. George, Grenada, West Indies.

Bullen, R. P., and F.W. Sleight

1963 *The Krum Bay Site: A Preceramic Site on St. Thomas, United States Virgin Islands*. American Studies Report No. 5. William L. Bryant Foundation, Orlando.

Callahan, R., G. D'Aluisio-Guerrieri, R. Lambardo, R. R. Lewis III, and B. Sorrie
1981 *Mangrove Forests of Vieques, Puerto Rico.* Management Report. Submitted to Department of Navy.

Carini, S. P.
1993 Compositional Analysis of West Indian Saladoid Ceramics and Their Relevance to Puerto Rican Prehistory. Unpublished Ph.D. dissertation, University of Connecticut, Storrs.

Causey, B., J. Delaney, E. Diaz, D. Dodge, J. R. Garcia, J. Higgins, W. Jaap, C. A. Matos, G. P. Schmahl, C. Rogers, M. W. Miller, and D. Turgeaon
2000 Status of Coral Reefs in the U.S. Caribbean and Gulf of Mexico: Florida, Texas, Puerto Rico, U.S. Virgin Islands, and Navassa. In *Status of Coral Reefs of the Worlds*, edited by C. R. Wilkinson, pp. 239-259. Australian Institute of Marine Science, Townsville.

Chanca, D. A.
1949 *Navegaciónes Colombinas*, edited by E. O'Gorman. Secretaria de Educación Pública, Mexico City.

Chanlatte Baik, L. A.
1979 *Excavaciones arqueológicas en Vieques.* Revista del Museo de Antropología, Historía y Arte de la Universidad de Puerto Rico 1(1):55–59.

1983 Sorcé-Vieques: climax culturel del Igneri y su participación en los procesos sociuoculturales antillanos. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 9:73–95. Montréal.

Chanlatte Baik, L. A., and Y. M. Narganes Stordes
1983 *Vieques-Puerto Rico: Asiento de una nueva cultura aborigen antillana.* Centro de Investigaciones Arqueológicas de la Universidad de Puerto Rico. Santo Domingo.

Cintrón, G., A. E. Lugo, D. J. Pool, and G. Morris
1978 Mangroves of Arid Environments in Puerto Rico and Adjacent Islands. *Biotropica* 10(2):110–121.

Colin, P. L.
1978 *Caribbean Reef Invertebrates and Plants.* T. F. H. Publications.

Collier, A.
1964 The American Mediterranean. In *Natural Environment and Early Cultures*, edited by R. C. West, pp. 122–142. Handbook of Middle American Indians, vol. I, University of Texas Press, Austin.

Crampsey, R.A.
1975 *Puerto Rico.* Larimer Trend & Company, Ltd. London.

Cruxent, J. M., and I. Rouse
1969 Early Man in the West Indies. *Scientific American* 221:42–52.

Curet, L. A.

.1992 House Structure and Cultural Change in the Caribbean: Three Case Studies from Puerto Rico. *Latin American Antiquity* 3:160–174.

1996 Ideology, Chiefly Power, and Material Culture: An Example from the Greater Antilles. *Latin American Antiquity* 7:114–131.

Curet, L.A., and J. R. Oliver

1998 Mortuary Practices, Social Development, and Ideology in Precolumbian Puerto Rico. *Latin American Antiquity* 9:217–239.

Denker, E., and B. Denker

1985 *The Main Street Pocket Guide to North American Pottery and Porcelain*. The Main Street Press, Pittstown, New Jersey.

Dietz, J. L.

1986 *Economic History of Puerto Rico: Institutional Change and Capitalist Development.* Princeton University Press, Princeton, New Jersey.

Dookhan, I.

1973 *Vieques or Cab Island: Source of Anglo-Spanish Conflict.* Journal of Caribbean Prehistory, 7:1-22.

Drewett, P.

1999 Human and Landscape Transformation at Port St. Charles, Barbados. *Proceedings of the 18th International Congress for Caribbean Archaeology,* pp. 110–118. St. George, Grenada, West Indies.

Ecology and Environment, Inc.

2000 *Environmental Assessment for Transfer of the Naval Ammunition Support Detachment Property, Vieques, Puerto Rico*. Ecology and Environment, Inc. Commander Naval Facilities, Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia.

Ewel, J. J., and J. L. Whitmore

1973 *The Ecological Life Zones of Puerto Rico and the U.S. Virgin Islands*. Forest Service Research Paper ITF-18. Institute of Tropical Forestry, Rio Piedras, USDA.

1914 Relations of Aboriginal Culture and Environment in the Lesser Antilles. *Bulletin of the American Geographical Society* 46(9):662–678.

Figueredo, A. E.

1976 Caño Hondo, un residuardo preceramico en la Isla de Vieques. In *Proceedings of the 6th International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles*, pp. 247–252. Pointe á Pitre.

Geo-Marine, Inc.

1996 *Land Use Management Plan for U.S. Naval Facilities, Vieques, Puerto Rico*. Geo-Marine, Inc. Submitted to Department of Navy, U.S. Naval Station Roosevelt Roads and Atlantic Division, Naval Facilities Engineering Command, Norfolk.

2002 *Integrated Natural Resources Management Plan, Navy Lands on Vieques Island, Puerto Rico, Plan Years 2003--2012*. Geo-Marine, Inc. Submitted to Department of Navy, U.S. Naval Station Roosevelt Roads and Atlantic Division, Naval Facilities Engineering Command, Norfolk.

Glover, L.
1971 *Geology of the Coamo Area, Puerto Rico, and its Relation to the Volcanic Arc Trench Association*. Professional Paper 636. U.S. Geological Survey, Washington, D.C.

Harring, C. H.
1963 *The Spanish Empire in America*. Harcourt, Brace, & World, New York.

Haviser, J. B., Jr.
1991 Preliminary Results from Test Excavations at the Hope Estate Site (SM-026), St. Martin. In *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, pp. 647–666. Archaeological-Anthropological Institute of the Netherlands Antilles, Willemstad.

1997 Settlement Strategies in Early Ceramic Age. In *Indigenous People of the Caribbean*, edited by S. M. Wilson, pp. 57–69. University Press of Florida, Gainesville

Higuera-Gundy, A.
1989 Recent Vegetation Changes in Southern Haiti. In *Biogeography of the West Indies, Past, Present, and Future*, edited by C.A. Woods, pp. 191-200. Sandhill Crane Press, Gainesville.

1991 Antillean Vegetational History and Paleoclimate Reconstructed from the Paleolimnological Record of Lake Miragone, Haiti. Ph.D. dissertation, University of Florida, Gainesville. University Microfilms, Ann Arbor.

Hodell, D.A., J.H. Curtis, G.A. Jones, A. Higuer-Gundy, M. Brenner, M.W. Binford, and K.T. Dorsey
1991 Reconstruction of Caribbean Climate Change Over the Past 10,500 Years. *Nature* 352:790-793.

Holdridge, L. R.
1967 *Life Zone Ecology*. Tropical Science Center, San José, Costa Rica.

Holdridge, L. R., C. R. Grenke, W. H. Hatheway, T. Liang, J. A. Tosi, Jr.
1971 *Forest Environments in Tropical Life Zones: A Pilot Study*. Pergamon Press, Oxford.

Hunter, A B.
2005 "1954B" (photo title) from, *Autobiography: Andrew Blinn Hunter, a Canadian Born U.S. Marine Living in Japan*. Electronic document http://andrewblinhunter.com/bio

Jordan, D.G., and D.W. Fisher
1977 Relation of Bulk Precipitation and Evapotranspiration to Water Quality and Water Resources, St. Thomas U.S. Virgin Islands. U.S. Geological Survey Water Supply Paper 1663:1.

Ketchum, W.
1983 *Pottery and Porcelain*. Alfred A. Knopf, New York.

Knight, K.
2005 "Scapular" (entry) The New Advent Catholic Encyclopedia. Electronic document http://www.newadvent.org/cathen/, accessed December 8, 2005

Langhorne, E. C.
1987 *Vieques: History of a Small Island.* Vieques Conservation and Historical Trust, Vieques, Puerto Rico.

Lewis, R. R.
1985 *Status of the Mangrove Forests on Vieques, Puerto Rico*. Mangrove Systems, Inc. Submitted to Ecology and Environment, Inc., Buffalo, New York.

Little, E. L., Jr., and F. H. Wadsworth
1964 *Common Trees of Puerto Rico and the Virgin Islands*. Agriculture Handbook No. 249. USDA Forest Service. U.S. Government Printing Office, Washington, D.C.

Little, E. L., Jr., R. O. Woodbury, and F. H. Wadsworth
1974 *Trees of Puerto Rico and the Virgin Islands,* vol. 2. Agriculture Handbook No. 449. USDA Forest Service. U.S. Government Printing Office, Washington, D.C.

Lundberg, E. R.
1985 Settlement Pattern Analysis for South-Central Puerto Rico. In *Archaeological Data Recovery at El Bronce, Puerto Rico—Final Report, Phase 2*, edited by L. S. Robinson, E. Lundberg, and J. B. Walker pp. L1–L23. Archaeological Services, Inc., Fort Myers, Florida. Submitted to the U.S. Army Corps of Engineers, Jacksonville District, Florida.

1989a *Preceramic Procurement Patterns at Krum Bay, Virgin Islands*. Ph.D. dissertation, Department of Anthropology, University of Illinois at Urbana-Champaign. University Microfilms International, Ann Arbor.

1989b Interrelationships Among Preceramic Complexes of Puerto Rico and the Virgin Islands. In *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, edited by E. N. Ayubi and J. B. Haviser, pp. 73–85. Curacao.

MacNeish, R. S., and A. Nelkon-Turner
1983 *Final Annual Report of the Belize Archaic Archaeological Reconnaissance*. Center for Archaeological Studies, Boston University, Boston.

Mason, J. A.
1917 Excavation of a New Archaeological Site in Porto Rico. *Proceedings of the Nineteenth International Congress of Americanists*, pp. 220–223. Washington, D.C.

1941 A *Large Archaeological Site at Capá, Utuado, with Notes on Other Porto Rican Sites Visited in 1914–1915.* Scientific Survey of Porto Rico and the Virgin Islands, vol. 18, pt. 2. New York Academy of Sciences, New York.

Matos-Carabello, D.
2000 Overview of Puerto Rico's Small-Scale Fisheries Statistics, 1994-1997. *Proceedings of the 51st Gulf and Caribbean Fisheries Institute* 51:215-231.

Miller, J. A., R. L. Whitehead, S. B. Gingerich, D. S. Oki, and P. G. Olcott
1999 *Ground Water Atlas of the United States; Segment 13 Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands*. Hydrologic Investigations Atlas 730-N. United States Geological Survey, Reston, Virginia.

Morales Carrión, A.
1983 *Puerto Rico and the Non-Hispanic Caribbean: A Study in the Decline of Spanish Exclusivism.* University of Puerto Rico, Río Piedras

Murphy, A. R.
1999 From Island to the Sea: Archaeological Investigations Along Ancient Watercourses in Antigua. In *Proceedings of the 18th International Congress for Caribbean Archaeology*, pp. 119–123. St. George, Grenada, West Indies.

Nettles, C. P.
1975 The Founding Fathers and the West Indies: The Economics of Revolution. In *The American Revolution and the West Indies*, edited by C. W. Toth, pp. 67–73. National University Publications, Port Washington and London.

Noël Hume, I.
1970 *A Guide to Artifacts of Colonial America*. Alfred A. Knopf, Inc., New York.

Oliver, J. J.
1990 Ceramic Analysis. In *Excavation and Analysis Results of Archaeological Investigations at Medianía Alta (l-22) and Vieques (L-23), Loiza, Puerto Rico*, pp. 43–120. Grossman and Associates, New York.

1992a The Caguana Ceremonial Center: A Cosmic Journey through Taíno Spatial & Iconographic Symbolism. Paper presented at the Tenth International Symposium of Latin American Indian Literature Association, San Juan, Puerto Rico.

1992b The *Results of Archaeological Testing and Data Recovery Investigations at the Lower Camp Site, Culebra Island National Wildlife Refuge, Puerto Rico*. Submitted to National Park Service, U.S. Department of the Interior, Atlanta.

1995 The Archaeology of the Lower Camp Site, Culebra Island: Understanding Variability in Peripheral Zones. In *Proceedings of the 15th International Congress for Caribbean Archaeology*, edited by R. E. Alegría and M. Rodruez, pp. 485–500. Cento de Estudios Avanzados de Puerto Rico y el Caribe, San Juan, Puerto Rico.

1998 *El centro ceremonial de Caguana, Puerto Rico: simbolismo iconográfica, cosmovisión y el poderío caciquil taíno de Boriquén*. Fundación Arqgeológica Antropológica e Histórica de Puerto Rico, San Juan, Puerto Rico. BAR International Series. British Archaeological Reports, Oxford, England.

Ortiz Aguilú, J. J., E. J. Maíz, J. Sued Badillo, and T. R. Sara
2001 Palo Hincado, Puerto Rico: New Insights from Ongoing Investigations. Paper presented at the XIX International Congress for Caribbean Archaeology, Aruba, July 22–28.

Ortiz Aguilú, J. J., J. Rivera, A. Princípe, M. Meléndez, and M. Lavergne
1991 Intensive Agriculture in Pre-Columbian West Indies: The Case for Terraces. In *Proceedings of the Fourteenth Congress of the International Association for Caribbean Archaeology*, edited by A. Cummins and P. King, pp. 278–285. Barbados Museum and Historical Society, St. Ann's Garrison.

Pantel, A.G.
1988 Precolumbian Flaked Stone Assemblages in the West Indies. Ph.D. dissertation, Universtiy of Tenessee, Knoxville.

Pina, P., M. Veloz Maggiola, and M. García Arévalo
1974 *Esquema para una revisisión de nomenclaturas arqueológicas del poblamiento precerámico en las Antillas*. Serie Monográfica No. 3. Ecicciones Fundación Garcíia Arévalo, Inc., y Museo del Hombre Dominicano, Santo Domingo.

Proctor, G. R.
1994 *Vieques Mangrove Forest Manual*. Puerto Rico Department of Natural and Environmental Resources, San Juan.

Rabin Siegal, R. L., and H. Santiago Cazull
1992 *Study of the Historical and Architectural Resources of the Municipality of Vieques, Puerto Rico (1844 – 1941)*. Manuscript on file at R. Christopher Goodwin & Associates, Frederick, Maryland.

Raffaele, H. A., M. J. Velez, R. Cotte, J. J. Whelan, E. R. Keil, and W. Cumpiano
1973 *Rare and Endangered Animals of Puerto Rico*. U.S. Department of Agriculture, Soil Conservation Service, and Puerto Rico Department of Natural Resources, San Juan.

Rainey, F.
1940 *Porto Rican Archaeology*. Scientific Survey of Puerto Rico and Virgin Islands, vol. 18, pt. 1. New York Academy of Sciences, New York.

Reinecke, R.
2001 *Mangrove Forest Health and Status, Vieques Island, Naval Station Roosevelt Roads*. Draft. Geo-Marine, Inc., Plano, Texas. Submitted to Commander, Atlantic Division, Naval Facilities and Engineering Command, Norfolk.

Robinson, L. S., E. R. Lundberg, and J. B. Walker
1985 *Archaeological Data Recovery at El Bronce, Puerto Rico: Final Report, Phase 2*. Archaeological Services, Ft. Myers, Florida. Submitted to the U.S. Army Corps of Engineers, Jacksonville District.

Rodríguez, M.

1989 The Zoned Incised Crosshatch (ZIC) Ware of Early Precolumbian Ceramic Age Sites in Puerto Rico and Vieques Island. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by P. Siegel, pp. 249–266. BAR International Series 506. British Archaeological Reports, Oxford, England.

1991 Aqueología de Punta Candelaro, Puerto Rico. In *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, pp. 605–627. Archaeological-Anthropological Institute of the Netherlands Antilles, Willemstad.

1992 Late Ceramic Age Diversity in Eastern Puerto Rico. Paper presented at the 57th Annual Meeting of the Society for American Archaeology, Pittsburgh.

1997 Excavations at the Maruca Site, a Precermaic Community in Purto Rico. Paper presented at the 62nd Annual Meeting of the Society for American Archaeology, Nashville.

Roe, P.

1989 A Grammatical Analysis of Cedrosan Saldoid Vesssel Form Categories and Surface Decoration Aesthetic and Technical Styles in Early Antillean Ceramics. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by P. Siegel, pp. 267–382. BAR International Series 506. British Archaeological Reports, Oxford, England.

Rouse, I. B.

1940 Some Evidence Concerning Origins of West Indian Pottery Making. *American Anthropologist* 42:49–80.

1941 An Analysis of the Artifacts of the 1914–1915 Porto Rican Survey. In *A Large Archaeological Site at Capá, Utuado, with Notes on Other Porto Rican Sites Visited in 1914–1915.* Scientific Survey of Porto Rico and the Virgin Islands, vol. 18, pt. 2. New York Academy of Sciences, New York.

1952a *Porto Rican Prehistory*. Scientific Survey of Porto Rico and the Virgin Islands, vol 18, pt 3, Excavations in the West and North. New York Academy of Sciences, New York.

1952b *Porto Rican Prehistory*. Scientific Survey of Porto Rico and the Virgin Islands, vol 18, pt 4 Excavations in the Interior, South and East, Chronology. New York Academy of Sciences, New York.

1960 *The Entry of Man into the West Indies*. Publications in Anthropology No. 61. Yale University, New Haven.

1964 Prehistory of the West Indies. *Science* 144(3618):499–513.

1982 Ceramic and Religious Development in the Greater Antilles. *Journal of New World Archaeology* 5(2):45–55.

1992 *The Tainos: Rise and Decline of the People who Greeted Columbus*. Yale University Press, New Haven and London.

Rouse, I. B., and L. Allaire
1978 Caribbean. In *Chronologies in New World Archaeology*, edited by R. E. Taylor and C. W. Meighan, pp. 431–481. Academic Press, New York.

Rouse, I. B., and R. E. Alegría
1990 *Excavations at María de la Cruz Cave and Hacienda Grande Village Site, Loiza, Puerto Rico.* Publications in Anthropology No. 80. Yale University, New Haven.

Sanders, S. L., M. A. Simons, C. A. Cappozola, A. Curet, and J. Granberry
1997 Cultural Resources Stabilization Study of 12VPr2-66, and Field Verification of Survey Results for 200 Acres on Vieques, Puerto Rico. R. Christopher Goodwin & Associates, Inc. Submitted to Department of the Navy, Atlantic Division, Naval Facilities Engineering Command, Norfolk.

Sanders, S. L., M. A. Simons, R. C. Goodwin, D. D. Davis, and F. Vento
2001 *Archaeological Survey and Inventory of the VNR.*. Technical Report. Patterns and Transformations in the Prehistory and History of Vieques, vol. I. R. Christopher Goodwin & Associates, Inc. Submitted to Department of the Navy, Atlantic Division, Naval Facilities Engineering Command, Norfolk.

Santana, A.
1983 Puerto Rico in a Revolutionary World. In *Puerto Rico: A Political and Cultural History,* edited by A. Morlaes Carrión, pp. 51–78. W.W. Norton, New York.

Siegel, P. E.
1989 Site Structure, Demography, and Social Complexity in the Early Ceramic Age of the Caribbean. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by P. E. Siegel, pp. 193–245. BAR International Series 506. British Archaeological Reports, Oxford, England.

1991a Political Evolution in the Caribbean. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 13:232–250. Curaçao, Netherlands Antilles.

1991b On the Antillean Connection for the Introduction of Cultigens in Eastern North America. *Current Anthropology* 32:332–334.

1992 *Ideology, Power, and Social Complexity in Prehistoric Puerto Rico.* Ph.D. dissertation, State University of New York at Binghamton. University Microfilms, Ann Arbor.

1996 Ideology and Culture Change in Puerto: A View from the Community. *Journal of Field Archaeology* 23:313–333.

1999 Contested Places and Places of Contest: The Evolution of Social Power and Ceremonial Space in Prehistoric Puerto Rico. *Latin American Antiquity* 10(3):209–238.

Siegel, P. E., J. Jones, D. M. Pearsall, and D. P. Wagner
1999 Culture and Environment in Prehistoric Puerto Rico. *Proceedings of the 18th International Congress for Caribbean Archaeology*, pp. 281–290. St. George, Grenada, West Indies.

South, S.
1977 *Method and Theory in Historical Archaeology*. Academic Press, New York.

Torres-González, S.
1989 *Reconnaissance of the Groundwater Resources of Vieques Island, Puerto Rico*. Water Resources Investigations Report No. 86–4100. U.S. Geological Survey, U.S. Department of the Interior, San Juan.

Torres Ramírez, B.
1968 *La Isla de Puerto Rico (1765–1800)*. Instituto de Cultura Puertorriqueña, San Juan.

Toulouse, J. H.
1971 *Bottle Makers and Their Marks*. Thomas Nelson, Inc., New York.

Tronolone, C. A., M. A. Cinquino, C. E. Vandrei, and G. S. Vescelius
1984 *Cultural Resource Reconnaissance Survey for the Vieques Naval Reservation*. Ecology and Environment, Inc. Submitted to Department of the Navy, Atlantic Division, Naval Facilities Engineering Command, Norfolk.

Veloz Maggiolo, M., and E. Ortega
1976 The Preceramic of the Dominican Republic: Some New Finds and Their Possible Relationships. *Proceedings of the First Puerto Rican Symposium on Archaeology*, edited by L. S. Robinson, pp. 147–201. Fundación Arqueolólogica, Antropológica, e Histórica de Puerto Rico, San Juan.

Veloz Maggiola, M., J. González Colón, E. Maíz, E. Questall Rodríguez
1975 *Cayo Confresí: Un sitio precerámico de Puerto Rico*. Taller, Santo Domingo.

Veloz Maggiola, M., E. Ortega, P. Pina, and B. Vega
1971 Three Stone Artifact Sites in the Dominican Republic. *Proceedings of the 4th International Congress for the Study of Pre-Columbian Cultures in the Lesser Antilles*, pp. 103–109. St. Lucia Archaeological and Historical Society.

Vicenti, V. P., S. Silander, M. Bareto, J. Saliva, P. Torres, and D. Corales
1991 *An Ecological Evaluation of Some Marine and Terrestrial Systems at Ceiba and Vieques Island after Hurricane Hugo: Fiscal Year 1990–1991*. Submitted to U.S. Fish and Wildlife Service, Boqueron, Puerto Rico.

Walker, J. B.
1985 A Preliminary Report on the Lithic and Osteological Remains from the 1980, 1981, and 1982 Field Seasons at Hacienda Grande (12PSJ7-5). *Proceedings of the 10th International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles*, pp. 181–224, Fort de France. Centre de Recherches Caraïbes, Univerité de Montréal.

1993 *Stone Collars, Elbow Stones, and Three-Pointers, and the Nature of Taíno Ritual and Myth*. Ph.D dissertation, Washington State University, Pullman. University Microfilms, Ann Arbor.

Williams, E.
1973 *From Columbus to Castro: The History of the Caribbean, 1492--1969*. Harper & Row, New York, Evanston, San Francisco, and London.

Wilson. S. A.
1997 Introduction to the Study of the Indigenous People of the Caribbean. In *The Indigenous People of the* Caribbean, edited by S. M. Wilson, pp. 1–9. University Press of Florida, Gainesville.

APPENDIX A
PROFILES OF KEY RESEARCHERS

Timothy R. Sara. M.A., RPA
Principal Investigator/Project Manager

Timothy R. Sara is a Registered Professional Archaeologist (RPA) with 20 years of professional experience in archaeological research, cultural resources management, and historic preservation planning. Mr. Sara has designed and directed surveys and excavations of historic and prehistoric archaeological resources in the eastern United States, Midwest, Southwest, and Caribbean. He received his MA degree in Anthropology from the City University of New York in 1994 where his focus of study was on prehistoric settlement patterns. He has obtained a thorough knowledge of Section 110 and Section 106 and of the National Historic Preservation Act as amended (NHPA) and applying the NRHP eligibility criteria to cultural resources. In 2003, Mr. Sara was Principal Investigator for the Paleoenvironmental Study of Navy Lands on Vieques, Puerto Rico, for the U.S. Department of the Navy and currently serves as Principal Investigator for the U.S. Navy for archaeological investigations at the Roosevelt Roads Naval Station. Mr. Sara has received honors and awards for academic and professional studies in the eastern United States and Caribbean. Currently, Mr. Sara is Director of Cultural Resources for Geo-Marine's Eastern and Caribbean Region.

Since 1988 Mr. Sara has conducted archaeological research in the Caribbean on a variety of investigations involving both Precolumbian and Spanish colonial resources. Between 1988-1992 Mr. Sara was Project Director for the Phase III data recovery investigations at the Metropolitan Detention Center, Municipality of Guaynabo, Puerto Rico. Between 1994-2000, he served as Principal Investigator and Project Manager for a series of archaeological investigations conducted at the U.S. Post Office and Federal Courthouse, Old San Juan, prior to its rehabilitation. At the conclusion of the six-year study, Mr. Sara was awarded the GSA Public Buildings Heritage Award for professional archaeological services associated with the project and public outreach programs in Puerto Rico. In 2001, Mr. Sara was an Associate Scientist for Phase III data recovery investigations at Palo Hincado, Barranquitas, a major Precolumbian habitation and economic center in central Puerto Rico. Mr. Sara is a member of the International Association of Caribbean Archaeologists (IACA) and is a regular contributor to its Congress as well as contributing author of publications by the Intistuto de Cultura Puertorriqueña (ICP).

David M. Franz., M. S.
Project Archaeologist

David M. Franz has over thirteen years of professional experience in cultural resource management and research in the social sciences. He was worked as a historic archaeologist in the East, Southeast, and Midwest United States, and has most recently served as Field Director for the Institute for Long Island Archaeology at Stony Brook University. Mr. Franz received his B.S. under Dr. James Adovasio at Mercyhurst College in 1997, and completed his M.S. at the University of Louisiana at Lafayette in Communication and Sociology in 2003. In addition to cultural resources management, Mr. Franz has worked with various local, state, and federal agencies in forensic recovery of human remains, and as a documentary producer/director on several archaeological projects. His personal research interests include media sociology and the monomyth in pop-culture, on which he has recently presented a paper to the Association of Educators in Journalism and Mass Communication.

APPENDIX B
ARTIFACT INVENTORY

Artifact Inventory:
Vieques Naval Training Range November 2005

Site	GMI Cat. Number	Shovel Test	Strat.	Class	Type	Subtype	Count	Weight (g)	Length (mm)	Width (mm)	Thick (mm)	Date	Notes	Photo
Camp Garcia	A-5-1	STP A-5	II	Personal	Metal	Medallion	1	6.2	29	18	4	post - 1910	sterling scapular medal, date range 1910+, obverse: Sacred Heart Jesus; Reverse: Madonna and child.	X

Appendix C
Habitat Characterization Report

HABITAT CHARACTERIZATION AT AREAS OF CONCERN (AOC) AOC-R, PI-4, PI-7, PAOC-J, K, and S FOR THE FORMER VIEQUES NAVAL TRAINING RANGE (VNTR) AND NAVAL AMMUNITION SUPPORT DETACHMENT (NASD), VIEQUES ISLAND, PUERTO RICO

FINAL REPORT

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TABLE OF CONTENTS

Page

1.0 INTRODUCTION **1**

2.0 SITE LOCATION **1**

3.0 METHODS **1**

4.0 RESULTS AND DISCUSSION **4**

4.1 NATURAL HABITAT DESCRIPTION 4
4.2 PROTECTED SPECIES 5
4.3 AOC-R (FORMER CONSTRUCTION STAGING AREA) 5
4.3.1 Site Description 5
4.3.2 Vegetation Community Description 5
4.3.3 Wildlife Description 10
4.3.4 Protected Species 11
4.4 PAOC-S (FORMER POL PIPELINE) 12
4.4.1 Site Description 12
4.4.2 Vegetation Community Description 12
4.4.3 Wildlife Description 12
4.4.4 Protected Species 16
4.5 PAOC J AND K (CAMP GARCIA SITES) 16
4.5.1 Site Description 16
4.5.2 Vegetation Community Description 16
4.5.3 Wildlife Description 19
4.5.4 Protected Species 19
4.6 PI-4 (FORMER WASTE TREATMENT SITE) 19
4.6.1 Site Description 19
4.6.2 Vegetation Community Description 19
4.6.3 Wildlife Description 24
4.6.4 Protected Species 24
4.7 PI-7 (FORMER RADAR AND QUARRY SITES) 24
4.7.1 Site Description 24
4.7.2 Vegetation Community Description 26
4.7.3 Wildlife Description 28
4.7.4 Protected Species 28

5.0 LITERATURE CITED **29**

LIST OF FIGURES

No. **Page**

1 General Location of Vieques Island, Puerto Rico 2
2 Location of the Areas of Concern (AOC) within the Former Naval Ammunition Support Detachment (NASD) and Former Vieques Naval Training Range (VNTR) 3
3 Location of the AOC-R (Former Construction Staging Area) and the Ephemeral Stream in the Former NASD 6
4 Location of PAOC-S (Former POL Pipeline) 12
5 Locations of PAOC J, K, and PI-4 at or Adjacent to the Former Camp Garcia Area 17
6 Location of PI-4 (Former Waste Treatment Site) 20
7 Location of PI-7 (Former Radar and Quarry Sites) 25

LIST OF TABLES

No. **Page**

1 Federally Listed Species Occurring or Potentially Occurring at the former NASD Vieques and former VNTR 4
2 List of All Plants Recorded in the AOC-R and AOC-J (in part) of the former NASD, Vieques, 19 September 2005 (140 Species Total) 7
3 Wildlife Observed at AOC-R and in the Adjacent Quabrada 11
4 List of All Plants Recorded in the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005 (116 Species Total) 13
5 List of All Animals Recorded in the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005 16
6 List of All Plants Recorded in the former Camp Garcia Area within the Former VNTR, 20 September 2005 (54 Species Total) 18
7 List of All Animals Recorded in the former Camp Garcia Area within the Former VNTR, 20 September 2005 21
8 List of All Plants Recorded in the PI-4 and Runway Areas within the Former VNTR, 20 September 2005 (99 Species Total) 21
9 List of All Animals Recorded in the PI-4 Area within the Former VNTR, 20 September 2005 24
10 List of All Plants Recorded in the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the Former VNTR, 20 September 2005 (101 Species Total) 26
11 List of All Plants Recorded in the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the Former VNTR, 20 September 2005 29

ACRONYMS AND ABBREVIATIONS

°	degree
%	Percent
ac	Acres
AOC	Areas of Concern
EMA	Eastern Maneuver Area
F	Farenheit
Ft	Feet/Foot
LIA	Live Impact Area
mi	Miles
NASD	Naval Ammunition Support Detachment
NSRR	Naval Site Roosevelt Roads
PI	Photo Identified
U.S.	United States
USFWS	United States Fish and Wildlife Service
VNTR	Vieques Naval Training Range

1.0 INTRODUCTION

Biological field assessments were conducted at Areas of Concern (AOC), Potential AOC, and photo identified (PI) as part of a Comprehensive Long-Term Environmental Action Navy (CLEAN) III Contract, Contract Task Order 007 and 39 Vieques Island, Puerto Rico. The purpose of this evaluation was to identify habitat or potential habitat that currently is or could be used by the Least Tern, Roseate Tern, or any other listed endangered, threatened, critical or sensitive avian species, within the specified areas of concern. Additionally, a survey of the flora was conducted to determine if any State or Federally listed plant species were present

2.0 SITE LOCATION

Puerto Rico is located on the Antillean Island Arc separating the Caribbean Sea from the Atlantic Ocean. The island of Vieques is located approximately 6 miles (mi) southeast of Puerto Rico (**Figure 1**). It is approximately 21 mi long (east to west) and 4.5 mi wide (north to south), encompassing a total of 32,986 acres (ac). There are two towns on the island, Esperanza on the south side and Isabel Segunda on the north side.

The Navy administered approximately 22,437 ac on the west and east ends of the island. The former Naval Ammunition Support Detachment (NASD) was located on the western side of Vieques and encompasses 8,265 ac. The Eastern Maneuver Area (EMA) was composed of approximately 11,000 acres. This report covers AOC-R (former construction staging area) located within the former NASD and five sites (PI-4, PI-7, PAOC-J, K, and S) on eastern Vieques in the former Vieques Naval Training Range (VNTR) (**Figure 2**).

3.0 METHODS

To support this evaluation a field survey was conducted at each site in order to determine the presence of plant and animal species, and to determine whether preferred habitat was present for any federally endangered or threatened plant and/or animal species.

To support these assessments, a habitat characterization was conducted at each of the six sites. The objectives of the habitat characterization are listed below:

1. Identify terrestrial (upland), wetland (palustrine and estuarine), and marine habitat units, including subunits within and contiguous to each site;
2. Identify the dominant and subdominant plant species within each site habitat unit and contiguous habitat units and, where applicable, identify any vegetative gradients;
3. Identify wildlife species residing within or utilizing each site's habitat unit and contiguous habitat units, as well as species relative abundance;
4. Identify any critical habitat for federally designated threatened and endangered species within and contiguous to each site; and
5. Determine the known occurrences of federally designated threatened or endangered species, as well as the identification of habitat that may potentially support federally designated threatened and endangered species within and contiguous to each site.

Prior to field reconnaissance, vegetation communities were characterized into broad community types based on color signatures from true-color aerial photographs (November 4, 1999: scale, 1 inch equal 500 feet [ft]). Before conducting the fieldwork, a literature search was conducted for each federally protected species. During the September 19-20, 2005 surveys, 3 biologists (Mr. Carlos Laboy – animals and plants, Dr. Alberto E. Areces-Mallea – plants, and Dr. Dan Wilkinson – plants and animals) walked throughout each site and identified any federally protected species seen and evaluated the site for the presence or absence of preferred habitat for the species. Community types were verified in the field by walking the perimeter and the interior of the sites. Most plant species were identified in the field; however, some specimens were collected for identification using taxonomic references (Acevedo-Rodriguez 1996; Liogier 1982, 1985, 1988, 1994, 1995, 1997; Little and Wadsworth 1964; Little et al. 1964).

Figure 1. General Location of Vieques Island, Puerto Rico.

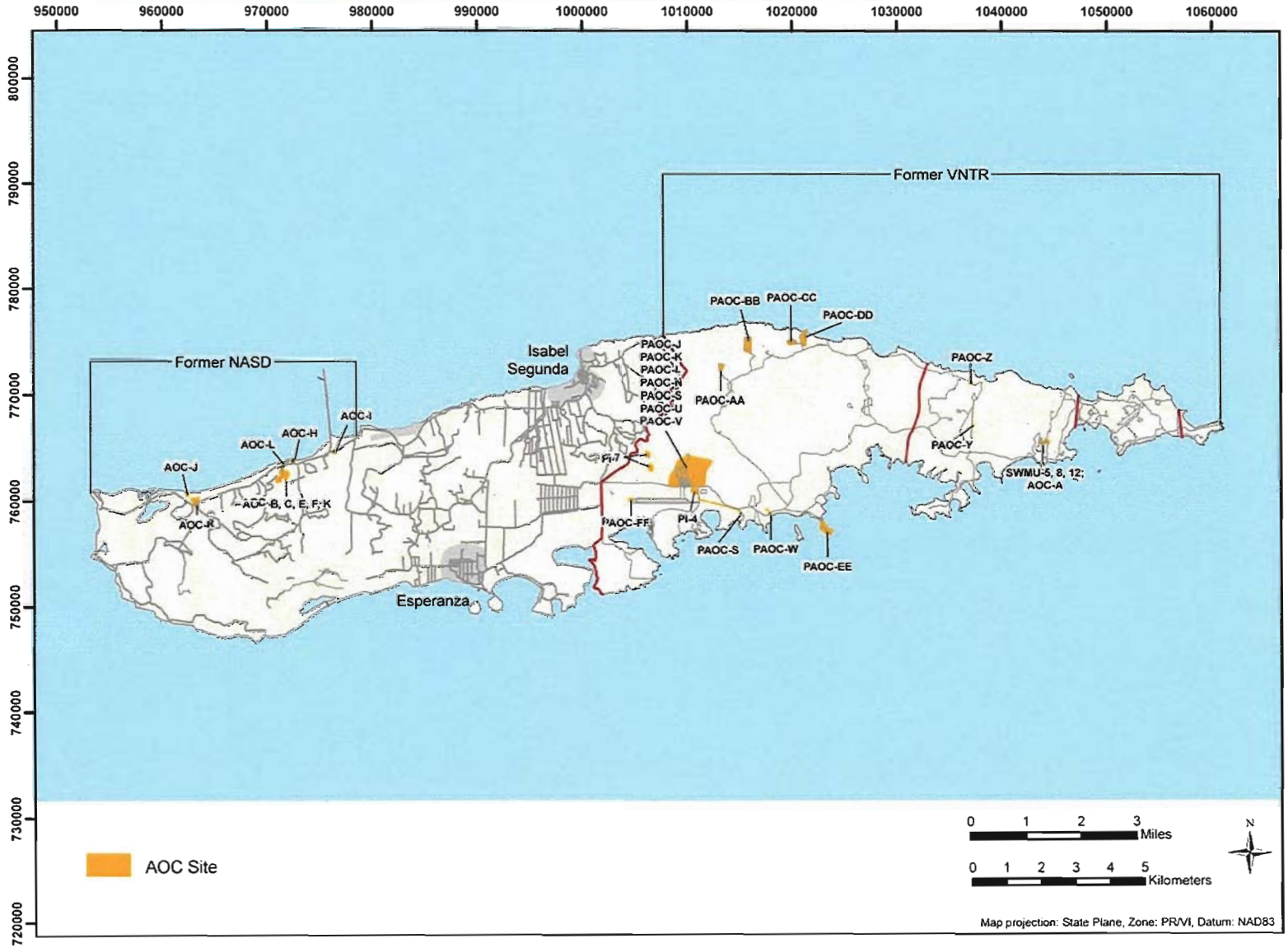


Figure 2. Location of the Areas of Concern (AOC) within the Former Naval Ammunition Support Detachment (NASD) and Former Vieques Naval Training Range (VNTR).

Wildlife species such as birds, mammals, and lizards that were found residing within or utilizing each site's habitat were identified during the field surveys. Wildlife habitat was also identified. A wildlife biologist characterized the habitats and determined the types of wildlife that could potentially inhabit the plant communities or sites. Any wildlife species observed, were identified in the field with the aid of 8 x 40 binoculars and reference guides (Raffaele 1989; Raffaele et al. 1998).

Several terrestrial and marine species that occur on or around Vieques are listed as protected by the United States (U.S.) Fish and Wildlife Service (USFWS). Sixteen federally listed species are known to occur or have the potential to occur within the former NASD and former VNTR (**Table 1**).

Table 1
Federally Listed Species Occurring or Potentially Occurring at the Former NASD and former VNTR

***Scientific Name* (Common Name)**	**Federal Status**
Plants	
Chaemacrista glandulosa var. *mirabilis* (Herb)	Endangered
Stahlia monosperma (Cobana negra)	Threatened
Calyptranthes thomasiana (Tree)	Endangered
Eugenia woodburyana (Evergreen tree)	Endangered
Goetzea elegans (Beautiful goetzea)	Endangered
Reptiles and Amphibians	
Chelonia mydas (Green sea turtle)	Threatened
Dermochelys coriacea (Leatherback sea turtle)	Endangered
Caretta caretta (Loggerhead sea turtle)	Threatened
Eretmochelys imbricata (Hawksbill sea turtle)	Endangered
Birds	
Falco peregrinus tundrius (Arctic peregrine falcon)	Threatened
Pelecanus occidentalis occidentalis (Brown pelican)	Endangered
Sterna dougalli dougalli (Roseate tern)	Endangered
Mammals	
Physeter macrocephalus (Sperm whale)	Endangered
Balaenoptera physalus (Fin whale)	Endangered
Megaptera novaeangliae (Humpback whale)	Endangered
Trichechas manatus (West Indian manatee)	Endangered

Source: Geo-Marine, Inc. 2001

In addition to identification of wildlife in the field, existing literature sources were used to identify any additional species that may have occurred on the sites but were not observed. Most of the wildlife that occurs in the area are bird and lizard species.

This report includes figures of each site showing the habitat units and subunits, landscaped areas, roadways, and structures where applicable. For each site, a list of plant species observed within the habitat unit is given, as well as a list of observed wildlife species. The location of known federally designated threatened and endangered species is given. Where applicable, a descriptive comparison of wildlife utilization between the site habitat and reference site habitat is given with a generalized food web applicable to each habitat unit.

4.0 RESULTS AND DISCUSSION

4.1 NATURAL HABITAT DESCRIPTION

Mean annual precipitation on Vieques is 45 inches, with the wet season extending from May to November and the dry season from December to April. Relative humidity in Vieques averages about 75%. Mean annual temperature is about 79.8°F with a record low of 60°F and a high of 98°F. The western part of the island is wetter than the eastern portion. Vegetation on the western part, where a portion of this survey took place, is mesic in nature.

Vieques lies within the subtropical dry forest life zone, covering about 66% of the island and the subtropical moist forest life zone at the higher elevations (Ewel and Whitmore 1973). Nine vegetation types have been identified on Vieques: (1) sandy beach; (2) beach scrub; (3) dry evergreen beach woodland; (4) mixed dry evergreen and deciduous woodland of the rocky coastal slopes; (5) ucar forest; (6) seasonal forests of high moisture areas such as ravines and drainage areas; (7) moist deciduous formation of the inner hills and slopes; (8) thorn scrub; and (9) mangroves. The vast majority of Navy land at Vieques is undeveloped and supports a variety of habitat types with thorn scrub communities the most common and interspersed with forested ravines and other upland forest types. Mangrove swamps, lagoons, coconut flats, and salt/sand flats occur along coastal areas.

The original dominant vegetation where the surveys took place was subtropical dry forest with subunits of thorn scrub, sandy beach, and mixed forests along the coast referred to as "coastal forest." Small subunits of mixed mangrove and seasonal forests were present near lagoons. Today all that remains are areas of highly modified disturbed vegetation at most of the sites that included former buildings, foundations, roadways, parking areas, trails, grassy areas, and quarries.

4.2 Protected Species

Cobana negra (*Stahlia monosperma*), a federally threatened tree, has been found between the boundary of black mangrove (*Avicennia germinans*) communities, salt flats, and the upland communities in the NASD and in the EMA. This species is also known to occur in coastal forests of southeastern Puerto Rico (Little and Wadsworth 1964). Based on recent surveys conducted within the NASD by Geo-Marine, Inc., there were only two locations where cobana negra is found (Wilkinson and Cubina 2000); neither of the two locations are located within the sites evaluated as part of this report. The preferred habitat for cobana negra was not thought to be present at the PI/PAOC sites discussed in this report.

The threatened Arctic peregrine falcon (*Falco peregrinus tundrius*) has been observed at former Naval Site Roosevelt Roads (NSRR) (GMI 1998). This species utilizes open grassland areas for potential feeding areas. The brown pelican (*Pelecanus occidentalis occidentalis*) and the roseate tern (*Sterna dougalli dougallii*) are not likely to utilize this terrestrial site but may be seen nearby due to the proximity of nearby marine habitat.

4.3 AOC-R (Former Construction Staging Area)

4.3.1 Site Description

AOC-R, the Former Construction Staging Area, located north and south of Highway 200 near a pump station was approximately 12 ac in size (**Figure 3**). There were two dirt trails leading to the site; one ran along the western edge of the site and one ran diagonally along the eastern edge of the site. Several habitats and man-made structure components were present. The southern boundary of the site was adjacent to a grassy mowed area along Highway 200. A pump station was inset about midway along the road. Behind the grassy area was a dense, scrubby, brushy area. A large concrete pad was located north of this scrub and extended the full width of the site. The pad was completely vegetated in the 1999 aerial photographs but in January 2001 during a previous survey the pad was sparsely covered with vines and weeds. Currently the pad is densely covered with vegetation. The vegetation surrounding the concrete pad had been cleared in the past. The western dirt path led past the concrete pad to a northern area that was separated from the pad by dense thorn scrub and coastal forest. The site is by secondary plant communities consisting of dense growth of vines, shubs, and herbaceous plants.

4.3.2 Vegetation Community Description

Although the concrete pad area had been cleared, a large number of weeds and vines were observed growing on top of the concrete pad and its surroundings The concrete pad was dominated by woody vegetation and vines. The original vegetation community at AOC-R from the road to near the coast is practically nonexistent. The area is covered by secondary communities consisting of an open mixture of

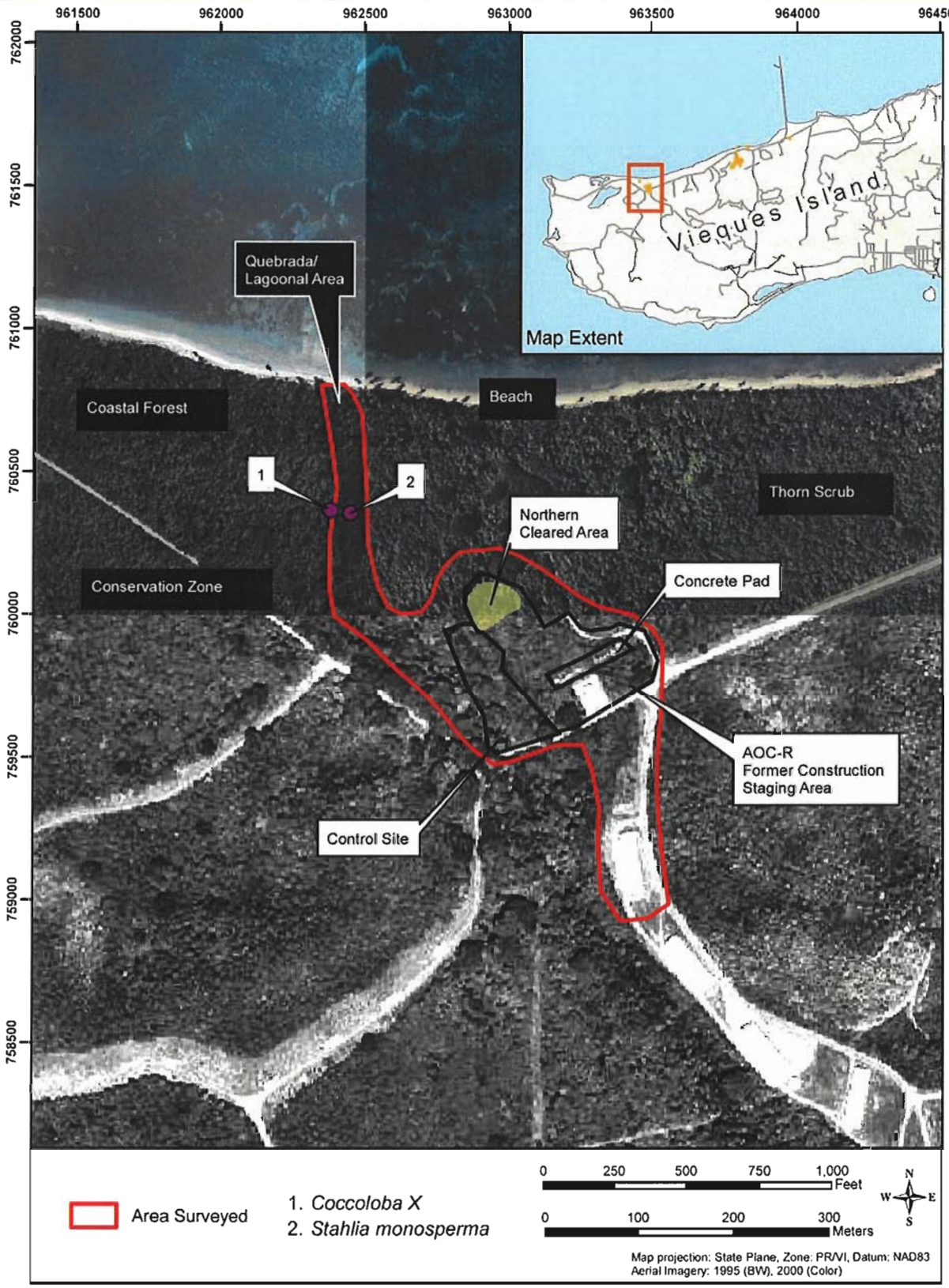


Figure 3. Location of the AOC-R (Former Construction Staging Area) and the Ephemeral Stream in the Former NASD.

native and invasive trees with an impressive overgrowth of vines and opportunistic shrubs and herbaceous plants. There are also open patches, grasses patches, densely covered with weedy plants. Much less disturbed and thus, much more interesting is the creek or ephemeral stream that borders the site on the west side. There are several native species that occur along this riparian area. On the east bank there is one large individual of a hybrid *Coccoloba* species (N 18 07' 05.6" and W 65 33' 04.4") that has been recorded recently on the east end of the island in the former Live Impact Area (LIA). On the west bank near the inland edge of the mangrove community we discovered two individuals of *Stahlia monosperma* (N18 07' 05.7' and W 65 33' 05.1") There were 140 plant species recored in this area, primarily weedy herbaceous invasive species (**Table 2**).

