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Attachment F
Geotechnical Lab Test Results

Volume 1 Includes:
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Table F-2 Summary of Remolded Soil Tests
Table F-3 Summary of Rock Tests
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Grain Size Tests; Specific Gravity Tests
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Volume 3 Includes:
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Triaxial and Direct Shear Tests
Moisture-Density and CBR Tests
Rock Core Tests

Volume 1 of 3

Job No. 6234-06-3534
MACTEC ENGINEERING AND CONSULTING, INC
November 28, 2006

LABORATORY TESTING - GEOTECHNICAL

Laboratory testing was performed on disturbed, undisturbed, and remolded soil samples, and on rock cores obtained during the subsurface investigation. All testing was performed in accordance with ASTM standards or other standards where applicable. Selection of the samples to be tested and the tests to be performed on the samples were done by Bechtel. Bechtel provided Geotechnical Laboratory Test Assignment Sheets dated July 7, August 10, August 24, and October 5, 2006. Each later assignment sheet supplemented the earlier sheets with new assignments.

The laboratory personnel determined that some of the assigned tests on soil samples could not be performed because of insufficient sample volume. Some of the rock cores on which tests were assigned contained fractures or geometric characteristics that made them unsuitable to test; this information was reported to Bechtel and they assigned replacement tests on other samples.

Testing of soil and rock samples, except for chemical tests, distribution coefficient and resonant column torsional shear (RCTS) testing, was done in MACTEC's laboratories in Charlotte, North Carolina and Atlanta, Georgia.

Chemical testing for pH, sulfates and chlorides in selected soil samples as assigned by Bechtel was done by Severn Trent Laboratories, Inc. (STL), a subcontractor to MACTEC.

The distribution coefficient, Kd, was determined by the Savannah River National Laboratory, located at the Savannah River Site of the DOE in Aiken, South Carolina and operated by the Washington Savannah River Company. The Washington Savannah River Company LLC, under a Work for Others Agreement with MACTEC, performed the Kd tests. These test results are not available at the time of preparation of this Attachment F. The Kd tests will be presented in Attachment H.

Resonant Column Torsional Shear (RCTS) testing of soil samples as assigned by Bechtel was done by the Fugro Consultants laboratory in Houston, Texas, a subcontractor to MACTEC, under the technical overview of Dr. K.H. Stokoe of the University of Texas. The RCTS test results are not available at the time of preparation of this Attachment F. The tests on the samples selected for RCTS testing, including the classification tests on these samples, will be presented in Attachment I.

Excluding the Kd and RCTS tests, the following tests were assigned, performed and the results are presented in this Attachment F:

1.1 IDENTIFICATION TESTS

- Moisture content, ASTM D 2216-05
- Atterberg limits, ASTM D 4318-05
- Sieve and hydrometer analysis, ASTM D 422-63 (2002) and ASTM D 6913-04
- Specific gravity of soil, ASTM D 854-06
- Chemical analysis, (pH, Chloride, Sulfate) EPA SW846 9045C and EPA MCAWW 300.0A
- Unit weight of soil, ASTM D 5084-03 (Sections 5.7 – 5.9. 8.1, 11.3.2)

1.2 COMPRESSIBILITY TEST

- Consolidation tests, ASTM D 2435-04

1.3 COMPACTION AND STRENGTH TESTS

- Unconsolidated-undrained triaxial compression, ASTM D 2850-03
- Consolidated – undrained triaxial compression, ASTM D 4767-04
- Direct shear – Soil, ASTM D 3080-04
- Moisture-density, ASTM D 1557-02
- CBR testing, ASTM D 1883-05
- Specimen preparation – Rock Cores, ASTM D 4543-04
- Compressive Strength and Elastic Moduli – Rock Cores, ASTM D 7012–04

1.4 REPORTING

Except for the Kd and RCTS tests, the laboratory test reports, consisting of individual test data and results sheets as required by the testing standard, are contained in this Attachment F. A summary of the test results on soil samples in Attachment F is found in Table 6 of the Data Report, which is repeated herein as Table F-1. The compaction and CBR tests on the remolded soil samples are summarized in Table F-2. The summary of the test results on rock core samples in Attachment F is provided in Table F-3 herein. Table F-4 lists the laboratory testing equipment used by the MACTEC laboratories in Charlotte and Atlanta. The distribution coefficient tests (Kd) are found in Attachment H. The RCTS tests, including the data and report reviewed by Dr. K. H. Stokoe, are found in Attachment I. The classification tests on the RCTS tests are also found in Attachment I.

1.5 QUALITY ASSURANCE

Quality related activities performed by MACTEC and its subcontractors organizations during the work herein presented were in accordance with the MACTEC Quality Assurance Manual and the MACTEC Quality Assurance Project Document. The MACTEC QA program complies with NQA-1 Subpart 2.2 and to the requirements of 10CFR50 Appendix B.