Table 2
List of All Plants Recorded in the AOC-R and AOC-J (in part) of the Former NASD, Vieques, 19 September 2005 (140 Species Total)

Family	Species	Common Name(s)
MIMOSACEAE	*Acacia farnesiana* (L.) Willd.	Aroma; Casha
MIMOSACEAE	*Acacia retusa* (Jacq.) Howard	Acacia zarza
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
FABACEAE	*Andira inermis* (W. Wr.) DC.	Moca; Angelin tree
POLYGONACEAE	*Antigonon leptopus* Hook & Arn.	Bellísima; Love chain
CAESALPINACEAE	*Bauhinia monandra* Kurz	Mariposa; Butterfly Bauhinia
ASTERACEAE	*Bidens alba* (L.) DC. var. (CH. Schulz) Melchert	Margarita
NYCTAGINACEAE	*Boerhavia diffusa* L.	Mata pavo; Hog-weed
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
BORAGINACEAE	*Bourreria succulenta* Jacq.	Palo de vaca
POACEAE	*Brachiaria fasciculata* (Sw.) S. T. Blake	----
POACEAE	*Brachiaria* sp.	----
COMBRETACEAE	*Bucida buceras* L.	Úcar
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	Almácigo
BRASSICACEAE	*Cakile lanceolata* (Willd.) O. E. Schulz	Mostacilla; Sea-rocket
COMMELINACEAE	*Callisia repens* (Jacq.) L.	Cohitre enano
FABACEAE	*Canavalia rosea* (Sw.) DC.	Canavalia; Bay-bean
CAPPARACEAE	*Capparis hastata* Jacq.	Burro; Broad-leaved caper
SOLANACEAE	*Capsicum annuum* L. var. *glabriusculum* (Dunal) H. & P.	Ají picante; Bird pepper
CARICACEAE	*Carica papaya* L.	Lechosa, Papaya; Papaw
FLACOURTIACEAE	*Casearia guianensis* (Aubl.) Urban	Cafeíllo; Wild coffee
MORACEAE	*Cecropia schreberiana* Miq.	Yagrumo hembra; Trumpet tree
ULMACEAE	*Celtis trinervia* Lam.	Almez, Ruiseñor
POACEAE	*Cenchrus incertus* M. A. Curtis	Abrojo de dunas; Sand bur grass
FABACEAE	*Centrosema pubescens* Benth.	Flor de conchitas; Butterfly pea
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce messembryanthemifolia* (Jacq.) Dugand	Lecherito de costa
POACEAE	*Chloris petraea* Sw.	Yerba de dedo; Finger grass
POACEAE	*Chloris radiata* (L.) Sw.	Grama de costa; Plush-grass
MENISPERMACEAE	*Cissampelos pareira* L.	Oreja de ratón
VITACEAE	*Cissus verticillata* (L.) Nicolson & Jarvis	Bejuco de Caro; Pinakoop
VERBENACEAE	*Citharexylum fruticosum* L.	Palo de guitarra; Old woman bitter

Table 2 (Continued)
List of All Plants Recorded in the AOC-R and AOC-J (in part) of the former NASD, Vieques, 19 September 2005 (140 Species Total)

Family	Species	Common Name(s)
RUTACEAE	*Citrus aurantium* L.	Naranja, Naranja agria; Sour orange
POLYGONACEAE	*Coccoloba uvifera* (L.) L.	Uva de playa; Sea grape
POLYGONACEAE	*Coccoloba venosa* L.	Calambreña; Chiguery grape
POLYGONACEAE	*Coccoloba* sp. (hybrid?)	----
ARECACEAE	*Coccothrinax alta* (O. F. Cook) Becc.	Palma plateada; Silver palm
ARECACEAE	*Cocos nucifera* L.	Cocotero; Coconut palm
COMMELINACEAE	*Commelina diffusa* Burm. f.	Cohitre; Blue day flower
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
BORAGINACEAE	*Cordia dentata* Poir.	Capá blanco; White manjack
BORAGINACEAE	*Cordia polycephala* (Lam.) I. M. Johnst.	Basora prieta; Black sage
EUPHORBIACEAE	*Croton astroites* Dryand.	Maná
ASCLEPIDACEAE	*Cryptostegia grandiflora* R. Brown	Bejuco de goma; Rubber vine
CYPERACEAE	*Cyperus alternifolius* L.	Paragüita; Umbrella sage
CYPERACEAE	*Cyperus rotundus* L.	Coquí; Nut grass
FABACEAE	*Dalbergia ecastaphyllum* (L.) Taub.	Maraimaray
EUPHORBIACEAE	*Dalechampia scandens* L.	----
CAESALPINACEAE	*Delonix regia* (Bojer in Hook.) Raf.	Flamboyán; Flamboyant
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
DIOSCOREACEAE	*Dioscorea alata* L.	Ñame de agua; White yam
BIGNONIACEAE	*Distictis lactiflora* (Vahl) DC.	Liana fragante
ERYTHROXYLACEAE	*Erythroxylum brevipes* DC.	Brisselet
MYRTACEAE	*Eugenia biflora* (L.) DC.	Hoja menuda; Black rod-wood
EUPHORBIACEAE	*Euphorbia heterophylla* L.	Acerca amor
MORACEAE	*Ficus citrifolia* P. Miller	Jagüeillo; Boislaglu
FABACEAE	*Galactia striata* (Jacq.) Urban	----
RHAMNACEAE	*Gouania lupuloides* (L.) Urban	Bejuco de indio; Soap stick
NYCTAGINACEAE	*Guapira fragans* (Dum.-Cours.) Little	Corcho; Black mampoo
STERCULIACEAE	*Guazuma ulmifolia* Lam.	Guácima; Bastard cedar
AMARANTHACEAE	*Hymenocallis caribaea* (L. emend Gawl.) Herb.	Lirio blanco; Spider lily
LAMIACEAE	*Hyptis capitata* Jacq.	Botoncillo negro; Wild hops
MIMOSACEAE	*Inga laurina* (Sw.) Willd.	Guamá; Pomshock
CONVOLVULACEAE	*Ipomoea alba* L.	Bejuco de vaca; Moon-vine
CONVOLVULACEAE	*Ipomoea hederifolia* L.	Cambustera
CONVOLVULACEAE	*Ipomoea nil* (L.) Roth.	Bejuco de gloria
CONVOLVULACEAE	*Ipomoea tiliacea* (Willd.) Choisy in DC.	Bejuco blanco; Goat foot
CONVOLVULACEAE	*Ipomoea violacea* L.	Bejuco de luna; COSAT moon-vine
OLEACEAE	*Jasminum fluminense* Vell.	Jasmín oloroso
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona
RHAMNACEAE	*Krugiodendron ferreum* (Vahl) Urban	Bariaco; Black iron-wood
COMBRETACEAE	*Laguncularia racemosa* (L.) Gaertn.	Mangle blanco; Mangrove
POACEAE	*Lasiacis ligulata* Hitch. & Chase	Millo trepador
MIMOSACEAE	*Leucaena leucocephala* (Lam.) De Wit	Acacia pálida; Wild tamarind

Table 2 (Continued)
List of All Plants Recorded in the AOC-R and AOC-J (in part) of the former NASD, Vieques, 19 September 2005 (140 Species Total)

Family	Species	Common Name(s)
VERBENACEAE	*Lippia nodiflora (L.) Michx.*	Cidrón, Yerba de sapo; Cape-wood
FABACEAE	*Lonchocarpus heptaphyllus* (Poir.) A. DC.	Forteventura, Palo hediondo
ONAGRACEAE	*Ludwigia octovalvis* (Jacq.) Raven	Cangá; Primrose willow
BIGNONIACEAE	*Macfadyena unguis-cati* (L.) A. Gentry	Bejuco de gato; Cat´s claw
FABACEAE	*Macroptilium lathyroides* (L.) Urban	Habichuela parada; Wild bush bean
MALVACEAE	*Malachra alceifolia* Jacq.	Malva de caballo; Bastard okra
ANACARDIACEAE	*Mangifera indica* L.	Mango; Mango tree
SAPINDACEAE	*Melicoccus bijugatus* Jacq.	Quenepa; Ginep
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
STERCULIACEAE	*Melochia tomentosa* L.	Bretónica afelpada
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. f.	Batatilla blanca
MIMOSACEAE	*Mimosa pudica* L.	Moriviví; Sensitive plant
CUCURBITACEAE	*Momordica charantia* L.	Cundeamor; Wild balsam apple
NYCTAGINACEAE	*Neea buxifolia* (Hook.f.) Heimerl	Nea, Nia; Neea
ORCHIDIACEAE	*Oeceoclades maculata* (Lindley) Lindley	Lengua africana
POACEAE	*Panicum laxum* Sw.	Malojillo de monte
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
POACEAE	*Paspalidium geminatum* (Forssk.) Stapf.	Yerba de agua; Water grass
POACEAE	*Paspalum distichum* L.	----
POACEAE	*Paspalum millegrana* Schrad.	Cortadora, Paja brava
POACEAE	*Paspalum virgatum* L.	Cortadero, Matojo blanco
PASSIFLORACEAE	*Passiflora foetida* L.	Tagua-Tagua
PASSIFLORACEAE	*Passiflora suberosa* L.	Flor de pasion
SAPINDACEAE	*Paullinia pinnata* L.	Bejuco de paloma
PHYTOLACACEAE	*Petiveria alliacea* L.	Anamú; Garlic weed
EUPHORBIACEAE	*Phyllanthus niruri* L.	Quinino; Gale of the wind
PIPERACEAE	*Piper aduncum* L.	Higuillo de hoja menuda
PIPERACEAE	*Piper amalago* L.	Higuillo de limón; Shot-shot
NYCTAGINACEAE	*Pisonia aculeata* L.	Uña de gato; Prickly mampoo
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Psychotria nervosa* Sw.	Bálsamo, Palo moro
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
APOCYNACEAE	*Rauvolfia viridis* Willd. ex Roem. & Schultes	Cachimbo blanco; Bitter bush
FABACEAE	*Rhynchosia reticulata* (Sw.) DC.	Frijolillo de monte
PHYTOLACCACEAE	*Rivina humilis* L.	Carmín; Cat´s blood
ACANTHACEAE	*Ruellia tuberosa* L.	Saltaperico; Many-roots
MIMOSACEAE	*Samanea saman* (Willd.) Merrill	Samán; Rain tree
LILIACEAE	*Sansevieria hyacinthoides* (L.) Druce	Lengua de vaca; Sweet Sansevieria
SAPINDACEAE	*Serjania polyphylla* (L.) Radlk.	Bejuco de canastas; Basket wood
FABACEAE	*Sesbania sericea* (Willd.) Link	Papagayo
AIZOACEAE	*Sesuvium portulacastrum* (L.) L.	Verdolaga rosada; Sea purslane

Table 2 (Continued)
List of All Plants Recorded in the AOC-R and AOC-J (in part) of the former NASD, Vieques, 19 September 2005 (140 Species Total)

Family	Species	Common Name(s)
POACEAE	*Setaria geniculata* (Lam.) Beauv.	Arrocillo; Yellow fostail
MALVACEAE	*Sida rhombifolia L.*	Escoba colorada
POACEAE	*Spartina patens (Ait.) Muhl.*	Yerba de sal; Salt grass
RUBIACEAE	*Spermacoce sp.*	----
LOGANIACEAE	*Spigelia anthelmia* L.	Lombricera; Waterweed
ANACARDIACEAE	*Spondias mombin* L.	Jobo; Hogplum
POACEAE	*Sporobolus jacquemontii* Kunth	Pelo de burro
CAESALPINACEAE	*Stahlia monosperma* (Tul.) Urban	Cóbana negra, Polisandro
MALPIGHIACEAE	*Stigmaphyllon emarginatum* (Cav.) A. Juss.	Bejuco de San Pedro
CAESALPINACEAE	*Tamarindus indica* L.	Tamarindo; Tamarind
MYRTACEAE	*Syzygium malaccensis* (L.) Merr. & Perry	Manzana malaya; Malay apple
COMBRETACEAE	*Terminalia catappa* L.	Almendra; Indian almond
THELYPTERIDACEAE	*Thelypteris tetragona* (Sw.) Small	Helecho
MALVACEAE	*Thespesia populnea* (L.) Soland ex Correa	Emajagüilla; Cork tree
BORAGINACEAE	*Tournefortia hirsutissima* L.	Nigua
EUPHORBIACEAE	*Tragia volubilis* L.	Pringamoza; Stinging vine
ULMACEAE	*Trema micranthum* (L.) Blume.	Guacimilla, Palo de cabra
MELIACEAE	*Trichilia hirta* L.	Retamo; Broomstick
PHYTOLACACEAE	*Trichostigma octandrum* (L.) H. Walt.	Bejuco de nasa
TILIACEAE	*Triumpheta semitriloba* Jacq.	Cadillo de perro
FABACEAE	*Vigna luteola* (Jacq.) Benth.	Frijol silvestre
RUTACEAE	*Zanthoxylum martinicense* (Lam.) DC.	Ayúa, Cenizo; Prickly ash
RUTACEAE	*Zanthoxylum monophyllum* (Lam.) P. Wilson	Carrubio, Espino rubial; Yellow prickle
RHAMNACEAE	*Ziziphus mauritiana* Lam.	Aprín; Indian jujube

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, we distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988). This treatment is strongly supported by molecular data and no doubt will prevail in the future.

4.3.3 Wildlife Description

Several wildlife species were observed utilizing the vegetated areas, concrete pad, edges of the cleared areas, and woody vegetation. The sides of the concrete pad provided shade, foraging areas, and hiding places for the common, garden and spotted anoles, which were abundant. A mongoose was seen crossing a trail in a cleared area. Wildlife observed at AOC-R, and adjacent habitat, presented in **Table 3**.

Habitat for birds included thorn scrub, coastal forest, and the adjacent riparian forest (vegetation along the stream). Many birds were seen along the edges of the cleared area around the concrete pad, along the trails, and were using the vegetation associated with the concrete pad for perches. A total of 16 species of birds were seen at the AOC-R site during this survey,and an additional 6 species during a previous survey. An additional six species were found along the riparian site. The most common birds at the site were gray kingbirds, bananaquits, and greater Antillean grackles. Bird species included those that would typically be found in coastal forest and thorn scrub habitat. A Brown pelican was observed flying along the coast north of the site.

Table 3
Wildlife Observed at AOC-R and in the Adjacent Quabrada

Common Name	Scientific Name	AOC-R	Adjacent Habitat
Mammals			
Mongoose	*Herpestes auropunctatus*	X	
Reptiles and Amphibians			
Anole (Common Lizard)	*Anolis cristatellus*	X	X
Grass Anole (Garden Lizard)	*Anolis pulchellus*	X	X
Anole (Spotted Lizard)	*Anolis stratulus*	X	X
Birds			
Green Mango	*Anthracothorax viridis*	X	
Great Egret	*Ardea alba*		X
Great Blue Heron	*Ardea herodias*		X
Green Heron	*Butorides virescens*	X	
Mangrove Cuckoo	*Coccyzus minor*		X
Bananaquit	*Coereba flaveola*	X	X
Scaly-naped pidgeon	*Columba squamosa*		x
Common ground Dove	*Columbina passerina*	X	X
Smooth-billed Ani	*Crotophaga ani*	X	X
Adelaide's Warbler	*Dendroica adelaidae*	X	X
Caribbean Elaenia	*Elaenia martinica*		X
Magnificent Frigatebird	*Fregata magnificens*		X
Puerto Rico Woodpecker	*Melanerpes portoricensis*	X	X
Puerto Rican Flycatcher	*Myiarchus antillarum*		X
Yellow-crowned Night-Heron	*Nyctanassa violacea*	X	
Antillean-crested Hummingbird	*Orthorhyncus cristatus*	X	
Osprey	*Pandion haliaetus*		X
Cave swallow	*Pterochelidon fulva*		X
Greater Antillean Grackle	*Quiscalus niger*	X	X
Puerto Rican Lizard Cuckoo	*Saurothera vieilloti*		X
Black-faced Grassquit	*Tiaris bicolor*	X	
Yellow-faced Grassquit	*Tiaris olivacea*		X
Loggerhead Kingbird	*Tyrannus caudifasciatus*	X	X
Gray Kingbird	*Tyrannus dominicensis*	X	X
Pin-tailed Whydah	*Vidua macroura*	X	
White-winged dove	*Zenaida asiatica*	X	X
Zenaida Dove	*Zenaida aurita*	X	X

4.3.4 Protected Species

The site was located within thorn scrub and mixed coastal forest habitat. There were no federally protected species or preferred habitats observed at this upland site. However, along the adjacent stream bank on the west side there were two individuals of *Stahlia monosperma.* On the west bank near the inland edge of the mangrove community we discovered two individuals of *Stahlia monosperma* (N18 07' 05.7' and W 65 33' 05.1") This is a new site for this species, althought there are two previously recorded sites along the north shore in the former NASD. On the east bank there is one large individual of a hybrid *Coccoloba* species (N 18 07' 05.6" and W 65 33' 04.4") that has been recorded recently on the east end of the island in the former LIA, although this plant is of scientific interest it has no protected status.

4.4 PAOC-S (Former POL Pipeline)

4.4.1 Site Description

This site parallels existing roads from near the shoreline to where it exits near the east end of the airstrip (**Figure 4**). The terrain was modified to create a level site for placement of the pipeline. We could not determine where the original pipeline was located since it has been taken out of service. Much of the old pipe is scattered on other side of what appears to be the original pipeline route.

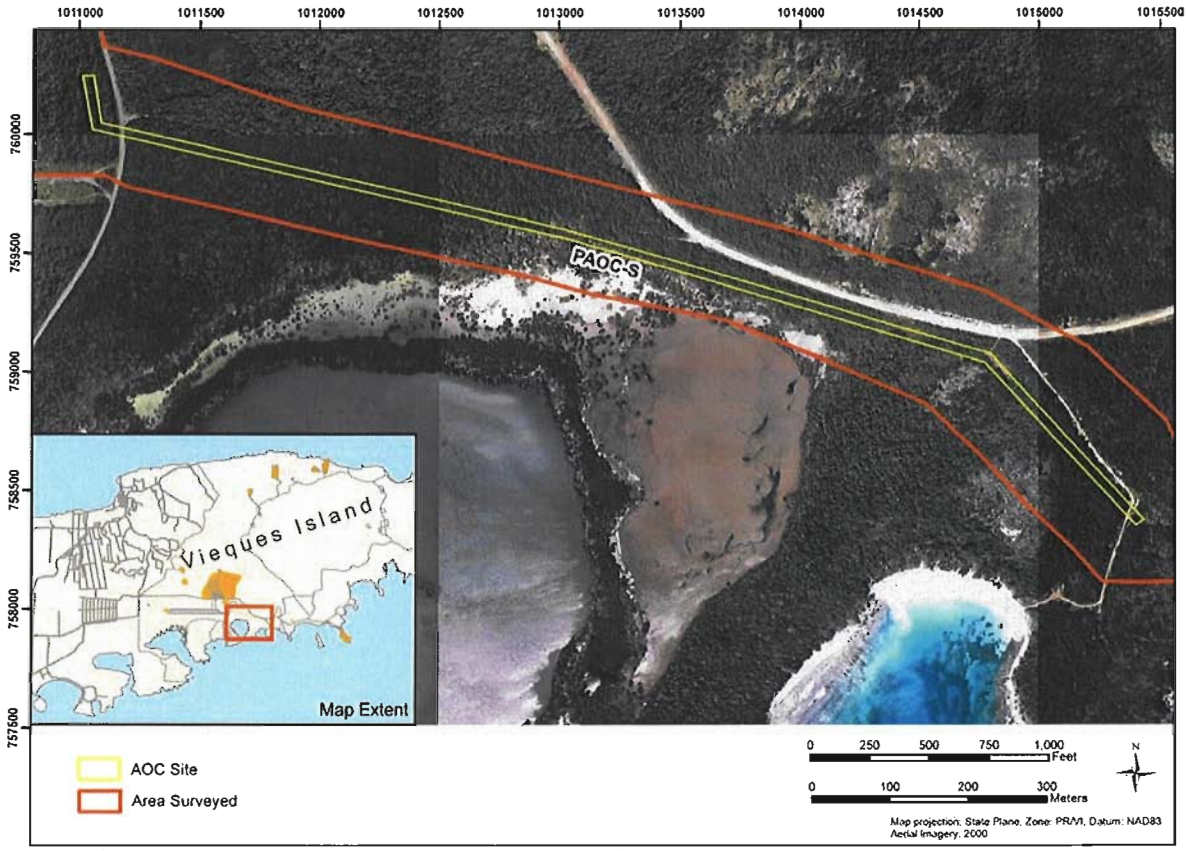


Figure 4. Location of PAOC-S (Former POL Pipeline).

4.4.2 Vegetation Community Description

The original plant community along the road was obviously cleared years ago when the pipeline was constructed. Currently, there are rocky mounds, leveled ground, built up areas, as well as other evidences of substrate disturbance (e.g., by bulldozer activity). The vegetation is basically a thorn scrub dominated by opportunistic acacias and *Prosopis*. There are many weedy invaders and at places there is a nearly continuous herbaceous layer. The pipeline borders a black mangrove forest (mangrove fringe of Bahia Tapon) for much of its length; however, previous wetlands examinations in this area have noted the pipeline and reported that no *Stahlia* trees were present in the available habitat at the edge of the tidal community. There were 116 plant species recorded along the pipeline route (**Table 4**). Most of which were invasive species that are characteristic of young secondary forest found on Vieques.

4.4.3 Wildlife Description

Several common wildlife species were observed utilizing the vegetated areas, pipes, edges of the cleared areas, and soil piles, and vegetation. Wildlife observed at PAOC-S, and adjacent habitat, is presented in **Table 5**.

Table 4
List of All Plants Recorded in the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005 (116 Species Total)

Family	Species	Common Name(s)
MALVACEAE	*Abutilon umbellatum* (L.) Sweet	Malvavisco cimarrón
MIMOSACEAE	*Acacia retusa* (Jacq.) Howard	Acacia zarza
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
AMARANTHACEAE	*Achyrantes aspera* L.	Rabo de gato; Man-better man
EUPHORBIACEAE	*Adelia ricinella* L.	Escambrón
RUTACEAE	*Amyris elemifera* L.	Cuabilla
AVICENNIACEAE	*Avicennia germinans* (L.) L.	Mangle negro; Black mangrove
BATIDACEAE	*Batis maritima* L.	Barilla; Salt wort
NYCTAGINACEAE	*Boerhavia coccinea* Mill.	Mata de pavo
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
BORAGINACEAE	*Bourreria succulenta* Jacq.	Palo de vaca
POACEAE	*Bouteloua americana* (L.f.) Scribn.	Yerba mesquite
POACEAE	*Brachiaria adspersa* (Trin.) Parodi	Millito; Brown top millet
POACEAE	*Brachiaria* sp.	----
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	Almácigo
CAPPARACEAE	*Capparis flexuosa* (L.) L.	Palinguán; Caper tree
CAPPARACEAE	*Capparis indica* (L) Fawc. & Rendle	Sapo prieto; Linguam
SCROPHULARIACEAE	*Capraria biflora* L.	Té del país; Goat weed
SOLANACEAE	*Capsicum annuum* L. var. *glabriusculum* (Dunal) H. & P.	Ají picante; Bird pepper
SAPINDACEAE	*Cardiospermum microcarpum* HBK	Farolito; Ballon vine
FLACOURTIACEAE	*Casearia guianensis* (Aubl.) Urban	Cafeíllo; Wild coffee
POACEAE	*Cenchrus echinatus* L.	Abrojo; Bur grass
FABACEAE	*Centrosema pubescens* Benth.	Flor de conchitas; Butterfly pea
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
CAESALPINACEAE	*Chamaecrista nictitans* (L.) Moench ssp. *Nictitans*	Moriviví bobo
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce hyssopifolia* (L.) Small	Lechera
POACEAE	*Chloris inflata* Link	Horquetilla morada; Blue grass
POACEAE	*Chloris radiata* (L.) Sw.	Grama de costa; Plush-grass
VITACEAE	*Cissus trifoliata* L.	Caro costero
VITACEAE	*Cissus verticillata* (L.) Nicolson & Jarvis	Bejuco de Caro; Pinakoop
VERBENACEAE	*Citharexylum fruticosum* L.	Palo de guitarra; Old woman bitter
VERBENACEAE	*Clerodendron aculeatum* (L.) Schlecht.	Botón de oro; Crab prickly
FABACEAE	*Clitoria ternatea* L.	Bejuco de conchitas
ARECACEAE	*Coccothrinax alta* (O. F. Cook) Becc.	Palma plateada; Silver palm
RHAMNACEAE	*Colubrina arborescens* (Mill.) Sarg.	Abeyuelo, Sanguinaria; Greenheart
COMMELINACEAE	*Commelina diffusa* Burm. F.	Cohitre; Blue day flower
CONVOLVULACEAE	*Convolvulus nodiflorus* Desr.	Aguinaldo blanco
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
FABACEAE	*Crotalaria lotifolia* L.	Cascabelillo axilar
EUPHORBIACEAE	*Croton astroites* Dryand.	Maná

Table 4 (Continued)
List of All Plants Recorded in the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005 (116 Species Total)

Family	Species	Common Name(s)
EUPHORBIACEAE	*Croton betulinus* Vahl	----
EUPHORBIACEAE	*Croton discolor* Willd.	Lechecillo
EUPHORBIACEAE	*Croton rigidus* (Muell. Arg.) Britton	Guayacancillo; Yellow balsam
ASCLEPIDACEAE	*Cryptostegia grandiflora* R. Brown	Bejuco de goma; Rubber vine
EUPHORBIACEAE	*Dalechampia scandens* L.	----
POACEAE	*Digitaria bicornis* (L.) R. & S.	----
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
POACEAE	*Digitaria* sp.	----
BIGNONIACEAE	*Distictis lactiflora* (Vahl) DC.	Liana fragante
CELASTRACEAE	*Elaeodendrum xylocarpum* (Vent.) DC.	Coscorrón; Marble-tree
OLEACEAE	*Forestiera segregata* (Jacq.) Krug & Urban	Florida privet, Ink-bush
FABACEAE	*Galactia dubia* DC.	----
FABACEAE	*Galactia striata* (Jacq.) Urban	----
RHAMNACEAE	*Gouania lupuloides* (L.) Urban	Bejuco de indio; Soap stick
NYCTAGINACEAE	*Guapira fragans* (Dum.-Cours.) Little	Corcho; Black mampoo
BORAGINACEAE	*Heliotropium indicum* L.	Cotorrera; Indian heliotrope
CACTACEAE	*Hylocereus trigonus* (Haw.) Safford.	Pitajaya; Night blooming cereus
FABACEAE	*Indigofera suffruticosa* Miller	Añil; Índigo
CONVOLVULACEAE	*Ipomoea hederifolia* L.	Cambustera
CONVOLVULACEAE	*Ipomoea triloba* L.	Bejuquillo de puerco
CONVOLVULACEAE	*Jacquemontia havanensis* (Jacq.) Urban	Aguinaldo de costa
THEOPHRASTACEAE	*Jacquinia armillaris* Jacq.	Azúcares
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona
RHAMNACEAE	*Krugiodendron ferreum* (Vahl) Urban	Bariaco; Black iron-wood
COMBRETACEAE	*Laguncularia racemosa* (L.) Gaertn.	Mangle blanco; Mangrove
VERBENACEAE	*Lantana camara* L.	Cariaquillo; Yellow sage
VERBENACEAE	*Lantana involucrata* L.	Santa María; Button sage
MIMOSACEAE	*Leucaena leucocephala* (Lam.) De Wit	Acacia pálida; Wild tamarind
VERBENACEAE	*Lippia nodiflora* (L.) Michx.	Cidrón, Yerba de sapo; Cape-wood
BIGNONIACEAE	*Macfadyena unguis-cati* (L.) A. Gentry	Bejuco de gato; Cat´s claw
MALVACEAE	*Malvastrum* sp.	----
SAPINDACEAE	*Melicoccus bijugatus* Jacq.	Quenepa; Ginep
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
STERCULIACEAE	*Melochia pyramidata* L.	Bretónica piramidal
STERCULIACEAE	*Melochia tomentosa* L.	Bretónica afelpada
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. F.	Batatilla blanca
CACTACEAE	*Opuntia repens* Bello	Olaga; Suckers
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
POACEAE	*Paspalum vaginatum* Sw.	----
PASSIFLORACEAE	*Passiflora suberosa* L.	Flor de pasion
FABACEAE	*Pictetia aculeata* (Vahl) Urban	Tachuelo; Fustic
CACTACEAE	*Pilosocereus royenii* (L.) Byles & Rowley	Dildo; Organ pipe
FABACEAE	*Piscidia carthagenensis* Jacq.	Ventura; Fish poison
NYCTAGINACEAE	*Pisonia subcordata* Sw.	Corcho blanco; Water mampoo

Table 4 (Continued)
List of All Plants Recorded In the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005 (116 Species Total)

Family	Species	Common Name(s)
MIMOSACEAE	*Pithecellobium unguis-cati* (L.) Mart.	Escambrón colorado; Black bean
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
APOCYNACEAE	*Rauvolfia viridis* Willd. Ex Roem. & Schultes	Cachimbo blanco; Bitter bush
RHIZOPHORACEAE	*Rhizophora mangle* L.	Mangle rojo; Red mangrove
FABACEAE	*Rhynchosia minima* (L.) DC.	Frijolillo
FABACEAE	*Rhynchosia reticulata* (Sw.) DC.	Frijolillo de monte
PHYTOLACCACEAE	*Rivina humilis* L.	Carmín; Cat´s blood
ACANTHACEAE	*Ruellia tuberosa* L.	Saltaperico; Many-roots
CELASTRACEAE	*Schaefferia frutescens* Jacq.	Cafeíllo; Florida boxwood
SAPINDACEAE	*Serjania polyphylla* (L.) Radlk.	Bejuco de canastas; Basket wood
MALVACEAE	*Sida cordifolia* L.	Escoba acorazonada
MALVACEAE	*Sida stipularis* Cav.	Escoba blanca; Wire weed
MALVACEAE	*Sidastrum multiflorum* (Jacq.) Fryxell	Sidastro
SAPOTACEAE	*Sideroxylon obovatum* Lam.	Alquitrán; Break hill
SOLANACEAE	*Solanum lanceifolium* Jacq.	Tomatillo de paloma
POACEAE	*Spartina patens* (Ait.) Muhl.	Yerba de sal; Salt grass
POACEAE	*Sporobolus jacquemontii* Kunth	Pelo de burro
VERBENACEAE	*Stachytarpheta jamaicensis* (L.) Vahl	Bretónica
MALPIGHIACEAE	*Stigmaphyllon emarginatum* (Cav.) A. Juss.	Bejuco de San Pedro
FABACEAE	*Stylosanthes hamata* (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
FABACEAE	*Tephrosia cinerea* (L.) Pers.	Añil cenizo
BROMELIACEAE	*Tillandsia fasciculata* Sw.	Nido parásito; Bunch moss
BORAGINACEAE	*Tournefortia volubilis* L.	Nigua enredadera
EUPHORBIACEAE	*Tragia volubilis* L.	Pringamoza; Stinging vine
POACEAE	*Tragus berteronianus* Schult.	Hincadora; Prickle grass
PHYTOLACACEAE	*Trichostigma octandrum* (L.) H. Walt.	Bejuco de nasa
FABACEAE	*Vigna luteola* (Jacq.) Benth.	Frijol silvestre
MALVACEAE	*Wissadula periplocifolia* (L.) Presl	Pichona
RUTACEAE	*Zanthoxylum monophyllum* (Lam.) P. Wilson	Carrubio, Espino rubial; Yellow prickle
COMMELINACEAE	Indet.*	----

*In sterile condition (no flowers or fruits available for determination)

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, we distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988).

Table 5
List of All Animals Recorded in the PAOC-S (Along the Pipeline) Area in the Former VNTR, 19 September 2005

Common Name	Scientific Name	POCS
Mammals		
Mongoose	*Herpestes auropunctatus*	x
Reptiles and Amphibians		
Anole (Common Lizard)	*Anolis cristatellus*	x
Grass Anole (Garden Lizard)	*Anolis pulchellus*	x
Anole (Spotted Lizard)	*Anolis stratulus*	x
Birds		
Green Mango	*Anthracothorax viridis*	x
Cattle Egret	*Bubulcus ibis*	x
Green Heron	*Butorides virescens*	x
Killdeer	*Charadrius vociferus*	x
Mangrove Cuckoo	*Coccyzus minor*	x
Bananaquit	*Coereba flaveola*	x
Scaly-naped pidgeon	*Columba squamosa*	x
Adelaide's Warbler	*Dendroica adelaidae*	x
Caribbean Elaenia	*Elaenia martinica*	x
Scaly-Breasted Thrasher	*Margarops fuscus*	x
Puerto Rico Woodpecker	*Melanerpes portoricensis*	x
Northern Mockingbird	*Mimus polyglottos*	x
Yellow-crowned Night-Heron	*Nyctanassa violacea*	x
Greater Antillean Grackle	*Quiscalus niger*	x
Puerto Rican Lizard Cuckoo	*Saurothera vieilloti*	x
Gray Kingbird	*Tyrannus dominicensis*	x
White-winged dove	*Zenaida asiatica*	x

4.4.4 Protected Species

The site was located within thorn scrub and mangrove fringe forest habitat. There were no federally protected species observed at this site. The former pipeline ran near the edge of a mangrove community which appreared to have potential habitat for *Stahlia,* however a extensive search during this field effort and previous searches conducted in 2001 did not find any plants. The orginal construction of the pipeline would have potentially impacted *Stahlia* habitat.

4.5 PAOC J AND K (CAMP GARCIA SITES)

4.5.1 Site Description

This site is located at or adjacent to the former Camp Garcia Area (**Figure 5**). The area is maintained mowed grassland. Around the perimeter of Camp Garcia and parts of the PAOC-J and PAOC-K had been recently scraped of vegetation and pushed into piles to create a clear zone around the fence. The cleared vegetation had not grown back.

4.5.2 Vegetation Community Description

The vegetation at PAOC-J and PAOC-K is a moderately sparse thorn scrub community dominated by Mesquite (*Prosopis juliflora),* aroma *(Acacia farnesian)* and twisted acacia (*A. tortuosa)*. These species create a sparse canopy with adequate light penetration for good herbaceous ground cover. Camp Garcia

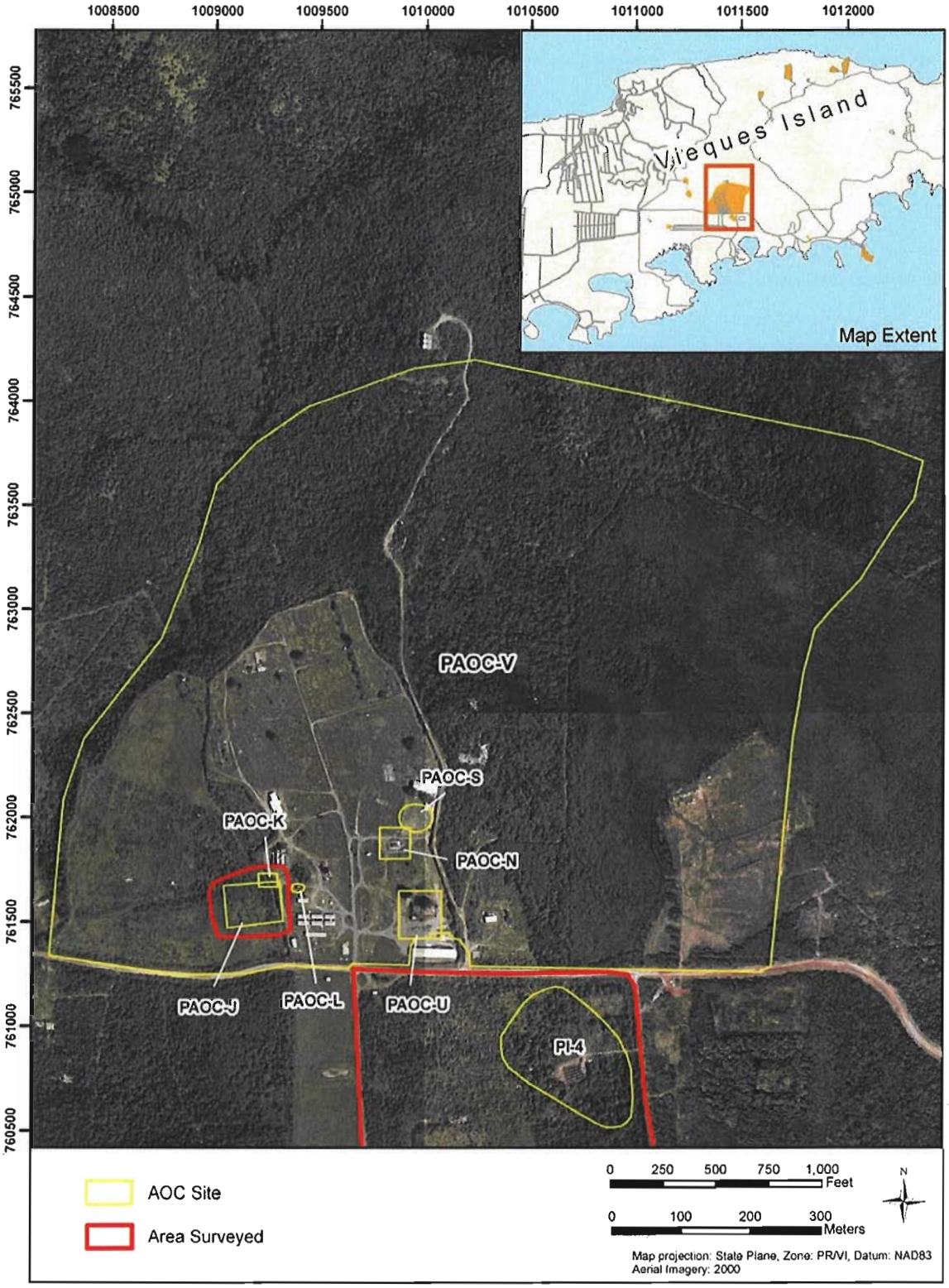


Figure 5. Locations of PAOC J, K and PI-4 at or Adjacent to the Former Camp Garcia Area.

is a combination of a grassy maintained area with few isolated trees around the housing and utilitarian facilities. A wire fence transformed in a sort of paradise for weedy climbers, and a highly disturbed, relatively open area surrounding the whole site, dominated by mesquite and two *Acacia* species. Due to the heavy human impact, this area has the largest percentage of herbaceous and weedy vegetation recored for any of the sites visited (74%). There were 54 species of plants recored for all two sites (**Table 6**).

Table 6
List of All Plants Recorded in the PAOC J and K Areas of the former Camp Garcia Area within the Former VNTR, 20 September 2005 (54 Species Total)

Family	Species	Common Name(s)
MALVACEAE	*Abutilon hirtum* (Lam.) Sweet	Buenos días
MIMOSACEAE	*Acacia farnesiana* (L.) Willd.	Aroma; Casha
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
AMARANTHACEAE	*Achyrantes aspera* L.	Rabo de gato; Man-better man
ANNONACEAE	*Annona reticulata* L.	Corazón; Custard apple
NYCTAGINACEAE	*Boerhavia coccinea* Mill.	Mata de pavo
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
ASCLEPIADACEAE	*Calotropis procera* (Ait.) Ait. f.	Algodón de seda; Giant milkweed
SCROPHULARIACEAE	*Capraria biflora* L.	Té del país; Goat weed
CARICACEAE	*Carica papaya* L.	Lechosa, Papaya; Papaw
FLACOURTIACEAE	*Casearia sylvestris* Sw.	Cafeíllo cimarrón, Sarna de perro
POACEAE	*Cenchrus brownii* Roem. & Schult.	Abrojito
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
CAESALPINACEAE	*Chamaecrista diphylla* (L.) Greene	Hediondilla; Wild peaunt
CAESALPINACEAE	*Chamaecrista nictitans* (L.) Moench	Moriviví bobo
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce hyssopifolia* (L.) Small	Lechera
EUPHORBIACEAE	*Chamaesyce prostrata* (Ait.) Small	Lechecillo
POACEAE	*Chloris inflata* Link	Horquetilla morada; Blue grass
CAPPARACEAE	*Cleome gynandra* L.	Jazmín de río; White massambee
CAPPARACEAE	*Cleome viscosa* L.	Volantín amarillo; Yellow massambee
COMMELINACEAE	*Commelina diffusa* Burm. f.	Cohitre; Blue day flower
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
FABACEAE	*Crotalaria incana* L.	Cascabelillo vacio; Shake-shake
FABACEAE	*Crotalaria retusa* L.	Cascabelillo
CUCURBITACEAE	*Cucumis anguria* L.	Pepinillo silvestre
POACEAE	*Cynodon dactylon* (L.) Pers.	Yerba bermuda; Bermuda grass
EUPHORBIACEAE	*Dalechampia scandens* L.	----
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
POACEAE	*Eleusine indica* (L.) Gaertn.	Grama de caballo; wire grass
EUPHORBIACEAE	*Euphorbia heterophylla* L.	Acerca amor
RUBIACEAE	*Hedyotis corymbosa* (L.) Lam.	Graciosa
BORAGINACEAE	*Heliotropium indicum* L.	Cotorrera; Indian heliotrope
CONVOLVULACEAE	*Ipomoea tiliacea* (Willd.) Choisy in DC.	Bejuco blanco; Goat foot
OLEACEAE	*Jasminum fluminense* Vell.	Jasmín oloroso
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona

Table 6 (Continued)
List of All Plants Recorded in the PAOC J and K Areas of the former Camp Garcia Area within the Former VNTR, 20 September 2005 (54 Species Total)

Family	Species	Common Name(s)
VERBENACEAE	*Lantana camara* L.	Cariaquillo; Yellow sage
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. f.	Batatilla blanca
CUCURBITACEAE	*Momordica charantia* L.	Cundeamor; Wild balsam apple
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
POACEAE	*Paspalum fimbriatum* Kunth	Pata de conejo
PASSIFLORACEAE	*Passiflora foetida* L.	Tagua-Tagua
EUPHORBIACEAE	*Phyllanthus amarus* Schumach.	Quinino de pobre
PORTULACACEAE	*Portulaca oleracea* L.	Verdolaga; Purs lane
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
FABACEAE	*Rhynchosia minima* (L.) DC.	Frijolillo
ACANTHACEAE	*Ruellia tuberosa* L.	Saltaperico; Many-roots
MALVACEAE	*Sida abutifolia* Mill.	Escoba tendida
MALVACEAE	*Sida stipularis* Cav.	Escoba blanca; Wire weed
FABACEAE	*Stylosanthes hamata* (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
PHYTOLACACEAE	*Trichostigma octandrum* (L.) H. Walt.	Bejuco de nasa
ASTERACEAE	*Tridax procumbens* L.	Pancha, San Juan del monte; Tridax

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, we distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988).

4.5.3 Wildlife Description

Several common wildlife species were observed utilizing the grassy areas and thorn scrub habitat. Wildlife observed at PAOC-J and PAOC-K, and adjacent habitat, are presented in **Table 7**.

4.5.4 Protected Species

The PAOC-K and PAOC-J sites were located in thorn scrub forest habitat. There were no federally protected species or preferred habitats observed at PAOC-K or PAOC-J.

4.6 PI-4 (Former Waste Treatment Site)

4.6.1 Site Description

This site is located south of Camp Garcia across the road and north of the east end of the airfield (**Figure 6**). This site appears to have been a former treatment area for waste. There are numerous concrete foundations, concrete culverts with ditches and piles of rubble and soil.

4.6.2 Vegetation Community Description

Habitat in this area is mostly a man-made *Prosopis/Acacia* successional savanna with a dense, nearly continuous herbaceous layer (*Commelina diffusa)* covering most ground surface including the concrete pads. There are also many invasive shrubs and vines, the great majority of which are weeds (22% of all

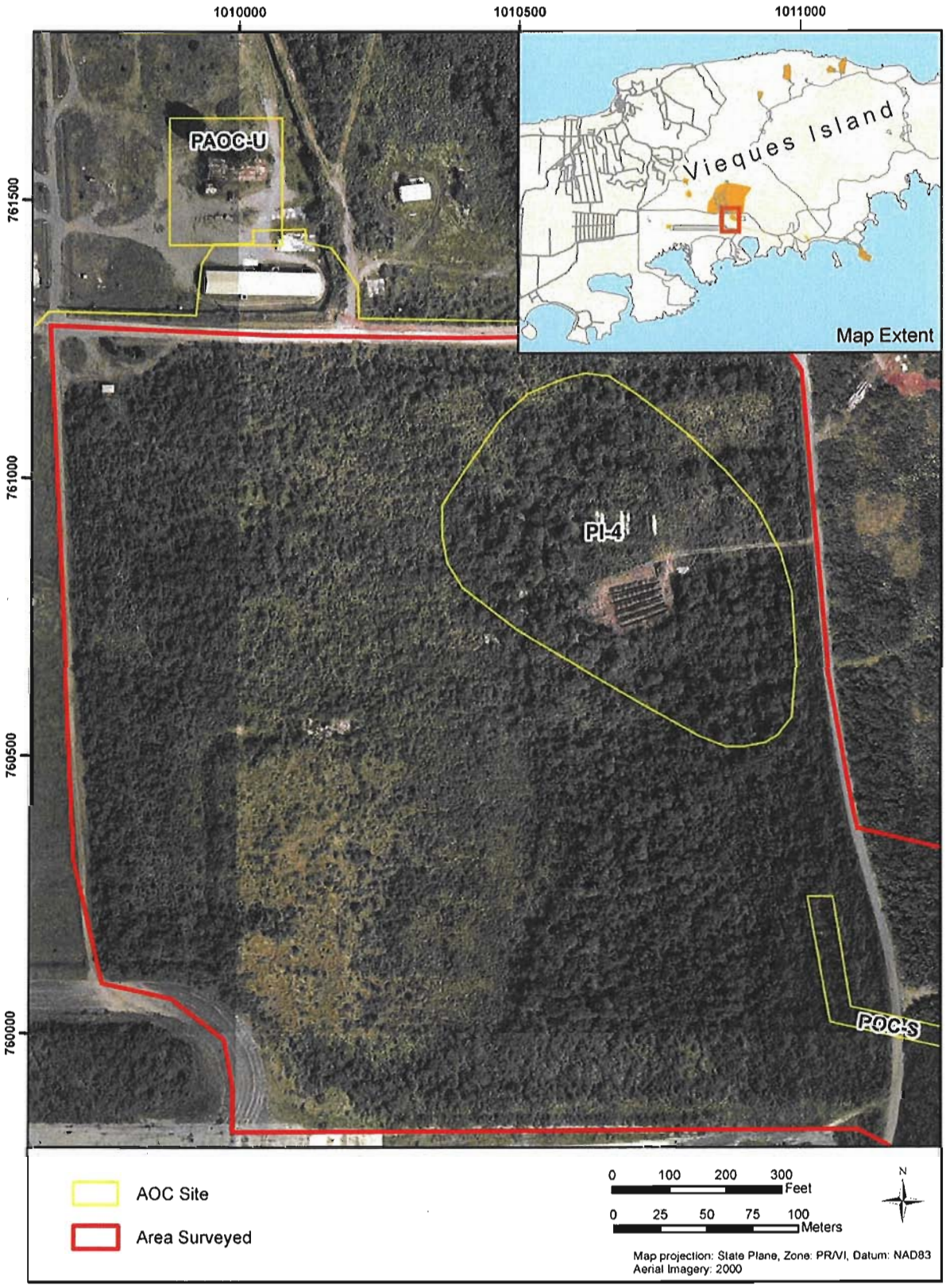


Figure 6. Location of PI-4 (Former Waste Treatment Site).

Table 7
List of All Animals Recorded in the former Camp Garcia Area within the Former VNTR, 20 September 2005

Common Name	Scientific Name	PAOC-J,K,S
Mammals		
Mongoose	*Herpestes auropunctatus*	x
Reptiles and Amphibians		
Anole (Common Lizard)	*Anolis cristatellus*	x
Grass Anole (Garden Lizard)	*Anolis pulchellus*	x
Anole (Spotted Lizard)	*Anolis stratulus*	x
Birds		
Bananaquit	*Coereba flaveola*	x
American Kestrel	*Falco sparverius*	x
Northern Mockingbird	*Mimus polyglottos*	x
Puerto Rican Flycatcher	*Myiarchus antillarum*	x
Greater Antillean Grackle	*Quiscalus niger*	x
Gray Kingbird	*Tyrannus dominicensis*	x
Zenaida Dove	*Zenaida aurita*	x

species recorded here correspond to creepers, climbers and vines). Non-leguminous trees are scarce, both in number of species and individuals. These are: *Ziziphus mauritiana*, *Bucida buceras*, *Citharexylum fruticosum*, *Zanthoxylum monophyllum*, *Bursera simaruba*, and *Bourreria succulenta*. Low herbaceous plants dominate the area surrounding the former runway. There were 99 species of plants recorded from this area (**Table 8**).

Table 8
List of All Plants Recorded in the PI-4 and Runway Areas within the former VNTR, 20 September 2005 (99 Species Total)

Family	Species	Common Name(s)
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
EUPHORBIACEAE	*Acalypha indica* L.	----
AMARANTHACEAE	*Achyrantes aspera* L.	Rabo de gato; Man-better man
FABACEAE	*Aeschynomene americana* L.	Yerba Rosario
ASTERACEAE	*Ageratum conyzoides* L. ssp. *conyzoides*	Mentastro, Yerba de cabrío
STERCULIACEAE	*Ayenia insulicola* Cristóbal	----
ASTERACEAE	*Bidens alba* (L.) DC. var. (CH. Schulz) Melchert	Margarita
NYCTAGINACEAE	*Boerhavia coccinea* Mill.	Mata de pavo
NYCTAGINACEAE	*Boerhavia diffusa* L.	Mata pavo; Hog-weed
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
BORAGINACEAE	*Bourreria succulenta* Jacq.	Palo de vaca
POACEAE	*Bouteloua americana* (L.f.) Scribn.	Yerba mesquite
POACEAE	*Brachiaria fasciculata* (Sw.) S. T. Blake	----
POACEAE	*Brachiaria* sp.	----
COMBRETACEAE	*Bucida buceras* L.	Úcar
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	Almácigo
ASCLEPIADACEAE	*Calotropis procera (Ait.) Ait. f.*	Algodón de seda; Giant milkweed
CAPPARACEAE	*Capparis flexuosa* (L.) L.	Palinguán; Caper tree

Table 8 (Continued)
List of All Plants Recorded in the PI-4 and Runway Areas within the former VNTR, 20 September 2005 (99 Species Total)

Family	Species	Common Name(s)
SCROPHULARIACEAE	*Capraria biflora* L.	Té del país; Goat weed
POACEAE	*Cenchrus myosuroides* HBK.	Abrojo de espiga; Spiked-bur grass
FABACEAE	*Centrosema pubescens* Benth.	Flor de conchitas; Butterfly pea
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
CAESALPINACEAE	*Chamaecrista diphylla* (L.) Greene	Hediondilla; Wild peaunt
CAESALPINACEAE	*C. nictitans* ssp. *pattelaria* (Colladon) Irwin & Barneby	Moriviví bobo
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce hyssopifolia* (L.) Small	Lechera
EUPHORBIACEAE	*Chamaesyce turpinii* (Boiss.) Millsp.	Lecherita
POACEAE	*Chloris inflata* Link	Horquetilla morada; Blue grass
POACEAE	*Chloris radiata* (L.) Sw.	Grama de costa; Plush-grass
VITACEAE	*Cissus verticillata* (L.) Nicolson & Jarvis	Bejuco de Caro; Pinakoop
VERBENACEAE	*Citharexylum fruticosum* L.	Palo de guitarra; Old woman bitter
CAPPARACEAE	*Cleome viscosa* L.	Volantín amarillo; Yellow massambee
COMMELINACEAE	*Commelina diffusa* Burm. f.	Cohitre; Blue day flower
TILIACEAE	*Corchorus hirsutus* L.	Malvaté
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
FABACEAE	*Crotalaria retusa* L.	Cascabelillo
CUCURBITACEAE	*Cucumis anguria* L.	Pepinillo silvestre
FABACEAE	*Dalbergia ecastaphyllum* (L.) Taub.	Maraimaray
EUPHORBIACEAE	*Dalechampia scandens* L.	----
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
POACEAE	*Eragrostis pilosa* (L.) Beauv.	----
POACEAE	*Eragrostis* sp.	----
CONVOLVULACEAE	*Evolvulus convolvuloides* Stearn	----
FABACEAE	*Galactia dubia* DC.	----
FABACEAE	*Galactia striata* (Jacq.) Urban	----
BORAGINACEAE	*Heliotropium curassavicum* L.	Cotorra de playa; Seaside heliotrope
CONVOLVULACEAE	*Ipomoea indica* (Burm. f.) Merr.	Bejuco de gloria
CONVOLVULACEAE	*Ipomoea tiliacea* (Willd.) Choisy in DC.	Bejuco blanco; Goat foot
CONVOLVULACEAE	*Ipomoea triloba* L.	Bejuquillo de puerco
OLEACEAE	*Jasminum fluminense* Vell.	Jasmín oloroso
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona
VERBENACEAE	*Lantana camara* L.	Cariaquillo; Yellow sage
VERBENACEAE	*Lantana involucrata* L.	Santa María; Button sage
MIMOSACEAE	*Leucaena leucocephala* (Lam.) De Wit	Acacia pálida; Wild tamarind
BIGNONIACEAE	*Macfadyena unguis-cati* (L.) A. Gentry	Bejuco de gato; Cat´s claw
MALVACEAE	*Malvastrum americanum* (L.) Torrey	Malva silvestre
MALVACEAE	*Malvastrum corchorifolium* (Desr.) Britton	Escoba blanca
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
STERCULIACEAE	*Melochia pyramidata* L.	Bretónica piramidal

Table 8 (Continued)
List of All Plants Recorded in the PI-4 and Runway Areas within the former VNTR, 20 September 2005 (99 Species Total)

Family	Species	Common Name(s)
CUCURBITACEAE	*Melothria pendula* L.	Pepinillo
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. f.	Batatilla blanca
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
CAESALPINACEAE	*Parkinsonia aculeata* L.	Palo de rayo; Horsebean, Jerusalem thorn
POACEAE	*Paspalum distichum* L.	----
POACEAE	*Paspalum fimbriatum* Kunth	Pata de conejo
POACEAE	*Paspalum virgatum* L.	Cortadero, Matojo blanco
POACEAE	*Paspalum* sp.	----
PASSIFLORACEAE	*Passiflora suberosa* L.	Flor de pasion
MALVACEAE	*Pavonia spinifex* (L.) Cav.	Cadillo espinoso
EUPHORBIACEAE	*Phyllanthus niruri* L.	Quinino; Gale of the wind
PORTULACACEAE	*Portulaca oleracea* L.	Verdolaga; Purs lane
PORTULACACEAE	*Portulaca quadrifida* L.	Yerba de pollo; Chicken weed
PORTULACACEAE	*Portulaca teretifolia* Kunth	Yerba verdolaga
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
APOCYNACEAE	*Rauvolfia viridis* Willd. ex Roem. & Schultes	Cachimbo blanco; Bitter bush
FABACEAE	*Rhynchosia reticulata* (Sw.) DC.	Frijolillo de monte
PHYTOLACCACEAE	*Rivina humilis* L.	Carmín; Cat´s blood
ACANTHACEAE	*Ruellia tuberosa* L.	Saltaperico; Many-roots
POACEAE	*Setaria geniculata* (Lam.) Beauv.	Arrocillo; Yellow fostail
MALVACEAE	*Sida ciliaris* L.	Escoba peluda, Escoba pestañosa
MALVACEAE	*Sidastrum multiflorum* (Jacq.) Fryxell	Sidastro
POACEAE	*Spartina patens* (Ait.) Muhl.	Yerba de sal; Salt grass
RUBIACEAE	*Spermacoce verticillata* L.	Botón blanco
LOGANIACEAE	*Spigelia anthelmia* L.	Lombricera; Waterweed
POACEAE	*Sporobolus jacquemontii* Kunth	Pelo de burro
VERBENACEAE	*Stachytarpheta jamaicensis* (L.) Vahl	Bretónica
POACEAE	*Stenotaphrum secundatum* (Walt.) Kuntze	Cinta; Crab grass
MALPIGHIACEAE	*Stigmaphyllon emarginatum* (Cav.) A. Juss.	Bejuco de San Pedro
FABACEAE	*Stylosanthes hamata* (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
FABACEAE	*Tephrosia cinerea* (L.) Pers.	Añil cenizo
BORAGINACEAE	*Tournefortia volubilis* L.	Nigua enredadera
EUPHORBIACEAE	*Tragia volubilis* L.	Pringamoza; Stinging vine
MALVACEAE	*Urena lobata* L.	Cadillo; Bur
STERCULIACEAE	*Waltheria indica* L.	Basora prieta, Malvavisco
MALVACEAE	*Wissadula periplocifolia* (L.) Presl	Pichona
RUTACEAE	*Zanthoxylum monophyllum* (Lam.) P. Wilson	Carrubio, Espino rubial; Yellow prickle
RHAMNACEAE	*Ziziphus mauritiana* Lam.	Aprín; Indian jujube

*In sterile condition (no flowers or fruits available for determination)

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, I distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988). This treatment is strongly supported by molecular data and no doubt will prevail in the future.

4.6.3 Wildlife Description

Common wildlife species were observed utilizing the vegetated areas, pipes, concrete pads, concrete culverts, edges of the cleared areas, and soil piles, and vegetation. Wildlife observed at PI-4, and adjacent habitat, is presented in **Table 9**.

Table 9
List of All Animals Recorded in the PI-4 Area within the former VNTR, 20 September 2005

Common Name	Scientific Name	PI-4
Mammals		
Mongoose	*Herpestes auropunctatus*	x
Reptiles and Amphibians		
Anole (Common Lizard)	*Anolis cristatellus*	x
Grass Anole (Garden Lizard)	*Anolis pulchellus*	x
Anole (Spotted Lizard)	*Anolis stratulus*	x
Birds		
Cattle Egret	*Bubulcus ibis*	x
Killdeer	*Charadrius vociferus*	x
Mangrove Cuckoo	*Coccyzus minor*	x
Bananaquit	*Coereba flaveola*	x
Scaly-naped pidgeon	*Columba squamosa*	x
Common ground Dove	*Columbina passerina*	x
Smooth-billed Ani	*Crotophaga ani*	x
Adelaide's Warbler	*Dendroica adelaidae*	x
Caribbean Elaenia	*Elaenia martinica*	x
American Kestrel	*Falco sparverius*	x
Scaly-Breasted Thrasher	*Margarops fuscus*	x
Puerto Rico Woodpecker	*Melanerpes portoricensis*	x
Northern Mockingbird	*Mimus polyglottos*	x
Puerto Rican Flycatcher	*Myiarchus antillarum*	x
Antillean-crested Hummingbird	*Orthorhyncus cristatus*	x
Greater Antillean Grackle	*Quiscalus niger*	x
Gray Kingbird	*Tyrannus dominicensis*	x
White-winged dove	*Zenaida asiatica*	x

4.6.4 Protected Species

The site was located within young thorn scrub forest habitat. There were no federally protected species or preferred habitats observed at this site

4.7 PI-7 (Former Radar and Quarry Sites)

4.7.1 Site Description

The two PI-7 sites are located northeast of Camp Garcia and east of Vieques township (**Figure 7**). This site appears to have been a former radar and quarry site.

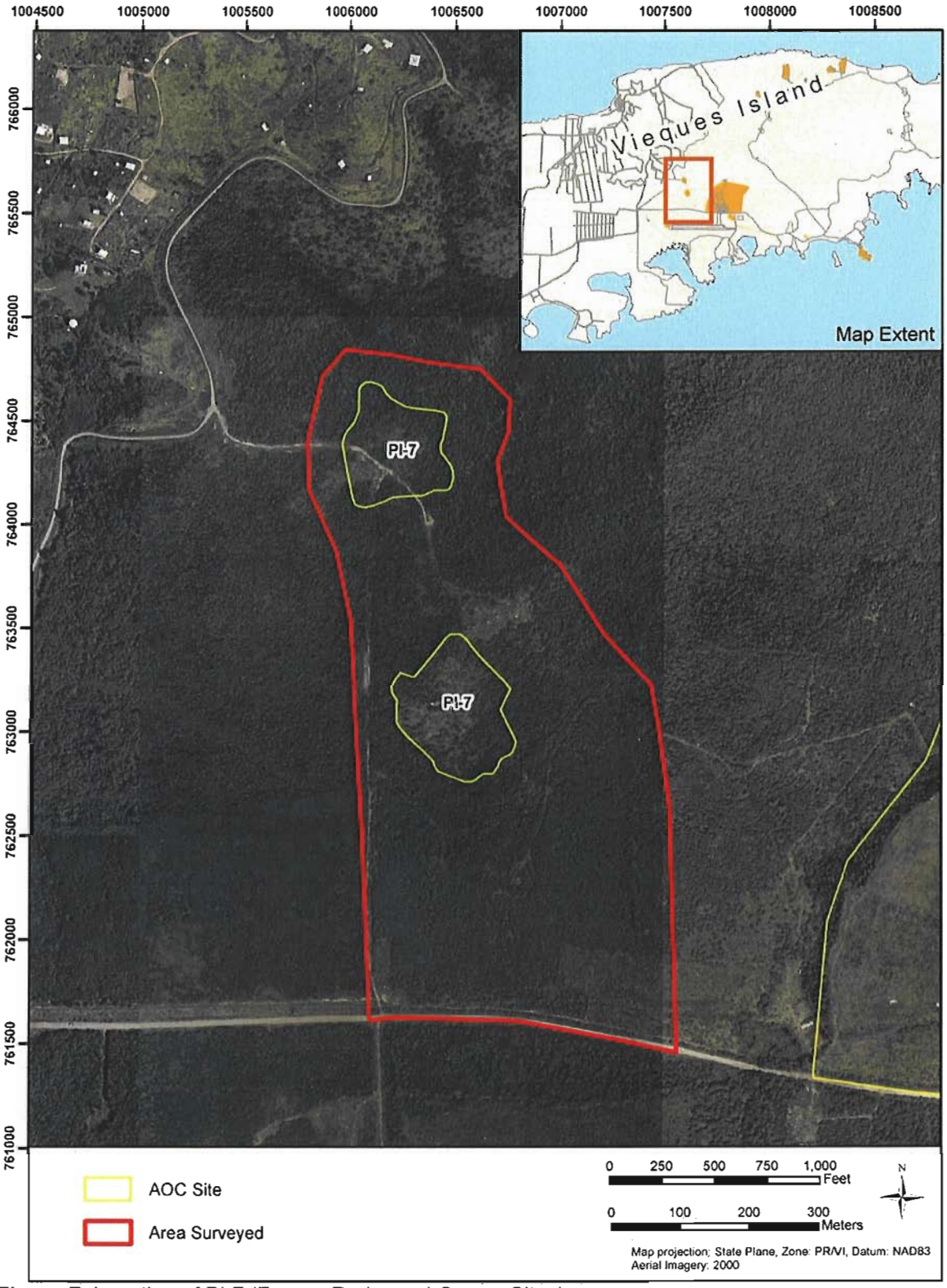


Figure 7. Location of PI-7 (Former Radar and Quarry Sites).

4.7.2 Vegetation Community Description

This site is a mixed woodland/upland forest (moist deciduous formation) which is found mostly on the inner hill and slopes primarily on the western side of Vieques. Dominant vegetation was seasonal forests and woodlands (on the moist humid side of the hills especially along drains and gullies), shrubs, and dense grassland areas on the south and southeastern slopes of radar hill, these were probably established by repeated fires during training activities (GMI 1996; 2001). Common trees are *Andira inermis*, *Prosopis juliflora*, various *Acacia* and *Casearia* species, *Trichilia hirta*, *Cordia collococca*, *Piscidia carthagenensis*, *Bursera simaruba*, *Guapira fragrans*, *Zanthoxylum monophyllum*, *Schaefferia frutescens*, and *Ziziphus mauritiana*. Despite the disturbance of former times and the great number of invasive weeds (mostly along the road and open areas), the site seems to be slowly recovering. There wer 101 plants recorded at these two sites (**Table 10**).

Table 10
List of All Plants Recorded in the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the Former VNTR, 20 September 2005 (101 Species Total)

Family	Species	Common Name(s)
FABACEAE	*Abrus precatorius* L.	Ojo de cangrejo; Crab´s eyes
MALVACEAE	*Abutilon umbellatum* (L.) Sweet	Malvavisco cimarrón
MIMOSACEAE	*Acacia farnesiana* (L.) Willd.	Aroma; Casha
MIMOSACEAE	*Acacia macracantha* Humb. & Bonpl.	Tamarindo silvestre; Tamarind
MIMOSACEAE	*Acacia retusa* (Jacq.) Howard	Acacia zarza
MIMOSACEAE	*Acacia tortuosa* (L.) Willd.	Casia; Twisted acacia
AMARANTHACEAE	*Achyrantes aspera* L.	Rabo de gato; Man-better man
FABACEAE	*Andira inermis* (W. Wr.) DC.	Moca; Angelin tree
EUPHORBIACEAE	*Argythamnia fasciculata* (Vahl) Muell. Arg.	----
MALVACEAE	*Bastardia viscosa* (L.) HBK	Escoba babosa; Viscid mallow
NYCTAGINACEAE	*Boerhavia coccinea* Mill.	Mata de pavo
POACEAE	*Bothriochloa pertusa* (L.) A. Camus	Huracán; Hurricane grass
POACEAE	*Brachiaria adspersa* (Trin.) Parodi	Millito; Brown top millet
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	Almácigo
CAPPARACEAE	*Capparis flexuosa* (L.) L.	Palinguán; Caper tree
FLACOURTIACEAE	*Cassearia guianensis* (Aubl.) Urban	Cafeíllo; Wild coffee
FLACOURTIACEAE	*Cassearia sylvestris* Sw.	Cafeíllo cimarrón, Sarna de perro
APOCYNACEAE	*Catharanthus roseus* (L.) G. Don	Playera; Periwinkle
POACEAE	*Cenchrus echinatus* L.	Abrojo; Bur grass
FABACEAE	*Centrosema pubescens* Benth.	Flor de conchitas; Butterfly pea
FABACEAE	*Centrosema virginianum* (L.) Benth.	Conchita de Virginia
CAESALPINACEAE	*Chamaecrista diphylla* (L.) Greene	Hediondilla; Wild peanut
CAESALPINACEAE	*Chamaecrista nictitans* (L.) Moench	Moriviví bobo
EUPHORBIACEAE	*Chamaesyce hirta* (L.) Millsp.	Lechecillo
EUPHORBIACEAE	*Chamaesyce hyssopifolia* (L.) Small	Lechera
POACEAE	*Chloris inflata* Link	Horquetilla morada; Blue grass
VITACEAE	*Cissus trifoliata* L.	Caro costero
VITACEAE	*Cissus verticillata* (L.) Nicolson & Jarvis	Bejuco de Caro; Pinakoop
VERBENACEAE	*Citharexylum fruticosum* L.	Palo de guitarra; Old woman bitter
ARECACEAE	*Coccothrinax alta* (O. F. Cook) Becc.	Palma plateada; Silver palm
COMMELINACEAE	*Commelina diffusa* Burm. f.	Cohitre; Blue day flower
BORAGINACEAE	*Cordia collococca* L.	Capá rojo, Ateje; Red manjack
FABACEAE	*Crotalaria falcata* Vahl ex DC.	Matraca; Rattlebox

Table 10 (Continued)
List of All Plants Recorded in the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the Former VNTR, 20 September 2005 (101 Species Total)

Family	Species	Common Name(s)
FABACEAE	*Crotalaria retusa* L.	Cascabelillo
EUPHORBIACEAE	*Croton astroites* Dryand.	Maná
EUPHORBIACEAE	*Croton lobatus* L.	Croto lobulado
BIGNONIACEAE	*Cydista aequinoctialis* (L.) Miers	Bejuco blanco; Guard withe
CYPERACEAE	*Cyperus compressus* L.	----
POACEAE	*Dactyloctenium aegyptium* (L.) Beauv.	Yerba egipcia; Egyptian grass
EUPHORBIACEAE	*Dalechampia scandens* L.	----
MIMOSACEAE	*Desmanthus virgatus* (L.) Willd.	Desmanto
FABACEAE	*Desmodium* sp.	----
POACEAE	*Digitaria bicornis* (L.) R. & S.	----
POACEAE	*Digitaria insularis* (L) Mez	Zorra; Silky grass
BIGNONIACEAE	*Distictis lactiflora* (Vahl) DC.	Liana fragante
ERYTHROXYLACEAE	*Erythroxylum brevipes* DC.	Brisselet
EUPHORBIACEAE	*Euphorbia heterophylla* L.	Acerca amor
FABACEAE	*Galactia striata* (Jacq.) Urban	----
NYCTAGINACEAE	*Guapira fragans* (Dum.-Cours.) Little	Corcho; Black mampoo
BORAGINACEAE	*Heliotropium indicum* L.	Cotorrera; Indian heliotrope
FABACEAE	*Indigofera suffruticosa* Miller	Añil; Índigo
CONVOLVULACEAE	*Ipomoea indica* (Burm. f.) Merr.	Bejuco de gloria
CONVOLVULACEAE	*Ipomoea tiliacea* (Willd.) Choisy in DC.	Bejuco blanco; Goat foot
CONVOLVULACEAE	*Ipomoea triloba* L.	Bejuquillo de Puerco
OLEACEAE	*Jasminum fluminense* Vell.	Jasmín oloroso
EUPHORBIACEAE	*Jatropha gossypiifolia* L.	Higuereta cimarrona
MIMOSACEAE	*Leucaena leucocephala* (Lam.) De Wit	Acacia pálida; Wild tamarind
BIGNONIACEAE	*Macfadyena unguis-cati* (L.) A. Gentry	Bejuco de gato; Cat´s claw
FABACEAE	*Macroptilium lathyroides* (L.) Urban	Habichuela parada; Wild bush bean
MALVACEAE	*Malachra alceifolia* Jacq.	Malva de caballo; Bastard okra
MALVACEAE	*Malvastrum* sp.	----
SAPINDACEAE	*Melicoccus bijugatus* Jacq.	Quenepa; Ginep
STERCULIACEAE	*Melochia nodiflora* Sw.	Bretónica prieta
CONVOLVULACEAE	*Merremia quinquefolia* (L) Hall. f.	Batatilla blanca
POACEAE	*Panicum maximum* Jacq.	Yerba de guinea; Guinea grass
POACEAE	*Paspalum fimbriatum* Kunth	Pata de conejo
EUPHORBIACEAE	*Phyllanthus niruri* L.	Quinino; Gale of the wind
FABACEAE	*Piscidia carthagenensis* Jacq.	Ventura; Fish poison
MIMOSACEAE	*Pithecellobium unguis-cati* (L.) Mart.	Escambrón colorado; Black bean
PORTULACACEAE	*Portulaca oleracea* L.	Verdolaga; Purs lane
MIMOSACEAE	*Prosopis juliflora* (Sw.) DC.	Mesquite
RUBIACEAE	*Randia aculeata* L.	Tintillo; Ink-berry
APOCYNACEAE	*Rauvolfia viridis* Willd. ex Roem. & Schultes	Bitter bush
FABACEAE	*Rhynchosia reticulata* (Sw.) DC.	Frijolillo de monte
PHYTOLACCACEAE	*Rivina humilis* L.	Carmín; Cat´s blood
MIMOSACEAE	*Samanea saman* (Willd.) Merrill	Samán; Rain tree
CELASTRACEAE	*Schaefferia frutescens* Jacq.	Cafeíllo; Florida boxwood
CAESALPINACEAE	*Senna obtusifolia* (L.) Irwin & Barneby	Dormidera, Dormilona

Table 10 (Continued)
List of All Plants Recorded in the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the Former VNTR, 20 September 2005 (101 Species Total)

Family	Species	Common Name(s)
CAESALPINACEAE	*Senna occidentales* (L.) Link	Hedionda; Coffee sena
SAPINDACEAE	*Serjania polyphylla* (L.) Radlk.	Bejuco de canastas; Basket wood
POACEAE	*Setaria setosa* (Sw.) Scribn.	Yerba suave
MALVACEAE	*Sida abutifolia* Mill.	Escoba tendida
MALVACEAE	*Sida ciliaris* L.	Escoba peluda, Escoba pestañosa
MALVACEAE	*Sida cordifolia* L.	Escoba acorazonada
MALVACEAE	*Sida rhombifolia* L.	Escoba colorada
MALVACEAE	*Sidastrum multiflorum* (Jacq.) Fryxell	Sidastro
SAPOTACEAE	*Sideroxylon salicifolium* (L.) Lam.	Sabina; Willow bustic
RUBIACEAE	*Spermacoce verticillata* L.	Botón blanco
POACEAE	*Sporobolus jacquemontii* Kunth	Pelo de burro
VERBENACEAE	*Stachytarpheta jamaicensis* (L.) Vahl	Bretónica
MALPIGHIACEAE	*Stigmaphyllon emarginatum* (Cav.) A. Juss.	Bejuco de San Pedro
FABACEAE	*Stylosanthes hamata* (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
FABACEAE	*Tephrosia cinerea* (L.) Pers.	Añil cenizo
EUPHORBIACEAE	*Tragia volubilis* L.	Pringamoza; Stinging vine
MELIACEAE	*Trichilia hirta* L.	Retamo; Broomstick
ASTERACEAE	*Tridax procumbens* L.	Pancha, Tridax
TILIACEAE	*Triumpheta semitriloba* Jacq.	Cadillo de perro
STERCULIACEAE	*Waltheria indica* L.	Basora prieta, Malvavisco
RUTACEAE	*Zanthoxylum monophyllum* (Lam.) P. Wilson	Carrubio, Espino rubial; Yellow prickle
RHAMNACEAE	*Ziziphus mauritiana* Lam.	Aprí; Indian jujube
COMMELINACEAE	Indet.*	----

*In sterile condition (no flowers or fruits available for determination)

Note: Following the conservation of the name *Leguminosae* for the family (*sensu latiore*) in the third edition of the International Code of Botanical Nomenclature, many authors treat the three families of *Order Fabales* as one single family (*Leguminosae*) with three subfamilies. However, we distinguish three different families (*Fabaceae*, *Caesalpinaceae* and *Mimosaceae*) as does A. Cronquist in *The Evolution and Classification of Flowering Plants* (1988

4.7.3 Wildlife Description

Several common wildlife species were observed utilizing woody vines, brush piles and soil piles, and vegetation. Wildlife observed at PI-7 are presented in **Table 11**.

4.7.4 Protected Species

The site was located within thorn scrub forest habitat. There were no federally protected species or preferred habitats observed at this site.

Table 11
List of All Plants Recorded In the PI-7 Area (Radar Hill and Old Quarry/Dumpsite) within the former VNTR, 20 September 2005

Common Name	Scientific Name	PI-7
Mammals		
Mongoose	*Herpestes auropunctatus*	x
Reptiles and Amphibians		
Anole (Common Lizard)	*Anolis cristatellus*	x
Grass Anole (Garden Lizard)	*Anolis pulchellus*	x
Anole (Spotted Lizard)	*Anolis stratulus*	x
Birds		
Green Mango	*Anthracothorax viridis*	x
Bananaquit	*Coereba flaveola*	x
Scaly-naped pidgeon	*Columba squamosa*	x
Common ground Dove	*Columbina passerina*	x
Smooth-billed Ani	*Crotophaga ani*	x
Adelaide's Warbler	*Dendroica adelaidae*	x
Caribbean Elaenia	*Elaenia martinica*	x
Puerto Rico Woodpecker	*Melanerpes portoricensis*	x
Northern Mockingbird	*Mimus polyglottos*	x
Puerto Rican Flycatcher	*Myiarchus antillarum*	x
Greater Antillean Grackle	*Quiscalus niger*	x
Zenaida Dove	*Zenaida aurita*	x

5.0 LITERATURE CITED

Acevedo-Rodriguez, P. 1996. Flora of St. John; U.S. Virgin Islands. New York Botanical Garden Press. Bronx, New York.

Cronquist, A. 1988. The Evolution and Classification of Flowering Plants. New York Botanical Garden Press; 2nd edition. New York.

Ewel, J.S. and J.L. Whitmore. 1973. Ecological Life Zones of Puerto Rico and the U.S. Virgin Islands. U.S. Department of Agriculture – Forest Service Research Paper ITF – 18. 72 p.

Geo-Marine, Inc. 1996. Land Use Management Plan for U.S. Naval Facilities Vieques, Puerto Rico. Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia.

Geo-Marine, Inc. 1998. Final Integrated Natural Resource Management Plan for U.S. Naval Station Roosevelt Roads, Puerto Rico. Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia.

Geo-Marine, Inc. 2001. Biological Assessment for Continuing Training Activities on the Inner Range, Vieques, Puerto Rico. Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia.

Liogier, H.A. 1985. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 1 Casuarinacae to Connaraceae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. 1988. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 2 Leguminosae to Anacardiaceae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. 1994. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 3. Cyrillaceae to Myrtaceae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. 1995. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 4. Melastomataceae to Lentibulariaceae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. 1997. Descriptive Flora of Puerto Rico and Adjacent Islands; Spermatophyta. Vol. 5. Acanthaceae to Compositae. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Liogier, H.A. and L.F. Wadsworth. 1982. Flora of Puerto Rico and Adjacent Islands: A Systematic Synopsis. Editorial de la Universidad de Puerto Rico, Rio Piedras, Puerto Rico.

Little, E.L., and F.H. Wadsworth. 1964. Common Trees of Puerto Rico and the Virgin Islands. Agriculture Handbook No. 249. U.S. Department of Agriculture, Forest Service, Washington, D.C.

Little, E.L., R. Woodbury, and F.H. Wadsworth. 1964. Trees of Puerto Rico and the Virgin Islands. Vol. 2. Agriculture Handbook No. 449. U.S. Department of Agriculture, Forest Service, Washington, D.C.

Raffaele, H. A. 1989. A Guide to the Birds of Puerto Rico and the Virgin Islands. Princeton University Press, Princeton, New Jersey.

Raffaele, H., J. Wiley, O. Garrido, A. Keith, and J. Raffaele. 1998. A Guide to the Birds of the West Indies. Princeton University Press. Princeton, New Jersey.

Wilkinson, D.L., and A. Cubiña. 2000. Survey of Endangered, Threatened, and Candidate Plant Species, Naval Ammunition Support Department (NASD), Vieques, Puerto Rico. Draft Report. Fajardo, Puerto Rico.

Appendix D
SWMU 1 – Soil Boring Logs – for Monitoring Wells

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW01	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/14/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS : **15.0 feet bls.** START : **01/14/04 @ 0800** END : **01/14/04 @ 1130** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0.0					
		20	SS-1	4 - 4 - 7 - 7 (11)	0.0 to 0.5' WELL GRADED SAND (SW), dark yellowish brown (10YR 3/4), dry, medium dense, fine to coarse sand. 0.5' to 2.0' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium dense, medium sand, trace clay.	Schonstedt cleared boring from 0 to 2 feet. OVM 0.0 ppm 0.0 ppm
2	2.0					Schonstedt cleared boring from 2 to 4 feet.
		14	SS-2	7 - 3 - 7 - 7 (10)	2.0' to 2.5' Same as above. 2.5' to 4.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, loose, fine to coarse sand, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
4	4.0					Schonstedt cleared boring from 4 to 8 feet.
		22	SS-3	3 - 4 - 5 - 6 (9)	4.0' to 4.5' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, loose, medium grained sand, trace coarse gravel, trace clay. 4.5' to 6.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, loose, fine to coarse sand, trace fine gravel.	OVM 0.0 ppm 0.0 ppm
6	6.0					
		16	SS-4	6 - 6 - 3 - 4 (9)	6.0' to 8.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, loose, fine to coarse sand.	OVM 0.0 ppm 0.0 ppm
8	8.0					Schonstedt cleared boring from 8 to 10 feet.
		20	SS-5	7 - 6 - 8 - 8 (14)	8.0' to 10.0' Same as above.	OVM 0.0 ppm 0.0 ppm
10	10.0					
		1	SS-6	50/1"	10.0' to 12.0' No sample collected, rock encountered.	Started drilling with air hammer.
	12.0					

Sampler Signature: **J. Swenfurth** Date: **01/14/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW01	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/14/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **15.0 feet bls.** START : **01/14/04 @ 0800** END : **01/14/04 @ 1130** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12					12.0' moist sand and gravel.	
						OVM 0.0 ppm 0.0 ppm
14						
					15.0' saturated sand.	
16						
					16.5' rock encountered.	
18						
						OVM 0.0 ppm 0.0 ppm
20						
	21.5					
22					END OF BORING @ 21.5 FEET BLS.	

Sampler Signature: **J. Swenfurth** Date: **01/14/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW02	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/15/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **27.5 feet bls.** START : **01/15/04 @ 0830** END : **01/15/04 @ 1400** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0.0					
		18	SS-1	1 - 2 - 2 - 2 (4)	0.0 to 0.5' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, very loose, fine to medium grained sand. 0.5' to 2.0' WELL GRADED SAND WITH CLAY (SW-SC), brown (10YR 4/3), dry, loose, fine to medium grained sand, non plastic, non cohesive.	Schonstedt cleared boring from 0 to 2 feet. OVM 0.0 ppm 0.0 ppm
2	2.0					Schonstedt cleared boring from 2 to 4 feet.
		10	SS-2	3 - 4 - 4 - 4 (8)	2.0' to 4.0' Same as above.	OVM 0.0 ppm 0.0 ppm
4	4.0					Schonstedt cleared boring from 4 to 6 feet.
		22	SS-3	1 - 3 - 4 - 6 (7)	4.0' to 4.5' Same as above. 4.5' to 6.0' LEAN CLAY (CL), very dark grayish brown (10YR 3/2), dry, medium, low plasticity, cohesive, trace organic material (roots).	OVM 0.0 ppm 0.0 ppm
6	6.0					Schonstedt cleared boring from 6 to 8 feet.
		22	SS-4	4 - 8 - 11 - 15 (19)	6.0' to 7.0' Same as above. 7.0' to 8.0' LEAN CLAY WITH SAND (CL), dark yellowish brown (10YR, 3/4), dry, fine grained sand, non plastic, cohesive.	OVM 0.0 ppm 0.0 ppm
8	8.0					Schonstedt cleared boring from 8 to 10 feet.
		22	SS-5	13 - 9 - 9 - 6 (18)	8.0' to 8.5' Same as above. 8.5' to 9.5' WELL GRADED SAND (SW), brown (10YR 4/3), dry, medium dense, fine to coarse grained sand. 9.5' to 10.0' LEAN CLAY WITH SAND (CL), brown (10YR, 4/3), dry, very stiff, fine grained sand, non plastic, cohesive.	OVM 0.0 ppm 0.0 ppm
10	10.0					
		18	SS-6	8 - 10 - 15 - 15 (25)	10.0' to 12.0' Same as above.	OVM 0.0 ppm 0.0 ppm
	12.0					

Sampler Signature: **J. Swenfurth** Date: **01/15/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW02	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/15/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **27.5 feet bls.** START : **01/15/04 @ 0830** END : **01/15/04 @ 1400** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12	12.0					
		24	SS-7	7 - 16 - 21 - 27 (37)	12.0' to 14.0' LEAN CLAY WITH SAND (CL), brown (10YR 4/3), dry, hard, fine grained sand, low plasticity, noncohesive.	OVM 0.0 ppm 0.0 ppm
14	14.0					
		3	SS-8	9 - 50/5"	14.0' to 15.5' Same as above. 15.5' to 16.0' Rock encountered.	OVM 0.0 ppm 0.0 ppm. Began air hammer at 15.5' bls.
16	16.0					
18						OVM 0.0 ppm 0.0 ppm
20						
22					21.5' Fractured rock (andesite) with Lean clay and sand.	
24					23.5' Moist sand.	

Sampler Signature: **J.Swenfurth** Date: **01/15/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW02	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/15/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **27.5 feet bls.** START : **01/15/04 @ 0830** END : **01/15/04 @ 1400** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
24					25.0' Fractured rock with clay.	OVM 0.0 ppm 0.0 ppm
26					27.5' Saturated.	
28						
30						OVM 0.0 ppm 0.0 ppm
32						
34						
					END OF BORING @ 34.5 FEET BLS.	

Sampler Signature: **J.Swenfurth** Date: **01/15/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW03	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/16/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon.**

WATER LEVELS **23.0 feet bls.** START : **01/16/04 @ 0730** END : **01/16/04 @ 1130** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0.0					
		20	SS-1	7 - 7 - 7 - 6 (14)	0.0 to 2.0' POORLY GRADED SAND (SP), brown (10YR 4/3), dry, medium dense, fine grained sand, trace clay, trace organic material (roots), non plastic, noncohesive.	Schonstedt cleared boring from 0 to 2 feet. OVM 0.0 ppm 0.0 ppm
2	2.0					Schonstedt cleared boring from 2 to 4 feet.
		10	SS-2	4 - 2 - 5 - 5 (7)	2.0 to 4.0' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, loose, fine grained sand, trace clay, non plastic, noncohesive.	OVM 0.0 ppm 0.0 ppm
4	4.0					Schonstedt cleared boring from 4 to 6 feet.
		24	SS-3	8 - 8 - 11- 11 (19)	4.0 to 6.0' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium dense, fine grained sand, some fine to coarse gravel, trace clay, non plastic, noncohesive.	OVM 0.0 ppm 0.0 ppm
6	6.0					Schonstedt cleared boring from 6 to 8 feet.
		20	SS-4	9 - 11 - 12 - 15 (23)	6.0' to 8.0' Same as above.	OVM 0.0 ppm 0.0 ppm
8	8.0					Schonstedt cleared boring from 8 to 10 feet.
		20	SS-5	6 - 10 - 13 - 13 (23)	8.0' to 10.0' LEAN CLAY (CL), dark yellowish brown (10YR, 4/4), dry, very stiff, trace sand, non plastic, noncohesive.	OVM 0.0 ppm 0.0 ppm
10	10.0					
		24	SS-6	3 - 7 - 9 - 13 (16)	10.0' to 12.0' LEAN CLAY (CL), brown (10YR 5/3), dry, very stiff, gray/tan mottled clay, trace sand, trace organic material (roots), low plasticity, cohesive.	OVM 0.0 ppm 0.0 ppm
	12.0					

Sampler Signature: **J. Swenfurth** Date: **01/16/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW03	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/16/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon.**

WATER LEVELS **23.0 feet bls.** START : **01/16/04 @ 0730** END : **01/16/04 @ 1130** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12	12.0					
14	14.0	24	SS-7	5 - 11 - 19 - 28 (30)	12.0' to 14.0' LEAN CLAY (CL), brown (10YR 5/3), dry, very stiff, gray/tan mottled clay, trace sand, low plasticity, cohesive.	OVM 0.0 ppm 0.0 ppm
16	16.0	24	SS-8	7 - 24 - 24 - 21 (48)	14.0' to 16.0' LEAN CLAY (CL), brown (10YR 5/3), dry, hard, gray/tan mottled clay, trace sand, low plasticity, cohesive.	OVM 0.0 ppm 0.0 ppm
18	18.0	24	SS-9	4 - 4 - 6 - 8 (10)	16.0' to 18.0' LEAN CLAY (CL), brown (10YR 5/3), dry, stiff, gray/tan mottled clay, trace coarse sand, trace silt, low plasticity, cohesive.	OVM 0.0 ppm 0.0 ppm
20	20.0	24	SS-10	4 - 6 - 8 - 8 (14)	18.0' to 18.5' Same as above. 18.5' to 20.0' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), moist, medium dense, fine grained sand, trace clay.	OVM 0.0 ppm 0.0 ppm
22	22.0	1	SS-11	50/1"	20.0' to 22.0' Rock encountered.	OVM 0.0 ppm 0.0 ppm
24						

Sampler Signature: **J.Swenfurth** Date: **01/16/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW03	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/16/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon.**

WATER LEVELS **23.0 feet bls.** START : **01/16/04 @ 0730** END : **01/16/04 @ 1130** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
24						
					25.0' Fine grained sand, yellowish brown (10YR 5/4), saturated, trace clay.	
26						
						OVM 0.0 ppm 0.0 ppm
28						
30					30.0' to 32.0' Fractured rock	hard drilling with augers.
						OVM 0.0 ppm 0.0 ppm
32					END OF BORING @ 32.0 FEET BLS.	
34						

Sampler Signature: **J.Swenfurth** Date: **01/16/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW04	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/16/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **23.0 feet bls.** START : **01/16/04 @ 1520** END : **01/17/04 @ 0930** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0.0					
		4	SS-1	4 - 5 - 4 - 3 (9)	0.0 to 2.0' POORLY GRADED SAND (SP), brown (10YR 4/3), dry, loose, fine grained sand, trace clay, trace organic material (roots), trace coarse gravel, non plastic, noncohesive.	Schonstedt cleared boring from 0 to 2 feet. OVM 0.0 ppm 0.0 ppm
2	2.0					Schonstedt cleared boring from 2 to 4 feet.
		18	SS-2	5 - 5 - 8 - 8 (13)	2.0' to 4.0' Same as above.	OVM 0.0 ppm 0.0 ppm
4	4.0					Schonstedt cleared boring from 4 to 6 feet.
		24	SS-3	12 - 13 - 14 - 15 (27)	4.0' to 5.5' Same as above. 5.5' to 6.0' WELL GRADED SAND (SW), yellowish brown (10YR 5/4), dry, medium dense, fine to coarse sand, trace clay, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
6	6.0					Schonstedt cleared boring from 6 to 8 feet.
		20	SS-4	18 - 17 - 19 - 25 (36)	6.0' to 7.0' Same as above. 7.0 to 8.0' POORLY GRADED SAND (SP), brown (10YR 4/3), dry, dense, fine grained sand, trace clay, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
8	8.0					Schonstedt cleared boring from 8 to 10 feet.
		8	SS-5	10 - 16 - 19 - 24 (35)	8.0' to 10.0' LEAN CLAY (CL), brown (10YR 4/3), dry, hard, some coarse sand, low placsticity, noncohesive.	OVM 0.0 ppm 0.0 ppm
10	10.0					
	12.0					

Sampler Signature: **J. Swenfurth** Date: **01/16/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW04	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/16/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **23.0 feet bls.** START : **01/16/04 @ 1520** END : **01/17/04 @ 0930** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12	12.0					
14	15.0					OVM 0.0 ppm 0.0 ppm
16	17.0	20	SS-6	10 - 20 - 20 - 23 (40)	15.0' to 16.5' LEAN CLAY (CL), brown (10YR 5/3), dry, hard, low plasticity, cohesive. 16.5' to 17.0' LEAN CLAY WITH SAND (CL), brown (10YR 5/3), dry, hard, fine to medium grained sand, non -plastic, noncohesive.	OVM 0.0 ppm 0.0 ppm
18						
20	20.0					
22	22.0	23	SS-7	18 - 38 - 30 - 37 (68)	20.0' to 22.0' WELL GRADED SAND WITH GRAVEL (SW), brown (10YR 5/3), dry, very dense, fine to coarse gravel, coarse gravel is green andesite.	OVM 0.0 ppm 0.0 ppm
24					22.0' Fractured rock (andesite) and clay. 23.0' Saturated.	23.5' Began air hammer.