1.6 DESCRIPTIONS

A brief description of the tests performed and reported in this Attachment F is as follows:

Moisture Content ASTM D 2216-05

A test specimen is dried in an oven at a temperature according to the ASTM standard to a constant weight. The loss of weight due to drying is considered to be water. The water content is calculated by dividing the weight of water by the weight of the dry specimen. The water content is expressed as a percentage value.

Atterberg Limits ASTM D 4318-05

The specimen is processed to remove any material retained on the 425-μm (No. 40) sieve. The liquid limit is determined by performing trials in which a portion of the specimen is spread in a brass cup, divided in two by a grooving tool, and then allowed to flow together from the shocks caused by repeatedly dropping the cup in a standard mechanical device. The multipoint liquid limit, Method A, requires three or more trials over a range of water contents to be performed and the data from the trials plotted or calculated to make a relationship from which the liquid limit is determined. The one-point liquid limit, Method B, uses the data from two trials at one water content multiplied by a correction factor to determine the liquid limit.

The plastic limit is determined by alternately pressing together and rolling into 3.2-μm (1/8-inch) diameter thread a small portion of plastic soil until its water content is reduced to a point at which the thread crumbles and can no longer be pressed together and re-rolled. The water content of the soil at this point is reported as the plastic limit.

The plasticity index is calculated as the difference between the liquid limit and the plastic limit.

Particle Size Analysis ASTM D 422-63 (2002) and ASTM D 6913-04

Sieve Analysis – The dried soil sample is separated into a series of fractions using a standard set of nested sieves. The sieving operation is conducted by means of a lateral and vertical motion of the nest of sieves, accompanied by jarring action to keep the sample moving continuously over the surface of the sieves. The weights retained on each of the set of nested sieves are used to calculate the percent of the sample passing each sieve size.

Hydrometer Analysis – The portion of the soil sample passing the No. 10 (2.0 mm) sieve is soaked in water and dispersed using a dispersing agent. The solution is placed in a cylinder and stirred, and the density of the solution is monitored over time with a hydrometer to observe the settling out of suspended soil particles. Diameters corresponding to the readings of the hydrometer are then calculated using Stoke's law.

ASTM D 6913-04 is the current specification for grain size analysis, but does not include hydrometer testing. Where hydrometer testing was required, Section 1.4 of the specification allows that ASTM D 422-63 (2002) be used.

Section 5.1.1 of ASTM D 422-63 (2002) and Table 1 of ASTM D 6913-04 give minimum sample mass requirements (the minimum depends on the maximum particle size present) for each test. In cases where there was not enough sample to meet the appropriate recommended mass, the test was completed using the available sample and it was noted in the Remarks section of the Particle Size Distribution Report.

Specific Gravity of Soil ASTM D 854-06

The specific gravity is required in calculation of the soil properties void ratio and degree of saturation. Specific gravity G is defined as the ratio of the unit weight (or density) of soil solids (particles) to the unit weight (or density) of water. The specific gravity of the soil particles is determined according to Method B of the ASTM standard.

Chemical Analysis (pH, Chloride, Sulfate) EPA SW846 9045C and EPA MCAWW 300.0A

A small quantity of soil was placed in a jar and sent to the laboratory for chemical analysis. Chemical analyses consisted of soil pH, and chloride and sulfate ion concentration. The concentration of chloride and sulfate ions is measured using an ion chromatograph with results reported in units of milligrams per kilogram. Soil pH is measured using a pH meter with results reported to 0.1 pH units.

Unit Weight of Soil ASTM D5084-03 (Sections 5.7 – 5.9. 8.1, 11.3.2)

Sections of the undisturbed samples were extruded from the sampling tubes and trimmed to remove any surface irregularities. Dimensions of the sample were measured and recorded and the weight is determined. Unit weight is calculated by dividing the sample weight by volume. If the moisture content is known, dry unit weight can be calculated by dividing the wet sample unit weight by (1 + moisture content, in decimal format).

Consolidation Tests ASTM D 2435-04

Sections of the undisturbed samples were extruded from the sampling tube for consolidation testing. The specimen was then trimmed into a disc 2.5 inches in diameter and 1-inch thick. The disc was confined in a stainless steel ring and sandwiched between porous plates. It was then subjected to incrementally increasing vertical loads and the resulting changes in specimen height with respect to time were measured with a micrometer dial gauge. The load increments were doubled each time, and deformation (consolidation) under each load increment was considered complete when the deformations versus time plot was analyzed using the log-time method. The test results are presented in the form of pressure versus percent strain curves and pressure versus void ratio curves.

Unconsolidated – Undrained Triaxial Shear Testing ASTM D 2850-03

The undisturbed samples assigned for testing were cut into sections which were extruded vertically from the sampling tubes for triaxial shear testing. The specimens thus formed consisted of cylinders with nominal diameter 2.9 inches and a height to diameter ratio of between 2 and 2.5 as required by the ASTM standard. The specimens were encased in rubber membranes. Each was then placed into a compression chamber and confined by an all-around fluid pressure. The samples were then loaded axially without any special effort to saturate them, or otherwise change their moisture content, and without allowing any drainage to occur during the testing. Failure was assumed to have occurred when the specimens had undergone the maximum load they would support.

Consolidated – Undrained Triaxial Shear Testing ASTM D 4767-04

The specimens, encased in the rubber membranes, were saturated by back-pressure prior to shearing. Section 8.2.3.1 of the ASTM standard describes how to determine when the specimen is saturated. Drainage was allowed from the specimen during the consolidation phase, thus allowing equilibrium under the confining stress, but no drainage was allowed during the loading phase. Failure was assumed to have occurred when the specimens had reached the maximum deviator stress or an axial strain of 17 percent.

Pore pressures generated during the loading phase were measured. The test is termed consolidated-undrained and total stresses result if no pore pressure corrections are included. When the pore pressures generated during the loading phase are subtracted from the total stresses, effective stresses result.

Direct shear – Soil ASTM D 3080-04

A soil specimen with a nominal diameter of 2.5 inches and a height of 1 inch is placed in a loading device and is held under constant normal (vertical) load while the loading device deforms the specimen at a controlled strain rate on or near a single shear plane determined by the configuration of the device. One vertical stress was assigned for each test, and shear stresses versus horizontal displacements are taken whereby peak shear stress is obtained. For each test, the vertical stress is constant throughout the test. The direct shear test, thus assigned, provides an estimate of the shear strength at the assigned normal (vertical) stress.

Moisture-Density Modified Proctor Test ASTM D 1557-02

Three buckets of soil were obtained in the field for each bulk sample assigned by Bechtel. In the laboratory these buckets were thoroughly mixed to assure uniformity of test specimens for all testing assigned on the bulk samples.

For the moisture-density relationship, the samples were tested in accordance with the ASTM standard for the modified Proctor test. The test yielded the optimum moisture content and corresponding maximum dry density for the bulk sample.

CBR Testing ASTM D1883-05

The California Bearing Ratio (CBR) test is used to compare the bearing capacity of a material to that of a well-graded crushed stone. Thus, a well-graded crushed stone material should have a CBR $\approx$ 100%. The test uses a loading device to advance a piston at 0.05 in/min into the compacted test material. The load required for advancing the piston is measured and recorded at specific penetration intervals and used to generate a stress versus penetration curve.

Each material tested had two specimens prepared at the optimum moisture content and compacted to 95% of the maximum dry density in a cylindrical mold. Surcharge weights were placed on top of the specimens to simulate the overburden stresses expected in the field. One of the specimens was then placed in a water bath to soak for 96 hours, while monitoring swelling that occurred. The other test specimen proceeded to penetration testing without soaking. Upon completion of the penetration test, the CBR of each specimen tested was computed using stress measurements corresponding to 0.1 and 0.2 inches penetration and the corresponding values for well-graded crushed stone—1,000 and 1,500 psi, respectively.

Section 7.1.2 of the ASTM standard was modified per Bechtel request as described in the previous paragraph.

Specimen Preparation – Rock Cores ASTM D 4543-04

This procedure specifies the methods for laboratory specimen preparation and determination of the length and diameter of rock core specimens and the conformance of the dimensions with established standards. Because the dimensional, shape, and surface tolerances of rock core specimens are important for determining rock properties of intact specimens, great care must be exercised when preparing core samples for strength testing. The prepared cores are measured to determine the straightness of elements on the cylindrical surface, flatness of the specimen ends, and perpendicularity of end surfaces to the specimen axis.

Deviations to the specimen preparation criteria were reported for several cores. Where deviations occurred they are reported on the individual test reports. Deviations to core preparation included side straightness, end flatness, parallelism, and perpendicularity. Deviations to the minimum core diameter requirement of 10 times the largest mineral grain were also reported for some cores.

Compressive Strength and Elastic Moduli – Rock Cores ASTM D 7012–04

This procedure specifies the manner in which to determine the strength of rock, in this case the uniaxial or unconfined compressive strength. This method also specifies the apparatus, instrumentation, and procedures for determining the stress-axial strain and the stress-lateral strain curves, as well as Young's modulus and Poisson's ratio.