Sampler Signature: **J.Swenfurth** Date: **01/16/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW04	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/16/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **23.0 feet bls.** START : **01/16/04 @ 1520** END : **01/17/04 @ 0930** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
24						
					25.0' Fractured rock, moist.	
26						
						OVM 0.0 ppm 0.0 ppm
28						
30						
						OVM 0.0 ppm 0.0 ppm
32						
34						

Sampler Signature: **J.Swenfurth** Date: **01/17/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW04	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/16/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **23.0 feet bls.** START : **01/16/04 @ 1520** END : **01/17/04 @ 0930** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36						
38					38.0' Rock (andesite), dark greenish gray (10GY 4/1).	hard layer to drill through.
						OVM 0.0 ppm 0.0 ppm
40						
42					END OF BORING @ 42.0 FEET BLS.	
44						
46						

Sampler Signature: **J.Swenfurth** Date: **01/17/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW05	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/17/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **23.0 feet bls.** START : **01/17/04 @ 1310** END : **01/17/04 @ 1730** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0.0					
		22	SS-1	4 - 5 - 6 - 10 (11)	0.0 to 0.5' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, medium dense, fine grained sand, trace coarse gravel, trace organic material (roots). 0.5' to 2.0' LEAN CLAY WITH GRAVEL (CL), dark yellowish brown (10YR 4/4), dry, stiff, trace coarse sand, low plasticity, cohesive.	Schonstedt cleared boring from 0 to 2 feet. OVM 0.0 ppm 0.0 ppm
2	2.0					Schonstedt cleared boring from 2 to 4 feet.
		22	SS-2	12 - 15 - 30 - 36 (45)	2.0' to 4.0' LEAN CLAY WITH GRAVEL (CL), dark yellowish brown (10YR 4/4), dry, stiff, coarse gravel (andesite), trace coarse sand, low plasticity, cohesive.	OVM 0.0 ppm 0.0 ppm
4	4.0					Schonstedt cleared boring from 4 to 6 feet.
		13	SS-3	15 - 47 - 50/1"	4.0' to 6.0' Same as above.	OVM 0.0 ppm 0.0 ppm 5.0 feet switch to air hammer.
6	6.0					Schonstedt cleared boring from 6 to 8 feet.
						OVM 0.0 ppm 0.0 ppm
8						Schonstedt cleared boring from 8 to 10 feet.
10						OVM 0.0 ppm 0.0 ppm

Sampler Signature: **J. Swenfurth** Date: **01/17/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW05	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/17/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **23.0 feet bls.** START : **01/17/04 @ 1310** END : **01/17/04 @ 1730** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
12						air hammer drilling.
14						
16						
18						
20						
22						
					23.0' moist to wet.	
24						

Sampler Signature: **J.Swenfurth** Date: **01/17/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW05	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/17/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **23.0 feet bls.** START : **01/17/04 @ 1310** END : **01/17/04 @ 1730** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
24						air hammer drilling.
26					26.0' Sand with gravel (andesite).	
28						
30						
32						
34						
36						

Sampler Signature: **J.Swenfurth** Date: **01/17/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW01MW05	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 1** DATE: **01/17/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **23.0 feet bls.** START : **01/17/04 @ 1310** END : **01/17/04 @ 1730** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36						
					END OF BORING @ 37.0 FEET BLS.	
38						
40						
42						
44						
46						

Sampler Signature: **J.Swenfurth** Date: **01/17/2004**

Appendix D
SWMU 1 – Soil Boring Logs - Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS : **NA** START : **1035** END : **1040** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), dark yellowish brown (10YR 4/6), dry, loose, fine to medium grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1040** END : **1045** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/6), dry, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1105** END : **1110** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/6), dry, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1110** END : **1115** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/6), dry, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1115** END : **1120** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/6), dry, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS06	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1125** END : **1130** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' LEAN CLAY WITH SAND (CL), very dark grayish brown (10YR 3/2), dry, soft, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS07	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1130** END : **1135** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS08	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0910** END : **0915** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, very loose, medium grained sand, trace organic material (roots), trace fine gravel.	Schonstedt used to clear boring location.
1.0					END OF BORING @ 8" bls.	Note: EPA split soil sample.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS09	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1140** END : **1145** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/6), dry, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS10	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1145** END : **1150** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' LEAN CLAY WITH SAND (CL), very dark grayish brown (10YR 3/2), dry, coarse grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	Note: Field duplicate collected. Sample ID: CGW1FD01P-R01
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS11	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0905** END : **0910** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), dark yellowish brown (10YR 4/4), dry, fine to c to coarse grained sand, fine to coarse gravel, trace organic material (roots).	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS12	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0925** END : **0930** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots).	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS13	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0940** END : **0945** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots).	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS14	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0955** END : **1000** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots).	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS15	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1005** END : **1010** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots).	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS16	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1025** END : **1030** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots).	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS17	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0925** END : **0930** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' WELL GRADED SAND (SW), very dark grayish brown (10YR 3/2), dry, very loose, fine to coarse grained sand, trace organic material (roots), trace fine to coarse gravel.	
1.0					END OF BORING @ 8" bls.	Note: EPA split sample.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS18	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1040** END : **1045** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND (SW), very dark brown (10YR 3/3), dry, very loose, fine to coarse grained sand, trace organic material (roots), trace fine to coarse gravel, trace gastropods, trace small black seeds.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS19	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1055** END : **1100** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots), trace gastropods.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS20	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1110** END : **1115** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots), trace gastropods.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	Note: Field duplicate collected.
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS21	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1125** END : **1130** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, medium grained sand, some coarse gravel, trace organic material (roots).	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS22	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/05/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1135** END : **1140** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots), trace black seeds, trace gastropods.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/05/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS23	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Intermittent drizzle** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0745** END : **0750** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), dark brown (10YR 3/3), dry, fine to coarse sand, fine to coarse gravel, trace organic material (roots).	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS24	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0755** END : **0800** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), brown (10YR 4/3), dry, fine to coarse sand, fine to coarse gravel, trace organic material (roots), very angular gravel.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS25	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0810** END : **0815** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), brown (10YR 4/3), dry, fine to coarse sand, fine to coarse gravel, trace organic material (roots), very angular gravel.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	Note: MS/MSD collected at this location.
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS26	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0840** END : **0845** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), brown (10YR 4/3), dry, fine to coarse sand, fine to coarse gravel, trace organic material (roots), very angular gravel.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS27	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0855** END : **0900** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), brown (10YR 4/3), dry, fine to coarse sand, fine to coarse gravel, trace organic material (roots), trace gastropods, very angular gravel.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS28	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0925** END : **0930** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH GRAVEL (SP), dark yellowish brown (10YR 4/4), dry, medium grained sand, fine gravel, trace organic material (roots), trace black seeds.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS29	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Partly cloudy 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0945** END : **0950** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 3/4), dry, medium grained sand, trace organic material (roots), trace gastropods.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS30	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0955** END : **1000** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), dark yellowish brown (10YR 3/4), dry, fine to coarse grained sand, fine and coarse gravel, trace organic material (roots), trace gastropods.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	Note: Field duplicate collected.
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS31	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1025** END : **1030** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED GRAVEL WITH SAND (GW), dark yellowish brown (10YR 3/4), dry, fine and coarse gravel, fine to coarse grained sand, trace organic material (roots).	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS32	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1035** END : **1040** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), brown (10YR 4/3), dry, fine to coarse sand, fine to coarse gravel, trace organic material (roots), trace rusted metal in sample, very angular gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS33	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0945** END : **0950** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, medium grained sand, very loose, trace organic material (roots), trace coarse gravel, trace gastropods. Note: white powder at surface of boring location.	
1.0					END OF BORING @ 8" bls.	Note: EPA slit sample.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS34	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/09/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1055** END : **1100** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, medium grained sand, some coarse gravel, trace organic material (roots), trace black seeds, trace gastropods.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/09/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS35	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1005** END : **1010** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), dark brown (10YR 3/3), dry, medium dense, medium grained sand, trace organic material (roots), trace coarse gravel.	
1.0					END OF BORING @ 8" bls.	Note: EPA split sample.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS36	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0735** END : **0740** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, loose, medium grained sand, some organic material (roots), trace fine gravel, trace gastropods.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS37	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0740** END : **0745** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, loose, medium grained sand, trace organic material (roots), trace fine gravel.	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS38	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0745** END : **0750** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 3/4), dry, loose, medium grained sand, trace organic material (roots), few fine to coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS39	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0755** END : **0800** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, loose, medium grained sand, trace organic material (roots), few fine to coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS40	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0805** END : **0810** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, medium grained sand, few roots, trace fine and coarse gravel, trace gastropods.	
1.0					END OF BORING @ 8" bls.	Note: Field duplicate collected.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS41	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0815** END : **0820** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, fine grained sand, trace fine gravel, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS42	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0840** END : **0845** LOGGER : **B. Brice**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), dark yellowish brown (10YR 4/4), dry, very loose, fine to coarse grained sand, fine gravel, few coarse gravel, trace gastropods, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	Note: MS/MSD collected.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS43	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0855** END : **0900** LOGGER : **B. Brice**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, very loose, medium grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS44	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0925** END : **0930** LOGGER : **B. Brice**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), very dark grayish brown (10YR 3/2), dry, very loose, medium grained sand, some clay, trace orgainic material (roots), trace gastropods, trace black seeds.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS45	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1005** END : **1010** LOGGER : **B. Brice**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), dark brown (10YR 3/3), dry, very loose, fine to medium grained sand, fine and coarse gravel, trace organic material (roots), trace gastropods.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS46	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1010** END : **1015** LOGGER : **B. Brice**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH GRAVEL (SP), dark yellowish brown (10YR 3/4), dry, very loose, fine to medium grained sand, fine to coarse gravel, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS47	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 80° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1025** END : **1030** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, loose, medium grained sand, some fine to coarse gravel, trace clay, trace organic material (roots)(black seeds).	Schonstedt used to clear boring location. OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS48	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/04/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1025** END : **1030** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/6), dry, loose, medium grained sand, trace organic material (roots), trace gastropods.	
1.0					END OF BORING @ 8" bls.	Note: EPA split sample.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/04/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS49	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 85° F, windy** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1040** END : **1045** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), dark yellowish brown (10YR 4/6), dry, loose, trace coarse gravel, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW1SS50	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 1** DATE: **02/10/04**

WEATHER: **Sunny 85° F, windy** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1055** END : **1100** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH GRAVEL (SW), dark yellowish brown (10YR 3/4), dry, loose, trace organic material (roots)(black seeds), trace gastropods.	
1.0					END OF BORING @ 8" bls.	Note: Field duplicate collected.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **02/10/2004**

Appendix D
SWMU 2 – Soil Boring Logs – Surface/Subsurface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SB01	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 2** DATE: **01/21/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 3" split spoon to rock.**

WATER LEVELS **NA** START : **01/21/04 @ 0845** END : **01/21/04 @ 0935** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm): Breathing Zone / Above Hole
	0.0					
		24	SS-1	NA	0.0' to 1.0' WELL GRADED SAND (SW), very dark grayish brown (10YR 3/2), dry, very loose, some coarse gravel, trace organic material (roots). 1.0' to 2.0' POORLY GRADED SAND (SP), very dark grayish brown (10YR 3/2), dry, very loose, medium grained sand, trace coarse gravel.	FID 0.0 ppm 0.0 ppm Headspace jar = 0.0 ppm
2	2.0					
		22	SS-2	NA	2.0' to 3.0' Same as above. 3.0' to 4.0' LEAN CLAY (CL), yellowish brown (10YR 5/4), dry, hard, low plasticity, cohesive.	FID 0.0 ppm 0.0 ppm Headspace jar = 0.0 ppm
4	4.0					
		12	SS-3	NA	4.0' to 4.5' Same as above. 4.5' to 5.0' Rock cobbles (andesite).	FID 0.0 ppm 0.0 ppm Headspace jar = 0.0 ppm
	5.0					
6					END OF BORING @ 5.0 ft. bls.	This boring was used to determine lithology and the interval to be sampled based on headspace results. Two additional borings were drilled within 6 - inches of this boring to collect a soil sample from the 3 to 5 foot interval. Boring grouted to surface upon completion.
8						Note: FID = Flame Ionization Detector.
10						
	12.0					

Sampler Signature: **J. Swenfurth** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SB02	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 2** DATE: **01/22/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Simco 2800 HT mobile drill rig with 3" split spoon.**

WATER LEVELS **NA** START : **01/22/04 @ 0900** END : **01/22/04 @ 0945** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm): Breathing Zone / Above Hole
	0.0					
		10	SS-1	NA	0.0' to 2.0' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry, loose, some coarse gravel (andesite).	FID 0.0 ppm 0.0 ppm Headspace jar = 0.0 ppm
2	2.0					
		18	SS-2	NA	2.0' to 4.0' POORLY GRADED SAND WITH CLAY (SP-SC), brown (10YR 4/3), dry, loose, some coarse gravel (andesite).	FID 0.0 ppm 0.0 ppm Headspace jar = 0.0 ppm
4	4.0					
	4.5	0	SS-3	NA	4.0' to 4.5' No sample collected. Refusal at 4.5' bls.	
6					END OF BORING @ 4.5 ft. bls.	This boring was used to determine lithology and the interval to be sampled based on headspace results. An additional boring was drilled within 6 - inches of this boring to collect a soil sample from the 2 to 4 foot interval. Boring grouted to surface upon completion.
8						Note: FID = Flame Ionization Detector.
10						
	12.0					

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

Appendix D
SWMU 2 – Soil Boring Logs – Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny, 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0910** END : **0915** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 4/4), moist, loose, fine to coarse grained sand, coarse gravel.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0925** END : **0930** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), yellowish brown (10YR 5/6), moist, loose, medium grained sand, trace clay, non plastic, noncohesivce.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1000** END : **1005** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), moist, loose, medium grained sand, trace clay, non plastic, noncohesivce.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1025** END : **1030** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND (SW), yellowish brown (10YR 5/6), moist, loose, trace clay, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1055** END : **1100** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH SILT (SP-SM), dark yellowish brown (10YR 4/3), moist, loose, fine grained sand, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS06	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1105** END : **1110** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND (SW), yellowish brown (10YR 5/6), moist, loose, trace clay.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS07	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1040** END : **1045** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 4/4), moist, loose, fine to coarse grained sand, coarse gravel.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS08	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1115** END : **1120** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), very dark brown (10YR 2/2), dry, loose, fine grained sand, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS09	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1155** END : **1200** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), brown (10YR 5/3), dry, loose, fine to coarse grained sand, coarse gravel.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS10	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1225** END : **1230** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), brown (10YR 5/3), dry, very loose, coarse grained gravel.	OVM 0.0 ppm 0.0 ppm
1.0					END OF BORING @ 0.7 ft. bls.	
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS11	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1240** END : **1245** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT (SW-SC), brown (10YR 5/3), dry, very loose, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW2SS12	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 2** DATE: **01/21/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1215** END : **1220** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), brown (10YR 5/3), dry, loose, coarse grained gravel.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/21/2004**

Appendix D
SWMU 4 –Soil Boring Logs – Surface/Subsurface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SB01	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **01/21/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Simco 2800 HT mobile drill rig with 3" split spoon.**

WATER LEVELS **NA** START : **01/21/04 @ 1145** END : **01/21/04 @ 1245** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. FID (ppm): Breathing Zone / Above Hole
	0.0					
		24	SS-1	NA	0.0' to 1.5' WELL GRADED SAND (SW), dark yellowish brown (10YR 3/4), dry, loose, fine to coarse sand, trace coarse gravel, trace organic material (roots). 1.5' to 2.0' POORLY GRADED SAND (SP), black (10YR 2/1), dry, loose, medium grained sand.	FID 0.0 ppm 0.0 ppm Headspace jar = 0.0 ppm
2	2.0					
		24	SS-2	NA	2.0' to 2.5' Same as above. 2.5' to 3.5' WELL GRADED SAND WITH CLAY (SW-SC), dark yellowish brown (10YR 4/4), dry, medium dense, trace coarse gravel. 3.5' to 4.0' POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), dry to moist, very loose, medium grained sand.	FID 0.0 ppm 0.0 ppm Headspace jar = 0.0 ppm
4	4.0					
		24	SS-3	NA	4.0' to 6.0' Same as above.	FID 0.0 ppm 0.0 ppm Headspace jar = 0.0 ppm
6	6.0					
					END OF BORING @ 6.0 ft. bls.	Note: 3-inch split spoon driven down three times. Boring stayed open. No augers were used. Note: Boring grouted to surface upon completion. Note: FID = Flame Ionization Detector.
8						
10						
	12.0					

Sampler Signature: **J. Swenfurth** Date: **01/21/2004**

Appendix D
SWMU 4 – Soil Boring Logs - Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1250** END : **1255** LOGGER : **K. Coats/J. Hayes/K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND WITH GRAVEL (SM), dark brown (10YR 3/3), moist, loose, medium grained sand.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1305** END : **1310** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SANDY LEAN CLAY WITH GRAVEL (CL), dark brown (10YR 3/3), moist, stiff, medium grained sand, coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1245** END : **1250** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SANDY LEAN CLAY WITH GRAVEL (CL), dark brown (10YR 3/3), moist, stiff, medium grained sand, coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1310** END : **1315** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' CLAYEY SAND (SC), dark brown (10YR 3/3), moist, loose, fine grained sand, trace coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1320** END : **1325** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' CLAYEY SAND WITH GRAVEL (SC), dark brown (10YR 3/3), moist, loose, fine grained sand.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS06	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1355** END : **1400** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' CLAYEY SAND WITH GRAVEL (SC), dark brown (10YR 3/3), moist, loose, fine grained sand, fine to coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS07	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1400** END : **1405** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' CLAYEY SAND WITH GRAVEL (SC), dark brown (10YR 3/3), moist, loose, fine grained sand, fine to coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS08	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1410** END : **1415** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' CLAYEY SAND WITH GRAVEL (SC), dark brown (10YR 3/3), moist, loose, fine grained sand, fine to coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS09	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1415** END : **1420** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' CLAYEY SAND WITH GRAVEL (SC), dark brown (10YR 3/3), moist, loose, fine grained sand, fine to coarse gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS10	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1425** END : **1430** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SANDY LEAN CLAY WITH GRAVEL (CL), dark brown (10YR 3/3), moist, stiff, fine grained sand, fine gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS11	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1430** END : **1435** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SANDY LEAN CLAY WITH GRAVEL (CL), dark brown (10YR 3/3), moist, stiff, fine grained sand, fine gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW4SS12	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 4** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1435** END : **1440** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SANDY LEAN CLAY WITH GRAVEL (CL), dark brown (10YR 3/3), moist, stiff, fine grained sand, fine gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

Appendix D
SWMU 5 – Soil Boring Logs – Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW5SS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 5** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0940** END : **0945** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 3/6), dry, loose, medium to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	Note: EPA split sample.
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW5SS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 5** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1000** END : **1005** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 3/6), moist, loose, medium to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW5SS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 5** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1020** END : **1025** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 3/6), moist, loose, fine to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW5SS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 5** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1040** END : **1045** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 3/6), moist, loose, medium to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
1.0					END OF BORING @ 0.7 ft. bls.	Note: Collected MS/MSD at this location.
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

Appendix D
SWMU 6-7 –Soil Boring Logs – Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0850** END : **0855** LOGGER : **K. Coats/J. Hayes/K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel, trace rusted metal debris.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0835** END : **0840** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0910** END : **0915** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0915** END : **0920** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0920** END : **0925** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel, trace metal debris (nails).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS06	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0935** END : **0940** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel.	
1.0					END OF BORING @ 8" bls.	Note: MS/MSD and Field Duplicate collected at this location.
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS07	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0950** END : **0955** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS08	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0955** END : **1000** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel, trace rusted metal debris (bolt).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS09	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1015** END : **1020** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND WITH GRAVEL (SM), dark brown (10YR 3/3), dry, loose, fine grained sand.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW6/7SS10	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 6 & 7** DATE: **06/13/00**

WEATHER: **Sunny, hot, 91° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1010** END : **1015** LOGGER : **K. Coats, J. Hayes, K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' SILTY SAND (SM), dark brown (10YR 3/3), dry, loose, fine grained sand, trace fine gravel.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/13/2000**

Appendix D
SWMU 8 – Soil Boring Logs – Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW8SS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 8** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1055** END : **1100** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 4/4), moist, loose, medium to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	Note: Field duplicate also collected at this location.
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW8SS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 8** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1120** END : **1125** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 4/4), moist, loose, medium to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	Note: EPA slit sample.
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW8SS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 8** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1135** END : **1140** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), dark yellowish brown (10YR 4/4), moist, loose, fine to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW8SS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 8** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1145** END : **1150** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), brown (10YR 5/3), dry, loose, fine to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
1.0					END OF BORING @ 0.7 ft. bls.	
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW8SS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 8** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1150** END : **1200** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), brown (10YR 5/3), dry, very loose, fine to medium grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

Appendix D
SWMU 10 – Soil Boring Logs - Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF Phase I RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **06/07/00**

WEATHER: **Sunny 90° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1110** END : **1115** LOGGER : **A. Chang**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), very dark brown (10YR 2/2), dry to moist, loose, fine grained sand, non plastic, noncohesivce.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **A. Chang** Date: **06/07/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF Phase I RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **06/07/00**

WEATHER: **Sunny 90° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1210** END : **1215** LOGGER : **A. Chang**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, very loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **A. Chang** Date: **06/07/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF Phase I RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **06/07/00**

WEATHER: **Sunny 90° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1255** END : **1300** LOGGER : **A. Chang**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), dark brown (10YR 3/3), dry, medium dense, fine grained sand, trace organic material (roots), non plastic, noncohesivce.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **A. Chang** Date: **06/07/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF Phase I RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **06/07/00**

WEATHER: **Sunny 90° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1340** END : **1345** LOGGER : **A. Chang**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), very dark brown (10YR 2/2), dry, loose, medium grained sand, trace organic material (roots), trace clay.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **A. Chang** Date: **06/07/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Partly cloudy, 84° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1145** END : **1150** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/2), moist, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **R. Gorsira** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS06	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1005** END : **1010** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), very dark brown (10YR 2/2), dry, loose, fine grained sand, trace organic material (roots), non plastic, noncohesivce.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS07	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0935** END : **0940** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), very dark brown (10YR 2/2), dry to moist, loose, fine grained sand, non plastic, noncohesivce.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS08	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1125** END : **1130** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), very dark grayish (10YR 3/2), dry, loose, coarse grained sand, trace organic material (roots), non plastic, noncohesivce.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS09	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1245** END : **1250** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, very loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS10	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1040** END : **1045** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), very dark brown (10YR 2/2), dry, loose, fine grained sand, trace organic material (roots), non plastic, noncohesivce.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS11	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0850** END : **0855** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS12	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1220** END : **1225** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, very loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **0/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS13	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0910** END : **0915** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), dark brown (10YR 3/3), dry, medium dense, fine grained sand, trace organic material (roots), non plastic, noncohesivce.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS14	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1205** END : **1210** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' LEAN CLAY (CL), dark yellowish brown (10YR 4/4), dry, soft, some coarse grained sand, trace fine gravel, low plasticity, cohesive.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS15	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1135** END : **1140** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), very dark brown (10YR 2/2), dry, medium grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS16	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0955** END : **1000** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), very dark grayish brown (10YR 3/2), moist, fine grained sand, trace organic material (roots), trace gravel.	
	0.7				END OF BORING @ 8" bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **R. Gorsira** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS17	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1105** END : **1110** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), very dark grayish brown (10YR 3/2), dry, very loose, mdium grained sand, trace organic material (roots), trace clay.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS18	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1020** END : **1025** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), very dark brown (10YR 2/2), dry, loose, medium grained sand, trace organic material (roots), trace clay.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS19	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 90° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1100** END : **1105** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), dark brown (10YR 3/3), dry, loose, fine grained sand, trace organic material (roots), non plastic.	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SS20	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1050** END : **1055** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, loose, medium grained sand, trace organic material (roots).	
1.0					END OF BORING @ 8" bls.	
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

Appendix D
SWMU 10 – Soil Boring Logs – for Monitoring Wells

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW01	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/08/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **40.0 feet bls.** START : **01/08/04 @ 1100** END : **01/22/04 @ 1715** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
	0.0						
2	2.0	18	SS-1	6 - 5 - 10 - 8 (15)	0.0 to 0.5' SILT WITH SAND (ML), black (7.5YR 2.5/1), dry, stiff, fine grained sand, trace organic material (roots). 0.5' to 2.0' WELL GRADED SAND (SW), dark brown (10YR 3/3), dry, medium dense, fine to coarse sand, trace clay.	OVM 0.3 ppm	0.3 ppm
4	4.0	15	SS-2	3 - 5 - 6 - 6 (11)	2.0' to 4.0' Same as above.	OVM 0.3 ppm	0.3 ppm
6	6.0	18	SS-3	3 - 6 - 8 - 10 (14)	4.0' to 6.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, medium dense, fine coarse sand, trace clay.	OVM 0.0 ppm	0.0 ppm
8	8.0	24	SS-4	8 - 17 - 22 - 22 (39)	6.0' to 8.0' WELL GRADED SAND (SW), light yellowish brown (2.5Y 6/4), dry, dense, fine to coarse sand, trace coarse gravel.	OVM 0.0 ppm	0.0 ppm
10	10.0	10	SS-5	11 - 16 - 16 - 18 (32)	8.0' to 10.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, dense, fine to coarse sand, trace coarse gravel.	OVM 0.0 ppm	0.0 ppm
	12.0	24	SS-6	13 - 17 - 18 - 15 (35)	10.0' to 12.0' Same as above.		

Sampler Signature: **J. Swenfurth** Date: **01/08/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW01	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/08/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **40.0 feet bls.** START : **01/08/04 @ 1100** END : **01/22/04 @ 1715** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12	12.0					
14	14.0	22	SS-7	3 - 12 - 12 - 14 (24)	12.0' to 14.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, medium dense, fine to coarse sand, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
16	16.0	24	SS-8	22-22-26 - 50/4" (48)	14.0' to 16.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, dense, fine to coarse sand, trace coarse gravel.	OVM 0.0 ppm 0.0 ppm
18	18.0	20	SS-9	19 - 28 - 50/6"	16.0' to 18.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, very dense, fine to coarse sand, trace coarse gravel (limestone).	OVM 0.0 ppm 0.0 ppm
20	20.0	22	SS-10	16 - 27 - 27 - 26 (54)	18.0' to 20.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, very dense, fine to coarse sand.	OVM 0.0 ppm 0.0 ppm
22	22.0	24	SS-11	12 - 18 - 21 - 22 (39)	20.0' to 20.5' LEAN CLAY (CL), yellowish brown (10YR 5/6), dry, hard, low plasticiy, cohesive. 20.5' to 20.7' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, very dense, fine to coarse sand. 20.7' to 22.0' LEAN CLAY (CL), yellowish brown (10YR 5/6), dry, hard, low plasticiy, cohesive.	OVM 0.0 ppm 0.0 ppm
24	24.0	24	SS-12	13 - 19 - 24 - 28 (43)	22.0' to 24.0' LEAN CLAY (CL), yellowish brown (10YR 5/6), dry, hard, low plasticiy, cohesive. trace coarse sand, trace black phospate specs, magenta mottling throughout.	OVM 0.0 ppm 0.0 ppm Stopped drilling with hollow stem augers. Moved off hole to begin drilling at SWMU 1.

Sampler Signature: **J.Swenfurth** Date: **01/08/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW01	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/08/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **40.0 feet bls.** START : **01/08/04 @ 1100** END : **01/22/04 @ 1715** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
24						Began drilling with air hammer on 01-22-04 at 1530
					25.0' Fractured rock layer.	
26						26.0' Poor air return up borehole.
						OVM 0.0 ppm 0.0 ppm
28						
						OVM 0.0 ppm 0.0 ppm
30						
32						32.0' Belt broke on Mobile B-61 drill rig. Continued air drilling with Simco drill rig.
					33.0' Granodiorite layer encountered.	
34						
36						

Sampler Signature: **J.Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW01	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/08/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **40.0 feet bls.** START : **01/08/04 @ 1100** END : **01/22/04 @ 1715** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
36						
38						OVM 0.0 ppm 0.0 ppm
40					40.0' Saturated, water blowing out borehole.	
42					END OF BORING @ 42.0 FEET BLS.	
44						
46						

Sampler Signature: **J.Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW02	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/19/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **27.0 feet bls.** START : **01/19/04 @ 1100** END : **01/19/04 @ 1430** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
0.0						
2, 4	0.0–5.0				0.0' to 5.0' POORLY GRADED SAND (SP), dark brown (7.5YR 3/3), dry, loose, fine grained sand, trace clay.	OVM 0.0 ppm 0.0 ppm
6	5.0–7.0	24"	SS-1	7 - 6 - 9 - 7 (15)	5.0' to 7.0' POORLY GRADED SAND (SP), dark brown (7.5YR 3/3), dry, medium dense, fine grained sand, trace clay.	OVM 0.0 ppm 0.0 ppm
8	7.0–10.0					OVM 0.0 ppm 0.0 ppm
10	10.0–12.0	18	SS-2	9 - 10 - 8 - 20 (18)	10.0' to 12.0' LEAN CLAY WITH SAND (CL), brown (7.5YR 4/3), dry, medium dense, fine grained sand, trace medium grained sand, non plastic, noncohesive.	OVM 0.0 ppm 0.0 ppm

Sampler Signature: **J. Swenfurth** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW02	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/19/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **27.0 feet bls.** START : **01/19/04 @ 1100** END : **01/19/04 @ 1430** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12	12.0					
14	15.0					OVM 0.0 ppm 0.0 ppm
16	17.0	16	SS-3	9 - 13 - 18 - 26 (31)	15.0' to 15.5' WELL GRADED SAND (SW), brown (7.5YR 4/4), dry, dense, fine to coarse grained sand. 15.5' to 17.0' LEAN CLAY WITH SAND (CL), brown (7.5YR 4/4), dry, hard, medium grained sand, trace fine sand.	OVM 0.0 ppm 0.0 ppm
18	20.0					OVM 0.0 ppm 0.0 ppm
20	22.0	22	SS-4	11 - 20 - 44 - 45 (64)	20.0' to 21.5' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/6), dry, very dense, trace coarse gravel. 21.5' to 22.0' Weathered granodiorite (saprolite), dry.	OVM 0.0 ppm 0.0 ppm
22						Began air hammer at 22.0' bls.
24						

Sampler Signature: **J.Swenfurth** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW02	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/19/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **27.0 feet bls.** START : **01/19/04 @ 1100** END : **01/19/04 @ 1430** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
24						
						OVM 0.0 ppm 0.0 ppm
26						
					27.0' Sandy layer, moist.	
28						
					29.0' Hard rock, (granodiorite).	
30						
						OVM 0.0 ppm 0.0 ppm
					31.0' Soft rock.	
32						
34						

Sampler Signature: **J.Swenfurth** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW02	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/19/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **27.0 feet bls.** START : **01/19/04 @ 1100** END : **01/19/04 @ 1430** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36						
					END OF BORING @ 37.0 FEET BLS.	
38						
40						
42						
44						
46						

Sampler Signature: **J.Swenfurth** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW03	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/19/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **18.0 feet bls.** START : **01/19/04 @ 1500** END : **01/19/04 @ 1610** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0.0					
2						OVM 0.0 ppm 0.0 ppm
4	5.0					
6	7.0	20	SS-1	6 - 10 - 10 - 12 (20)	5.0' to 7.0' POORLY GRADED SAND (SP), dark brown (7.5YR 3/3), dry, medium dense, fine grained sand, trace medium grained sand, trace clay, trace organic material (roots).	OVM 0.0 ppm 0.0 ppm
8						OVM 0.0 ppm 0.0 ppm
10	10.0					
	12.0	24	SS-2	15 - 21 - 24 - 25 (45)	10.0' to 12.0' LEAN CLAY WITH SAND (CL), brown (7.5YR 4/3), dry, dense, fine grained sand, trace medium grained sand, non plastic, noncohesive.	OVM 0.0 ppm 0.0 ppm

Sampler Signature: **J. Swenfurth** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW03	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/19/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **18.0 feet bls.** START : **01/19/04 @ 1500** END : **01/19/04 @ 1610** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
12	12.0					
14	15.0					OVM 0.0 ppm 0.0 ppm
16	17.0	20	SS-3	10-26-38 - 50/5" (64)	15.0' to 16.5' WELL GRADED SAND (SW), brown (7.5YR 4/4), dry, very dense, fine to coarse grained sand, trace clay. 16.5' to 17.0' LEAN CLAY WITH SAND (CL), brown (7.5YR 4/4), dry, medium grained sand, trace fine grained sand.	OVM 0.0 ppm 0.0 ppm
18					18.0' to 23.0' WELL GRADED SAND (SW), moist.	Began air hammer drilling at 17.0' bls. OVM 0.0 ppm 0.0 ppm
20						
22					23.0' WELL GRADED SAND (SW), moist to wet.	OVM 0.0 ppm 0.0 ppm
24						

Sampler Signature: **J.Swenfurth** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW03	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/19/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **18.0 feet bls.** START : **01/19/04 @ 1500** END : **01/19/04 @ 1610** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
24						
						OVM 0.0 ppm 0.0 ppm
26						
					27.0' Hard rock layer (granodiorite).	
28						
30						
						OVM 0.0 ppm 0.0 ppm
32						
34						

Sampler Signature: **J.Swenfurth** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW03	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/19/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **18.0 feet bls.** START : **01/19/04 @ 1500** END : **01/19/04 @ 1610** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36					36.0' Sand and Gravel layer, dry.	
					END OF BORING @ 37.0 FEET BLS.	
38						
40						
42						
44						
46						

Sampler Signature: **J.Swenfurth** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW04	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/20/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **35.0 feet bls.** START : **01/20/04 @ 1500** END : **01/20/04 @ 1700** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0.0					
2						OVM 0.0 ppm 0.0 ppm
4						
	5.0					
6		24	SS-1	8 - 15 - 17 - 27 (32)	5.0' to 6.5' POORLY GRADED SAND (SP), brown (10YR 4/3), dry, dense, fine grained sand. 6.5' to 7.0' LEAN CLAY (CL), brown (10YR 4/3), dry, hard, low plasticiy, cohesive.	OVM 0.0 ppm 0.0 ppm
	7.0					
8						OVM 0.0 ppm 0.0 ppm
10	10.0					
		16	SS-2	14 - 19 - 22 - 40 (41)	10.0' to 12.0' LEAN CLAY (CL), brown (10YR 4/3), dry, hard, trace medium grained sand, low plasticity, noncohesive.	OVM 0.0 ppm 0.0 ppm
	12.0					

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW04	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/20/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **35.0 feet bls.** START : **01/20/04 @ 1500** END : **01/20/04 @ 1700** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12	12.0					
14	15.0					OVM 0.0 ppm 0.0 ppm
16	17.0	24	SS-3	22 - 26 - 22 - 24 (48)	15.0' to 16.5' WELL GRADED SAND (SW), yellowish brown (10YR 5/4), dry, dense, fine to coarse grained sand, trace fine weathered gravel (granodiorite/saprolite). 16.5' to 17.0' LEAN CLAY WITH SAND (CL), brown (7.5YR 4/4), dry, medium grained sand, trace fine grained sand.	OVM 0.0 ppm 0.0 ppm
18						Began air hammer drilling at 17.0' bls.
20						OVM 0.0 ppm 0.0 ppm
22					22.0' Fractured rock layer.	OVM 0.0 ppm 0.0 ppm
24					23.0' to 25.0' Sand layer.	

Sampler Signature: **J.Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW04	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/20/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **35.0 feet bls.** START : **01/20/04 @ 1500** END : **01/20/04 @ 1700** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
24						
						OVM 0.0 ppm 0.0 ppm
26					26.0' to 27.0' Sand layer.	
28						
30						
						OVM 0.0 ppm 0.0 ppm
32						
34						
					35.0' to 42.0' Coarse sand layer, saturated.	

Sampler Signature: **J.Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW04	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/20/04**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **35.0 feet bls.** START : **01/20/04 @ 1500** END : **01/20/04 @ 1700** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
36						air hammer drilling.
38						OVM 0.0 ppm 0.0 ppm
40						
42					END OF BORING @ 42.0 FEET BLS.	
44						
46						

Sampler Signature: **J.Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW05	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/21/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **35.0 feet bls.** START : **01/21/04 @ 1520** END : **01/22/04 @ 1325** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0.0					
2						OVM 0.0 ppm 0.0 ppm
4	5.0					
6	7.0	18	SS-1	5 - 9 - 12 - 14 (21)	5.0' to 7.0' LEAN CLAY WITH SAND (CL), brown (10YR 4/3), dry, very stiff, medium grained sand, non plastic, noncohesive.	OVM 0.0 ppm 0.0 ppm
8						OVM 0.0 ppm 0.0 ppm
10	10.0					
	12.0	24	SS-2	10 - 12 - 14 - 27 (26)	10.0' to 12.0' Same as 5.0' to 7.0'.	OVM 0.0 ppm 0.0 ppm

Sampler Signature: **J. Swenfurth** Date: **01/21/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW05	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/21/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **35.0 feet bls.** START : **01/21/04 @ 1520** END : **01/22/04 @ 1325** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12						
14	15.0					OVM 0.0 ppm 0.0 ppm
16	17.0	20	SS-3	10 - 13 - 13 - 10 (26)	15.0' to 15.5' Same as 10.0' to 12.0'. 15.0' to 16.0' WELL GRADED SAND (SW), yellowish brown (10YR 5/4), dry, medium dense, fine to coarse grained sand, 16.0' to 17.0' Same as 10.0' to 12.0'.	OVM 0.0 ppm 0.0 ppm
18						
20	20.0					
22	22.0	18	SS-4	19 - 26 - 23 - 26 (49)	20.0' to 22.0' WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, dense, fine to coarse sand.	OVM 0.0 ppm 0.0 ppm
24						Began drilling with air hammer at 22.0' bls. OVM 0.0 ppm 0.0 ppm

Sampler Signature: **J.Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW05	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/21/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **35.0 feet bls.** START : **01/21/04 @ 1520** END : **01/22/04 @ 1325** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
24						
26					26.0' Sand and clay layer.	Good air return up borehole during drilling.
					27.0' Fractured rock layer.	
28						OVM 0.0 ppm 0.0 ppm
30						
32						OVM 0.0 ppm 0.0 ppm
34						

Sampler Signature: **J.Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10MW05	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **01/21/04**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **Geoworks, Inc.**

DRILLING METHOD AND EQUIPMENT USED : **Mobile B-61, 6" OD HSA's with 2" split spoon to rock, switched to 6-1/4" OD air hammer.**

WATER LEVELS **35.0 feet bls.** START : **01/21/04 @ 1520** END : **01/22/04 @ 1325** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36					36.0' Rock layer (granodiorite).	
					37.0' Sandy layer, grayish brown.	
38						
						OVM 0.0 ppm 0.0 ppm
40						
42					42.0' Saturated zone.	A lot of water being blown up borehole.
					END OF BORING @ 43.0 FEET BLS.	
44						
46						

Sampler Signature: **J.Swenfurth** Date: **01/22/2004**

Appendix D
SWMU 10 – Soil Boring Logs – Subsurface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB01	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF Phase I RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **06/07/00**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1140** END : **1145** LOGGER : **A. Chang**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2						
4	4.0					
	5.0	NA	NA	NA	4.0' to 5.0' POORLY GRADED SAND (SP), dark brown (7.5YR 3/3), dry, medium dense, fine grained sand, trace medium grained sand, trace clay, trace organic material (roots).	
6						
8						
10						

Sampler Signature: **A. Chang** Date: **06/07/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB02	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF Phase I RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **06/07/00**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1240** END : **1245** LOGGER : **A. Chang**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2						
4	4.0					
	5.0	NA	NA	NA	4.0' to 5.0' POORLY GRADED SAND (SP), dark brown (7.5YR 3/3), dry, medium dense, fine grained sand, trace clay.	
6						
8						
10						

Sampler Signature: **A. Chang** Date: **06/07/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB03	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF Phase I RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **06/07/00**

WEATHER: **Sunny, 85°F** DRILLING CONTRACTOR **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1405** END : **1410** LOGGER : **A. Chang**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0.0					
2						
4	4.0					
	5.0	NA	NA	NA	5.0' to 7.0' LEAN CLAY WITH SAND (CL), brown (10YR 4/3), dry, very stiff, medium grained sand, non plastic, noncohesive.	
6						
8						
10						

Sampler Signature: **A. Chang** Date: **06/07/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB04	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF Phase I RFI INVESTIGATION** LOCATION : **SWMU 10** DATE: **06/07/00**

WEATHER: **Sunny, 90°F** DRILLING CONTRACTOR **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1440** END : **1445** LOGGER : **A. Chang**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0.0					
2						
	3.5					
4		NA	NA	NA	3.5' to 4.5' POORLY GRADED SAND (SP), brown (10YR 4/3), dry, dense, fine grained sand.	
	4.5					
6						
8						
10						

Sampler Signature: **A. Chang** Date: **06/07/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB05	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Partly cloudy, 84° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1155** END : **1200** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
	0.7				Black plastic liner found at 0.7' bls.	
					0.7' to 1.3' LEAN CLAY WITH SAND (CL), strong brown (7.5YR 4/6), moist, soft, coarse grained sand, trace organic material (roots).	
1.0		NA	NA	NA		
	1.3					
					END OF BORING @ 1.3' bls.	
1.5						
2.0						
2.5						

Sampler Signature: **R. Gorsira** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB06	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1015** END : **1020** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
1.0						
1.5						
2.0						
2.5						

Boring continued on next page.

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB06	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1015** END : **1020** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
3.0						
		NA	NA	NA	3.0' to 3.6' LEAN CLAY WITH SAND (CL), dark brown (10YR 4/3), dry, medium stiff, non plastic, noncohesive, fine grained sand.	Black plastic liner at 3.0' bls.
3.5						
					END OF BORING @ 3.6' bls.	
4.0						Note: Boring grouted to surface upon completion.
4.5						
5.0						
5.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB07	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0950** END : **0955** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
	0.7				Black plastic liner found at 0.7' bls.	
					0.7' to 1.3' LEAN CLAY WITH SAND (CL), dark brown (10YR 3/3), dry to moist, soft, fine grained sand, trace organic material (roots).	
1.0		NA	N A	NA		
	1.3					
					END OF BORING @ 1.3' bls.	Note: Boring grouted to surface upon completion.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB08	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1135** END : **1140** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.75				Black plastic liner found at 0.75' bls.	
1.0	1.35	NA	NA	NA	0.75' to 1.35' LEAN CLAY WITH SAND (CL), yellowish brown (10YR 5/4), dry, medium stiff, coarse grained sand, trace organic material (roots).	
1.5					END OF BORING @ 1.35' bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB09	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1250** END : **1255** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
	0.9				Black plastic liner found at 0.9' bls.	
1.0		NA	NA	NA	0.9' to 1.3' LEAN CLAY (CL), dark brown (10YR 3/3), dry, medium stiff, low plasticiy, noncohesive.	
1.5	1.5				1.3' to 1.5' POORLY GRADED SAND (SP), dark brown (10YR 3/3), dry, loose, coarse grained sand.	
					END OF BORING @ 1.5 ft. bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB10	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1050** END : **1055** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.83				Black plastic liner found at 0.83' bls.	
1.0	1.45	NA	NA	NA	0.83 to 1.45' LEAN CLAY WITH SAND (CL), dark brown (10YR 3/3), dry, medium stiff, non plastic, noncohesive, fine to medium grained sand.	
1.5					END OF BORING @ 1.45' bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB11	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0855** END : **0900** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
1.0						
1.5						
2.0	2.0				Black plastic liner found at 2.0' bls.	
2.5	2.66'	NA	NA	NA	2.0' to 2.66' POORLY GRADED SAND WITH CLAY (SP-SC), dark yellowish brown (10YR 4/6), dry, loose, non plastic, noncohesive.	
					END OF BORING @ 2.66' bls.	Note: Boring grouted to surface upon completion.

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB12	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1235** END : **1240** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
1.0	1.08				Black plastic liner found at 1.08' bls.	
		NA	NA	NA	1.08' to 1.75' LEAN CLAY WITH SAND (CL), dark brown (10YR 3/3), dry, medium grained sand, non plastic.	
1.5	1.75					
					END OF BORING @ 1.75' bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **0/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB13	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0925** END : **0930** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
	0.7				Black plastic liner found at 0.7' bls.	
					0.7' to 1.3' LEAN CLAY WITH SAND (CL), brown (10YR 4/3), dry, medium stiff, medium plastic, cohesive, fine grained sand.	
1.0		NA	NA	NA		
	1.3					
					END OF BORING @ 1.3 ft bls.	Note: Boring grouted to surface upon completion.
1.5						
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB14	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1210** END : **1215** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
	0.7				Black plastic liner found at 0.7' bls.	
1.0		NA	NA	NA	0.7' to 1.2' LEAN CLAY WITH SAND (CL), dark yellowish brown (10YR 3/6), dry, soft, low plasticity, noncohesive, fine grained sand.	
	1.3				1.2' to 1.3' POORLY GRADED SAND (SP), dark yellowish brown (10YR 3/6), dry, very loose, fine grained sand.	
1.5					END OF BORING @ 1.3 ft bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB15	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1150** END : **1155** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.75				Black plastic liner found at 0.75' bls.	
1.0	1.4	NA	NA	NA	0.75' to 1.4' POORLY GRADED SAND (SP), dark brown (10YR 4/3), dry to moist, very loose, coarse grained sand, trace gravel.	
1.5					END OF BORING @ 1.4 ft bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB16	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1000** END : **1005** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.75				Black plastic liner found at 0.75' bls.	
1.0	1.4	NA	NA	NA	0.75' to 1.4' LEAN CLAY WITH SAND (CL), dark yellowish brown (10YR 4/4), dry, soft, low plasticity, noncohesive, fine grained sand.	
1.5					END OF BORING @ 1.4 ft bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB17	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1110** END : **1115** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.5				Black plastic liner found at 0.5' bls.	
1.0	1.16	NA	NA	NA	0.5' to 1.16' LEAN CLAY WITH SAND (CL), dark yellowish brown (10YR 4/4), dry to moist, medium dense, coarse grained sand, non plastic, noncohesive, trace organic material (roots), trace cobbles.	
1.5					END OF BORING @ 1.16 ft bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB18	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1035** END : **1040** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
1.0	1.0				Black plastic liner found at 1.0' bls.	
		NA	NA	NA	1.0' to 1.6' POORLY GRADED SAND WITH CLAY (SP-SC), dark brown (10YR 4/3), dry, loose, medium grained sand.	
1.5	1.6'					
					END OF BORING @ 1.6 ft bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB19	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/20/04**

WEATHER: **Sunny 90° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1120** END : **1125** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5						
	0.83				Black plastic liner found at 0.83' bls.	
1.0		NA	NA	NA	0.83' to 1.4' POORLY GRADED SAND (SP), yellowish brown (10YR 5/6), moist, very loose, coarse grained sand.	
1.5	1.5				1.4' to 1.5' LEAN CLAY (CL), dark gray (5Y 4/1), dry to moist, trace medium sand, medium plastic, cohesive.	
					END OF BORING @ 1.5 ft bls.	Note: Boring grouted to surface upon completion.
2.0						
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/20/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW10SB20	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 10** DATE: **01/22/04**

WEATHER: **Sunny 85° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1100** END : **1105** LOGGER : **J. Swenfurth**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.83				Black plastic liner found at 0.83' bls.	
1.0		NA	NA	NA	0.83' to 1.5' LEAN CLAY WITH SAND (CL), dark yellowish brown (10YR 4/4), dry to moist, medium dense, coarse grained sand, low plasticity, noncohesive.	
1.5	1.5				END OF BORING @ 1.5 ft bls.	
2.0						Note: Boring grouted to surface upon completion.
2.5						

Sampler Signature: **J. Swenfurth** Date: **01/22/2004**

Appendix D
SWMU 12 – Soil Boring Logs - Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW12SS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 12** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1205** END : **1210** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT (SW-SM), yellowish brown (10YR 5/4), dry, very loose, fine to coarse grained sand, trace coarse gravel, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW12SS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 12** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1225** END : **1230** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT (SW-SM), yellowish brown (10YR 5/4), dry, very loose, fine to coarse grained sand, trace coarse gravel, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW12SS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 12** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1235** END : **1240** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), yellowish brown (10YR 5/4), dry, very loose, fine to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW12SS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 12** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1245** END : **1250** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), yellowish brown (10YR 5/4), dry, very loose, fine to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGW12SS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **SWMU - 12** DATE: **01/19/04**

WEATHER: **Sunny, hot, light wind** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1255** END : **1300** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		NA	NA	NA	0.0' to 0.7' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), yellowish brown (10YR 5/4), dry, very loose, fine to coarse grained sand, non plastic.	OVM 0.0 ppm 0.0 ppm
0.5						
	0.7				END OF BORING @ 0.7 ft. bls.	Note: Split sample with EPA.
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/19/2004**

Appendix D
PAOC F – Soil Boring Logs - Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAFSS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - F** DATE: **06/14/00**

WEATHER: **Sunny, 92° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0955** END : **1000** LOGGER : **K. Coats/J. Hayes/K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' LEAN CLAY WITH GRAVEL (CL), brown (10YR 4/3), dry, stiff.	
1.0					END OF BORING @ 0.7 ft. bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/14/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAFSS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - F** DATE: **06/14/00**

WEATHER: **Sunny, 92° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1010** END : **1015** LOGGER : **K. Coats/J. Hayes/K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), brown (10YR 4/3), dry, loose, medium graded sand.	
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/14/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAFSS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - F** DATE: **06/14/00**

WEATHER: **Sunny, 92° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1045** END : **1050** LOGGER : **K. Coats/J. Hayes/K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), brown (10YR 4/3), dry, loose, medium graded sand.	
1.0					END OF BORING @ 0.7 ft. bls.	
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/14/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAFSS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - F** DATE: **06/14/00**

WEATHER: **Sunny, 92° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1050** END : **1055** LOGGER : **K. Coats/J. Hayes/K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5		NA	NA	NA	0.0' to 0.7' LEAN CLAY WITH GRAVEL (CL), brown (10YR 4/3), dry, stiff, fine gravel.	
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/14/2000**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAFSS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - F** DATE: **06/14/00**

WEATHER: **Sunny, 92° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **1020** END : **1025** LOGGER : **K. Coats/J. Hayes/K. Swanson**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND WITH CLAY (SP-SC), brown (10YR 4/3), dry, loose, medium grained sand.	
1.0					END OF BORING @ 0.7 ft. bls.	Note: MS/MSD and Field Duplicate collected at this location.
1.5						
2.0						
2.5						

Sampler Signature: **K. Swanson** Date: **06/14/2000**

Appendix D
PAOC G – Soil Boring Logs - Surface

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAGSS01	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - G** DATE: **01/22/04**

WEATHER: **Sunny, 81° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0850** END : **0855** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), brown (10YR 4/3), moist, loose, fine grained sand, trace coarse gravel, trace organic material (roots).	
1.0					END OF BORING @ 0.7 ft. bls.	
1.5						
2.0						
2.5						

Sampler Signature: **R. Gorsira** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAGSS02	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - G** DATE: **01/22/04**

WEATHER: **Sunny 81° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0910** END : **0915** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5		NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), brown (10YR 4/3), moist, loose, fine grained sand, trace coarse gravel, trace organic material (roots).	
	0.7				END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **R. Gorsira** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAGSS03	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - G** DATE: **01/22/04**

WEATHER: **Sunny 81° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0930** END : **0935** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' LEAN CLAY WITH SAND (CL), mottled yellowish brown (10YR 5/4) and very dark grayish brown (10YR 3/2), moist, medium stiff, fine grained sand, low plasticity, cohesive.	
					END OF BORING @ 0.7 ft. bls.	
1.0						
1.5						
2.0						
2.5						

Sampler Signature: **R. Gorsira** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAGSS04	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - G** DATE: **01/22/04**

WEATHER: **Sunny 81° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0840** END : **0845** LOGGER : **I. Lynch**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), brown (10YR 4/3), moist, loose, fine grained sand, trace clay, trace coarse gravel, trace organic material (roots).	
1.0					END OF BORING @ 0.7 ft. bls.	
1.5						
2.0						
2.5						

Sampler Signature: **I. Lynch** Date: **01/22/2004**

PROJECT NUMBER	BORING NUMBER	
183719.FI.ZZ	CGAGSS05	SHEET 1 OF 1

SURFACE SOIL LOG

PROJECT : **AFWTF RFI INVESTIGATION** LOCATION : **AOC - G** DATE: **01/22/04**

WEATHER: **Sunny 82° F** DRILLING CONTRACTOR : **CH2M HILL**

DRILLING METHOD AND EQUIPMENT USED : **3" diameter stainless steel hand auger with stainless steel bowl and spoon.**

WATER LEVELS **NA** START : **0940** END : **0945** LOGGER : **R. Gorsira**

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
0.5	0.7	NA	NA	NA	0.0' to 0.7' POORLY GRADED SAND (SP), brown (10YR 4/3), moist, loose, fine grained sand, trace organic material (roots).	
1.0					END OF BORING @ 0.7 ft. bls.	
1.5						
2.0						
2.5						

Sampler Signature: **R. Gorsira** Date: **01/22/2004**

Appendix D
PI-4 – Soil Boring Logs – Surface/Subsurface

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER EPI04-SO01 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : 8 PI/PAOC Sites | LOCATION : PI-4 | DATE: 2/27/2006

WEATHER: Sunny hot humid | DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT USED: Trailer mounted Earth probe 200

WATER LEVELS N/A | START : 2/8/1904 | END : 1625 | LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-4'	46/46	#1		0-36" CLAYEY SAND (SC), dark reddish brown (5YR 3/4), dry, medium, dense, fine sand with clay 36-48" SANDY CLAY (CL), reddish brown (5 YR 5/4), dry, medium to stiff, medium plastic, some fine to medium sand	FID = 1.70 ppm 1/26/2006 UXO clearance at surface 0-2' sample taken Sample taken @ 1115
4						
6	4-8'	46/46	#2		48-96" CLAYEY SAND(SC), yellowish red (5 YR 4/6), moist, medium dense, medium sand w/clay becoming coarse w/depth	FID = 3.0 ppm 1/26/2006 Sample taken @1130 from 4-6'
8						
10	8-12'	32/46	#3		SANDY CLAY (CL), strong brown (7.5 YR 5/6), slightly moist, stiff, medium dense, some fine to very coarse sand becoming fine w/depth	FID = 3.2 ppm
12						

Sampler Signature: J. Myers Date: 2/27/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER EPI04-SO01 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : 8 PI/PAOC Sites | LOCATION : PI-4 | DATE: 2/27/2006

WEATHER: Sunny hot humid | DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT USEI Trailer mounted Earth probe 200

WATER LEVELS N/A | START : 2/8/1904 | END : 1625 | LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
14	12-16'	32/46	#4		12-18' FAT CLAY (CH), brown (7.5 YR 5/4), slightly moist, high plasticity, cohesive	FID - 3.31 ppm
16						
18	16-19'	36/36	#5		18-19' becomes SANDY FAT CLAY (CH) with medium brown to coarse sand	FID 3.5 ppm
20	19-20'	12-Dec	#6		19-20' SANDY FAT CLAY (CH) brown (7.5 YR 5/4), slightly moist, high plasticity, with fine to coarse sand, some fine gravel ~10%	FID 3.5 ppm Refusal @ 20' bgs
22						
24						

Sampler Signature: J. Myers Date: 2/27/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.01	SB-02 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : LOCATION **PI-4** DATE: 28-Feb-06

WEATHER: Sunny hot humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1420 END : 1455 LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0-4'	36/46	#1		0-4' WELL GRADED SAND (SW) yellowish red (5 YR 4/6), dry, medium dense, fine to coarse sand, some fine gravel and few cobbles of granodiorite weathered	FID = 1.08 ppm
6, 8	4-8'	46/46	#2		4-8' WELL GRADED SAND WITH CLAY (SW-SC), yellowish red (5 YR 5/6), slightly moist, dense, fine to coarse sand, some clay, few fine gravel cohesive	FID = 0.4 ppm
10, 12	8-12'	46/46	#3		LEAN CLAY (CL), brownish yellow (10 YR 6/6), slightly moist, medium density, low plasticity, little fine sand	FID = 1.01 ppm
14	12-14'	24/24	#4		SAA with fine to coarse gravel ~10%	PID = 0.3 ppm refusal @ 14' bgs
					TD @ 14' bgs	

Sampler Signature: _____ Date: _____

CH2MHILL	PROJECT NUMBER 183719.FI.01	BORING NUMBER SB-03 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : LOCATION : PI-4 DATE: 27-Feb-06

WEATHER: Sunny hot humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1340 END : 1430 LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-4'	32/46	#1		0-6" SILT (ML) dark brown, (7.5 YR 3/2), dry, loose silt	Background - FID 1.3 ppm
					6-24" LEAN CLAY WITH SAND (CL), dark reddish brown (5 YR 2.5/2), dry, stiff, medium plasticity, cohesive, some fine sand	1/26/2006 sample of 0-1ft taken twice for volume sample taken @ 0805
2					24-46" WELL GRADED SAND (SW), red (2.5 YR 4/6), Dry, loose, fine to medium sand	
4	4-8'	33/46	#2		46-52" Same as above	FID 2.3 ppm
					52-67" LEAN CLAY WITH SAND(CL), reddish brown(5YR 5/4), slightly moist, stiff, medium plasticity, some fine sand	1/26/2006 sample taken @0850 at 4 to 6 ft
6					67-96" CLAYEY SAND(SC), reddish brown (5YR 5/4), moist, medium, dense, medium sand w/fine sand and clay	
8	8-12'	36/46	#3		96-108" Same as above	FID 2.4 ppm
					108-120" SANDY LEAN CLAY(CL), yellowish brown(10YR 5/6), moist stiff, medium plasticity, some medium and fine sand.	
10					120-144" CLAYEY SAND(SC), reddish brown(5YR 5/4), moist, medium, dense, medium sand w/clay	
12	12-15'	34/36	#4		144-180" CLAYEY SAND(SC), yellowish red(5YR 5/6), moist, medium dense, medium to coarse sand, some fine gravely weathered gabrodiorite, some clay.	FID 2.85 ppm
14						
15					Refusal @ 15' bgs	

Sampler Signature: J. Myers Date: 2/27/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.01	SB-04 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : LOCATION PI-4 DATE: 24-Feb-06

WEATHER: Sunny and humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1435 END : LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0.4"	2.4/4	#1		SANDY LEAN CLAY(CL), very dusky red(2.5 YR 2.5/2), dry stiff, medium plastic, some fine sand	1/26/2006 Sample taken @0920 MS/MSD @ surface sample 0-1, interval sampled twice for volume
2						
4	4-8'	4'/4'	#2		SANDY LEAN CLAY(CL), reddish brown (5 YR 4/4), moist, stiff, medium plasticity some fine to coarse sand and gravel. Many cobbles ~4 cm diameter of gabrodiorictic rock - weathered heavily	Sample taken @0930 at 4-6 ft
6						
8	8-12'		#3		WELL GRADED SAND WITH CLAY & GRAVEL(SW-CL), light brown(7.5YR 6/4), dry, loose, angular, fine to coarse sand and fine gravel	
10						
12						

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.01	SB-05 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : LOCATION **PI-4** DATE: 24-Feb-06

WEATHER: Sunny and humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1330 END : LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0.4"	3.3/4	#1		0-.5': SILT WITH SAND(ML), very dark brown (7.5 YR 2.5/3), dry, non plastic noncohesive, little fine sand. .5-2.6': LEAN CLAY WITH SAND(CL), very dark brown(7.5 YR 2.5/2), dry, medium plasticity, cohesive, some fine sand 2.6-4': POORLY GRADED SAND(SP),reddish brown(5YR 4/4), dry loose fine sand, some silt	
2						
4						
	4-8'	4/4	#2		4-7' FAT CLAY WITH SAND(CH), yellowish red(5YR 4/6), dry, highly plastic cohesive w/fine to medium sand. Stiff 7-8' FAT CLAY WITH SAND (CH), reddish brown(5YR 4/4), moist, stiff, high plasticity, few fine to medium sand	
6						
8						
	8-12'	4/4	#3		Same as above	
10						
12						
	12-14'	2/2'	#4		Same as above	
14						

Sampler Signature: J. Myers Date: 2/24/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.01	SB-05 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : LOCATION **PI-4** DATE: 24-Feb-06

WEATHER: Sunny and humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1330 END : LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	14-16'	1.7/2	#4		14-15": Same as above 15-16': SILTY SAND (SM), brown(7.5YR 5/4), dry, medium dense, fine sand and silt	
16	16-19'	3/3	#5		SANDY FAT CLAY (CH), `reddish brown (5YR 4/4), moist, stiff, high plasticity, some fine to coarse sand.	Refusal @ 19' bgs.
18						
20					TD @ 19' bgs	
22						
24						
26						
28						

Sampler Signature: J. Myers Date: 2/24/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 6	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 1300 END : LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0 - 4'	4'	1		0 - 3.7': SILT (ML), dark grayish brown (10 YR 4/2), dry, medium stiffness.	FID (ppm) 4.15 Background 3.35
2						
4					3.7' - 6.5' SANDY SILT (ML), brown 10YR 5/3), dry, loose.	3.73
	4' - 8'	4'	2			
6					6.5 ' - 7.2' SILT (ML), brown (10 YR 4/3), dry, medium stiffness.	4.28
8					7.2' - 8' SILTY SAND (SM), brownish yellow (10 YR 6/8), dry, loose.	4.38
	8' - 12'	4'	3		8' - 11' SILT (ML) yellowish brown (10 YR 5/6), dry, stiff, occasional sand	4.21
10						
12					11' - 11.8' SILTY SAND (SM), dark yellowish brown (10YR 4/4), dry, loose. 11.8' - 12' SILT(ML), light brownish gray (10YR 6/2), dry, hard.	4.25
	12' - 14'	2'	4		12' - 14' SANDY SILT (ML), dark yellowish brown (10YR 4/6), dry stiff.	4.82 Background 4.79
14						

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 6 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 1300 hrs END : 1358 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	14' - 16'	2'	4		14' - 15.7' SILTY SAND (SM), dark yellowish brown (10YR 4/6),dry, loose	4.85
16	16' - 18'		5		15.7' - 17' CLAYRY SILT(ML), yellowish brown (10YR 5/8), dry, hard.	4.55
					17' - 18' SILTY SAND (SM), pale brown (10YR 6/3), dry, loose.	5.02
18						18' bgs: Refusal.
					End of boring at 18' bgs. 2/17/2006	
20						
22						
24						
28						

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 7	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : START : 1420 hrs END : LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0 - 4'	4'	1		0 - 4' SILT (ML), very dark grayish brown(10YR 3/2), dry, loose, medium stiffness.	FID (ppm) 4.71 Background: 4.73
6, 8	4' - 8'	4'	2		4' - 7' CLAYEY SILT (ML), brown (10YR 4/3) ,dry, stiff 7' - 8' SILT (ML), yellowish brown (10YR 5/6), dry, hard.	4.83 4.61
10, 12	8' - 12'	4'	3		8' - 12' SILT (ML), dark yellowish brown (10YR 4/4), dry, hard.	4.51

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 7 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : START : 1420 hrs END : LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
14, 16	12' - 16'	4'	4		12' - 16' SILT (ML), yellowish brown (10YR 5/6), dry, medium stiffness, medium density.	FID (ppm) 4.78 Background: 4.75
18					16' - 18' Same as above. 18' - 19' SILTY SAND (SM), dark yellowish brown (10 YR 4/6), dry, loose.	5.01
20, 22, 24					19' bgs: refusal. End of boring at 19' bgs. 2/17/2006	

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 8	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: Sunny DRILLING CONTRACTOR Earthworks

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : START : 1040 hrs END : 1123 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0 - 4'	3.7'	1		0 - 0.8' WELL GRADED GRAVEL (SW-SM), dark yellowish brown (10YR 4/4), loose, dry. 0.8' - 4' SILT (ML), dark yellowish brown (10YR 3/6), dry stiff, with occasional sand	FID (ppm) 2.53 Background 2.30 2.49
4 6	4' - 8'	3'	2		4' - 7.8' SILTY SAND (SM), brownish yellow (10YR 6/6) dry, loose.	3.59 3.81
8 10	8' - 12'	4'	3		7.8' - 12' SILT (ML), dark yellowish brown (10YR 4/6), dry, hard.	4.21 4.59
12						

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 8 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: Sunny DRILLING CONTRACTOR Earthworks

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : START : 1040 hrs END : 1123 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	12' - 16'	4'	4		12' - 16' Same as above	FID (ppm)
14						
16					16' bgs: Refusal.	
					End of boring at 16' bgs, 2/17/2006	
18						
20						
22						
24						

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.01	SB-09 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : LOCATION PI-4 DATE: 28-Feb-06

WEATHER: Sunny and humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1515 END : 1550 LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0-4'	38/46	#1		0-4' LEAN CLAY (CL), brown(7.5YR 4/3), slightly moist, medium plasticity top 12" with 10% >50mm cobbles. All with fine to coarse sand.	FID = 1.7 ppm
6, 8	4-8'	40/46	#2		4-6': WELL GRADED SAND WITH CLAY(SW-SC), brown (7.5YR 4/4), slightly moist, medium dense. 6-8': SILT (ML) dark yellowish brown(10 YR 4/6), slightly moist, none plastic 7-8': POORLY GRADED SAND (SP), yellowish brown(10YR 5/6), slightly moist, medium dense, fine sand	FID = .4 ppm
10, 12	8-12'	40/46	#3		8-12': WELL GRADED SAND WITH GRAVEL (SW), yellowish brown(10YR 5/8), slightly moist, medium dense, fine to coarse sand ~30%, gravel fine to 30mm cobbles. Weathered granodiorite, quartz and Spar fragments.	FID = .1 ppm
14	12-14'	24/24	#4		12-14': Same as above	0.5 ppm Refusal @ 14' bgs
					TD @ 14' bgs	

Sampler Signature: J. Myers Date: 2/28/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 10	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS NA START : 0840 hrs END : 0917 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0 - 4'	3.7'	1		0 - 4' SILT (ML), dark brown (10YR 3/3), dry, loose.	FID (ppm) 3.82; Background 4.09; 3.13
	4' - 8'	4'	2		4'-7.8' SILT (ML), dark yellowish brown (10YR 4/6), dry, very hard.	* FID out of gas.
					7.8-8' SANDY SILT (ML), dark yellowish brown (10YR 4/6), dry, medium stiffness.	No odor.
	8' - 12'	4'	3		8'-12' SILTY SAND (SM), pale brown (10YR 6/3), dry, loose.	No odor.
	12' - 13'	1'	4		12'-13' SANDY SILT (ML), light brownish gray (10YR 6/2), dry, loose.	No odor (FID not working, out of gas).
					End of boring at 13' bgs due to refusal. 02/17/06	

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.01	SB-11 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : LOCATION PI-4 DATE: 28-Feb-06

WEATHER: Sunny and humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1515 END : 1550 LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-4'	40/46	#1	0-2'	SILTY SAND (SM), brown(7.5YR 4/3), dry, medium dense fine sand, and silt	FID - .9 ppm 1/25/2006 0-2' Sampled twice for volume 0 ppm sample taken @0845
2				2-4'	WELL GRADED SAND WITH CLAY (SW-SC), yellowish red (5YR 4/6), moist, dense, fine to coarse sand (quartz, kspar) clay ~15%.	2-4' Sampled twice for volume 0 ppm sample taken @0855
4	4-8'	40/46	#2		WELL GRADED SAND WITH CLAY (SW-SC) Continuous w/finer grains @6' becoming coarse as in 2-4'	FID = .1 ppm
6						
8	8-12'	46/46	#3		WELL GRADED SAND WITH GRAVEL (SW), yellowish red(5 YR 4/6), moist, dense, fine to coarse sand ~25% coarse and fine gravel. Appears to be heavily weathered.	FID = .2 ppm
10						
12						

Sampler Signature: J. Myers Date: 2/28/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.01	SB-11	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : LOCATION PI-4 DATE: 28-Feb-06

WEATHER: Sunny and humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1515 END : 1550 LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	12-16'	46/46	#4		SANDY LEAN CLAY (CL), brown (7.5YR 5/4), moist, stiff, medium plastic, some fine to medium sand	FID = 0.5 ppm
14						
16	16-19'	36/36	#5		WELL GRADED SAND (SW), strong brown (7.5YR 5/8), slightly moist, dense, fine to coarse w/fine gravel	FID = 0.6 ppm Refusal @ 19' bgs
18						
					Refusal @ 19' bgs	
20						
22						
24						

Sampler Signature: J. Myers Date: 2/28/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 12	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : START : 0925 hrs END : 0917 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0 - 4'	4'	1		0 - 1' SILT (ML), very dark brown (10 YR 2/2 (ML), dry, medium density 1' - 1.8' SILTY SAND WITH GRAVEL (SM), brown (10 YR 5/3), dry, loose. 1.8' - 4' SILT (ML), dark yellowish brown (10 YR 4/6), dry, stiff.	No odor (FID not working) On 1/24/2006 0-1 sampled twice for volume sample taken @1030 No odor.
4						
6	4' - 8'	3.1'	2		4' - 7' SILT (ML), yellowish brown (10 YR 5/4), dry soft. 7' - 7.9' SILTY SAND (SM) yellowish brown (10 YR 5/6), dry, loose.	No odor. On 1/24/2006 2-6 ft sample taken @ 1045 No odor.
8						
10	8' - 12'	4'	3		7.9' - 12' SILT WITH SAND (ML), dark yellowish brown (10 YR 4/6), dry, stiff.	No odor.
12						

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 12 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/17/2006

WEATHER: Sunny & hot DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : START : 0925 hrs END : 1050 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
14	12' - 16'	3'	4		12' - 16' SILT WITH SAND(ML), dark yellowish brown (10 YR 4/6), dry, medium stiffness.	FID (ppm) No odor (FID not working, out of gas). No odor.
16						
18	16' - 20'		5		16' - 20' SANDY SILT (ML), yellowish brown (10 YR 5/6),dry, medium stiffness (16' - 17.5'), hard (17.5' - 20' bgs). Refusal at 20'	No odor. No odor.
20						
22					End of boring at 20' bgs. 02/17/06	
24						

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.01	SB-13 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : LOCATION PI-4 DATE: 1-Mar-06

WEATHER: Sunny, hot and humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1445 END : 1530 LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0-4'	46/46	#1		0-4' SANDY CLAY (CL) dark reddish brown (2.5 YR 3/3), moist, stiff, medium plasticity, w/some fine sand	FID = 1.5 ppm On 1/25/2006 0-1' sample taken @ 0915 Sampled twice for volume
6, 8	4-8'	46/46	#2		4-5.5' SANDY CLAY (CL), reddish brown (2.5 YR 4/4), moist, stiff, low plasticity, some fine to medium sand 5.5-8' WELL GRADED SAND WITH GRAVEL (SW), brown (7.5 YR 4/3), dry, medium dense, fine sand to coarse gravel, ~30% gravel.	FID = 1.7 ppm On 1/25/2006 2-4' sample taken @ 0930
10, 12	8-12'	46/46	#3		8-11.2' POORLY GRADED SAND (SP), dark yellowish brown (10 YR 4/6), slightly moist, medium dense, very fine sand. Becoming coarser with depth. 11.2-12' WELL GRADED SAND (SW) brown (7.5 YR 4/4) dry, dense, fine to coarse sand, little gravel.	FID = 3.75 ppm

Sampler Signature: J. Myers Date: 3/1/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.01	SB-13 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : LOCATION PI-4 DATE: 1-Mar-06

WEATHER: Sunny, hot and humid DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : START : 1445 END : 1530 LOGGER : J. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
14	12-16'	46/46	#3		12-16' WELL SORTED SAND (SW) strong brown (7.5 YR 5/6), slightly moist, medium dense, very fine to medium sand. Trace angular gravel.	FID = 3.75 ppm
16						
18						
20						
22						
24						

Sampler Signature: J. Myers Date: 3/1/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SB-14	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/14/2006

WEATHER: Sunny & humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer / direct push

WATER LEVELS : START : 0845 hrs END : 0931 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					0 - 2' SILT (ML), pale brown(10 YR 6/3), light brown, dry, medium dense. Concrete slab at 0.5 feet, jack hammered through.	FID (ppm) 0 - 4' bgs: 1.73 Background: 1.82 First sample collected above concrete slab.
4					2' - 4.5' SILT (ML), dark brown (10YR 3/3), dry, medium dense.	4' - 8' bgs: 1.65
6 8					4.5' - 8' SAND WITH SILT (SM), yellow (10 YR 8/6), dry, medium dense.	
10 12					End of boring at 8' bgs. 2/14/2006	

Sampler Signature: Andy Sprinkle Date: 2/14/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SB-15	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PI-4 DATE: 2/14/2006

WEATHER: Sunny & humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer / direct push

WATER LEVELS : START : 0815 hrs END : 0845 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0 - 5' SILT (ML), brown (10 YR 4/3) light brown, dry, loose. Concrete slab at 0.5 feet, jack hammered through.	FID (ppm) 0 - 4' bgs: 2.32 Background: 2.03 First sample collected above concrete slab.
2						
4						4' - 8' bgs: 2.15
					5' - 7' FINE GRAINED WITH CLAY (SC), yellowish brown (10 YR 5/4), light brown, dry, medium density.	
6						
					7' - 8' LEAN CLAY WITH SAND (CL), yellowish brown (10 YR 5/6), light brown, dry, medium stiffness.	
8						
					End of boring at 8' bgs. 2/14/2006	
10						
12						

Sampler Signature: Andy Sprinkle Date: 2/14/2006

Appendix D
PI-4 – Monitoring Well Boring Logs

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-4 | DATE: 1/26/2006

WEATHER: Sunny, 80'sF, mod wind | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : START : 1/26/2006 13:30 END : 1/30/06 15:25 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PIO/FIO FID	Above Hole FID
	0-2	15/24	SS1 (spt)	8-7-14-13	3"-POORLY GRADED SAND (SP), 10 yr 4/3 brown dry, loose. 9" - POORLY GRADED SAND (SP), 10 yr 7/6, yellow, dry, loose, grading into 3"- POORLY GRADED SAND (SP) brown (same as above) and brick - fill.	-1.72	
2	2-4	12/24	SS2 (spt)	12-9-19-15	3" - Same as above, with coarse gravel 9" - POORLY GRADED SAND (SP), 2.5 yr 4/6 (red) med. dense, dry, fine white mottling, decaying organic matter /petroleum? odor- no sign on FID: 2.35, 20, - 3.05 FID readings	-4.7/-7.27	18.11/-0.40
4	4-6	12/24	SS3 (spt)	19-13-15-19	POORLY GRADED SAND (SP), 7.5 yr 6/3 light brown. Trace fine gravel. med. dense, dry.	-12.0/2.65	N/A/ 2.69
6	6-8	18/24	SS4 (spt)	15-21-22-28	6" - POORLY GRADED SAND WITH SILT (SP-SM), 2.5 YR 3/6 (red), white - pink cobble and fine gravel, dry, med. dense 12" - POORLY GRADED SAND (SP), 7.5 yr 5/4 brown, dry, dense, green mottling , 1/2 " smaller dark gray and white mottling weathered granite.	N/A/3.82 PID- N/A FID - 1.89	N/A/4.02
8	8-10	13/24	SS5 (spt)	15-24-35-47	POORLY GRADED SAND (SP), some coarse sand. 10 yr 5/4 (light yellowish brown) dry, med dense to dense. tr. Fine gravel	N/A - PID not functioning FID 0 out of gas	
10	10-12		SS6 (spt)	12-26-34-34	POORLY GRADED SAND WITH SILT (SP-SM), 10 yr 7/6, yellow, dry, medium dense to dense, w/ coarse gravel and trace green mottles (1/4")		
12							

Sampler Signature: J. Sathaye Date: 1/27/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-4 DATE: 1/26 & 1/30/06

WEATHER: Sunny, 80'sF, low wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED: HSA (21/4") Mobile drill and air rotary (6" bit)

WATER LEVELS : START : 1/26/2006 13:30 END : 1/30/06 15:25 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): PIO/FIO	Breathing Zone FID	Above Hole FID
12								
	12-14	18/24	SS7 (spt)	18-19-25	POORLY GRADED SAND WITH SILT (SP-SM), 10 yr 5/6 yellowish brown, dry med. dense, tr. fine gravel.	n/a		
14								
	14-16	18/24	SS8 (spt)	15-16-13-10	Same as above; trace black mottles (2 mm)			
15								
16	16-18	18/24	SS9 (spt)	6-7-8-9	12" - POORLY GRADED SAND (SP), 10 yr 5/6 yellowish brown, dry, loose 6" - POORLY GRADED SAND (SP), 10 yr 6/6 brownish yellow, dry, medium dense, with fine gravel	3.08/-1.44		3.13/2.15
18								
	18-20	18/24	SS10 (spt)	15-15-24-23	POORLY GRADED SAND (SP), 10 yr 5/6 yellowish brown, dry, medium dense bottom 6" w/ gravel and cobble	0.56/-1.27		12.82/1.45
20								
21		12/18	SS11 (spt)	24-27-50-3"	WELL GRADED SAND (SW) and highly weathered, granite, dry dense to very dense, very crumbly	6.01/-1.31		11.80/-3.44
22		4/5	SS12 (spt)	50 (5")	Same as above	-10.0/-0.65		-6.11/0.97
			Air rotary from 22'			-11	-0.86	
24								

Sampler Signature: J. Sathaye Date: 1/30/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-4 DATE: 1/30/06

WEATHER: P. Sunny, 80's F, mod wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Air rotary mobile drill B-61

WATER LEVELS : START : 1/26/2006 13:30 END : 1/30/06 15:25 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PIO/FIO FID	Above Hole FID
24					sand and granite fragments	-12	-0.36
					Weathered /granite less weathered		
27							
					gray		
					{granite} visible quartz and orthoclase grains.	-12	-0.2
30							
32							
33							
					Granite {visible quartz feldspar and muscovite grains black mineral (hornblende?)	-13	-0.11
36							

Sampler Signature: J. Sathaye Date: 1/30/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-4 DATE: 1/30/2006

WEATHER: P. sunny, 80's F, mod. Wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Air rotary mobile drill B-61

WATER LEVELS : START : 1/26/2006 13:30 END : 1/30/06 15:25 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): PIO/FIO	Breathing Zone FID	Above Hole FID
36								
37						-14	0.27	
					granite			
39								
40								
42								
					slightly moist cuttings water @ 42' bgs.	-14		
					granite			
45								
					granite			
48					fracture zone between 49 and 50' - gushing water.	-14	-0.42	

Sampler Signature: J. Sathaye Date: 1/30/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI 4 DATE: 1/26/2006

WEATHER: P. cloudy, humid, drizzle in the a.m. 80's F DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 2-inch water rotary coring.

WATER LEVELS : START : 0820 1/26/2006 END : 1000 1/27/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone ID/FIO	Above Hole PID/FID
	0-2	12/24	SS-1 (spt)	5-18-13-20	5" - POORLY GRADED SAND WITH CLAY (SP-SC), 10 yr 3/3(dark brown) medium dense, moist w/roots 5" - concrete rubble 2" - brown soil as above	0 0	15.11
2	2-4	18/24	SS-2 (spt)	12-16-14-11	POORLY GRADED SAND (SP), 2.5 yr 6/6 (light red), medium dense, dry, with gravel and cobble	1.01/2.00	0.08/0.001
4	4-6	14/24	SS-3 (spt)	12-13-11-10	2"- cobble 4"-POORLY GRADED SAND (SP), 7.5 yr 4/4 brown, med. dense, dry, w/coarse gravel 8"- fine sand, SP, 10 yr 6/6 brownish yellow, dry, medium dense w/coarse gravel and cobble bottom 5"	2.45/4.51	1.30/3.46
6	6-8	20/24	SS-4 (spt)	52-20-25	POORLY GRADED SAND (SP), 10 yr 4/6, reddish brown, trace coarse gravel Clay (CL) 7.5 yr 4/6, brown moist, high plasticity, stiff to very stiff., w. cobble and gravel. Grading into 8"-POORLY GRADED SAND (SP) 75 yr 6/6, dry, dense with gravel, cobble, black 1/2" mottling.	7.84/1.82 1.55/0.06	2.80/1.83 3.12/4.27
8	8-10	24/24	SS-5 (spt)	13-15-30-47	SILT WITH SAND (ML), 5 yr 4/4 reddish brown, dry, v. stiff to hard, w/ coarse gravel; black and green mottling in lower 12", bottom 3" - brown sand, SP (medium, dry, 3 yr 4/4, medium dense) bottom 1", rock (dark gray, with green, mottling)	0.65/3.72	1.49/.248
10	10-12	24/24	SS-6 (spt)	12-22-15-43	5" - Sand as above 6"-POORLY GRADED SAND (SP), w/ Silt 5 yr 4/4, reddish brown, dense, with coarse gravel, dry, some green mottling (1/4-inch) Bottom 3", rock (cobble)	5.75/1.84	2.00/3.71

Sampler Signature: J. Sathaye Date: 1/26/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-4 DATE: 1/26/2006

WEATHER: P. cloudy, 80's F, low wind. DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Moblile drill, 2-inch water rotary coring.

WATER LEVELS : START : 0820 1/26/2006 END : 1000 1/27/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
12					10" - POORLY GRADED SAND (SP), 7.5 yr, 6/4 light brown, dry, medium dense, w/ gray coarse, gravel.	ID/FIO -793/-1.80	PID/FID -344/-2.37
	12-14	18/24	55-7 (spt)	11-132-22-34	8"- as above. Fine to coarse sand w/light gray mottles. Bottom 1" - weathered granite. White to light gray mottling structure.		
14		12/18	55-8 (spt)	25-44-50- 3"	Weathered granite with sand. dry, crumbly, reddish brown, green mottled feldspar/ quartz and feldspar granites	-8.20/-1.82	-2.00/-3.99
16		12/12	55-9 (spt)	34-50-4"	Same as above		
18							
20	17-22	18/60	Core 1-NQ		6" Weathered granite gray, green, white mottled core; some white clayey material (1") 12" - same as above with white 2-1/2" light green weathered portion, top 6" of this one. Jointing/ fractures not apparent, too weathered.	17" - coring begins Used - 120 gals of water	
22							
	22-27		Core 2-NQ		No recovery 22'-27'	Used 60 gals water	
24							

Sampler Signature: J. Sathaye Date: 1/26/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-4 DATE: 1/26/2006

WEATHER: Cloudy, low wind, 80's F. DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 2-inch water rotary coring.

WATER LEVELS : START : 0820 1/26/2006 END : 1000 1/27/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID / Above Hole FID
24					No recovery	PID -8.42 FID -2.22
27	27-29	12/26	Core 3-	Fine grained	3" - whitish -gr claying material (weathered granite 9" -dark gray/black rock some quartz visible, with vertical and horizontal joints (very fine crack) visible	Used 80 gallons water
30	29-31	18/26	Core 4-NQ	Fine grained	Dark gray-green rock , some brown weathered. w/brown layer on weathered surfaces. Some metallic gray visible on some surfaces. One joint plane visible in larger fragments at 60 to horizontal.	Used 50 gallons water -8.84 -1.76
32	31-32	12/12	Core 5-NQ	Fine grained	same as above; 2 sets of vertical joints apparent in larger fragments at 60 degrees. to horizontal. and at 45 deg. to 60 deg with each other.	Used 60 gallons
33	32-33.5	18/18	Core 6-NQ	Fine grained	Same as above- joints not as apparent due to smaller fragments. Fracture planes have 1/14" layer of pale white lt. green clay.	Used 60 gallons of water. -8.8 -1.7
36	33.5-33.7	42/42	Core 7-NQ	Fine grained	Same as above; light green and white clay on fracture planes. Light gray rock with dark brown on weathered surfaces.	

Sampler Signature: J. Sathaye Date: 1/26/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-4 | DATE: 1/26 & 1/27/06

WEATHER: Sunny, 80'sF, low wind | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 2-inch water rotary coring.

WATER LEVELS : START : 0820 1/26/2006 END : 1000 1/27/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID / Above Hole FID
36						
37						
	37-42	51/60	Core 8-NQ		Same as above; but rock is less weathered with several 4" to 6" core pieces intact. White clay on fracture planes visible at 60 degree to horizontal and approx. 45'/135' to each other. Where	end- 1/26/06 begin 1/27/06 1.52 / 2.15
39					clay is not present on fractures . Dark brown weathered surface visible. Lt. gray to dark gray rock, volcanic, fine grained. Lower 12" more weathered, fragmented than top 39".	Used 120 gal of water. Mid section of core has white pitting on surfaces. (water and fractured) Stop 1/27
42					Original borehole, including, core barrel and rods grouted from 0-42' bags. 2/2/2006 Well MW-02 installed in adjacent bore hole 5' north.	12'
45						
48						

Sampler Signature: J. Sathaye Date: 1/27/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-03	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques PI-4 LOCATION : PI-4 DATE: 1/23/2006

WEATHER: Sunny, very wind, 80's F DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : START : 0945 END : 1600 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PIO	FID	Above Hole PID/FID
						0	0.002	1.01/0
	0-2	18"/24	SS-1 (spt)	5-16-16-11	POORLY GRADED SAND (SP) 10YR 2/2 (very dark brown), moist to 10" medium dense top 4" with roots, organic - rich set (topsoil). Becoming progressively sandier (color from 10-18" = 7.5 yr 3/3 dark brown dry			
2								
	2-4	16"/24	SS-2 (spt)	8-9-8-7	POORLY GRADED SAND (SP), 7-5, 10YR 3/3 (dark brown), dry, loose, trace roots, with coarse sand last 4" and silt	0.67	0.4	2.0/0
4	4-6	13"/24	SS-3 (spt)	13-19-22-30	9" SILTY SAND (SM), 10YR 2/2 very dark brown, moist, stiff to very stiff trace cobble. 4" POORLY GRADED SAND (SP) 7.5TR 3/3 (dark brown), dry dense with coarse gravel	0.28	0.7	2.12/0.82
6	6-8	12"/26	SS-4 (spt)	12-20-26-25	POORLY GRADED SAND (SP), 10 YR 6/6. (yellowish brown), dry medium dense with gray and green coarse gravel (green mottling (gravel "rock")	0.63	0.54	0.92/0.22
8	8-10	10"/26	SS-5 (spt)	145-19-27	POORLY GRADED SAND (SP) 2.5 Y 1/6 , olive yellow, dry, medium dense , trace grey, coarse cobble in upper 2"	0.4	0.63	2.0/0.79
10	10-12	12"/26	SS-6 (spt)	8-13-19-31	SILTY SAND (SM), very fine sand 5YR 4/6 (dark yellowish brown) Stiff to very stiff ,with gray mottling.			
						0.27	0.89	0.66/1.30
12								

Sampler Signature: J. Sathaye Date: 1/23/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-03	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques PI-4 LOCATION : PI-4 DATE: 1/23/2006

WEATHER: Sunny, mod wind, 80's F DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : START : 0945 END : 1600 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): PIO	Breathing Zone FID	Above Hole PID/FID
12					9" POORLY GRADED SAND (SP) 10 yr 4/3 brown, some silt, slightly moist, medium dense	0.19	0.88	0.40/2.00
	12-16	18/24	SS7 (spt)	12-17-23-26	9" - POORLY GRADED SAND (SP), 10 yr 5/6 brownish yellow, dry, medium dense trace coarse sand and fine gravel trace gray mottling			
14	14-16	18/24	SS8 (spt)	11-11-12-14	POORLY GRADED SAND (SP), 10 yr 5/6 yellowish brown, dry, medium dense some gray mottling , trace medium sand.	0.19	0.85	0.34/0.89
16	16-18	13/24	SS9 (spt)	8-10-14-13	POORLY GRADED SAND (SP), 10 yr 6/6 brownish yellow, dry, loose, trace gray mottling top 3"	0.16	0.78	0.19/0.85
18	18-20	18/24	SS10(spt)	13-13-11-13	Same as above coarse sand	0.2	0.85	0.52
20	20-22	18/26	SS11(spt)	14-15-20	POORLY GRADED SAND (SP) 10 yr 5/6 yellowish brown, dry, medium dense; coarse gravel top 4" and coarse- medium sand bottom - 22 4"	0.17	1.08	0.19/1.10
22	22-24	13/17	SS12(spt)	25-38-50 (5")	POORLY GRADED SAND (SP) 7.5 yr 6/6 reddish yellow, dry , loose, and grey rock, with weathered fragmented metasedamentary or more likely very fine grained volcanic	0.23	0.8	0.33/0.80

Sampler Signature: J. Sathaye Date: 1/23/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-03	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques PIA PI 4 LOCATION : PI-4 DATE: 1/23/2006

WEATHER: Sunny, mod wind, 80's F DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : START : 0945 END : 1600 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole — PIO / FID / PID/FID
24					Began air rotary @ 20' due to collapse of borehole sand and weathered rock fragments (granodiorite and little limestone)	PIO FID PID/FID 0.29/0.99
26						
28					same as above	
30					Granite and granodiorite segments, some quartz/ feldspar; green mineral (epidote?) in whitish volcanic rock (rhyolite?) minor evidence of jointing.	
32						
						0.34/1.25
35						
36						

Sampler Signature: J. Sathaye Date: 1/23/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-03	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques PIA | LOCATION : PI-4 | DATE: 1/23/2006

WEATHER: Sunny, mod wind, 80's F | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : | START : 0945 | END : 1600 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID	Above Hole FID
36					Rotary drilling	0.19	1.10
39							
					granite and granodiorite fragments moist cuttings; cuttings same as above, to 47" bgs		
42							
44							
47					EOB (end of boring) 47' bgs		
48							
49							

Sampler Signature: J. Sathaye Date: 1/23/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-04	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-4 DATE: 1/24/2006

WEATHER: Sunny in the 80's (10-15 men) DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (4-1/4") B-61 Mobile drill, 2-inch water rotary coring, 5-foot barrel

WATER LEVELS : START : 0800 1/24/2006 END : 1000 1/25/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): PIO	Breathing Zone FID	Above Hole PID/FID
	0-2	12/24	SS1 (spt)	8-13-12-11	POORLY GRADED SAND (SP) , 7.5 yr 4/3 brown dry, medium dense, with coarse gravel, roots, leaves. (top soil), organic matter.	2-8	0.68	0.61/0.90
2	2-6	9/24	SS2 (spt)	8-7-8-6	POORLY GRADED SAND (SP), 7.5 yr 4/3 dry, loose, with cobble, trace roots, leaves	4.1	0.13	5.1/0.63
4	4-6	12/24	SS3 (spt)	11-11-12-20	6" rock fragments (cobble) (fill); dry, loose. 6" - POORLY GRADED SAND (SP), 7.5 yr 5/4 (brown) dry, medium dense, white mottling (lime?)	3.41	0.21	0.41/0.08
6	6-8	20/24	SS4 (spt)	15-11-10-11	9" gray cobble (fill) dry, loose 11" - POORLY GRADED SAND (SP), 7.5 yr 5/6 strong brown, dry, lose to medium dense some white and gray mottling.	0.52	0.45	0.45/0.80
8	8-10	10/24	SS5 (spt)	5-7-5-5	POORLY GRADED SAND (SP), 10 yr 4/6 dark yellowish brown, loose, dry. Granodiorite cobble, bottom 4"	N/A	0.13	N/A/0.25
10	10-12	18/24	SS6 (spt)	5-10-6-8	6" POORLY GRADED SAND (SP), 7.5 yr 3/3 dark brown, loose, moist, cobbles 12" POORLY GRADED SAND (SP), 10 yr 6/6 (brownish yellow) loose moist trace coarse gravel.	N/A	0.64	N/A/0.25
12								

Sampler Signature: J. Sathaye Date: 1/25/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-04	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques PI4 LOCATION : PI-4 DATE: 1/24/2006

WEATHER: Sunny in the 80's F Mod wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (4-1/4") B-61 Mobile drill, 2-inch water rotary coring, 5-foot barrel

WATER LEVELS : START : 0800 1/24/2006 END : 1000 1/25/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PIO / FID / Above Hole PID/FID
12						
	12-16	18/24	SS7 (spt)	19-17-11-13	POORLY GRADED SAND (SP), 10 yr 6/6 brownish yellow, loose, mist granite cobble top 6"	0.85 / 0.90
14						
	14-16	18/26	SS8 (spt)	13-17-20-30	14" same as above; (med. dense), no cobbles. 4" - POORLY GRADED SAND (SP), as above with pink (2-5 yr 8/2) mottling	0.89 / 1-12
16						
	16-18	18/24	SS9 (spt)	20-24-29-28	10" -POORLY GRADED SAND (SP), 7.5 yr 6/3 (light brown) dry, med dense 8" POORLY GRADED SAND (SP), 5 yr 5/6, dry medium dense, pink and black mottling	2.01 / 1.65
18						
	18-20	18/24	SS10(spt)	18-30-31-46	9" same as above 9" POORLY GRADED SAND (SP), 5 yr 5/6 and gray/green rock cobble and white mottling, dry, dense pink	2.2 / 2.65
20						
	20-22	16"/24	SS11 (spt)	16-22-28-37	4" - POORLY GRADED SAND (SP), 5 yr 4/6 yellowish red, medium dense, dry, coarse gravel 12" SILTY SAND (SM), 5 yr 5/8 yellowish red , dry, hard w/ coarse gravel (white/pink)	1.72 / 2.11
22						
	22-24	15/24	SS12 (spt)	12-19-20-27	9" - Sand, same as above (20-22 interval) 6" - weathered rock gravel and cobble- greenish grey crystals	2.24 / 2.47
24						

Sampler Signature: J. Sathaye Date: 1/24/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-04	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques PI4 LOCATION : PI-4 DATE: 1/25/2006

WEATHER: Sunny in the 80's F Mod wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (4-1/4") B-61 Mobile drill, 2-inch water rotary coring, 5-foot barrel

WATER LEVELS : START : 0800 1/24/2006 END : 1000 1/25/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PIO / FID / Above Hole PID/FID
24						
	24-26	18/26	SS13 (spt)	21-16-12-26	9" - Weathered green - gray rock, volcanic, with coarse gravel, silt, orange, brown, black mottling 9" - fine sand, SP, 5 yr 5/6 yellow brown) dry, medium dense.	n/a - unit out of gas
26						
	26-28	18/26	SS14(spt)	20-45-30-50 (3")	8" sand fine sand, SP, 7.5 yr 4/4 brown dry, dense, some black, fine mottling. 10" - weathered gray/green. rock in fine sand, silty matrix.	stop 1/24/06 Resume 1/25/06; w/ @0815 coring
28						
	28-33	11/60	Core 1-NQ		Weathered granite, 2" to 3" size fragments. 1" quartz/feldspar (orthoclase) fragments. 1" 1 mafic (dark gray/ green), fragments coastal with brown silty clay. Rock fragment. All oxidized. No joined/bedding apparent.	
30						
					Weathered Granite - 2" to 3" size fragments. 1" quartz/feldspar (orthoclase) fragments. 1" /Mafic (dark grey/green) fragments coated- w/ brown silty clay. rock, fragment. joints/bedding apparent.	
32						
33						
	33-38	36/60	Core 2-NQ		Weathered granite with green clay coating. 3- mafic rock fragments oxidized (greenish coating on some surfaces) 27" - severely weathered granite w/coarse grained sand, granite cobble, friable , granite coated with light green clay.	0.78 ppm /0.01 ppm used - 100 gals (5')
36						

Sampler Signature: J. Sathaye Date: 1/25/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-04	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques PI4 LOCATION : PI-4 DATE: 1/25/2006

WEATHER: Sunny, 85 F, Mod wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (4-1/4") B-61 Mobile drill, 2-inch water rotary coring, 5-foot barrel

WATER LEVELS : START : 0800 1/24/2006 END : 1000 1/25/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID / Above Hole FID
36						
38					No recovery	0.04 PID / -135 FID Used- 100 gals water.
	38-43	0/60	Core 3-NQ			
42						
43						
45						
	43-48	60/60	Core 4-NQ		Weathered granite, with mineralized veins and quartz veins. Vertical joint from - 45 to 46-25' Eight bedding planes/distributed fractures	Used - 100 gallons of water 0.04/1.34
48					evenly through section. Weathering apparent on planes. Rock is extremely friable, with coating of coarse quartz grains; bedding/fracture surface are oxidized with red brown mottling.	
	48-49	12/12	Core 5-NQ		Weathered granite. one vertical, mineralized join. Solid rock. Two bedding/fracture planes. 6" apart. Light green. Coating on weakened surfaces.	used 30 gallons of water.
49						

Sampler Signature: J. Sathaye Date: 1/25/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-05	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-4 DATE: 1/19/2006

WEATHER: Sunny Windy in the 80's (10-15 mph) DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : START : 0955 1/19/2006 END : 0830 1/20/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID	FID	Above Hole PID/FID
					0-5" POORLY GRADED SAND (SP), dark reddish brown (5 yr 3/2), moist, loose-medium density, with roots, fine gravel, trace of silt	0	0	5/2
	0-2	14"/24	SS1 (spt)	8-12-13-11	5-24" - POORLY GRADED SAND (SP), yellowish brown (10yr 5/6), dry, loose w/limestone gravel - medium			
2	2-4	9"/24	SS2 (spt)	10-11-11-15	POORLY GRADED SAND (SP), reddish brown 5 yr 3/3 dry, medium dense, with very fine sand. fragments, trace silt.	0	0	10/2
4	4-6	10"/24	SS3 (spt)	17-18-18-16	POORLY GRADED SAND (SP), brown dry 10 yr 7/6 medium dense, trace fine angular gravel, trace silt.	0	0	6/3
6	6-8	20"/24	SS4 (spt)	15-15-11-9	POORLY GRADED SAND (SP), light brown 10yr7/6 dry, medium dense, trace fines 14"- POORLY GRADED SAND (SP), light brown, dry medium dense, trace fine gravel (quartz) trace gray mottling.	0	0	8/2
8	8-10	24"/24	SS5 (spt)	11-13-13-14	POORLY GRADED SAND (SP), light brown 10yr 7/6 dry, loose, trace pale brown loose, coarse gravel at bottom, some gray mottling.	0	1	5/10
10	10-12	24"/24	SS6 (spt)	8-16-15-20	POORLY GRADED SAND (SP),light brown 10yr 5/4 lose, with coarse grained - 6" then light brown (10 yr 7/14) , dry, medium dense, w/ coarse to very fine gravel,	0	0	2/4

Sampler Signature: J. Sathaye Date: 1/19/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-05	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-4 | DATE: 1/19/2006

WEATHER: Sunny, 80's | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : | START : 0955 1/19/2006 | END : 0830 1/20/2006 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): PIO	Breathing Zone FID	Above Hole PID/FID
12					6" - POORLY GRADED SAND (SP), 10 YR 4/4 brown Dry, med, dense, some fine gravel	0	2	0/6
	12-14	15"	SS7 (spt)	17-23-29-34	9" - POORLY GRADED SAND (SP),10 YR 6/4 brown, dense, Gray -pink mottling last 3"			
14	14-16	18"	SS8 (spt)	12-21-35-46	POORLY GRADED SAND (SP) Reddish to dark brown, (10 yr 3/4 to 3/6) , dry dense, coarse sand at bottom with coarse gravel, with black-grey mottling and streaks.	0	6	0/6
16	16-18	12"/21"	SS9 (spt)	19-26-42 50(3")	POORLY GRADED SAND (SP), Reddish brown 2.5YR 4/6, dry, dense to v. dense, with black mottles and trace coarse, sand quartz	0	0	0/6
18	20-21.5	18"	SS10 (spt)	21-25-50- (5")	Same as above; some pink sand- 9" 9" - reddish brown (5 yr 4/6) sand, with weathered (oxidized grey) volcanic rock - rhyodacite? Light grey (bleached)	0	0	0/0
20			Air	Rotary	from cuttings. Gray - dark grey rock and reddish brown sand. (> 50 sand)			

Sampler Signature: J. Sathaye Date: 1/19/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-05	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-4 | DATE: 1/19/2006

WEATHER: P. Sunny, some rain, 80's | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : | START : 0955 1/19/2006 | END : 0830 1/20/2006 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID / FID; Above Hole PID/FID
24			Air hammer		Same as 20-24 (sand + rock - granodiorite) Sand , (>50%) granite /diorite gray dark gray and some (limestone) (white)	PID 0 FID 7
27						
30						
33					Sand - brown > 80% Limestone fragments white	at approximately 1525 0 3
36					Gray and pink granite/ diorite	Harder drilling 1600

Sampler Signature: J. Sathaye Date: 1/19/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-05	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-4 | DATE: 1/19/06- 1/20/06

WEATHER: Sunny mod, Wind, 80's | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4") B-61 Mobile drill, 6-inch air rotary bit.

WATER LEVELS : START : 0955 1/19/2006 END : 0830 1/20/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36					Same as above	
						C- 1615
37						
					Predominantly rock - granite/granodiorite oxidized brown color and quartz grains and k-feldsp	
						16:30
40		approx.		11/20/2006	moist @ 41 - slightly	stop @ -40,; 1645 drillers offsite 1650- leave right compressor @ site; Rods in hole.
					Predominately granite /granodiorite fragments in cuttings w / v. finely; powdered rock (unable to identify)	
44						
48						
49						
					EOB 49' BGS	

Sampler Signature: J. Sathaye Date: 1/20/2006

Appendix D
PI-7 –Soil Boring Logs

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB01 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Vieques East | LOCATION PI-7 | DATE: 3/13/2006

WEATHER: party cloudy and. 80 degrees | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 0915 | END : 1500 | LOGGER : W.Trevathan

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'				0-2' SILTY SAND (SM), dark brown (7.5 YR 3/2), dry, loose, with occasional organics	FID 1.6 (0-1.0) 1.5 (2.0-6.0')
2	2-6'				2-6' SILTY SAND (SM), dark brown (7.5 YR 3/3)	0.0
4						
6	6-8'				6-8' SILTY SAND (SM), yellowish red (5 YR 4/6), dry, medium dense,	0.0
8	8-10'				8-10' Same as above	0.0
10					10-17' CLAYEY SAND (SC), dark reddish brown (5YR 3/4), dry, medium density Refusal @ 17'	0.0

Sampler Signature: Pat K. Date: 3/16/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	SB02 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques LOCATION PI-7 DATE: 3/13/2006

WEATHER: partly cloudy and. 80 degrees DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : START : 945 END : 1615 LOGGER : P.Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'				0-2' SILTY SAND (SM), dark brown (7.5 YR 3/2), dry, loose, with occasional organics	FID 1.9 (0-2.0') 1.6 Background
2	2-6'				2-6' SILTY SAND (SM), dark brown (7.5 YR 3/3)	1.8 (2.0-4.0') 2.3 (4.0-6.0')
4						
6	6-8'				6-8' SILTY SAND (SM), yellowish red (5 YR 4/6), dry, medium dense,	2.3 (6.0-10.0')
8	8-10'				8-10' Same as above	
10					10-17' CLAYEY SAND (SC), dark reddish brown (5YR 3/4), dry, medium density Refusal @ 17'	2.3 (10.0-14.0') 2.4 (14.0-17.0')

Sampler Signature: Patrick Kish Date: 3/13/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB03 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/13/2006

WEATHER: cloudy and. 80 degrees | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 1015 | END : 1700 | LOGGER : W.Trevathan

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'				0-2' SILTY SAND (SM), dark brown (7.5 YR 3/2), dry, loose, with occasional organics	FID 1.9 (0-2.0') 1.6 Background
2	2-6'				2-6' SILTY SAND (SM), dark brown (7.5 YR 3/3)	1.8 (2.0-4.0') 2.3 (4.0-6.0')
4						
6	6-8'				6-8' SILTY SAND (SM), yellowish red (5 YR 4/6), dry, medium dense,	2.3 (6.0-10.0')
8	8-10'				8-10' Same as above	
10					10-17' CLAYEY SAND (SC), dark reddish brown (5YR 3/4), dry, medium density Refusal @ 17'	2.3 (10.0-14.0') 2.4 (14.0-17.0')

Sampler Signature: W.Trevathan Date: 3/13/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SB04 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/13/2006

WEATHER: cloudy and 80 degrees | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 1050 | END : 1430 | LOGGER : P. Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'				0-2' SILTY SAND (SM), pink (7.5 YR 8/3), dry, loose, silty. fine sand with occasional organics	FID 2.6 (0-2.0') 2.6 Background
2	2-6'				2-6' SILTY SAND (SM), strong brown (7.5 YR 5/6), dry, stiff, increasing oxidation with depth	2.7 (2.0-6.0')
4						
6	6-8'				6-9' Same as above	2.7 (6.0-9.0')
8	8-10'					
					9-10' POORLY GRADED SAND(SP), brownish yellow (10YR 6/6), dry, medium dense, fine sand	
10					10-11" same as above	
					11-16' SILTY SAND WITH GRAVEL(SM), yellowish red (5YR 4/6), dry, medium dense, slightly silty sand with iron staining, increasing gravel with depth	2.7 (11.0-16.0')
					Boring complete at 16" BLS	

Sampler Signature: P. Kish Date: 3/13/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB05 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/14/2006

WEATHER: scattered showers 70s | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 0820 | END : 0835 | LOGGER : L. Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (ft)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0-1' CLAYEY SAND (SC), dark brown (7.5 YR 3/3) dry loose 1-2' SANDY SILT (ML), fine, dry, loose	FID = 0
2					2-3' CLAYEY SAND (SC), yellowish brown (7.5 YR 5/6), dry medium compact 3-5' SANDY SILT(ML) evidence of oxidation - dark brown w/rust color, dry, compact	
4						
6					5-6' CLAYEY SAND (SC), brown (10 YR 4/3), loose, dry.	
					6-10' CLAYEY SAND (SC), yellowish red (5YR 4/6), dry, medium density	
8						
10						
					10-11' SILTY SAND (SM), strong brown (7.5 YR 4/6)	
					End of borehole at 11'	

Sampler Signature: Leslie Baechler Date: 3/14/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
183719.FI.02	SB06	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Vieques East | LOCATION PI-7 | DATE: 3/14/2006

WEATHER: scattered showers 70s | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 0840 | END : 0855 | LOGGER : L.Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					4 inches of road gravel then '0-2 SILTY SAND (SM), brown (10 YR 4/3), dry, loose	FID 0.0
4					2-3.5' SANDY SILT (ML), dark brown (7.5 YR 3/3), dry loose 3.5-4.5 CLAYEY SAND (SC), dark yellowish brown (7.5 YR 3/4), medium dense, dry 4.5-6 CLAYEY SAND (SC), yellowish brown (7.5 YR 5/6), dry, medium dense	0.0
6					6.0-8.0' Same as above. Refusal @ 8.0'	0.0
8					end of borehole @8.0' 3/15/06	

Sampler Signature: Leslie B. Date: 3/14/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	SB07	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques — LOCATION PI-7 — DATE: 3/14/2006

WEATHER: cloudy and. 80 degrees — DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : — START : 0750 — END : 0820 — LOGGER : P. Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole	
	0-2'				0-2' SANDY LEAN CLAY(CL), dark brown (7.5 YR 3/4), dry, medium density,	FID 0	(0-2.0')
4	2-6'				2-6' CLAYEY SAND WITH GRAVEL(SM), strong brown (7.5 YR 5/6),dry, medium dense, 4" layer of gravel ft.	0	(2.0-6.0')
8	6-10'				6-10' CLAYEY SAND (SM), reddish yellow (7.5 YR 6/8), dry, medium dense, medium grained sand	0	(6.0-10.0')
12	10-14'				10-11' CLAYEY SAND (SC), yellowish brown (10YR 5/6), dry medium dense. 11-15' CLAYEY SAND WITH GRAVEL(SC), yellowish red (5YR 5/8), dry to moist, fine grained sand. Increased gravel with depth	0	(10.0-14.0')
	14-15'				16 ft BLS Refusal, end of boring	0	(14.0-15.0')
16 20							

Sampler Signature: P. Kish — Date: 3/14/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB08 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Vieques East | LOCATION PI-7 | DATE: 3/14/2006

WEATHER: scattered showers | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 0940 | END : 1010 | LOGGER : P. Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0-1' CLAYEY SAND (SC), dark brown (7.5 YR 3/3) dry loose 1-2' SANDY SILT (ML), fine, dry, loose	FID 0.0
2					2-3' CLAYEY SAND (SC), yellowish brown (7.5 YR 5/6), dry medium compact 3-5' SANDY SILT(ML) evidence of oxidation - dark brown w/rust color, dry, compact	0.0 0.0
4						
					5-6' WELL GRADED GRAVEL WITH SAND (GW), brown (10 YR 4/3), loose, dry.	0.0
6					6.0'-10.0' Same as above see above w/addition of white vertical fracture.	0.0
8						
10					10-14' same as above end of borehole @ 14.0' 3/15/2006	0.0

Sampler Signature: Leslie B. Date: 3/15/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
183719.FI.02	SB09	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Vieques East | LOCATION PI-7 | DATE: 3/14/2006

WEATHER: Showers 75-80 degrees | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 1020 | END : 1045 | LOGGER : L.Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					0-1 SILTY SAND (SM), brown (10 YR 4/3), dry, loose 1-2' Shattered concrete with iron staining	FID 0.0
4					2-3.5' SANDY SILT (ML), dark brown (7.5 YR 3/3), dry loose 3.5-4.5 CLAYEY SAND (SC), dark yellowish brown (7.5 YR 3/4), medium dense, dry 4.5-6 CLAYEY SAND (SC), yellowish brown (7.5 YR 5/6), dry, medium dense	0.0
6						
8						

Sampler Signature: Leslie B. Date: 3/14/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	SB10	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Vieques East	LOCATION PI-7		DATE: 3/14/2006
WEATHER: P. cloudy 80s	DRILLING CONTRACTOR : Geoworks		
DRILLING METHOD AND EQUIPMENT USED : DPT			
WATER LEVELS :	START : 1048	END : 1130	LOGGER : L.Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0.2 0-0.5 broken up concrete 0.5-2 SILTY SAND (SM), brown (7.5 YR 4/4), dry, loose, some organics	FID 0.0 0.0
2						
					2-4' SILT (ML), dark brown (7.5 YR 3/3), loose, dry 4-6' CLAYEY SAND (SC), yellowish red(7.5 YR 5/6),medium dense, dry	
4						
6					6'-10' CLAYEY SAND (SC), yellowish red (5 YR 4/6), damp clayey medium grain sand	
8						
10					10.0-14.0' POORLY GRADED SAND (SP), yellowish red (5 YR 4/6), dry to damp medium dense	

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	SB11	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-7 | DATE: 3/14/2006

WEATHER: | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 1435 | END : 1500 | LOGGER : P.Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
			0-1.0'		0-1' POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), light brown (7.5 YR 6/4), dry, medium dense (1.0-2.0') POORLY GRADED GRAVEL (GP), gravelly residual bedrock material (granodiorite)	FID 0.0
2					End of borehole @ 2.0' 3/14/2006	
4						
6						
8						
10						

Sampler Signature: Patrick Kish Date: 3/14/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	SS12	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/14/2006

WEATHER: | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 1500 | END : 1520 | LOGGER : L.Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
			0-1.0'		0-1' POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), light brown (7.5 YR 6/4), dry, medium dense	FID 0.0
					End of borehole @ 1.0' 3/14/2006	
2						
4						
6						
8						
10						

Sampler Signature: PK Date: 3/14/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SS13 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/14/2006

WEATHER: hot sunny, 90s | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 1552 | END : 1520 | LOGGER : L.Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
			0-1.0'		0-1' POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), light brown (7.5 YR 6/4), dry, medium dense	FID 0.0
					End of borehole @ 1.0' 3/14/2006	
2						
4						
6						
8						
10						

Sampler Signature: Leslie Baechler Date: 3/14/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	SB14 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/14/2006

WEATHER: hot, 90s | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : DPT

WATER LEVELS : | START : 1522 | END : 1550 | LOGGER : L.Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0-1 CLAYEY SAND (SC), dark brown (7.5 YR 3/2),loose dry	FID 0.0
2					1-4' SILTY SAND (SM), brown (7.5 YR 6/4), dry, medium dense, loose	0.0
4					4-7' SILTY SAND (SM), dark brown (7.5 YR 3/3), dry, loose	0.0
6						
8					7-8' SILTY SAND (SM), dark brown (10 YR 3/3), dry, very dense to hard, turning orange and brown toward 8'	0.0
10					8-11' Same as above	
					Borehole end @ 11'	

Sampler Signature: Leslie Baechler Date: 3/14/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	SB15	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Vieques East | LOCATION : PI-7 | DATE: 3/16/2006

WEATHER: sunny and. 85 degrees | DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT USED : hand auger

WATER LEVELS : | START : 0800 | END : 0830 | LOGGER : P.Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'				0-2' LEAN CLAY WITH GRAVEL (CL), brown (10 YR 4/3), dry, very loose	0.0
	2-4'				2-4' LEAN CLAY WITH SAND (Cl), brown (10 YR 4/3), dry	0.0
					borehole complete @ 4.0', refusal 3/16/06 MPK	

Sampler Signature: Patrick Kish Date: 3/16/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB16 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Vieques East | LOCATION PI-7 | DATE: 3/16/2006

WEATHER: sunny and. 85 degrees | DRILLING CONTRACTOR: CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : Hand Auger

WATER LEVELS : N/A | START : 0700 | END : 0750 | LOGGER : P.Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	24'/24'			0-2' LEAN CLAY WITH GRAVEL (CL), brown (10 YR 4/3), dry, very loose	FID = 0.0
4	2-4'				2-4' WELL GRADED SAND WITH GRAVEL (SW-SC), brown (10 YR 4/3), dry, very loose	FID = 0.0 Hit weathered bedrock at 4' on top of ridge.
6					borehole complete @ 4.0', refusal 3/16/06 MPK	
8						
10						

Sampler Signature: Patrick Kish Date: 3/16/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB17 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/15/2006

WEATHER: partly cloudy | DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT USED : Hand Auger

WATER LEVELS : N/A | START : 0820 | END : 0840 | LOGGER : W. Trevathan

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-1'	12/12			0-1' WELL GRADED SAND WITH CLAY AND GRAVEL(SW-SC), dark yellowish brown (10 YR 4/4), dry, very loose.	FID background = 0.7 FID: 0.7
2	1-2'	12/12			1-2' SILTY SAND WITH GRAVEL (SM) dark yellowish brown (10 YR 4/4), dry, very loose	FID = 0.7
4					Refusal at '2.0' Hit bedrock at top of ridge.	
6						
8						
10						

Sampler Signature: W. Trevathan Date: 3/15/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	SB18 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques LOCATION PI-7 DATE: 3/15/2006

WEATHER: 80s, sunny, partly cloudy DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT USED : Hand Auger

WATER LEVELS : N/A START : 0900 END : 0940 LOGGER : W. Trevathan

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	24'/24'			0-2' LEAN CLAY WITH GRAVEL (CL), brown (10 YR 4/3), dry, very loose	FID = 0.0
4	2-4'				2-4' WELL GRADED SAND WITH GRAVEL (SW-SC), brown (10 YR 4/3), dry, very loose	FID = 0.0 Hit weathered bedrock at 4' on top of ridge.
6						
8						
10						

Sampler Signature: W. Trevathan Date: 3/15/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB19 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/15/2006

WEATHER: Partly Cloudy 80s | DRILLING CONTRACTOR: CH2M H

DRILLING METHOD AND EQUIPMENT USED : Hand Auger

WATER LEVELS : N/A | START : 1000 | END : 1055 | LOGGER : W. Trevathan/L.B.

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-1'				0-1' WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), dark yellowish brown (10 YR 4/4), very loose	FID - 0.0
	1-2'				1-2' CLAYEY SAND WITH GRAVEL (SC), brown (10 YR 4/3), dry, very loose, gravel increasing in size	
2						
	2-4'				2-4' SANDY LEAN CLAY WITH GRAVEL (CL), brown (10 YR 4/3), dry, very loose	FID - 0.0
4						
					Bedrock - end of borehole at 4'	
6						
8						
10						

Sampler Signature: W. Trevathan Date: 3/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS20 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Vieques East | LOCATION PI-7 | DATE: 3/16/2006

WEATHER: Sunny 85 degrees | DRILLING CONTRACTOR: CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : hand auger

WATER LEVELS : N/A | START : 0845 | END : 0930 | LOGGER : P.Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
1					0 - 1.5' CLAYEY GRAVEL WITH SAND (GC), brown (10YR 4/3), dry, loose	0.0 ppm
2					Refusal at 1.5' on 3 attempts	
3						
4						
5						

Sampler Signature: Patrick Kish Date: 3/16/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB21 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PI-7 | DATE: 3/16/2006

WEATHER: Humid, Calm | DRILLING CONTRACTOR: CH2M H

DRILLING METHOD AND EQUIPMENT USED : Hand Auger

WATER LEVELS : N/A | START : 0725 | END : 0900 | LOGGER : L.Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-1'				0-1' SANDY ORGANIC SOIL (OL/OH) dark yellowish brown (10 YR 3/4), dry, very loose	FID - 0.0
	1-3'				1-3' CLAYEY SAND WITH GRAVEL (SC), brown (10 YR 4/3),dry, loose, well-graded gravel	FID - 0.0
2						
					Refusal at weathered bedrock @ 3'	
4						
6						
8						
10						

Sampler Signature: Leslie Baechler Date: 3/16/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SS22 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques, 8 PI/PAOC Sites | LOCATION PI-7 | DATE: 3/16/2006

WEATHER: Humid, 80's | DRILLING CONTRACTOR: CH2M H

DRILLING METHOD AND EQUIPMENT USED : Hand Auger

WATER LEVELS : N/A | START : 0925 | END : 1000 | LOGGER : L.Baechler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0-8" CLAYEY SAND WITH GRAVEL (SC) yellowish brown (10 YR 5/4), dry very loose, refusal @ 8"	1st try, refusal @ 8" 2nd try, refusal @ 6" FID - 0.0 Hit bedrock 3rd try, refusal @ 8" Sample taken from 0-8"
2					Refusal at 8"	
4						
6						
8						
10						

Sampler Signature: Leslie Baechler Date: 3/16/2006

Appendix D
PI-7 – Monitoring Well Boring Logs

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 1 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-7 | DATE: 2/23/2006

WEATHER: Sunny, 80s F | DRILLING CONTRACTOR : Geoworks, Inc. Geoworks

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4" 10 foot); mobile drill B-61

WATER LEVELS : START : 0752 2/23/2006 END : 1000 3/2/06 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
	0-2	12/24	SS-1 (SPT)	6-13-16-12 (47)	5" POORLY GRADED SAND WITH SILT (SP-SM), 10 YR 4/4-dark yellowish brown, with roots, organics, dry, loose to medium dense, some silt. 7" POORLY GRADED SAND (SP), 10 YR 5/6 yellowish brown, dry, med. dense to loose, coarse.	FID ONLY 0.0	0.0
2	2-4	5/24	SS-2 (SPT)	9-14-15-14 (52)	POORLY GRADED SAND (SP), 5YR, 3/4 dark reddish brown, dry, medium dense, with fine white mottling, trace coarse sand (weathered bedrock)	0.03	0.0
4	4-6	12/22	SS-3 (SPT)	19-26-41-50 (136)	POORLY GRADED SAND (SP), 5YR 4/3 reddish brown, dry, dense to very dense, trace coarse sand; white with black mottling, cobble size zones of pink/white. (weathered bedrock)	0.02	0.13
6	6-8	13/24	SS-4 (SPT)	19-19-24-27 (89)	POORLY GRADED SAND (SP), 7.5 YR 4/6 strong brown, dry, medium dense, fine white and pink mottling.	0.09	0.13
8	8-10	13/24	SS-5 (SPT)	12-15-23-28 (78)	same as above	0.09	1.98
10	10-12	12/24	SS-6 (SPT)	16-22-29-24 (91)	POORLY GRADED SAND (SP), 5 YR 5/6, yellowish red, with silt, dry, medium dense; fine white and black mottles.	0.03	0.52
12					80		

Sampler Signature: J. Sathaye Date: 3/2/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 2 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-7 | DATE: 2/23/2006

WEATHER: Sunny, 80s F | STANDARD | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile drill B-61, HSA (2-1/4" ID) and 2" ID core

WATER LEVELS : | START : 0752 2/23/2006 | END : 1000 3/2/06 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12	12-14	15/20	SS-7 (SPT)	13-23-48-50 (134)	6" same as above 4" weathered bedrock and sand as above 5" weathered bedrock (granite/granodiorite) dry, friable, oxidized, light-grey, pale brown	FID ONLY 0.58 0.24
14		2/4	SS-8 (SPT)	50 - (4")	same as above refusal at 14.3' Start coring 2/23/06 @1025	0.71 0.13
16	14-19	0/60	I-NQ	RQD 0"/60" very poor		Used ~ 100 gallons of water No recovery
19	19-24	0/60	2-NQ	RQD 0"/6" very poor		Used ~50 gallons of water No recovery
20						
24	24/29	14/60	3-NQ	RQD 0"/60" very poor	medium grained granodiorite moderately weathered, closed joints, 0 degree mechanical breaks - mix of both	Used ~40 gallons of water
26						

Sampler Signature: J. Sathaye Date: 2/23/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 3 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-7 | DATE: 02/23/06- 02/24

WEATHER: Sunny, 80s F | STANDARD | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile drill B-61, 2" ID core barrel

WATER LEVELS : | START : 0752 2/23/2006 | END : 1000 3/2/06 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
26	24-29	14/60`	3-NQ	RQD 0/6 very poor	Individual grains of feldspar, etc. visible, black mineral. Green clay laminations on fractures; red oxidized minerals. Individual fragments are 1"-2" in size.	Used ~80 gallons of water
28						
30				RQD 0/60 very poor	Granodiorite, grey-brown, medium grained, moderately to lightly weathered. visible quartz, feldspar, marble mineral One 1/2" fragments coated w/white clayey material. One joint, 45" in large fragment; oxidized fracture surface.	Used ~50 gallons of water
32	29-34	5/60	4-NQ			
36	34-39	57/60	5-NQ	RQD 24/60 40% poor	Granodiorite, grey, medium grained, slightly to moderately weathered. visible quartz, feldspar, crystals and muscovite. Top ~18" is more weathered, smooth surface, hard. Bio staining on fracture surfaces. bottom 39": fractures @ ~70 & 30 degrees, close spaced. Weathered surfaces are red to green mineralized	@1352
40	39-44	55/60	6-NQ		Granodiorite, light grey, fine to medium grained	

Sampler Signature: J. Sathaye Date: 2/23/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 4 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-7 | DATE: 2/24; 2/23 & 2/28

WEATHER: Sunny, 80s F | STANDARD | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : 2" ID coring; mobile drill B-61

WATER LEVELS : | START : 0752 2/23/2006 | END : 1000 3/2/06 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
40__	39-44	55/60	6-NQ	RQD 42/60	Slightly weathered 40 to 40.75' and 42-43'; more fresh in remaining sample, visible crystals; generally feldspar, mafic mineral.	Joint spacing close. Used ~110 gal. of water. 1433 smooth disc, surfaces in fresh rock rough in weathered. stepped. Stopped for 2/26/06; started 2/22/06.
42__				70% fair	Hard-very hard. mineralized (white) joint 75 degrees ~40.5 to 41.5; weatherized zones shows joints bet.0 &75 degrees. Brown staining on weathered surfaces.	
44__	44/49	55/60	7NQ	37/60 60% fair	44-48.5: granodiorite, med grained, visible quartz, feldspar, crystals hard. 2 fractures per foot. vertical. One closed fracture.	Used ~230 gal. of water-hard drilling w/~30" return
46__					45-45.75: vertical fractured surfaces show brown, green weathered surfaces and muscovite. Fractures ~90". surfaces same as above.	
48__					48.5-49' change to granite(pink)+granodionite combination & 47-47.5: 2 sets 90 degree parallel fractures, ~1"apart. 1 closed, 1 open	
50__						
52__						
54__	49-54	60/60	8NQ	10/60 16% very poor	Granodiorite, light grey, med. grained as above. @49' sharp vertical contact w/granite. 49.5-54': fractures >10 per foot. Green/brown staining on open fracture surfaces. 50-50.5': 2 sets fracture, 70 degree and random fracture until 56.6" some closed, joint fracturing 53-53.2' (2 sets) as above slightly weathered.	
56__						
58__	54-59	58/60	9NQ	0/60 66% very poor	granodiorite, light grey, med grained, slightly to moderately weathered. Fractures every ~1-3", 0 degrees from 54-58'; every 3" betwee 58-59 feet. Fracture 56.5-58' 60 degree joint and 0 degree, 1-2" apart. Fracture surfaces are planar and rough; planar & smooth.	
60__						
62__	59-64	50/60	10NQ	40/60 66% fair	granodiorite light grey, medium grained,59'-60.2' mod dry,weathered;60-64.slightly weathered. Brown & green staining on open fracture surfaces. Two open frac. at 50-60.2 ft 3"apart. At 60.2 onee 0.5"pink (granite) band.60.2-61.5": 2 closed joints at 90 degrees 61.5-62:joint,closed,80 degrees. 62-64 feet:4 sets closed fractures,30 deg, 3-4" apart, white hard infilling.	
64__						
66__	64-66.5	23/30	11NQ	23/30 78% good	granodiorite, light grey, medium grained. One open fracture @ 65':slight weathering; brown stained layer & feldspar in rock-all stained brown 5 joints 40 degrees spaced 2" apart from 64.5 to 65.25" hard white infilling, mafic, dry, phenocrysts 0.5-2-inches bet 54-65'	
68__						

Sampler Signature: J. Sathaye Date: 2/28/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 5 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-7 | DATE: 2/28; 3/1 and 3/2/06

WEATHER: Sunny, 80s F | STANDARD | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : 2" ID coring; mobile drill B-61

WATER LEVELS : | START : 0752 2/23/2006 | END : 1000 3/2/06 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
69__					could not core/advance beyond 66.5'; drill barrel and core rods stuck at bottom of hole Well installed in adjacent boring, about 4-5' N of original location	
					air hammer down to 73' bgs	

Sampler Signature: J. Sathaye Date: 3/2/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 1 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-7 | DATE: 2/20/2006

WEATHER: Sunny, 80s F | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4" ID), split spoon, mobile drill

WATER LEVELS : | START : 0920 2/20/2006 | END : 0920 2/22/2006 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone FID only	Above Hole (ppm)
	0-2'	13/24	SS-1 (SPT)	2-3-4-7	11" ORGANIC SOIL (OL) dark brown, dry, loose, 41 roots, wood	--	-0-2
2					2" POORLY GRADED SAND (SP), dark yellowish brown (10 YR 4/4), dry, loose with silt		
	2'-4'	13/24	SS-2 (SPT)	12-13-11-13	SILTY SAND (SM), dark yellowish brown (10YR 3/4), dry, medium dense, white & grey mottles trace eroded granodiorite fragments.	0.36	-0-2
4							
	4-6'	13/24	SS-3 (SPT)	13-12-13-19	SILTY SAND (SM), dark yellowish brown (10 YR 3/4), dry, medium dense, very small white mottling & brown (oxidized) mottling (lightly weathered rock)	0.36	0-40
6					Same as above, yellowish red (5YR 5/6)		
	6-8'	15/24	SS-4 (SPT)	19-15-18-18		0.26	0.28
8							
	8-10'	12/26	SS-5 (SPT)	11-17-12-15	POORLY GRADED SAND (SP), brownish yellow (10 YR 6/6), dry, medium dense, friable very fine white mottles	0.42	0.39
10							
				8-12-14-17	5" - POORLY GRADED SAND (SP), brownish yellow (10 YR 6/6), slightly moist, medium dense.	0.86	0.89
	10-12'	16/24	SS-6 (SPT)		11" as above, dry & friable. trace fine gravel towards bottom		
12							

Sampler Signature: J. Sathaye Date: 2/20/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 2 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PI-7 | DATE: 02/20/06 & 02/21/06

WEATHER: Sunny, 80s F | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : HSA (2-1/4" ID), split spoon, mobile drill + air hammer 6" bit

WATER LEVELS : START : 0920 2/20/2006 END : 0920 2/22/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
					10" POORLY GRADED SAND (SP), yellowish brown	FID only / (ppm)
	12-14'	15/24	SS-7 (SPT)	17-23-27-30	(10YR5/6), medium dense, dry, friable-grading into medium sand, SP, as above. Bottom 2" - POORLY GRADED SAND (SP), brown (7.5 YR 4/4), medium dense with pink mottles.	0-68 / 0.73
14					6" POORLY GRADED SAND (SP), yellowish red (5YR 4/6), dry, medium dense, w/coarse gravel.	
	14-16'	12/24	SS-8 (SPT)	11-32-33-48	6" - POORLY GRADED SAND (SP), yellowish red (5YR 4/6), dry, dense, with black fine gravel	0.97 / 0.98
16					5" - same as above	
	16-18'	12/16	SS-9 (SPT)	18-23-50 (4")		0.84 / 0.89
18					6" grey volcanic rock w/fine grained texture, visible w/small quartz grains. [rhyodacite?]	@1115 02/20/06 stop w/hollow stem auger begin 02/21/06 - air hammer at 18 feet bgs.
20					grey, brown cuttings - no distinguishable rock fragments	21'@1315
22						
26						26' @ 1322

Sampler Signature: J. Sathaye Date: 2/21/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 3 OF 5

SOIL BORING LOG

PROJECT : East Vieques	LOCATION : PI-7		DATE: 2/21/2006
WEATHER: Sunny, 80s F	DRILLING CONTRACTOR : Geoworks, Inc.		
DRILLING METHOD AND EQUIPMENT USED : air hammer, 6" bit, mobile drill bit			
WATER LEVELS :	START : 0920 2/20/2006	END : 0920 2/22/2006	LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole FID only (ppm)
			Air hammer			
26						
28						
30						
						31 ' @ 1330
32						
34						
36					Less weathered bedrock granodiorite fragments; "sandy" cuttings have visible quartz grains	36' @ 1334
38						
40						

Sampler Signature: J. Sathaye Date: 2/21/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	MW-02	SHEET 4 OF 5

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-7 DATE: 2/21/2006

WEATHER: Sunny, 80s F DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : air hammer, 6" bit, mobile drill bit

WATER LEVELS : START : 0920 2/20/2006 END : 0920 2/22/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole FID only (ppm)
			Air hammer		granodiorite fragments here weathered surfaces	41' @ 1337
40						
42						
44						
46					granodiorite	46' @ 1341
48						
50						
51						51' @1345 stop until 1430
52						
					less weathered	
54						

Sampler Signature: J. Sathaye Date: 2/21/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 5 OF 5

SOIL BORING LOG

PROJECT : East Vieques	LOCATION : PI-7		DATE: 2/21/2006
WEATHER: Sunny, 80s F	DRILLING CONTRACTOR : Geoworks, Inc.		
DRILLING METHOD AND EQUIPMEN			
WATER LEVELS :	START : 0920 2/20/2006	END : 0920 2/22/2006	LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole FID only (ppm)
			Air hammer		granite/granodiorite color change to light grey/w rock fragments	
						56' @ 1447less weathered
54						
					harder drilling-granite with 3mm-5mm coarse grained at 2 grains of smaller feldspar grains	61' @ 1500
56						
59						
61						
62						
66						66' @ 1524 fracture @ 69'
					faint sign of moisture @ 70' slightly moist @ 71'	
70						
						71'@1553 - stop for 10 min. stop for 2/21/06 start 2/22/06 @ 0905 SWL = 63' BGS @ 0740
71						
76						76' @ 0920
80						
82						

Sampler Signature: J. Sathaye Date: 2/21/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-03	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-7 DATE: 3/3/2006

WEATHER: Sunny, 80s F, low wind, humid DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : 2-1/4" ID "HSA, mobile drill B-61

WATER LEVELS : START : 0855 3/3/2006 END : 1620 3/6/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2	4/24	SS-1 (SPT)	5-4-8-10 (27)	WELL GRADED SAND (SW), 7.5 YR 5/3 brown, dry, loose, some fine gravel	FID/PID unit not functioning
2	2-4	6/24	SS-2 (SPT)	9-13-14-16 (42)	2" same as above 4" POORLY GRADED SAND (SP), with silt 7-5 YR 5/3 brown, dry, medium dense.	
4	4-6	12/24	SS-3 (SPT)	14-15-15-15 (59)	3" slough, w/coarse gravel and cobble 9" SILTY SAND (SM), 7.5 YR 5/3 brown, dry, medium dense; tr.fine sand,tr white gravel, w/roots,yellow 1" size oxidized gravel. Last 2" reddish brown 10 R 4/4 Weathered bedrock/weak rock	
6	6-8	9/24	SS-4 (SPT)	18-20-26-34 (98)	3" SILTY SAND (SM), 7.5 YR 5/3 (as above) 6" fine sand, SP, 10YR 5/3 brown, dry, med.dense, friable- zone is weathered bedrock-fine grained grey,white,yellow,mottling, visible mica.	
8	8-10	9/24	SS-5 (SPT)	26-40-53(34) (119) (21%)	Weathered bedrock-dry,dense to very dense. Friable 7.5 YR 6/6 reddish yellow, grey, white, oxidized yellow/brown mottles, visible mica specks and fine sand-sized quartz grains.	
10	10-12	2/24	SS-6 (SPT)	50 (7")	Refusal - weakened to hard - granodiorite	
12						

Sampler Signature: J. Sathaye Date: 3/3/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	MW-03	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-7 DATE: 3/3/2006

WEATHER: Sunny, 80s F, low wind, humid DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : 6" diameter air hammer, mobile drill B-61

WATER LEVELS : START : 0855 3/3/2006 END : 1620 3/6/2006 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
12						
16						
20					@17' - 1310. Granite/granodiorite-hard-drilling. Fragments of rock show orthoclase and plagioclase, quartz and muscovite crystals.	
					1325 @ 22'	
24						
					1405 @ 32' granodiorite	
30						
					1418@37'	
30						
34						
38						
42						

Sampler Signature: J. Sathaye Date: 3/3/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	MW-03	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques	LOCATION : PI-7	DATE:	3/3/2006
WEATHER: Sunny, 80s F, low wind, humid	DRILLING CONTRACTOR : Geoworks, Inc.		
DRILLING METHOD AND EQUIPMENT USED : Air hammer (6"), mobile drill B-61			
WATER LEVELS :	START : 0855 3/3/2006	END : 1620 3/6/2006	LOGGER : B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
42						
					1425@45' Granodiorite + granite (pink feldspar)	
45						
50					1455@52'	
55						
60					Stop for 3-3-06	

Sampler Signature: B.Collom Date: 3/3/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	MW-03	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PI-7 DATE: 3/6/2006

WEATHER: Sunny, 80s F, low wind, humid DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Air hammer (6"), mobile drill B-61

WATER LEVELS : START : 0855 3/3/2006 END : 1620 3/6/2006 LOGGER : B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
72					Bottom of hole @ 72' @ 1620	03/07/2006 0745 DTW=51.8' = 20' of water in borehole. Instruct drillers to insta 25' screen.

Sampler Signature: B.Collom Date: 3/7/2006

Appendix D
PAOC J – Soil Boring Logs – Surface/Subsurface

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	SB01 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC J | DATE: 3/2/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 0900 | END : 0920 | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	24/24	#1		0-2': WELL GRADED SAND (SW), brownish yellow (10YR 6/6), slightly moist, dense, fine to coarse sand, some fine gravel, fragments of granitic rock & Kspar, quartz	Collect sample EPAJ SS01-0001
2	2-5'	34/36	#2		2-5': WELL GRADED SAND WITH GRAVEL (SW), light yellowish brown (10YR 6/4), slightly moist, medium dense, fine to coarse sand, fine to coarse gravel ~20% weathered quartz & Kspar, granite fragments.	Collect sample EPAJ SB01-0405
4						Refusal @ 5' bgs
					TD @ 5' bgs	
6						
8						
10						
12						
14						

Sampler Signature: J.Myer Date: 3/2/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	SB02 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC J | DATE: 3/2/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 1000 | END : 1025 | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	24/24	#1		WELL GRADED SAND (SW), brown (7.5YR 4/4), dense, fine to coarse sand, little fine gravel	FID = .32 ppm Collect sample EPAJ SS02-0001
4, 6	2-6'	46/46	#2		Same as above Becoming coarser @ 5.7'	FID = .33 ppm Collect sample EPAJ SB02-0406
8	6-8'	24/24	#3		WELL GRADED SAND WITH GRAVEL (SW), very pale brown (10YR 7/4), moist, medium dense, fine to coarse angular sand some fine gravel. Fragments of quartz, mica, K-Spar & granitic rock.	FID = .4 ppm Refusal @ 8' bgs
10, 12, 14					TD 8' bgs	

Sampler Signature: J.Myer Date: 3/2/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	SB03 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC J | DATE: 3/1/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 0915 | END : 0950 | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	24/24	#1		0-1': SILTY SAND (SM), gray (10YR 5/1), dry, sand is fine to medium, some cobbles fine to coarse gravel 1-2': WELL SORTED SAND (SW), very dark gray (7.5YR 3/1), moist, dense, fine-coarse	1.1 ppm
2	2-6'	46/46	#2		WELL SORTED SAND WITH GRAVEL (SW), yellow red (5YR 4/6), moist, dense, fine to coarse sand, fine gravel, Kspar, quartz, mica/biotite and granitic fragments	1.8 ppm
4 6	6-10'	46/46	#3		Same as above	2.7 ppm
8 10	10-14'	46/46	#4		WELL GRADED SAND WITH GRAVEL (SW), pink (7.5YR 7/3), moist, very dense, fine to coarse sand, fine to coarse gravel highly weathered	
12 14					TD 14' bgs	Refusal @ 14' bgs

Sampler Signature: J.Myers Date: 3/1/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	SB04 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC J | DATE: 3/2/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 0745 | END : | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	24/24	#1		SILTY SAND (SM), black (10YR 2/1), slightly moist, medium dense, fine to medium sand, some fine-coarse gravel. Organic matter top 4 inches	FID = 0.2 ppm Collect sample EPAJ SS04-0001
2						
	2-6'	42/46	#2		WELL GRADED SAND (SW), pink (7.5YR 7/3), moist, medium dense, fine to coarse sand. Some fine gravel and cobbles, fragments of quartz, Kspar, muscovite, and weathered granite	FID = 1.3 ppm Collect sample EPAJ SB04-0406
4						
6						
	6-10'	36/46	#3		WELL GRADED SAND WITH GRAVEL (SW), very pale brown (10YR 7/3), slightly moist, medium dense fine to coarse sand, fine to coarse gravel ~20%. Fragments of Kspar quartz, muscovite and weathered granite	FID = 3.32 ppm Refusal @ 10' bgs
8						
10						
					TD 10' bgs	
12						
14						

Sampler Signature: J.Myers Date: 3/2/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	SB05 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC J | DATE: 3/2/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 935 | END : 1025 | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	18/2	#1		0-.5: SILTY SAND (SM), dark reddish gray (5YR 4/2), dry, med. dense, fine sand with silt and organic matter. Trace fine gravel. .5-2: WELL GRADED SAND (SW), yellowish red (5YR 4/6), dense, moist, fine to coarse sand, trace fine gravel	FID = 2.75 ppm Collect samples EPAJ SS05-0001 and EPAJ SS05P-0001
4	2-6'	3.7/3.8	#2		WELL GRADED SAND (SW), reddish brown (5YR 4/4), moist, dense, fine to coarse sand trace fine gravel	FID not working Collect samples EPAJ SB05-0406 and EPAJ SB05P-0406
6	6-10'	3.8/3.8	#3		WELL GRADED SAND WITH CLAY (SW-SC), yellowish red (5YR 4/6) , moist, dense, fine to coarse sand, some clay. Quartz and Kspar fragments	FID not working
8						
10	10-14'	3.8/3.8	#4		10-12.5' Same as above	
12						
14					12.5-14': WELL GRADED SAND WITH GRAVEL (SW), light brown (7.5YR 6/4), slightly moist, medium dense, fine to coarse sand, some gravel fine.	
15	14-15'	12/12	#5		WELL GRADED SAND WITH GRAVEL (SW), (7.5YR 6/4), slightly moist, fine to coarse gravel, fine TD 15'	Refusal @ 15' bgs

Sampler Signature: J.Myer Date: 3/2/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB06 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC J | DATE: 3/1/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 1055 | END : 1135 | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	24/24	#1		WELL GRADED SAND (SW), reddish brown (5YR 4/3), moist, dense, very fine to medium sand	FID not working Collect sample EPAJ SS06-0001
2	2-4'	46/46	#2		2-4':CLAYEY SAND (SC), reddish brown (2.5 YR 4/4), moist, dense fine sand with clay	
4					4-6': WELL GRADED SAND (SW), reddish brown (5YR 4/3), moist, dense fine to coarse, little fine gravel	FID not working Collect Sample EPAJ SB06-0406 MS/MSD
6	6-10'	46/46	#3		CLAYEY SAND (SC), reddish brown (2.5YR 4/4), moist, dense, fine to medium sand with clay	
8						
10	10-14'	46/46	#4		WELL GRADED SAND WITH CLAY (SW-SC), yellowish red (5YR 5/6), moist, dense, fine to coarse quartz Kspar pyrite? fragments, some clay	
12						
14	14-16'	24/24	#5		WELL GRADED SAND WITH GRAVEL (SW), pink (7.5YR 7/3), moist, medium dense, Kspar, quartz mica & granite rock fragments, fine to coarse sand and fine gravel.	Refusal @ 16'
16					TD @ 16' bgs	

Sampler Signature: J.Myers Date: 3/1/2006

Appendix D
PAOC J – Soil Boring Logs – for Monitoring Wells

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 1 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC J | DATE: 2/10/2006

WEATHER: Sunny, hot 80 degrees | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 HSA

WATER LEVELS : | START : 2/8/2006 | END : 1/30/06 | LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
						FID readings only
	0'-2'	13"/24" 54%	1-SPT	8-10-8-12 (18)	0'-2" ORGANIC SOIL (OL) dark brown, roots, leaf debris moist. 2'-1' SILTY SAND (SM), fine grained sand, drak grayish brown. 10 yr 4/2, medium density, dry, w/rock fragements 2mm-5mm.	-4.66 / -3.89
2						
	2'-4'	15"/24" 63%	2-SPT	15-19-25-36 (44)	Silty sand continues to 3'. At 3' becomes WELL GRADED SAND (SW); well graded medium to very coarse grained sand, mottled, black , white, brownish yellow. 10 yr, 5/6. Has appreance of hightly weatherd granodiorite. dry, very dense, highly friable w/ some silt.	-3.37 / -3.18
4						
	4'-6'	15"/24" 63%	3-SPT	24-35-33-40 (15)	CLAYEY SAND (SC) from above continues very dense, dry feldspar and quartz mineral feldspars weathering into clay.	-1.98 / -2.80
6						
	6'-8'	6"/10" 50%	4-SPT	30-50/4" (>50)	CLAYEY SAND (SC): well graded medium to very coarse grained sand dry, very dense, feldspar and quartz fragment, in a clay matrix. Rock Fragments 2mm-20mm. Highly weathered granodiorite.	-2.00 / -2.39
8						
	8'-10'	3"/4" 75%	5-SPT	50/4" (>50)	CLAYEY SAND (SC) weathered Granodiorite continues	-2.24 / -1.9
10						
	10'-12'	5"/9" 55%	6-SPT	30-50/3" (>50)	Weathered granodiorite continues.	-1.67 / -1.45
12						

Sampler Signature: Lisa Carter Date: 2/10/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 2 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC J | DATE: 2/10/2006

WEATHER: Sunny, hot 80 degrees | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 HSA /6" air hammer

WATER LEVELS : | START : 2/10/2006 | END : 1/30/06 | LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
12						
	12'-14'	0"/3" 0%	7-SPT	50/3" (>50)	Split Spoons hitting refusal in weathered granodiorite switch equipment over to 6" air hammer.	09:40 begin air hammer.
15						
18						
21					Weathered granodiorite cuttings. Cutting are sand and clay blown up to surface.	09:45
24						

Sampler Signature: Lisa Carter Date: 2/10/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 3 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC J | DATE: 2/10/2006

WEATHER: Sunny, hot 80 degrees | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED: Mobile B-61 HDX 3.25 6" air hammer

WATER LEVELS : | START : 2/10/2006 | END : 1/30/06 | LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
24						
27						
30					Still in weathered granodiorite at 31 feet bgs.	09:56
33						
36					At approx 35' drill rig starting to get ino fractured, weathered bedrock. Drilling is slower.	09:59

Sampler Signature: Lisa Carter Date: 2/10/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 4 OF 5

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC J DATE: 2/10/2006

WEATHER: Sunny, hot 80 degrees DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 6" air hammer

WATER LEVELS : START : 2/10/2006 END : 1/30/06 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36						10:02 - at 36'
39						
					Bedrock more competent harder to drill through	10:01 - at 41'
42						
45						
					Granodiorite	10:30 at 46'
48					At approx 35' drill rig starting to get ino fractured, weathered bedrock. Drilling is slower.	09:59

Sampler Signature: Lisa Carter Date: 2/10/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 5 OF 5

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC J DATE: 2/10/2006

WEATHER: Sunny, hot 80 degrees DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Mobile B-61 HDX 3.25 6" air hammer

WATER LEVELS : START : 2/10/2006 END : 1/30/06 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
48						10:02 - at 36'
51						10:45 stop at 51' will see if water comes into the borehole.
54						
57						
60						12:37 Stop drilling at 60' let hole sit open over weekend to see if water comes in. No, it is dry.

Sampler Signature: Lisa Carter Date: 2/10/2006

Appendix D
PAOC K – Soil Boring Logs – Surface/Subsurface

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB01 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC K | DATE: 2/28/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 0830 | END : 0900 | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	24/24	#1		0-.5': SILTY SAND (SM), grey (10YR 5/1), slightly moist, fine sand with silt and organic matter. .5-2': WELL GRADED SAND (SW), reddish brown (5YR 4/4), moist, dense, fine to coarse sand.	FID = 1.28 ppm Collect sample EPAKSS01-0001
2	2-6'	46/46	#2		WELL GRADED SAND (SW), yellowish red (5YR 4/6), moist dense, fine to coarse sand Kspar quartz mostly biotite?	FID = 1.94 ppm Collect sample EPAKSB01-0406
4						
6	6-10'	46/46	#3		WELL GRADED SAND WITH GRAVEL (SW), very pale brown (10 YR 7/4), moist, dense, fine to coarse sand, fine gravel, highly weathered granodiorite	FID = 1.5 ppm
8						
10						10' refusal
					TD 10' bgs	
12						
14						

Sampler Signature: J.A.Myers Date: 3/1/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SB02 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC K | DATE: 2/28/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 1100 | END : | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	24/24	#1		WELL GRADED SAND WITH GRAVEL (SW), dark grayish brown (10YR 4/2), dry, dense, fine to coarse sand w/fine to coarse gravel 710 mm	FID = 0.3 ppm Collect sample EPAK SS02-0001
2	2-6'	46/46	#2		WELL GRADED SAND WITH CLAY (SW-SC), red (2.5YR 4/6), moist, dense fine to coarse sand, some clay	FID = 0.28 Collect sample EPAK SB02-0406
4						
6	6-10'	46/46	#3		WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), yellowish red (5YR 4/6) moist, dense fine to coarse sand some fine gravel with clay	FID = 0.35
8						
10	10-14	46/46	#4		Same as above	FID = 0.33
12						
14	14-15	12/12	#5		14-15.5: Same as above	FID = 0.75
15						

Sampler Signature: J.A.Myers Date: 2/28/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB02 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC K | DATE: 2/28/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 1100 | END : | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
16	15-17	24/24	#5		15.5-17': WELL GRADED SAND (SW), pinkish white (2.5YR 8/2), moist, very dense fine to coarse sand, little granodiorite fine gravel, highly weathered, mostly quartz and Kspar.	FID = 0.75
18						
20						
22						
24						
26						
28						

Sampler Signature: J.A.Myers Date: 2/28/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SB03 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques | LOCATION PAOC K | DATE: 3/2/2006

WEATHER: sunny, hot and humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : trailer mount Earth probe 200

WATER LEVELS : NA | START : 0820 | END : | LOGGER : J.A. Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	1.8/2	#1		WELL GRADED SAND WITH GRAVEL (SW), dark brown (10YR 3/3), slightly moist, medium dense, fine to coarse sand, some fine gravel. ~15%	FID = 1.56 ppm
2	2-6'	3.8/3.8	#2		2-5.8': POORLY GRADED SAND WITH SILT (SP-SM), very dark brown (7.5YR 2.5/3), slightly moist, medium dense, fine sand some silt 5.8-6': WELL GRADED SAND WITH CLAY (SW-SC), reddish brown (5YR 4/4), moist, dense, fine to coarse sand, little gravel. Mostly quartz and Kspar fragments	FID = 2.66 ppm
4 6	6-10'	3.8/3.8	#3		Same as above	FID = 3.16 ppm
8 10	10-11"	1/1	#4		WELL GRADED SAND WITH GRAVEL (SW), light reddish brown (2.5YR 6/3), moist, medium dense fine to coarse sand fine gravel ~25% weathered quartz and Kspar and granite fragments.	FID = 2.67 ppm refusal @ 11'
12 14 15					TD 11' bps	

Sampler Signature: J.A.Myers Date: 3/2/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER	
	183719.FI.02	SB04	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC K | DATE: 3/8/2006

WEATHER: sunny, 80's F, light breeze | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Mobile Drill B-61 HSA w/40 lb. hammer, 2" split spoon

WATER LEVELS : NA | START : 1010 | END : | LOGGER : B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	6"	#1	15-17-50/1	SILTY GRAVEL WITH SAND (GM), yellowish brown (10YR 5/4), yellow brown, dry, sand is fine to coarse, gravel 1-1/4" to 1" angular to sub angular, some organics, loose in split spoon	Mast up @ -950 FID headspace = 0 ppm 0957 - collect EPAK - SS-04-0001
4	2-4'	6"	#2	15-14-12-15	Same as above, slightly lower gravel content, bottom 1" is very slightly moist	FID = 0 ppm
6	4-6'	5"	#3	11-16-22-32	SILTY SAND WITH GRAVEL (SM), pale brown (10YR 6/3), dry, sand fine to coarse, gravel 1/4" to 3/4", loose in split spoon	FID = 0 ppm 1015-collect EPAK-SB04-0406 P.Kish starts logging DPT @ 6.0'
8					6-9': CLAYEY SAND (SC), strong brown (7.5YR 5/6), dry-damp Refusal @ 9.0'	
10 12 14					End of borehole @ 9.0' 03/15/06	

Sampler Signature: B.Collom Date: 3/8/2006

CH2MHILL	PROJECT NUMBER	BORING NUMBER
	183719.FI.02	SB05 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC K | DATE: 2/28/2006

WEATHER: sunny hot humid | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mounted Earth probe 200

WATER LEVELS : NA | START : 0945 | END : '1040 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	24/24	#2		SILTY SAND (SM), reddish gray (5YR 5/2), dry, medium dense, fine to medium sand, some gravel ~2 cm & cobbles with silt	Collect sample 0-1' E-PAK SS05-0001 FID = 0.6 ppm
4 6	2-6'	46/46	#2		WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), strong brown (7.5YR 5/6), moist, dense, medium to fine, some coarse sand & fine gravel with clay	FID = 0.02 ppm
8 10	6-10'	46/46	#3		6-8': WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), red (2.5YR 4/6), moist, dense, coarse to fine sand, some fine gravel 8-10': WELL GRADED SAND WITH CLAY (SW-SC), red (2.5YR 4/6), moist, dense, medium to fine sand	
12	10-13'	36/36	#4		WELL GRADED SAND WITH GRAVEL (SW), reddish yellow (7.5YR 7/6), moist, dense, medium to coarse sand with coarse to fine gravel.	Refusal at 13'.
14					TD 13' bgs	

Sampler Signature: J. Myers Date: 2/28/2006

Appendix D
PAOC L – Soil Boring Logs – Surface/Subsurface

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC L SB01 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC L | DATE: 02/27/06

WEATHER: hot humid overcast | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1000 | END : 1030 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	1.8/2	S1		SILTY SAND (SM), brown (10YR 4/3), dry, loose, fine sand	Background = 2.22 FID TVA 1000 brand FID 2.22 collect sample SS01-0002 at 0-2 feet.
4	2-4.5'	2.3/2.5	S2		Same as above, some granodiorite cobbles and brick fragments	2.26 FID collect sample SS01-0204
6 8					TD 4.5'	Refusal @ ~4.5' bgs

Sampler Signature: J.Myers Date: 2/27/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC L SB02 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling LOCATION : PAOC L DATE: 03/08/06

WEATHER: sunny 80s F DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Mobile drill B-61 HSA w/140 lb. hammer + 2' split spoon

WATER LEVELS : NA START : 0820 END : 0845 LOGGER : B.Collom/CH2M HILL

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	12/24	S1	14-17-23-17	SILTY SAND WITH GRAVEL (SM), brown (10 YR 5/3),dry, sand fine to medium gravel 1/4" to 3/4", loose in spoon, some organics	0805 - mast up boring to west of bldg. FID HS = 0 ppm 0820 - collect EPAL - SS02-0001
2	2-4'	10/24	S2	11-10-7-5	same as above, slightly higher gravel content, very slightly moist, some organics	FID = 0 ppm
4	4-6'	16/24	S3	4-2-2-2	Top 8" same as above, slightly moister, bottom 8" grade SILTY SAND WITH GRAVEL (SM), dark yellowish brown (10YR 4/4), sand is fine to coarse gravel 1/4" to 1/2", sub angular, very loose, 1 piece of what appears to be brick	FID = 1 ppm 0840 - collect EPAL - SB02-0406
6					BOH @ 6'	
8						
10						

Sampler Signature: B.Collom Date: 3/8/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC L SB03 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION : PAOC L | DATE: 03/08/06

WEATHER: sunny 80s F | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Mobile drill B-61 HSA w/140 lb. hammer + 2' split spoon

WATER LEVELS : NA | START : 0900 | END : 0920 | LOGGER : B.Collom/CH2M HILL

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	16"	S1	15-20-12-15	Top 10" SILTY SAND WITH GRAVEL (SM), brown (10YR 5/3), dry, sand is fine to coarse, gravel, 1/4" loose in spoon bottom 6" grade slightly moister, piece of brick in shoe	0855 mast up, boring to N. of bldg. FID = HS = 0 ppm 0905 - collect EPAL SS03-0001
2	2-4'	10"	S2	12-50/5	same as above, grades slightly moister w/depth, some black mottles, few organics, rock in drive shoe	FID HS = 0 ppm
4	4-6'	8"	S3	34-42-50/3	SILTY GRAVEL WITH SAND (GM), dark yellowish brown (10YR 4/4), slightly moist, sand is fine to coarse, gravel 1/4" to 1", angular, loose in split spoon, few organics	FID HS = 0 ppm Collect EPAL - SB03-0406 @ 0920
6	6-12'				('6.0 - 12.0') No recovery Refusal @ 12.0'	
8						
10						

Sampler Signature: B.Collom Date: 3/8/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC L SB04 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling	LOCATION : PAOC L		DATE: 03/08/06
WEATHER: sunny 80s F	DRILLING CONTRACTOR : Geoworks		
DRILLING METHOD AND EQUIPMENT USED : Direct push - Simco Earth probe 200 w/2' x 4' sampler			
WATER LEVELS : NA	START : 1055	END :	LOGGER : B.Collom/CH2M HILL

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	24"	S1		SILTY SAND WITH TRACE GRAVEL(SM), very dark grayish brown (10YR 3/2), dry, sand is fine to coarse, gravel 1/4", angular loose in sleeve, some organics, few orange mottles	1055 begin direct push boring to E. of bldg. 1105 - collect EPAL - SS04-0001 Collect MS/MSD volumes FID = 0 ppm
2	2-4'	24"	S2		top 6' same as above, then changes abruptly to POORLY GRADED SAND WITH SILT (SP-SM), very dark grayish brown (10YR 3/2), slightly moist, loose in sleeve, sand fine to med. bottom 4", a mixture of brick fragments, granite fragments and other gravel - fill.	FID = 0 ppm 1115 - collect EPAL - SB04-0204
4					Refusal at 4.5' feet - no 4-6' sample	
6						
8						

Sampler Signature: B.Collom Date: 3/8/2006

Appendix D
PAOC L – Soil Boring Logs – for Monitoring Wells

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 1 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC L | DATE: 2/15/2006

WEATHER: Sunny, hot 80 degrees | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 HSA

WATER LEVELS : | START : 2/8/2006 | END : 2/15/06 | LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
						FID readings only
	0'-2'	16"/24" 66%	1-SPT	6-12-12-6 (24)	ORGANIC SOIL (OL); grass roots ad organic debris. 0'-6" 6'-2' SILTY SAND (SM); very fine grained sand w/silt brown. 10 yr. 5/3 dry, w/some rock fragments 2mm to 10 mm. (fill)	2.05 / 1.92
2	2'-4'	5"/24" 21%	2-SPT	4-3-1-1 (4)	SILTY SAND (SM) continues slightly moist , loose, trace brick fragments (fill)	2.34 / 1.94
4	4'-6'	1"/24"	3-SPT	1-1-2-3 (3)	SILTY SAND (SM) continues slighty moist, loose, trace brick fragmenta (fill)	2.23 / 1.94
6	6'-8'	2"/24" 8%	4-SPT	3-7-21-47 (28)	SILTY SAND (SM) continues slighty, moist, loose, dark brown. 10yr 3/3, rock fragments. 2mm-10mm (Fill)	-2.00 / -2.39
8	8'-10'	14"/24" 58%	5-SPT	3-7-21-47 (28)	SILTY SAND (SM) continues to 9' from 2'. Turns to Sand (SW); well graded medium to very coarse grained sand, mottled, black and white brownish yellow. 10 yr, 5/6 has apperance of highly weathered granodiorite dry.	2.15 / 2.07
10	10'-12'	12"/17" 71%	6-SPT	31-40-50/5" (>50)	Very dense, highly friable quartz and feldspar minerals. Sand, weathered granodorite continues most of the felspars weathered to clay.	2.03 / 2.3
12						

Sampler Signature: Lisa Carter Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 2 OF 5

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC L | DATE: 2/15/2006

WEATHER: Sunny, hot 80 degrees | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 HSA & 6" air hammer.

WATER LEVELS : | START : 2/8/2006 | END : 2/15/06 | LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
12						FID readings only
	12'-14'	4"/4" 100%	7-SPT	50/4"	Weathered grandorite continues	2.83 2.84
	14'-16'	0"/1" 0%	8-SPT	50/1"	Auger refussal at 14' 9:00 switch to air hammer starting at 14' BGS.	Auger refusal at 14'
15						
					At 16', top of bedrock, granodiorite, fractured. Possible fracture at 17'	
18						
21						1000 at 21' BGS.
24						

Sampler Signature: Lisa Carter Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01 SHEET 3 OF 5

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC L DATE: 2/15/2006

WEATHER: Sunny, hot 80 degrees DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 6" air hammer

WATER LEVELS : START : 2/8/2006 END : 2/15/06 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
24						
						10:15 at 26' BGS.
27						
30						10:30 at 31' BGS.
33						
36						10:50 at 36' BGS.

Sampler Signature: Lisa Carter Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01 SHEET 4 OF 5

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC L DATE: 2/15/2006

WEATHER: Sunny, hot 80 degrees DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 6" air hammer

WATER LEVELS : START : 2/8/2006 END : 2/15/06 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36						
39						11:10 at 41' BGS
42						
45						11:35 at 46' BGS.
48						

Sampler Signature: Lisa Carter Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 5 OF 5

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC L DATE: 2/15/2006

WEATHER: Sunny, hot 80 degrees DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 6" air hammer

WATER LEVELS : START : 2/8/2006 END : 2/15/2006 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
48						
51						13:05 AT 51' BGS.
					at - 53' encountered a fine grained volcanic bedrock, dark gray to black	
54					of unknow thickness.	
						13:25 at 56' BGS.
57						
60						13:40 at 60' BGS. Let borehole sit to see if water comes in.

Sampler Signature: Lisa Carter Date: 2/15/2006

Appendix D
PAOC N – SWMU 10 – Soil Boring Logs – Surface/Subsurface

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER EPAN SS/SB01 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - N DATE: 2/1/2006

WEATHER: Sunny, 85 F DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Direct push

WATER LEVELS : NA START : 1120 hrs END : 1200 hrs LOGGER : P. Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
	0-2	24/24	#1		0-1' SILTY SAND (SM), light gray (7.5YR 7/1), dry, loose, with occasional angular gravel.	PID (ppm) / FID (ppm): 1.57 (0-1') / 0.8
2					1-4.5' SILTY CLAY SAND (SC), dark brown (7.5YR 3/4), medium dense, dry, dark	1.54 (2-4') / 1.7
	2-6	48/48	#2			
4						
					4.5- 6': SILTY CLAY SAND (SP-SC), dark yellowish brown (10YR 4/6), loose	2.1 (4-6') / 1.72
6						
					END OF BOREHOLE at 6.0' bgs. 2/1/2006	Background reading: 0.43 / 2.14
8						
10						
12						

Sampler Signature: Patrick Kish Date: 2/1/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 2	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - N DATE: 2/17/2006

WEATHER: Sunny and humid DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 0740 END : 0825 LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
2, 4	0 - 4'	4/4'	#1		0-3.2': SILT WITH SAND (ML), dark yellowish brown (10YR 3/4), dry, medium stiffness. 3.2' - 4': WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown (10YR 4/4), dry, loose	FID (ppm) 3.82 Background 5.82 3.95
6, 8	4' - 8'	3.2/4'	#2		4-8': WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown (10YR 4/4), dry, loose	4.53 7.81
10, 12	8' - 12'	3.5'	3		8-12' SILTY SAND WITH CLAY (SM-SC), dark yellowish brown (10YR 4/6), dry, loose.	3.87 3.75

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 2	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - N DATE: 2/17/2006

WEATHER: Sunny & Humid DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 0740 hrs END : 0825 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
14 16	12' - 16'	3.8/4'	4		12 -14' Same as above 14-16' SILT WITH SAND (ML), yellowish brown (10YR 5/6), dry, medium stiffness.	FID (ppm) 5.25 Background 8.32 6.31
18 20	16' - 20'	4'	5		16-20' CLAY WITH SAND (CL), yellowish brown (10YR 5/6), dry, hard 20': Refusal.	4.82 4.72
22 24					End of boring at 20' bgs. 02/17/06	

Sampler Signature: Andy Sprinkle Date: 2/17/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 3	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - N DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 1450 hrs END : 1545 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
2, 4	0 - 4'	4/4'	#1		0 - 3.7' SILT (ML), dark yellowish brown (10YR 3/4), dry, hard. 3.7'-8' WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown (10YR 4/6), dry, loose.	0-1 ft 0 ppm FID (ppm) 1.92 Background 1.73 1-3 ft 10 ppm, so SS sample 1-3 feet bgs 2.43
6, 8	4' - 8'	3/4'	#2			2.33 4.5-6 ft 3.5 ppm 3.1
10, 12	8' - 12'	2.8/4'	#3		8'-12' WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown (10 YR 3/6), dry, loose.	1.91 2.03

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 3 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - N DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 1450 hrs END : 1545 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
14 16	12' - 16'	3.1'	#4		12-16' WELL GRADED SAND AND SILT (SW-SM), yellowish brown (10YR 5/4), dry, loose, trace gravel.	FID (ppm) 3.62 Background 3.73 3.47
18 20	16' - 20'	3.5'	#5		16-20' Same as above 20' bgs Refusal.	2.41 2.93
22 24					End of boring at 20' bgs. 02/16/06	

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 4	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - N DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 1420 hrs END : LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
2, 4	0 - 4'	4/4	#1		0-0.6' SILT (ML), light brownish gray (10YR 6/2), dry, loose. 0.6-3.8' CLAYEY SILT (ML), dark yellowish brown (10YR 3/4), dry, stiff. 3.8-8' WELL GRADED SAND WITH SILT (SW - SM), dark yellowish brown (10YR 3/4), dry, loose.	FID (ppm) 1.65 Background 1.89 1.82
6, 8	4' - 8'	4/4	#2			2.05 2.31
10, 12	8' - 12'	3.5/4	#3		8-12' WELL GRADED SAND WITH SILT (SW), dark yellowish brown (10YR 4/6), dry, loose.	

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 4 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - N DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 1420 hrs END : LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	12' - 13'	4/4'	#4		12 - 13' Same as above. 13' bgs: Refusal	FID (ppm) 2.15 Background 2.54
14					End boring at 13' bgs. 12/16/06	
16						
18						
20						
22						
24						

Sampler Signature: Andy Sprinkle Date: 2/16/2006

Appendix D
PAOC N – Soil Boring Logs – for Monitoring Wells

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC-N | DATE: 2/3/2006

WEATHER: P. Sunny 70's-80's, Low | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : B-61 mobile drill with 2-1/4" HSA

WATER LEVELS : | START : 8:05 | END : 08:40 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID	Above Hole PID
	0-2	15/24	SS1 (spt)	15-19-15-10	POORLY GRADED SAND (SP), dark brown fine, dry, loose, medium dense, with coarse gravel and cobble, top 6"	0.62	10
2	2-4	14/24	SS2 (spt)	13-16-22-22	SILTY SAND (SM), light brown medium dense, dry with coarse gravel	-4.23	7
4	4-6	18/24	SS3 (spt)	10-7-8-6	POORLY GRADED SAND (SP) reddish brown, dry loose. Coarse gravel and cobble in top 12"	-15	-1
6	6-8	12/24	SS4 (spt)	7-8-11-8	Same as above; trace fine gravel	-14	5
8	8-10	7/24	SS5 (spt)	13-13-8-7	Same as above; cobble, bottom 2"	-16	7
10	10-12	14/24	SS6(spt)	7-6-8-8	3" - same as above 4" - SILTY SAND (SM), tan, moist, loose 7" - POORLY GRADED SAND (SP), tan, loose moist, trace fine gravel gray, black, pale pink 1/2" mottles.		
12							

Sampler Signature: J. Sathaye Date: 2/3/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC-N | DATE: 2/3/2006

WEATHER: Sunny 80's, low wind | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : B-61 mobile drill with 2-1/4" HSA

WATER LEVELS : | START : 8:40 | END : 9:30 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID / Above Hole PID
12						
	12-14	12/24	SS7 (spt)	6-8-9-10	7" - Same as above 5" - same as above; with fine to coarse gravel.	
14						
	14-16	16/24	SS8 (spt)	6-8-11-12	2" - same as above 6" - SILTY SAND (SM), brown, med. dense, moist 8"-POORLY GRADED SAND (SP), reddish brown, medium dense, moist, some silt	
16						
	16-18	14/24	SS9 (spt)	11-14-21-24	8"-POORLY GRADED SAND (SP), reddish brown, med. dense, moist 6"-POORLY GRADED SAND (SP), reddish brown, moist, med dense; small bed pale pink, with dark brown 4-inch mottles.	
18						
	18-20	24/24	SS10 (spt)	9-16-21-32	4" - SILTY SAND (SM), dark brown, moist med. Dense, with coarse gravel 20"- SILTY SAND (SM), orange brown, moist, dense to medium dense, trace fine gravel. fine black mottling; . Sand, bottom 5"	
20						
	20-22	18/24	SS11 (spt)	11-24-32-32-33	13" - SILTY SAND (SM), dark brown med dense, moist, trace gravel (fine) pink, light green mottles bottom 4"- (weathered granite) 5"- fine sand and cobbles Brown to reddish brown, dry, med. Dense	
22						
	22-24	17/24	SS12 (spt)	27-35-27-38	4"- same as above. 6"-POORLY GRADED SAND (SP), yellow brown, medium dense, dry, with coarse gravel. 1"- cobble 6"- SILTY SAND (SM), yellowish brown, med. Dense, dry, some fine gravel gray, black, pale pink 1/2" mottles.	
24						

Sampler Signature: J. Sathaye Date: 2/3/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC-N DATE: 2/3/2006

WEATHER: P. Sunny, 80's F, mod. Wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : B-61 mobile drill with 2-1/4" HSA

WATER LEVELS : START : 9:30 END : 10:55 (HSA) LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID / Above Hole PID
24						
	24-26	17/24	SS13 (spt)	13-18-18-22	9"-SILTY SAND (SM), brown med. Dense, moist, tr. Fine gravel. 8"- POORLY GRADED SAND (SP), brown, medium dense, dry, some fine gravel. Pale pink, black mottles (1/2)"	
26						
	26-28	20/24	SS14 (spt)	12-13-18-15	4"- POORLY GRADED SAND (SP), no mottling 13"-POORLY GRADED SAND (SP), reddish brown gray molthing (1/4") dry, med. Dense 3"-SILTY SAND (SM), red-brown, moist, med dense	
28						
	28/30	20/24	SS15 (spt)	18-20-26-32	9"-SILTY SAND (SM) as above; small balck mottles. 11"- fine sand, SP, reddish brown, moist, medium dense, pale pink mottles (1/4") with silt	
30						
	30-32	24/24	SS16 (spt)	15-21-37-41	13"- SILTY SAND (SM), reddish brown, moist, med dense to dense, blk, mottling (<1/4") 11- fine sand, (SP), w/silt, red brown, med. dense to dense, moist, pale pink mottling (1/4")	
32						
	32-34	19/23	SS17 (spt)	17-18-18-50 5"	POORLY GRADED SAND (SP), some silt brown, med dense to dense, moist. Pinkish mottles lower 10"	
34						
	34-34.5	5/5	SS18 (spt)	50 (5")	2 1/2 - SILTY SAND (SM), brown. Dense, moist, pink and yellow mottling 2 1/2 ", weathered gray, volcanic bedrock. could not break w/ hammer,v. hard) pink mottles, pits	
36						

Sampler Signature: J. Sathaye Date: 2/3/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01 SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC-N DATE: 2/3/2006

WEATHER: P. Sunny, 80's F, mod. Wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : B-61 mobile drill with 2-1/4" HSA

WATER LEVELS : START : 9:30 END : 10:55 (HSA) LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone PID / Above Hole PID
36			Air Hammer		Gray Volcanic Rock	
39						
42						Stop air hammer 2/3/06
					EOB 42" water @ 42', 2/3/06 @ 14:15	
45						
45						
45						
36						

Sampler Signature: J. Sathaye Date: 2/3/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC-N | DATE: 2/1/2006

WEATHER: Sunny, 80's F, low wind | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : B-61 mobile drill with 2-1/4" HSA

WATER LEVELS : | START : 15:25 | END : 16:00 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): PIO/FIO	Breathing Zone FID	Above Hole FID
	0-2	15/24	SS1 (spt)	4-4-4-7	SILTY SAND (SM), 7.5 yr 2.5/4 v. dk brown, some clay bottom 6" moist. Loose tr. Gravel, roots, organic matter- rich	22/-2.65	-21	-3.87
2								
	2-4	15/24	SS2 (spt)	8-12-11-11	9"- same as above (no organic matter) 6"- POORLY GRADED SAND (SP), 7.5 yr 5/6 dry, loose, tr. Cobble and coarse gravel.	22/1.42	-23	-4.2
4								
	4-6	12/24	SS3 (spt)	8-6-5-7	POORLY GRADED SAND (SP), 2.5 yr 3/6 dark red, moist, loose cobble bottom 1.5"	22/2.43	-24	-1.8
6								
	6-8	18/24	SS4 (spt)	3-3-3-5	As above: POORLY GRADED SAND (SP) trace gravel.	22/2.43	-24	-1.8
8								
	8-10	18/24	SS5 (spt)	10-6-3-3	3" - as above 3" - gray cobble 5" - POORLY GRADED SAND (SP), moist loose 5 yr 5/6 yellowish red. 7" -SILTY SAND (SM), 7.5 yr 5/4rest: as above	24/0.82	-18.2	0.97
10								
	10-12	15/24	SS6 (spt)	4-9-12-13	9" - POORLY GRADED SAND (SP), some silt, moist, lo 7.5 yr 3/6 strong brown 6" -POORLY GRADED SAND WITH GRAVEL (SP), coarse sand, 10 yr 5/6. gravel=gray moist, loose.	-5.1724138	-6.01	2.05
12								

Sampler Signature: J. Sathaye Date: 2/1/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC-N | DATE: 2/1/2006

WEATHER: Sunny, 80's F, low wind | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : B-61 mobile drill with 2-1/4" HSA

WATER LEVELS : | START : 15:25 | END : 16:00 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): PIO/FIO	Breathing Zone FID	Above Hole FID
12	12-14	15/24	SS7 (spt)	10-13-15-18	2" - gray cobble 13" - POORLY GRADED SAND (SP), 10 yr 4/6 dk. Yellowish brown, moist medium dense, w/ coarse gravel and silt.	-11/0.80	-10	0.52
14	14-16	11/24	SS8 (spt)	16-18-15-14	SILTY SAND (SM), with coarse gravel, 10 yr 4/6 dark yellowish red, moist, medium dense	-27/-3.51	-8	0.43
16								
	16-18	18/24	SS9 (spt)	8-13-15-15	6"-same as above 12" - fine sand, SP, 10 yr 5/6 yellowish brown, moist, medium dense. Bottom 4" w/cobble and coarse sand.	-27/3.51	-10	4.63
18	18-20	18/24	SS10 (spt)	13-12-14-6	6"- same as above, with coarse sand. 12" - SILTY SAND (SM) 10 yr 5/6 yellowish brown, moist , med dense. Fine to coarse gravel.			
20	20-22	15/24	SS11 (spt)	14-13-16-16	POORLY GRADED SAND (SP), 10 yr 5/8 yellowish brown, dry, medium dense, tr. Fine gravel.	0.68/1.42	9.8	2.1
22	22/24	18/24	SS12 (spt)	10-13-19-21	14" - SILTY SAND (SM), 10 yr 5/8 yellowish brown, dry, medium dense, tr. Fine gravel.	-1.42/1.80	1.52	2.43
24								

Sampler Signature: J. Sathaye Date: 2/1/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC-N | DATE: 2/1/2006

WEATHER: Sunny, 80's F, low wind | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : B-61 mobile drill with 2-1/4" HSA and air hammer.

WATER LEVELS : | START : 15:25 | END : 16:00 | LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): PIO/FIO	Breathing Zone FID	Above Hole FID
24	24-26	18/24	SS 13 (spt)	11-15-18-22	POORLY GRADED SAND (SP), 10 yr 5/8 yellowish brown, med. Dense, dry some fine gravel; intermittal zones w/ silty in mid. 6"	-2.22/1.85	10	65
26	26-28	24/24	SS14	14-20-26-24	12"- POORLY GRADED SAND (SP) trace granite cobble 12"- POORLY GRADED SAND (SP), as above; bottom 3" w/ pink and white mottling, trace silt	3.70/1.80	3.11	1.62
28	28-30	21/24	SS15 (spt)	22-35-45-50	6" - SILTY SAND (SM), 7.5 yr 5/8 strong brown, moist, very stiff. With brown, red, pink, white mottling and gravel. 12"- POORLY GRADED GRAVEL (GP) with fine sand, grey 7/2 pale green, very dense, moist. 3"- weathered granite	-2.20/2.53		-2.7/2.08
30						Start air hammer 09:55 from 0'		
				Air hammer	Change in color of cuttings from brown to gray between 33'-34'			
33								
35								
36					Water @ 35' bgs @ 10:30			

Sampler Signature: J. Sathaye Date: 2/1/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-02 SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC-N DATE: 2/1/2006

WEATHER: Sunny, 80's F, low wind DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : B-61 mobile drill with 2-1/4" HSA and air hammer.

WATER LEVELS : START : 15:25 END : 16:00 LOGGER : J. Sathaye

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36			Air Hammer		granite	
40						
					granite	
42						
43						
					EOB 43' bgs well screen 32'-42'	
45						
48						

Sampler Signature: J. Sathaye Date: 2/1/2006

Appendix D
PAOC S – Soil Boring Logs – Surface/Subsurface

PROJECT NUMBER	BORING NUMBER	
183719.FI.02	EPAS-SS01	SHEET 1 OF 1

SOIL BORING LOG

PROJECT :	NAVFAC - Atlantic (East Vieques)	LOCATION : PAOC-S 01	DATE: 2/2/2006
WEATHER:	Overcast, drizzle, 80 F	DRILLING CONTRACTOF Geoworks, Inc.	
DRILLING METHOD AND EQUIPMENT USEI Direct push			
WATER LEVELS NA	START : 0825	END : 0845	LOGGER : P. Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
		24/24"			0 - 1' SANDY FAT CLAY WITH GRAVEL (CH), very dark grayish brown (10YR 3/2), medium dense, angular gravel clast (possibly round rock).	PID 6.8 ppm (0-1') / FID 1.5 ppm
2		24/24"			1.0' - 6.0' SANDY CLAY WITH GRAVEL (CH), very dark grayish brown (10 YR 3/2). Same as above (0 - 1' bgs) with minor well sorted sand lenses (approx 0-2' bgs).	3.2 ppm (1-4') / 1.5 ppm
4						3.2 ppm (4-6') / 2.7
6					End boring at 6.0' bgs 2/2/2006	Background 0.11 ppm / 1.58 ppm Moisture in air appears to be affecting PID/FID readings
8						
10						
12						

Sampler Signature: Patrick Kish Date: 2/2/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 2	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/15/2006

WEATHER: Sunny & breezy. DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200 / direct push

WATER LEVELS NA START : 1330 hrs END : 1420 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0 - 4'	3.6'	1		0 - 0.6' LEAN CLAY WITH SAND (SC), very dark grey (10YR 3/1), dry, medium stiffness. 0.6 - 3.5' LEAN CLAY WITH SAND (CL), dark yellowish brown (10YR 4/4), dry, stiff. 3.5 - 4' CLAYEY SAND (SC), dark yellowish brown (10YR 4/4), dry, medium dense.:	FID (ppm) 1.25 Background 1.22 1.31 1.28
6, 8	4' - 8'	4'	2		4' - 8' SILT WITH SAND (ML), brown (10YR 4/3), very stiff.	1.05 2.83
10, 12	8' - 12'	4'	3		8' - 12' SILT WITH SAND, yellowish brown (10 YR 5/4), dry, medium dense.	2.25 2.89 3.12

Sampler Signature: Andy Sprinkle Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 2	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/15/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS NA START : 1330 hrs END : 1420 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
14	12' - 15'	3'	4		12 - 15' SANDY SILT (ML), dark yellowish brown (10YR 4/4), dry, loose, with weathered hard rock veins from 14.2' to 15' bgs.	FID (ppm) 2.8 2.6
16 18 20 22 24					End of boring at 15' bgs. 02/15/06	

Sampler Signature: Andy Sprinkle Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 3	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/15/2006

WEATHER: Sunny & breezy. DRILLING CONTRACTOR Earthworks

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS NA START : 1430 hrs END : 1450 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0 - 4'	3.2'	1		0 - 0.8' SILTY SAND, light gray (10YR 7/1), dry, loose. 0.8 - 3' SILT WITH SAND (ML), brown (10YR 4/3), dry, medium density 3 - 4' SILTY SAND (SM), brown (10YR 4/3), dry, loose.	FID (ppm) 8.53 Background 4.62 7.93
6, 8	4' - 8'	4'	2		4' - 7.8' LEAN CLAY WITH SAND (CL), dark yellowish brown (10YR 3/6), medium stiffness, dry. 7.8' - 8' WELL GRADED SAND (SW), dry, loose.	5.05 5.18
10, 12	8' - 12'		3		8' - 12' Same as above. Refusal. End of boring at 12' bgs.2/15/2006	

Sampler Signature: Andy Sprinkle Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 4	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/15/2006

WEATHER: Sunny (partly showers) DRILLING CONTRACTOR Earthworks

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS NA START : 1500 hrs END : 1526 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0 - 4'	3.5'	1		0 - 1' SILT (ML), very dark brown (10YR 2/2), dry, hard 1' - 4' SANDY SILT (ML), dark yellowish brown (10YR 4/6), dry, medium dense.	FID (ppm) 3.98 Background 4.23 4.55
6, 8	4' - 8'	4'	2		4' - 8' Same as above.	5.51 6.83
10, 12	8' - 12'	4'	3		8' - 11' SANDY SILT(ML), dark yellowish brown (10YR 4/6), dry, medium dense. 11' - 12' WELL GRADED SAND (SW), very pale brown (10YR 8/4), dry, medium dense, loose. 12' bgs: refusal. 2/15/2006	7.82 5.61

Sampler Signature: Andy Sprinkle Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 5	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS NA START : 1330 hrs END : LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0 - 1.5' SILT (ML), very dark gray (10YR 3/1), dry, medium stiff to stiff.	FID (ppm) 2.98
	0 - 4'	3.8/4'	1		1.5' - 3.2' LEAN CLAY (CL), very dark brown (10YR 2/2), dry, stiff.	Background 2.51
2					3.2' - 4' WELL GRADED SAND WITH SILT AND CLAY (SW - SM), brown (10YR 4/3),dry, loose.	
4					4' - 5.5' Same as 3.2' - 4' interval.	3.12
					5.5' - 7.6' SILT WITH SAND (ML), dark yellowish brown (10 YR 4/4), medium stiffness.	2.54
	4' - 8'	4'/4'	2			
6						
					7.6' - 8' LEAN CLAY WITH SAND (CL), dark yellowish brown (10YR 4/4), dry, stiff.	3.18
8					8' - 8.5' Same as above.	
					8.5' - 9' SILT WITH SAND(ML), brown (10YR 5/3), dry, medium stiffness.	2.33
10	8' - 12'	4/4'	3		9' - 12' WELL GRAED SAND WITH SILT (SW-SM), brown (10YR 5/3), dry, medium stiff, medium dense.	
12						3.75

Sampler Signature: Andy Sprinkle Date: 2/16/2006

PROJECT NUMBER	BORING NUMBER	
183719.FI.02	SS/SB 5	SHEET 2 OF 2

SOIL BORING LOG

PROJECT :	NAVFAC - Atlantic (East Vieques)	LOCATION : PAOC - S	DATE: 2/16/2006
WEATHER:	Sunny	DRILLING CONTRACTOR	Geoworks, Inc.
DRILLING METHOD AND EQUIPMENT USED	Simco Earth Probe 200		
WATER LEVELS NA	START : 1330	END : 1413	LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
					12' - 12.8' WELL GRADED SAND WITH SILT (SW - SM), dark yellowish brown (10YR 4/6), dry, coarse - medium dense.	FID (ppm) 3.82
	12' - 16'	48/48"	4		12.8' - 15' SILT WITH SAND (ML), yellowish brown (10YR 5/6), dry, medium stiff.	
14						
					15' - 16' WELL GRADED SAND(SW), brownish yellow (10YR 6/6), light brown, dry, loose.	3.61
16						
					16' - 18' LEAN CLAY (CL), dark grayish brown (10YR 4/2), dry, hard.	3.51
	16' - 18'	24/24"	5			
						4.03
18					18' Refusal	
					End of boring at 18' bgs. 2/16/2006	
20						
22						
24						

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 6	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS NA START : 0852 END : 1005 LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0 - 4'	48/48"	1		0 - 4' SILT (ML), dark brown (10YR 3/3), dry, medium dense, medium stiffness.	FID (ppm) 2.5 Background 2.66 2.48
6, 8	4' - 8'	37.2/48"	2		4' - 4.7' Same as 0 - 4' bgs interval. 4.7' - 8' WELL GRADED SAND WITH SILT (SW-SM), brownish yellow (10YR 6/8), dry, loose.	2.48 2.61
10, 12	8' - 12'	48/48"	3		8' - 12' SILT WITH SAND (ML), yellowish brown (10YR 5/6), dry, soft.	2.41 2.35

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 6	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS NA START : 0852 hrs END : 1005 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
14, 16	12' - 16'	48/48"	4		12' - 16' SILT WITH SAND (ML), yellowish brown (10YR 5/8), dry, soft fine to medium sand.	FID (ppm) 2.71; Background 3.3; 2.82
18, 20	16' - 20'	48/48"	5		16' - 17.3' Same as 12' - 16' interval. 17.3' - 20' SILT WITH SAND (ML), dark yellowish brown (10YR 3/6), dry, stiff.	2.89; 3.01
22, 24	20' - 24'	48/48"	6		20' - 22.6' Same as above. 22.6' - 24' LEAN CLAY (CL), dark yellowish brown (10YR 4/6), dry, very stiff, trace fine sand.	2.75; 2.9

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 6 SHEET 3 OF 3

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS NA START : 0852 hrs END : 1005 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole FID (ppm)
	24' - 26'				24' - 25.6' Same as 22.4' - 24' bgs interval. 25.6' - 26' WELL GRADED SAND WITH SILT (SW-SM), dark yellowish brown (10 YR 4/4), dry, medium dense.	2.58
26					26' bgs: Refusal. End of boring at 26' bgs.	
28						
30						
32						
34						
36						

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 7	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 0747 hrs END : 0844 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2, 4	0 - 4'	3.5'	1		0 - 4' SILT WITH SAND (ML), dark yellowish brown (10YR 3/6), dry, medium dense.	FID (ppm) 1.5 Background 1.25 1.48
6, 8	4' - 8'	4'	2		4 - 8' SANDY SILT (ML), dark yellowish brown (10YR 4/6), dry, dense, trace gravel and organics.	1.72 2.18
10, 12	8' - 12'		3		8 - 11.4' Same as above. 11.4 - 12 SILTY SAND (SM), yellowish brown (10YR 5/6), dry, loose.	1.32 1.45

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 7	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 0747 hrs END : 0844 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
14 16	12' - 16'	3.5'	4		12 - 16' SILTY SAND (SM), yellowish brown (10YR 5/6), dry, loose.	FID (ppm) 2.45 Background 2.33 2.65
18 20	16' - 20'	4'	5		16 - 20' WELL GRADED SAND WITH SILT (SW-SM), yellowish brown (10YR 5/8), dry, loose.	2.47 2.37
	20' - 21'	1'			20 - 21' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM), very pale brown (10YR 7/4), dry, loose.	3.15
22 24					21 bgs: refusal. End of boring at 21' bgs. 2/16/2006	

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 8	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : NA START : 1010 END : 1110 LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2 4	0 - 4'	48/48"	1		0 - 2.3' SILT (ML), yellowish brown (10YR 5/4), dry, stiff. 2.3' - 4' SILT (ML), brown (10YR 4/3), dry, stiff.	FID (ppm) 0' - 2.3' bgs: 1.75 Background 1.83 FID (ppm) 2.3' - 4' bgs: 1.69
6 8	4 - 8'	30"/48"	2		4' - 6.5' Same as above. 6.5' - 8' WELL GRADED SAND WITH SILT (SW - SM), light brown (10YR 6/3), dry, loose, trace gravel (fine).	4' - 6.5' bgs: 1.79 6.5' - 8' bgs: 1.83
10 12	8 - 12'		3		8' - 8.2' Same as above. 8.2' - 12' SILT WITH SAND (ML), very pale brown (10YR 7/4), dry, medium stiff, medium density.	8' - 8.2' bgs: 4.18 Background 2.93 8' - 12' bgs: 3.96

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 8	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/16/2006

WEATHER: Sunny DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Simco Earth Probe 200

WATER LEVELS : START : 1010 END : 1110 LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
14, 16	12' - 16'	48/48"	4		12' - 16' SILT WITH SAND (ML), yellowish brown (10YR 5/6), medium stiffness, medium density.	FID (ppm) 12' - 16' bgs: 3.71
18, 20	16' - 20'	48/48"	5		16' - 18.5' Same as above. 18.5' - 20' WELL GRADED SAND WITH SILT (SW - SM), dark yellowish brown (10YR 4/6), dry, loose.	16' - 18.5' bgs 3.75 18.5' - 20' bgs 3.82
22, 24	20' - 24'	48/48"	6		20' - 24' Same as above. End of boring at 24' bgs. Refusal	20' - 24' bgs: 3.73 24' bgs: 3.64

Sampler Signature: Andy Sprinkle Date: 2/16/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 9 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/15/2006

WEATHER: Sunny, slight breeze. DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Slide hammer / direct push

WATER LEVELS NA START : END : LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0 - 1.5' SILT (ML), light gray (10YR 7/1), dry, medium dense.	FID (ppm) 0 - 4' bgs: 2.63 Background 2.54
2					1.5' - 4' SILT (ML), brown yellowish brown (10YR 3/4), very dense.	
4					4' - 8' Same as above.	
6						
8					End of boring at 8' bgs. 02/15/06	
10						
12						

Sampler Signature: Andy Sprinkle Date: 2/15/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 10 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/8/2006

WEATHER: Sunny, humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push

WATER LEVELS NA START : 0900 hrs END : 0925 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					0 - 2' CLAYEY SAND (SC), brown (7.5YR 5/2), dry, loose, occasional gravel.	FID (ppm) 0' bgs: 1.97 1' bgs: 1.96 2' bgs: 2.18 Background 2.18
4 6					2' - 6' SILT (ML), brown (7.5YR 5/3), dry, stiff.	FID (ppm) 2' bgs: 1.72 4' bgs: 1.83 6' bgs: 1.81 Background 1.81
8 10 12					End of boring at 6.0' bgs 2/8/2006	

Sampler Signature: Andy Sprinkle Date: 2/8/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 11 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/8/2006

WEATHER: DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push

WATER LEVELS NA START : 0805 hrs END : 0830 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					0 - 2' CLAYEY SAND (SC), dark yellowish brown (10YR 4/6), dry, medium density.	FID (ppm) 0' - 2' bgs: 2.0 Background 2.0
4 6					2' - 3' Same as above. 3' - 6' LEAN CLAY (CL), dark yellowish brown (10YR 4/6), slightly moist.	FID (ppm) 2' bgs: 19.8 4' bgs: 17.3 6' bgs: 21.5 Background 21.3
8 10 12					Borehole complete at 6.0' bgs 2/8/2006	

Sampler Signature: Andy Sprinkle Date: 2/8/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 12 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/8/2006

WEATHER: Sunny, humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push

WATER LEVELS NA START : 0720 hrs END : 0735 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2		24"			0 - 2' SILTY SAND (SM),(10 YR 4/4),dry, loose, well sorted	FID (ppm) 0' bgs: 0.37 Background 0 2' bgs: 0.35
4 6					2.0 - 4.5' Same as above. 4.5 - 6.0' LEAN CLAY (CL), dark yellowish brown (10YR 4/6), moist, medium stiff, occasional sand.	FID (ppm) 2' bgs: 0.98 4' bgs: 1.16 6' bgs: 1.13 Background 1.2
8 10 12					Borehole complete at 6.0' bgs 2/8/2006	

Sampler Signature: Andy Sprinkle Date: 2/8/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 13	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (Vieques) LOCATION : PAOCS - E DATE: 2/7/2006

WEATHER: Overcast, rainy DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push

WATER LEVELS NA START : 0935 hrs END : 0950 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2		16"			0 - 2' CLAYEY SAND WITH GRAVEL (SC), dark yellowish brown (10YR 3/4), dry, loose	FID (ppm) 0' bgs: 0.22 1' bgs: -0.61 2' bgs: 0.21 Background 0.23
4 6					2 - 6.0' SANDY FAT CLAY (CH), brown (10YR 4/3), moist, medium stiffness	FID (ppm) 3' bgs: 0.13 4' bgs: -0.11 5' bgs: 0.91 6' bgs: 0.23
8 10 12					Borehole complete at 6.0' bgs 2/7/2006	

Sampler Signature: Andy Sprinkle Date: 2/7/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 14	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (Vieques) LOCATION : PAOCS DATE: 2/7/2006

WEATHER: Overcast, rainy DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT USEI Slide hammer, direct push

WATER LEVELS NA START : 0800 hrs END : 0825 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	15/24"			0 - 2' CLAYEY SAND (SC), dark brown (10YR 3/3), dry, loose	FID (ppm) 0 - 2' bgs: 2.30 Background 2.10
4	2-6'				2 - 6 LEAN CLAY WITH SAND AND GRAVEL (CL), yellow (10YR 7/6), dry, very stiff	FID (ppm) 2 - 4' bgs: 1.75 4 - 6' bgs: 2.18
6						
8						
10						
12						

Sampler Signature: Andy Sprinkle Date: 2/7/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 15	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/9/2006

WEATHER: Sunny, humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push

WATER LEVELS NA START : 0700 END: 0800 LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
					0 - 2' FINE SAND (SM), very dark brown (10YR 2/2), dry , loose	FID (ppm) 0' 2' bgs: 1.80 Background 1.60
2					2 - 4.5' SAND WITH CLAY (SC), yellowish brown (10YR 5/4), dry, dense, hard.	FID (ppm) 2 - 4.5' bgs: 1.7
4						
					End of boring at 4.5' bgs. Refusal 2/9/2006	
6						
8						
10						
12						

Sampler Signature: Andy Sprinkle Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 16 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/9/2006

WEATHER: Sunny, humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push

WATER LEVELS NA START : 0820 hrs END : 0830 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					0 - 0.5' SAND WITH SILT (SM), dark brown (10YR 3/3), dry, loose. 0.5' - 2.0' LEAN CLAY (CL), yellowish brown (10YR 5/6), dry, stiff.	FID (ppm) 0' 2' bgs: 2.30 Background 2.10
4 6					2 - 6.0' LEAN CLAY (CL), yellow (10YR 7/6), slightly moist, medium stiffness.	FID (ppm) 2' - 6.0' bgs: 2.3
8 10 12					End of boring at 6.0' bgs. 2/9/2006	

Sampler Signature: Andy Sprinkle Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 17 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/9/2006

WEATHER: Sunny, humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push

WATER LEVELS : NA START : 0845 END : 0930 LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					0 - 2' SAND WITH SILT (SM), dark yellowish brown (10YR 3/4), dry, loose.	FID (ppm) 0 - 2' bgs: 3.18 Background 3.14
4 6					2 - 3.75' SAND WITH SILT (SM), light gray (10YR 7/1), dry, hard.	FID (ppm) 2 - 3.75' bgs 3.2
8 10 12					End of boring at 3.75' bgs. 2/9/2006	

Sampler Signature: Andy Sprinkle Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 18 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/10/2006 / 2/14/06

WEATHER: Sunny, humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push

WATER LEVELS NA START : 0820 / 0730 hrs END : 0923 / 0815 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					0 - 2' SILT WITH GRAVEL (ML), yellow (10YR 8/6), loose.	FID (ppm) 0' 2' bgs: 1.42 Background 1.31
4 6					2 - 6' SILT (ML), yellow (10YR 8/6), dry, dense.	FID (ppm) 2' - 6' bgs: 1.23 Background 1.19
8					End of boring at 6' bgs. 2/10/2006 2/14/2006 6' - 8' SILT (ML), yellow (10YR 8/6), dry, dense.	FID (ppm) 6' - 8' bgs: 3.12 Background 2.73
10 12					End of boring at 8' bgs. 2/14/2006	

Sampler Signature: Andy Sprinkle Date: 2/10/2006 / 2/14/06

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 19 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/10/2006

WEATHER: Sunny, humid DRILLING CONTRACTOR CH2M HILL / Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Slide hammer, direct push, Simco Earth Probe 200

WATER LEVELS NA START : 0700 / 0815 hrs END : 0815 / 0850 hrs LOGGER : Andy Sprinkle

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2					0 - 2' WELL GRADED SAND WITH GRAVEL (SW), very pale brown (10YR 8/3), dry, loose.	FID (ppm) 0' 2' bgs: 1.14 Background 1.15
4 6					2 - 6' SILT WITH GRAVEL (ML), very pale brown (10YR 8/3), hard.	FID (ppm) 2' - 6' bgs: 1.12 Background 2.12
8 10 12					End of boring at 6' bgs. 2/10/2006 Note: Slide hammer boring 2/10/06 to 6 feet bgs, but because of low volume of sample recovery, decided to come back with direct push rig. Direct push rig total depth of boring to 4 feet bgs, hit refusal at 4 feet bgs and sampled 2-4 feet bgs.	

Sampler Signature: Andy Sprinkle Date: 2/10/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 20 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC - S DATE: 2/6/2006

WEATHER: Sunny, humid DRILLING CONTRACTOR CH2M HILL

DRILLING METHOD AND EQUIPMENT USED Hang auger

WATER LEVELS 2 ft BLS START : 0900 END : 0920 LOGGER : Patrick Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
					0-1': FAT CLAY (CH), very dark gray (7.5YR 3/1), slightly dense, dry, slightly gravely, slightly sandy	PID (ppm) 37.55 / FID (ppm) 0.58
					1-2': FAT CLAY (CH), very dark gray (7.5YR 3/1),medium density, dry, slightly gravely, slightly sandy	25.07 / 0.53
2					End of borehole @ 2.0' bgs. 2/6/2006	Background 31.6 / Background 0.72
4						
6						
8						
10						
12						

Sampler Signature: Patrick Kish Date: 2/6/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER SS/SB 21 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC - Atlantic (East Vieques) LOCATION : PAOC-S 21 DATE: 2/6/2006

WEATHER: Partly cloudy, 80 F DRILLING CONTRACTOR Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED Hand auger

WATER LEVELS : 2 ft BLS START : 0825 END : 0850 LOGGER : P. Kish

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone / Above Hole
1					0 - 1' SANDY FAT CLAY(CH), very dark grayish brown (10YR 3/2), dry to damp, coarse to medium dense, with abundant organics. Moisture increases with depth.	PID (ppm): 58.7 (0 - 1' bgs) FID (ppm): 0.38 (0 - 1' bgs)
2					1 - 1.5' SANDY FAT CLAY(CH), very dark grayish brown (10YR 3/2), damp to wet, dense, with abundant organics. Moisture increases with depth. Clay content decreases with depth. 1.5 - 2.0' SANDY FAT CLAY (CH), dark gray (5YR 4/1),damp to wet, dense, water at 2.0' bgs.	43.7 (1 - 2' bgs) 0.42 (1 - 2' bgs)
3					End of borehole @ 2.0' bgs. 2/6/2006	Background 65.4 Background -0.05
4						
5						
6						

Sampler Signature: Patrick Kish Date: 2/6/2006

Appendix D
PAOC S – Soil Boring Logs – for Monitoring Wells

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC-S DATE: 2/9/2006

WEATHER: Partly Sunny Periods of Rain 80's DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B.61 HDX 3.25-inch HSA and 2" core barrel w/3" steel casing

WATER LEVELS : START : 2/7/2006 END : 2/9/07 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
					See soil log for description from 0' - 6' bgs	Recorded only FID Reading below	
2							
4							
6							
	6'-8'	15"/24"	1-SPT	7-8-16-16 (24)	CLAYEY SAND (SC) ; slightly moist, Brown, 7.5 yr 4/4. Fine to medium grained sand, with trace rock fragments. 2 mm-4.75 mm, medium density.	2.10	2.20
8							
	8'-10'	15"/ 24"	2-SPT	8-10-13-15 (25)	SILTY SAND (SM), Slighty moist, dark yellowish brown, 10 yr 4/4 medium grained sand, medium density, w/ trace rock fragments 2mm	2.5	2.32
10							
	10-12	15"/24"	3-SPT	7-6-8-9 (14)	SILTY SAND (SM) from 8'-10' contiues	2.15	2.31
12							

Sampler Signature: Lisa Carter Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC-S | DATE: 2/9/2006

WEATHER: Partly Sunny/periods of rain 80's | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B.61 HDX 3.25-inch HSA and 2" core barrel w/3" steel casing

WATER LEVELS : | START : 2/7/2006 | END : 2/9/07 | LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
12							
	12'-14'	7"/24 71	4-spt	8-18-20-33 (38)	CLAYEY SAND (SC); Slighty moist, well graded fine to coarse grained sand, w/ppm rock fragements 4.75 to 10 mm w. little black mottling and white clay inclusions, dense.	2.5	2.53
14	14'-16'	9"-24 79	5-spt	8-21-23-31 (44)	SANDY LEAN CLAY (CL); slightyt moist lean clay, fine to medium grained sand, strong brown, 7.5 yr 4/6 w/little balck mottling and trace rock fagements 4mm, little to no plasticily, hard	2.7	2.38
16							
	16'-18'	16"/24"	6-spt	11-22-23-26 (45)	Sandy, clay continues from 14'-16" large (20 mm) rock fragment, at 17' bgs. Slightly mosit, hard	2.84	2.52
18							
	18'-20'	8"/13	7-spt	15-47-50/1"	Sandy clay contiues from 14'-16	2.45	2.48
21							
	20'-22'	17"/24"	8-spt	8-17-21-29	CLAYEY SAND (SC); Slighty moist medium to coarse grained sand, mottled brownish yellow. 10 yr 5/6 yellowish brown, 10 yr 7/3, very pale brown, dense, crumbly	2.78	2.76
24							
	22'-24'	6"/11" 55%	9-spt	27-50/5" -0.5	WELL GRADED SAND (SW); dry to slightly moist w/some clay, well graded medium to coarse grained mottled white with brownish yellow, 10 yr 5/6 and very pale brown. 10 yr 7/3, and black very dense, rock fragments angular	2.58	2.64

Sampler Signature: Lisa Carter Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC-S DATE: 2-7-06, 2-9-06

WEATHER: Part sunny w/periods of rain 80's DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B.61 HDX 3.25-inch HSA and 2" core barrel w/3" steel casing

WATER LEVELS : START : 2/7/2006 END : 2/9/06 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
24							
	24'-26'	10"/16" 63%	10-spt	20-47-50/4" (>50)	Sand from 22-'24' continues has appearance of weathered bedrock structure dry to slightly moist quartz and fieldspar noticeable	2.45	2.38
26	26'-28'	5"/11" 45%	11-spt	38-50/5" (.50)	Sand continues, weathered bedrock w/ some volcanic rock fragments, 5-50 mm in diameter dry to slightly moist	2.90	2.86
28							
	28'-30'	10"/15" 66%	12 -spt	40-47- 50 (>50)	Sand continues weatherd bedrock. Grain size increasing w/depth. Very coarse grained sand w/some rock fragments 2mm to 10mm. Dry to slighty moist. Appears to be weatherd grandionite.	2.90	2.68
30							
	30'-32'	0"/1" 0%	13 spt	50/1" RQD	Refusal due to weathed bedrock augers grinding on rock will switch to water rotary coring	2-9-06 Begin rock coring 11/19	
33	Core 30'-35'	2"/60 3%	1-NQ	0"/2" 0% Very poor	Granodiorite rock fragments Quartz and feldpar predominate fragments range from 4mm to 60 mm. Coarse grained minerals	approx 100 gallons of water used to core 1-NQ run	
36							

Sampler Signature: Lisa Carter Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC-S | DATE: 2/9/2006

WEATHER: Sunny, partly cloudy | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B.61 HDX 3.25-inch HSA and 2" core barrel w/3" steel casing

WATER LEVELS : | START : 2/7/2006 | END : 2/9/06 | LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36				RQD	Granodirorite continues rock is very friable. Small fragments coming out. 4/mm to 90 mm, quartz and feldspar crystals, some iron oxide staining coarse grained minerals	Approx 70 gallons of water used to core 2 NQ run
	35'-40'	3"/60" 5%	2-NQ	0"/3" 0% Very poor		
39						
40	40'-45'	52"/60" 87%	3-NQ	4" 15" 4"/23"/5 " 44%	Grandodirorite fractures at: 44.2' (green mineralization iron oxide staining 43.5 -44' (green mineralization and iron oxide staining) highly fractured above 41' bgs rock is coarse grained w/some pyrite cystals in matrix.	used approx 110 gallson of water to core 3-NQ run
42						
45					Terminate rock coring at 45' bgs Air hammer bore hole from land surface to 42' bgs.	
48						

Sampler Signature: Lisa Carter Date: 2/9/2006

Appendix D
PAOC U – Soil Boring Logs – Subsurface

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB1 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION : PAOC U | DATE: 03/02/06

WEATHER: sunny hot humid windy | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1100 | END : 1130 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	24/24	S1		0-2': SILTY SAND (SM), dark reddish brown (5YR 3/2), moist, medium dense, fine sand with silt	FID = 0.75 ppm
4	2-6'	40/46	S2		2-4': SILTY SAND (SM), dark reddish brown (5YR 3/4) moist dense fine to coarse sand with silt 4-5': POORLY GRADED SAND (SP), strong brown (7.5YR 4/6), moist, medium dense fine sand 5-6':LEAN CLAY (CL), reddish brown (2.5YR 4/4), moist, medium plasticity, little fine sand	FID = 2.70 ppm
6					TD @ 6'	
8						

Sampler Signature: J.Myer Date: 3/2/2006

PROJECT NUMBER	BORING NUMBER	
183719.FI.02	PAOC U SB2	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/02/06

WEATHER: sunny hot | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 0900 | END : 1340 | LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
	0-2'	22/24	S1		0-.5': SILTY SAND WITH GRAVEL (SM), .5-2': CLAYEY SAND (SC), very dark brown (7.5YR 2.5/3), dry, some medium, dense, fine coarse sand	FID = 1.55 ppm
2	2-6'	46/46	S2		2-4': CLAYEY SAND (SC), very dark brown (7.5YR 2.5/3), dry, some medium, dense, fine coarse sand 4-6': WELL GRADED SAND (SW), red (2.5YR 4/8), moist, medium, dense, fine to coarse sand, quartz k-spar and weathered granite fragments	refusal on metal object @ 3' reposition east of stake 3' no good, 5' west No refusal FID = 1.37 ppm
4						
6	6-8'	24/24	S3		6-8': Well graded sand as above	FID = 1.49 ppm
8	8-10'	24/24	S4		8-10': SAND WITH SILT (SW), yellowish red (5YR 4/6), very slightly moist, loose, sand fine to med. w/few coarse grains, poorly graded, trace gravel	Continue direct push @ SB02 @ 1300 3/10/06 FID HS = 0 ppm
10						

Sampler Signature: J.Myer Date: 3/2/2006

PROJECT NUMBER	BORING NUMBER	
183719.FI.02	PAOC U SB2	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling	LOCATION PAOC U		DATE: 03/02/06
WEATHER: sunny hot	DRILLING CONTRACTOR : Geoworks		
DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200			
WATER LEVELS : NA	START : 0900	END : 1340	LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
	10-14'	24/24	S4		10-12': SAND WITH SILT (SW), yellowish red (5YR 4/6), very slightly moist, loose, sand fine to med. w/few coarse grains, poorly graded, trace gravel, bottom 10" grade to finer sand.	FID = 1.55 ppm
12						
	12-16'	46/46	S5		12-16': SAND WITH SILT (SW), yellowish brown (10YR 5/6), dry, medium dense, sand is fine to coarse, poorly graded w/lenses of fine grain only, trace gravel	FID HS = 0 ppm
14						
16						
	16-17'	14/14	S6		16-17': SILTY SAND WITH GRAVEL (GM), brown (10YR 4/3), dry, medium dense, sand very fine to coarse, gravel 1/4" to 1", angular, large rock in drive shoe	FID HS = 0 ppm Very hard driving, large rocks Refusal @ 17' bgs @ 1340
18					BOH @ ~17' @ 1340	
20						

Sampler Signature: J.Myer Date: 3/2/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB3 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling LOCATION PAOC U DATE: 03/03/06

WEATHER: hot humid sunny DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA START : 0950 END : 1510 LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
2	0-2'	24/24	S1		0-2': SILTY SAND (SM), very dark brown (7.5YR 2.5/3), dry, medium dense, fine sand with silt.	FID = .01 ppm Collect sample EPAU-SS03-0001
4	2-6'	38/46	S2		14": CLAYEY SAND (SC), reddish brown (5YR 4/4), moist, dense, fine to medium sand 16": WELL GRADED SAND (SW), reddish brown (5YR 5/4), moist, medium dense, fine to coarse sand, little coarse gravel 8": SANDY CLAY (CL), reddish brown (5YR 4/4), moist, stiff, med. plasticity, some fine sand	FOD = 0.03 ppm Collect sample EPAU-SB03-0406
6 8 10	6-10'	48/48	S3		Top 2" same as above, next 1.8' changes abruptly to SANDY CLAY (CL) reddish brown (5YR 4/4), dry, stiff sand fine to medium with few coarse grains, poorly grade, slightly higher sand content with depth grading to SILTY SAND WITH GRAVEL (SM) in bottom 1' brown (7.5YR 4.4) , dry, loose, sand, fine to coarse, gravel 1/4" to 1/2" angular	Continue direct push @ SB03 @ 1400 03/10/06 FID HS = 0 ppm

Sampler Signature: B.Collom Date: 3/10/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB3 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling LOCATION PAOC U DATE: 03/03/06

WEATHER: hot humid sunny DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA START : 0950 END : 1510 LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
12, 14	10-14'	32/48	S4		Top 14" SILT WITH SAND (ML), yellowish brown (10YR 5/4), very slightly moist, soft, sand fine, bottom 18" grades quickly to SAND WITH SILT (SM), brown (10YR 5/4), sand poorly graded fine to medium, some coarse grains	FID HS = 0 ppm
16, 18	14-18'	46/46	S5		Top 6" as above, then grades quickly to SANDY SILT (ML), dark yellowish brown (10YR 4/6), very slightly moist, sand fine to med. w/few coarse grains, trace gravel, grades to finer sand with depth	FID HS = 0 ppm
20	18-20'	24/24	S6		Same as above	

Sampler Signature: B.Collom Date: 3/10/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB3 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling LOCATION PAOC U DATE: 03/03/06

WEATHER: hot humid sunny DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA START : 0950 END : 1510 LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
22	22-26'	18/24	S6		Same as above	
24	22-26'	44/46	S7		SILT WITH SAND (ML), strong brown (7.5YR 4/6), dry, medium stiffness, sand fine to medium, few coarse grains.	FID Hs = 0 ppm Hard driving, this whole interval, refusal @ 26' bgs
26					BOH @ 26' bgs @ 1510	
28						
30						

Sampler Signature: B.Collom Date: 3/10/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB4 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1015 | END : 1650 | LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
2	0-2'	24/24	S1		0-2': SILTY SAND (SM), very dark brown (7.5YR 2.5/3), dry, medium dense, fine sand w/silt, little organic material	FID = 0.01 ppm Collect samples EPAU SS04-0001 EPAU-SS04P-0001
4	2-6'	42/46	S2		2-4': CLAYEY SAND (SC), brown (7.5YR 4/4), slightly moist, dense, fine to medium sand 4-6' WELL GRADED SAND (SW), reddish brown (5YR 5/4), moist, medium dense, fine to coarse sand, some fine gravel	FID = 0.06 ppm Collect sample EPAU SB04-0406
6	6-10'	34/46	S3		Top 1' is SANDY SILT (MH), strong brown (7.5YR 4/6), dry, medium stiff, low plasticity sand fine to coarse, bottom 2' grade swiftly to SILTY SAND (SM), brown (7.5YR 4/4), dry, loose, trace gravel, sand grades finer with depth	03/09/06 cont. direct push @ SB04@1545 FID HS = 0 ppm
8						
10						

Sampler Signature: B.Collom Date: 3/9/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB4 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1015 | END : 1650 | LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zor Above Hole
12, 14	10-14'	48/48			10-14': SILTY SAND (SM), yellowish brown (10YR 5/6), dry, loose, sand fine to medium grades coarser with depth	FID HS = 0 ppm
16, 18	14-18'	48/48			14-18': SILT WITH SAND (ML), reddish brown (2.5YR 4/4), dry, medium stiff to stiff, sand, is fine, trace gravel @ 15', some black mottles, grades sandier with depth	FID HS = 0 ppm
20	18-20'	24-24			top 8" same as above, then grades quickly to SILTY SAND (SM), yellowish brown (10YR 5/4), dry, loose, sand fine to medium bottom 1' grades back to SANDY SILT (ML), yellowish brown (10YR 5/4), dry, medium stiff, sand is fine	FID HS = 0 ppm

Sampler Signature: B.Collom Date: 3/9/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB4 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks (Hector)

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1015 | END : 1650 | LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
22	20-22'	16/48		N/A	SANDY SILT (ML), yellowish brown (10YR 5/4), dry, medium stiff, sand is fine	FID HS = 0 ppm
24	22-25'	36/36		N/A	22-25': SILTY SAND (SM), yellowish brown (10YR 5/4), dry, loose, sand fine to coarse and grading coarser with depth	FID HS = 0 ppm Refusal @ 25' bgs
26 28 30					BOH @ 25' bgs @ 1650	

Sampler Signature: B.Collom Date: 3/9/2006

PROJECT NUMBER	BORING NUMBER	
183719.FI.02	PAOC U SB5	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/02/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1045 | END : 1110 | LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
2	0-2'	24/24	S1		0-2': SILTY SAND (SM), very dark brown (7.5YR 2.5/3), dry, dense, fine to medium sand, little organic matter	FID = 0.23 ppm Collect EPAU SS05-0001
4	2-6'	39/48	S2		4-6': GRADED SAND WITH GRAVEL (SW), yellowish red (5YR 4/6), moist, medium dense, fine-medium sand, ~15% gravel	FID = 0.33 ppm Collect EPAU SB05-0406
6	6-10'	34/48	S3		Top 1.5' is SAND WITH SILT (SM), reddish brown (2.5YR 4/4), very slightly moist, loose, sand fine to coarse, trace gravel, sub angular. Bottom 1.5' change abruptly to SANDY SILT (ML), strong brown (7.5YR 4/6), very slightly moist, medium stiff sand is fine to medium. Trace coarse grains, low plasticity, some black mottles.	Continue direct push @ SB05 @ 0955 03/10/06 FID HS = 0 ppm
8						
10						

Sampler Signature: B.Collom Date: 3/10/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
183719.FI.02	PAOC U SB5	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/02/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1045 | END : 1110 | LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
12, 14	10-14'	34/48	S4		Top 4" as above, grades quickly to SILTY SAND (SM), dark yellowish brown (10YR 4/6), dark yellowish brown, dry, loose, sand fine to coarse, trace gravel.	FID HS = 0 ppm Sampler is scored by something metallic @ ~13' depth per driller.
16, 18	14-18'	48/48	S5		Top 1.5' are SILTY SAND (SM), brown (10YR 5/3), dry, medium dense, sand very fine to medium, trace gravel, sand grades, coarser with depth. bottom 3.5' change abruptly to SANDY SILT (ML), reddish brown (5YR 4/4), dry, stiff, sand fine to coarse, decreasing sand content with depth, some black mottles.	FID HS = 0 ppm
20	18-20'	24-24	S6		18-20': SANDY SILT (ML), yellowish red (5YR 4/6), dry, very stiff, sand fine to coarse, many coarse grains are off white in color	FID HS = 0 ppm 1050 - encounter problems pulling sampler, very hard driving this entire interval, sampler stuck 1105 - sampler breaks free - ok

Sampler Signature: B.Collom Date: 3/10/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB5 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/02/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1045 | END : 1110 | LOGGER : J.Myers/B.Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	20-21'	10/12	S6		20-21': SANDY SILT (ML), yellowish red (5YR 4/6), dry, very stiff, sand fine to coarse, many coarse grains are off white in color	Refusal @ 21' bgs
22					BOH @ 21' bgs @ 1110	
24						
26						
28						
30						

Sampler Signature: B.Collom Date: 3/10/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB6 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1130 | END : 1600 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
2	0-2'	24/24	S1		0-.5': SILTY SAND (SM), some gravel & organic matter grey .5-2': CLAYEY SAND (SC), reddish brown (5YR 4/4), moist, dense, fine to coarse sand with clay	FID = 0.00 ppm Collect sample EPAU SS06-0001
4	2-6'	38/48	S2		2-4': WELL GRADED SAND (SW), yellowish red (5YR 4/6), moist, medium dense, fine-coarse sand 4-6': SANDY CLAY (CL), reddish brown (5YR 4/4), moist, stiff, medium plasticity, some fine sand	FID = 0.22 ppm Collect sample EPA U-SB06-0406 MS/MSD
6	6-10'	39/48	S3		6-10': WELL GRADED SAND (SW), brown (7.5YR 5/4), moist, medium dense, fine-medium	Break @ 6' 12 pm resume 1445 pm FID = 0.17 ppm
8						
10						

Sampler Signature: B.Collom Date: 3/3/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB6 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1130 | END : 1600 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	10-14'	43/48	#4		10-13.1': CLAYEY SAND (SC), dark yellowish brown (10YR 4/4), moist, medium dense, fine-very fine sand with clay	FID = 0.01 ppm
12					13.1-14': WELL GRADED SAND (SW), dark yellowish brown (10YR 4/4), dry, medium dense, fine-coarse sand	FID = 0.01 ppm
14	14-18'	34/48	#5		14-18': Sand continues becoming dense and gravelly Quartz, k-spar & granite fragments cobbles 10-30 mm - few fragments of volcanic rock	FID = 0.06 ppm
16						
18	18-20'	11/24	#6		18-20': CLAYEY SAND (SC), brown (7.5YR 5/4), moist, medium dense, fine sand with clay	FID = 0.21 ppm
20						

Sampler Signature: B.Collom Date: 3/3/2006

CH2MHILL

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB6 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1130 | END : 1600 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
22	20-22'	12/24	S6		18-20': CLAYEY SAND (SC), brown (7.5YR 5/4), moist, medium dense, fine sand with clay	FID = 0.21 ppm
24	22-26'	40/46	S7		22-26': WELL SORTED SAND (SW), strong brown (7.5YR 4/6), moist, medium dense, fine to coarse sand, little fine gravel Quartz, Kspar, granite fragments.	FID = 0.19 ppm
26	26-30'	40/46	S8		26-30': WELL SORTED SAND (SW), becoming coarser weathered bedrock (granodiorite?)	FID + 0.23 ppm
28						
30					TD @ 30'	Refusal @ 30' bgs

Sampler Signature: B.Collom Date: 3/3/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB7 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1800 | END : 3/10/06 0935 | LOGGER : J.Myers/B. Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
2	0-2'	23/24	S1		0-.5': SILTY SAND (SM) with organic material .5-2': CLAYEY SAND (SC), dark reddish brown (5YR 3/4), moist, dense, fine to medium sand	FID = 1.2 ppm Collect sample EPAU-SS07-0001
4	2-6'	44/48	S2		2-4': CLAYEY SAND (SC), dark reddish brown (5YR 3/4), moist dense fine to medium sand 4-6': WELL SORTED SAND (SW), red (2.5YR 5/8), moist, medium dense fine to coarse sand with organic matter & course gravel fill	FID = 1.3 ppm
6	6-10'	48/48	S3		6-8': SILTY SAND (SM), brown (7.5YR 4/4), slightly. moist, loose, sand fine to coarse, trace gravel, angular, few black mottles, grades siltier with depth to bottom 1' is silt with sand 8-10': SILTY SAND (SM), strong brown (7.5YR 4/6), slightly moist, medium stiff, sand is fine, few black & red mottles.	Cont. direct push @ SB07 @0820 03/10/06 FID HS = 0 ppm
8						
10						

Sampler Signature: B.Collom Date: 3/10/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB7 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earthprobe 200

WATER LEVELS : NA | START : 1800 | END : 3/10/06 0935 | LOGGER : J.Myers/B. Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
12, 14	10-14'	48/48	S4		Top 3': SILTY SAND (SM),brown (7.5YR 5/4), very slightly moist, loose, sand fine to coarse, poorly graded, travel gravel, angular, bottom 1' grades quickly to SANDY SILT (ML), brown(7.5YR 5/4), sand fine to coarse, medium stiff	FID HS = 0 ppm
16, 18	14-18'	48/48	S5		Top 6" as above, then grades quickly to SAND WITH SILT (SM), brown (7.5YR 5/3), very slightly moist, loose, sand fine to coarse. Bottom 2' change abruptly to SANDY CLAY (CL), reddish brown (5YR 4/3), very slightly moist, low plasticity, medium stiff, sand is fine, grades slightly sandier with depth, some black mottles.	FID HS = 0 ppm
20	18-20'	24/24	S6		Top 4" as above, then changes abruptly to SILTY SAND (SM), yellowish brown (10YR 5/6), very slightly moist, loose, sand fine to coarse, trace gravel	FID HS = 0 ppm

Sampler Signature: B.Collom Date: 3/10/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB7 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1800 | END : 3/10/06 0935 | LOGGER : J.Myers/B. Collom

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
22	20-22'	24/24	S6		20-22': SILTY SAND (SM), yellowish brown (10YR 5/6), very slightly moist, loose, sand fine to coarse, trace gravel	FID HS = 0 ppm
24	22-26'	46/46	S7		top 8" same as above, then changes abruptly to SANDY SILT (ML), reddish brown (5YR 4/4), very slightly moist, medium stiff, low plasticity. Sand is fine, few black mottles, sand content decreases slightly with depth	FID HS = 0 ppm
26	26-30'	36/36	S8		26-28': same as above 28-29': grades quickly to SILTY SAND (SM), strong brown (7.5YR 4/6) strong brown slightly moist, loose, sand fine to coarse, poorly graded, rock core in drive shoe	FID HS = 0 ppm Refusal @ 29' bgs
28						
30					BOH @ 29' @ 0935	

Sampler Signature: B.Collom Date: 3/10/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB8 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/02/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1140 | END : 1520 3/10/06 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
2	0-2'	2/2	S1		0-1': SILTY SAND WITH GRAVEL (SM), brown (10YR 4/3), dry, stiff, fine sand & silt with fine-coarse gravel. 1-2': WELL GRADED SAND WITH CLAY (SW-SC), yellowish red (5YR 4/6), moist dense fine to medium sand with clay	FID not working - no odor
4	2-6'	36/48	S2		4" fill material, brick & gravel followed by WELL GRADED SAND (SW), reddish brown (5YR 4/4), moist, medium dense, fine-medium sand	FID not working - no odor
6	6-10'	42/48	S3		6-8.2': Same as above 8.2-10': SILT WITH SAND (SM), brown (10YR 5/3), dry, stiff, some fine sand, cohesive	FID not working - no odor
8						
10						

Sampler Signature: B.Collom Date: 3/2/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB8 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/02/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1140 | END : 1520 3/10/06 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	10-14'	31/48	S4		10-14': WELL GRADED SAND WITH GRAVEL (SW), brown (7.5YR 5/4), dry, dense, fine to coarse sand, fine to coarse gravel.	FID not working - no odor
12						
14	14-18'	48/48	S5		14-18': CLAY WITH SAND (CL), yellowish red (5YR 5/6), moist, medium, cohesive, non plastic, some fine sand	FID not working - no odor
16						
18	18-20'	24/24	S6		18-20': CLAY WITH SAND (CL), yellowish red (5YR 5/6), moist, stiff, cohesive, low plasticity some fine sand	FID not working - no odor
20						

Sampler Signature: B.Collom Date: 3/2/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB8 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U | DATE: 03/02/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1140 | END : 1520 3/10/06 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
22	20-22'	24/24	S6		20-22 CLAY WITH SAND (CL), yellowish red (5YR 5/6), moist, stiff, cohesive, low plasticity, some fine sand	FID not working - no odor
24	22-26'	48/48	S7		22-26': Same as above	FID not working - no odor
26	26-29'	31/36	S8		26-28': CLAY WITH SAND (CL), yellowish red (5YR 5/6),moist, stiff, low plasticity, some fine to medium sand 28-29': WELL GRADED SAND (SW), light gray (7.5YR 7/1), dry, dense, weathered bedrock	FID not working - no odor Refusal @ 29' bgs
28						
30					Refusal @ 29' bgs	

Sampler Signature: B.Collom Date: 3/2/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB9 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling | LOCATION PAOC U PAOC U | DATE: 03/03/06

WEATHER: hot humid sunny | DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA | START : 1100 | END : 1520 3/09/06 | LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-2'	24/24	S1		0-2': CLAY WITH SAND (CL), dark reddish brown (5YR 2.5/2), moist, medium, some fine sand	FID = 0.46 ppm
2	2-6'	35/46	S2		2-3': POORLY GRADED SAND (SP), yellowish red (5YR 4/6), moist, medium dense, medium sand 3-6: SANDY CLAY (CL), reddish brown (5YR 4/4), moist, stiff, some fine sand	
4						
6	6-10'	46/46	S3		6-10': SILT WITH SAND (MH), brown (7.5YR 4/4), slightly moist, medium dense sand fine to medium, trace gravel, 1/4", grades slightly sandier with depth, bottom 4" are silty sand	3-9-06. Cont. boring w/direct push @ 1350 hrs FID HS = 0 ppm Soil logging only - no sample collection
8						
10						

Sampler Signature: B.Collom Date: 3/9/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB9 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling LOCATION PAOC U PAOC U DATE: 03/03/06

WEATHER: hot humid sunny DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA START : 1100 END : 1520 3/09/06 LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
12, 14	10-14'	32/46	S4		10-14': SAND WITH TRACE SILT (SM), dark yellowish brown (10YR 4/4), very slightly moist, loose sand fine to coarse, trace gravel @ 12', bottom 6" grades to finer sand	FID HS = 0 ppm
16, 18	14-18'	46/46	S5		Top 6" is SAND WITH TRACE SILT AND GRAVEL (SM) dark yellowish brown (10YR 4/4), dry, medium dense, sand, fine to medium, gravel 1/4" to 1/2" remainder is SANDY CLAY (CL) yellowish red (5YR 4/6), dry stiff, low plasticity, sand is fine to medium, few black mottles grades slightly sandier with depth	FID HS = 0 ppm
20	18-20'	24/24	S6		Top 3' as above, then grades sandier to SILTY SAND (SM) reddish brown (5YR 4/4), very slightly moist medium grading moister with depth to slightly moist at bottom, sand is fine to medium grading finer with depth	FID HS = 0 ppm

Sampler Signature: B.Collom Date: 3/9/2006

PROJECT NUMBER	BORING NUMBER
183719.FI.02	PAOC U SB9 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : East Vieques Sampling LOCATION PAOC U PAOC U DATE: 03/03/06

WEATHER: hot humid sunny DRILLING CONTRACTOR : Geoworks

DRILLING METHOD AND EQUIPMENT USED : Trailer mount Earth probe 200

WATER LEVELS : NA START : 1100 END : 1520 3/09/06 LOGGER : J.Myers

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): 3reathing Zon Above Hole
22	20-22'	24/24	S6		20-24': SILTY SAND (SM) reddish brown (5YR 4/4), very slightly moist medium grading moister with depth to slightly moist at bottom, sand is fine to medium grading finer with depth	FID HS = 0 ppm
24	22-25'	34/34	S8		22-24': Same as above then grades siltier w/depth to 24-25' SILT WITH SAND (CM), reddish brown (2.5YR 4/4), very slightly moist, medium stiff, low plasticity, sand fine to medium	~1' of borehole collapsed, top 1' is stiff sample from 22-25' FID HS = 0 ppm
26	25-27'	24/24	S9		25-26': Same as above, then grades sandier to 26-27' SILTY SAND (SM), reddish brown (5YR 4/4),slightly moist, loose, sand fine to med. rock core in drive shoe - refusal @ 27' bgs	FID HS = 0 ppm
28 30					BOH @ 27' 1520 hrs.	

Sampler Signature: B.Collom Date: 3/9/2006

Appendix D
PAOC U – Soil Boring Logs – for Monitoring Wells

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC-U DATE: 2/8/2006

WEATHER: Sunny, some clouds, periods of rain DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 HSA & 6" air hammer

WATER LEVELS : START : 2/8/2006 END : 2/9/06 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
						FID readings only	
	0-2'	15"/24" 63%	1SPT	7-6-5-7 (11)	0'-1' ORGANIC SOIL (OL) , organic matter roots. 1-2' SILTY SAND (SM); very fine grained sand, very dark grayish brown, 10 yr 3/2, dry, stiff	-.15	-.27
2							
	2'-4'	12"/24" 50%	2-SPT	19-20-14-10 (34)	Silty sand continues to 2.5' at 2.5' becomes Clayey Sand (SC) fine to medium grained sand, Dark yellowish brown 10 yr 3/6, silghty moist. Very little rock fragments 2mm-20 mm.	-.29	-.27
4							
	4'-6'	19"/24" 79%	3-SPT	8-78-11 (15)	POORLY GRADED SAND (SP); well sorted sand strong brown, 7.5 yr 4/6 trace rock fragments, 2mm. 4.75 mm. Slighty moist, medium denisty. 5'-6' LEAN CLAY (CL); with some fine grained sand, brown. 7.5 yr 4/4 slighty moist, very stiff.	.50	.33
6							
	6'-8'	12"/24" 50%	4-SPT	8-10-13-11 (23)	SANDY LEAN CLAY (CL) slighty moist yellowish brown 10 yr 5/4. Fine grained sand some rock fragments 2mm.-4mm. Stiff	.75	.76
8							
	8'-10'	15"-24" 63%	5-SPT	6-8-8-10 (16)	CLAYEY SAND (SC); very fine grained sand, yellowish brown, 10 yr 5/4 medium density, little rock fragments 2.4 mm slighty moist.	.75	.76
10							
	10'-12'	16"/24" 66%	6-SPT	8-8-9-9 (17)	CLAYEY SAND (SC) continues rocks larger, 4mm-20mm in diameter slighty moist	1.09	0.97
12							

Sampler Signature: Lisa Carter Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC-U DATE: 2/8/2006

WEATHER: Sunny w/ some clouds DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 HSA & 6" air hammer

WATER LEVELS : START : 2/8/2006 END : 2/9/06 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
12						FID readings only	
	12'-14'	12"/24" 50%	7-SPT	13-14-13-15	WELL GRADED SAND (SW); well graded fine to very coarse grained sand, dry, brown. 10 yr, 5/3 w/ little fines (clay), some rock fragmenst 2mm-10mm medium density	1.59	1.37
14							
	14'-16'	16"/24" 66%	8-SPT	11-12-10-13 (22)	Very coarse grained sand continues to 15' bgs. At 15', CLAYEY SAND (SC) slighty moist, medium denisty,yellowish brown, 10yr 5/4 w/trace coarse grained sand	3.01	2.55
15							
16							
	16'-18'	12"/24 50%	9-SPT	11-15-13-16	CLAYEY SAND (SC) 15'-16' continues slighty moist, medium denisty	2.28	2.06
18							
	18'-20'	18"/24" 75%	10-SPT	10-14-13-15 (27)	CLAYEY SAND (SC) continues to 19' bgs. At 19' becomes Sandy Clay (CL) strong brown. 7.5 yr 4/6 w/ fine grained sand, black inclusions. Slighty moist, stiff	2.88	3.26
20							
	20'-22'	15"/24" 63%	11-SPT	8-12-16-17 (28)	CLAYEY SAND (SC) contineus to 21.5' at 21.5' becomes Clayey Sand (SC) strong brown, 7.5 yr 5/6, fine grained to medium grained sand, slightly moist with black inclusions, dense	3.08	3.57
22							
	22'-24'	17"/24" 71%	12-SPT	19-26-34-38 (60)	CLAYEY SAND (SC) continues, with light gray 7.5 yr 7/1 clay inclusions, dry, very dense, medium grained.	2.86	3.09
24							

Sampler Signature: Lisa Carter Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : East Vieques | LOCATION : PAOC-U | DATE: 2/8/2006

WEATHER: Sunny w/ some clouds | DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 HSA & 6" air hammer

WATER LEVELS : | START : 2/8/2006 | END : 2/9/06 | LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone	Above Hole
24						FID readings only	
	24'-26'	3"/24" 13%	13-SPT	15-23-25-33 (48)	CLAYEY SAND (SC) continues , dry beginning to take on characteristics of weathered bedrock. Iron oxide staining, clay inclusion and rock fragments (50MM) very dense.	3.25	2.97
26							
	26'-28'	11"/17" 65%	14-SPT	14-29-50/5" (>50)	CLAYEY SAND (SC) continues dry. Very dense fine grained sand. Yellowish brown 10 yr 5/4	2.88	2.73
27							
	28'-30'	11"/24"	15-SPT	15-31-27-37 (58)	CLAYEY SAND (SC)sand continues to 29.5' at 29.5, into fractured rock volcanic weathered surfaces	2.26	2.38
28							
30							
	30'-32'	1"/11"	16-SPT	35-50/5" (>50)	Refusual on weathed bedrock. Switch over to air hammer.		
33					Volcanic Rock, light gray fine grained.		
36							

Sampler Signature: Lisa Carter Date: 2/9/2006

CH2MHILL	PROJECT NUMBER 183719.FI.02	BORING NUMBER MW-01	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : East Vieques LOCATION : PAOC-U DATE: 2/8/2006

WEATHER: Sunny, w/ some Clouds DRILLING CONTRACTOR : Geoworks, Inc.

DRILLING METHOD AND EQUIPMENT USED : Mobile B-61 HDX 3.25 HSA & 6" air hammer

WATER LEVELS : START : 2/8/2006 END : 2/9/06 LOGGER : Lisa Carter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
36					Volcanic rock. Light gray fine grained.	
39						
					41'	Drill to 42' let well sit overnight to see if water comes in.
42						
					Terminate Drilling at 43' BGS on 2-9-06	2-9-06 07:00 Drillers checked for water in borehole. (LC.) Borehole collapsed to 31'. Blow cuttings out again and wai to see where water is at.
					2/14/2006 Drill to 49' and set well at 17' 2/14/06 12:30 Depth to water 41'	08:00. Start air again to blow additional cuttings out. Water (coming out w/cuttings. Teminate at 43' BGS.
45						
48						

Sampler Signature: Lisa Carter Date: 2/9/2006

Appendix E
Grain Size Analysis Results

S 12277

SUBCONTRACT CHAIN-OF-CUSTODY RECORD

COMPUCHEM
a division of Liberty Analytical Corp.

501 Madison Avenue
Cary, NC 27513
1-800-833-5097

Project Name: CTO-39 PAOC S/183719.FI.02	Samples shipped to: ACCURA	CompuChem point-of-contact: (4) CATHY DOVER
TAT: 18 calendar days	Contact: Robert Semenak	Phone: (919) 379-4100 X 4089
Report style: level IV (full deliverables)	Address: 3342 International Park Drive, Atlanta, GA 30316	Fax: (919) 379- 4050
Disk requirement: excel	Phone: (404) 241-8722 x16	Sampling complete? Y or N (see Note 1)
	Project Locale (state) PR	Project-specific (PS) or Batch (B) QC? per method

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

BOX #2
A. HCl + Ice
B. HNO_3 + Ice
C. NaOH + Ice
D. H_2SO_4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. $NaHSO_4$ + Ice
I. ZnAc+NaOH + Ice
J. Methanol

BOX #3
F- Filtered
U- Unfiltered

BOX #4
H- High
M- Medium
L- Low

BOX #5
C- CLP
T- TCLP
S- SW-846
W- CWA 600-series
O- Other _____

Sample ID	Date / Year 2006	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	# of Bottles	Use for Lab QC (MS or DUP)	PARAMETERS: Grainsize (sieve only) ASTM D422				G06-0005-00 CCN	Remarks / Comments (see Notes 2 & 3)
EPAS-SS05-0001	2/2	1050	S	E	U			1		✓				910401	G12477

J. Dover 2/13/06

Clients Special Instructions: Temperature _____ °C

Lab: Received in good condition? Y or N Describe any problems:

#1 Relinquished by:(sig) Jennifer Dove	Date: 2/13/06	#2 Relinquished by:(sig)	Date:	Relinquished by:(sig)	Date:
Company Name: Compuchem	Time: 16:25	Company Name:	Time:	Company Name:	Time:
#1 Received by:(sig) [illegible]	Date: 2/14/06	#2 Received by:(sig)	Date:	#2 Received by:(sig)	Date:
Company Name: ACCURA	Time:	Company Name:	Time:	Company Name:	Time:

Note (1) If "N" lab should batch samples to await remainder of project - maximizing batch size and minimizing QC ratio; if "Y" lab should begin processing batches now.
Note (2) Samples should be stored 60 days after date report mailed at no extra charge.
Note (3) All lab copies of data should be retained for a minimum of 3 years.
Note (4) Please call point-of-contact to verify receipt of samples.

3342 International Park Drive Atlanta, GA 30316 Phone: (404) 241-8722 Fax: (404) 241-4577

ACCURA Engineering & Consulting Services, Inc.

ACCURA Geotechnical Laboratory

AASHTO R18

ASTM D422, D1140, C136, C117 / AASHTO T88, T27, T 11, T311
Standard Test Method for Particle-Size Analysis of Soils and Aggregates

PROJECT NUMBER	G06-0005-00	SAMPLE ID	G12477/EPAS-SS05-0001	TECH	VG
PROJECT NAME	CTO-39 PAOCS/183719,FI,02	SAMPLE TYPE	JAR	DATE	2/16/2006
SAMPLE LOCATION	-	SAMPLE DEPTH	-	CHECK	

AS-RECEIVED MOISTURE CONTENT

Mass of Wet Sample & Tare, g	632.95
Mass of Dry Sample & Tare, g	606.80
Mass of Tare, g	325.12
Moisture Content, %	9.3

HYGROSCOPIC MOISTURE CONTENT

Mass of Wet Sample & Tare, g	
Mass of Dry Sample & Tare, g	
Mass of Tare, g	
Moisture Content, %	NA

Mass of Wet Sample & Tare, g	632.95
Mass of Tare, g	325.12
Mass of Dry Sample, g	281.68

REMARKS

SIEVE ANALYSIS*

PORTION OF SAMPLE RETAINED ON # 4 SIEVE

Mass of Tare, g: 0.00

Sieve Size		Sample & Tare, g	% RETAINED	% PASSING
12"	COBBLES		0.0	100.0
3"	COARSE GRAVEL		0.0	100.0
2.5"			0.0	100.0
2"			0.0	100.0
1.5"			0.0	100.0
1"			0.0	100.0
.75"	FINE GRAVEL	0.00	0.0	100.0
.5"		20.34	7.2	92.8
.375"		21.44	7.6	92.4
#4	COARSE SAND	31.71	11.3	88.7

PORTION OF SAMPLE PASSING # 4 SIEVE

Sieve Size		Cumulative Mass retained, g	% PASSING
#10	MEDIUM SAND	49.91	82.3
#20		74.36	73.6
#40	FINE SAND	110.51	60.8
#60		141.99	49.6
#100		171.70	39.0
#200	FINES	193.77	31.2

* - ASTM Definitions of Classification
** - AASHTO Definitions of Classification

Oven ID #	109/399
Balance ID#	105/398/297
Sieve Shaker ID #	119/1529

PARTICLE-SIZE ANALYSIS*

% COBBLES	0.0	% MEDIUM Sand	21.5
% COARSE Gravel	0.0	% FINE Sand	29.6
% FINE Gravel	11.3	% FINES	31.2
% COARSE Sand	6.5	% TOTAL SAMPLE	100.0

PARTICLE-SIZE ANALYSIS**

% COBBLES	0.0	% COARSE Sand	21.5
% COARSE Gravel (Stone)	0.0	% FINE Sand	29.6
% MEDIUM Gravel (Stone)	7.6	% FINES (Silt-Clay)	31.2
% FINE Gravel (Stone)	10.1	% TOTAL SAMPLE	100.0

DESCRIPTION: NA

USCS (ASTM D2487; D2488): NA AASHTO (M 145): NA

3342 International Park Drive Atlanta, GA 30316 Phone: (404) 241-8722 Fax: (404) 241-4577

ACCURA Engineering & Consulting Services, Inc.

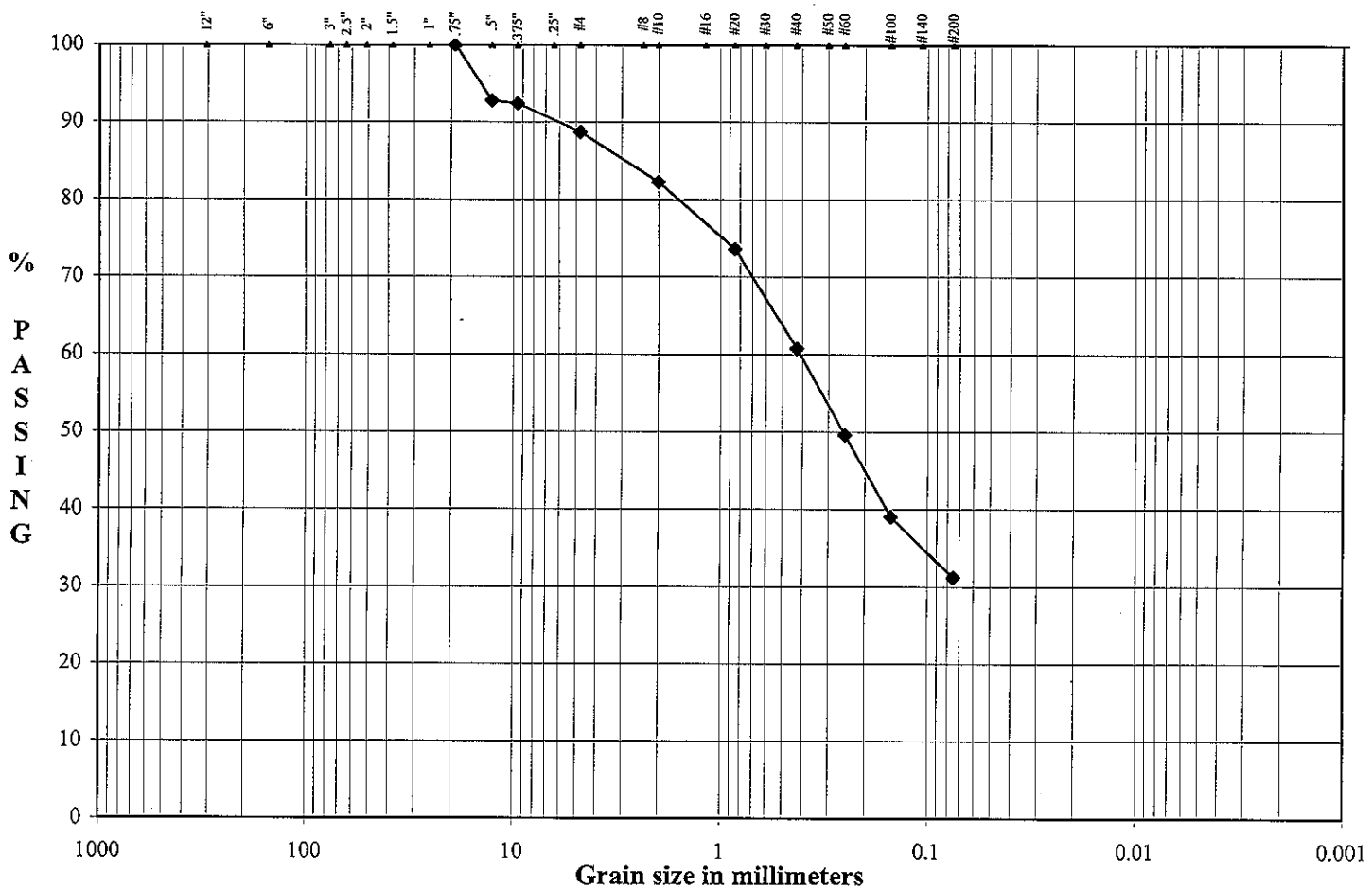
ACCURA Geotechnical Laboratory

AASHTO R18

ASTM D422, D1140, C136, C117 / AASHTO T88, T27, T 11, T311
Standard Test Method for Particle-Size Analysis of Soils and Aggregates

PROJECT #	G06-0005-00	SAMPLE ID	G12477/EPAS-SS05-0001	TECH	VG
PR. NAME	CTO-39 PAOCS/183719,FI,02	SAMPLE TYPE	JAR	DATE	2/16/2006
LOCATION	-	SAMPLE DEPTH	-	CHECK	

Particle-Size Analysis



Boulders	Cobbles	Gravel		Sand			Fines
		Coarse	Fine	Coarse	Medium	Fine	Silt-Clay

D_{10}	NA	mm
D_{30}	NA	mm
D_{60}	NA	mm
Cu	NA	
Cc	NA	

SOIL 3.xls [Particle-Size Graph], REV. 2; 07/21/04

Appendix F
Rock Core Photographs

PI-7, MW-01, 2/27/06
44'-54'
RUN # DEPTH' RQD (%) REC (INCH)
7 44-49 60 55/60
8 49-54 16 60/60
44' @ LOWER LEFT
54' @ UPPER RIGHT
N/O TOP

PT 7 MW-01. 2/27 & 4/28
RUN # REC (IN) RQD (%)
54-59 9 59/60 0
59-64 10 50/60 66
N/C TOP

PI-7, MW-01, 2/28/06

RUN	DEPTH	REC (in)	RQD
14	64'-66.5'	23/30	78%

64'e left

64'e right

Appendix G

Video Logs of Borings - Included on Appendices CD

To View the Video Logs of the borings please contact:

Public Affairs Office
NAVFAC Atlantic
6506 Hampton Blvd.
Norfolk, VA 23508-1278
757-322-8005

NFECL_PAO@navy.mil