The prepared specimen is placed in a loading frame and axial load is increased continuously on the specimen until peak load or failure of the specimen is obtained. To determine the elastic moduli, the specimen is instrumented with four strain gages (two mounted axially, two mounted laterally) prior to placement in the loading frame. Axial strain gages were 2 inches in length and lateral strain gages were 1 inch in length. Axial load and deformation (axial and lateral) readings are obtained as the load is applied to the specimen. Unconfined compressive strength is determined based on the cross-sectional area and the maximum recorded load applied to the specimen. Young's modulus (the slope of the stress-axial strain curve) and Poisson's ratio (ratio of lateral strain to axial strain) are calculated using the strain gage data from the data range generally between 40 and 60% of maximum strain. The specific data range for each core was individually selected based on visual review of the data. The selection utilized the average slope method over a range where both the axial and lateral stress-strain curves appeared most linear.

Deviations to the testing standard were reported for several cores. Where deviations occurred they are reported on the individual test reports. Deviations to the test standard included exception to the minimum axial strain gage length of 10 mineral grain diameters. Two inch axial strain gages were used for all cores.

Prepared By/Date, JRS 12/29/06
Checked By/Date, CES 12/29/06

Table F-1 (Rev. 1)
SUMMARY OF SOIL TESTS
SCE+G COL
MACTEC ENGINEERING AND CONSULTING, INC.
PROJECT # 6234-06-3534S

Source of Sample	Sample No.	Depth (ft)	Sample Type	Gravel [1] (%)	Sand [1] (%)	Fines [1] (%)	Silt [1] (%)	0.005 mm Clay [1] (%)	USCS Note (5)	Natural Moisture Content (%) at e_o SPT	Triaxial or Direct Shear 1	2	3	Cons.	Avg.	LL	PI	G_s	Dry Density (pcf) at e_o Triaxial or Direct Shear 1	2	3	Cons.	Avg.	Wet Density Avg. (pcf)	pH	Chloride (mg/kg)	Sulfate (mg/kg)
B-201	1	0	SPT						CL-ML	10.8																	
B-201	2	1.5	SPT	0	57	43	20	23	SM	19.3						NV	NP										
B-201	4	6	SPT	0	57	42	34	8	SM	18.4						NV	NP								5.4	4.1	5.1 (3)
B-201	6	11	SPT	0	67	33			SM	18.8																	
B-201	7	13.5	SPT	0	63	37	28	9	SM	20.1						NV	NP										
B-201	8	18.5	SPT	0	68	32			SM	24.9																	
B-201	9	23.5	SPT						SM	24.5															5.6	3.9	6.0 (3)
B-201	10	28.5	SPT	0	62	39	34	5	SM	28.6						NV	NP										
B-201	11	33.5	SPT	4	87	8			SW-SM	9.1															6.0	1.9 (3)	7.5
B-201	13	43.5	SPT	0	79	20	19	1	SM	15.9																	
B-201	14	48.5	SPT	1	77	23			SM	16.0																	
B-203	2	1.5	SPT	0	74	26			SM	15.4																	
B-203	4	6	SPT	0	70	30	26	4	SM	20.5																	
B-203	6	11	SPT	0	67	24			SM	24.0																	
B-203	8	18.5	SPT	0	68	32			SM	23.3																	
B-203	9	23.5	SPT	0	63	37	31	6	SM	31.1																	
B-203	11	33.5	SPT	0	70	31			SM	29.1																	
B-203	13	43.5	SPT	0	58	42	37	5	SM	32.3																	
B-203	14	48.5	SPT	0	71	29			SM	24.6																	
B-204	UD-1	8.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-204	UD-2	18.5	UD						ML		17.30			18.2	17.8	NV	NP	2.87	91.14			98.99	95.07	112			
B-204	UD-3	28.5	UD						ML					24.1	24.1	NV	NP	2.95				87.44	87.44	109			
B-204	UD-4	38.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-205	2	1.5	SPT	0	23	78	42	36	ML	34.6						NV	NP										
B-205	4	6	SPT	0	29	71			ML	22.9															5.3	4.5	5.6 (3)
B-205	6	11	SPT	0	35	65			ML	31.7																	
B-205	8	18.5	SPT	0	38	62	51	11	ML	30.8						NV	NP										
B-205	9	23.5	SPT	0	60	40			SM	31.6																	
B-205	10	28.5	SPT	15	51	34			SM	34.0																	
B-205	11	33.5	SPT	64	30	7			GW-GM	13.5																	
B-205	13	43.5	SPT	4	58	38	34	4	SM	21.5						NV	NP										
B-205	14	48.5	SPT	11	45	44	40	4	SM	7.8						NV	NP										
B-206	2	1.5	SPT						ML	22.8																	
B-206	4	6	SPT	0	63	37			SM	29.8																	
B-206	6	11	SPT	0	61	39	32	7	SM	30.7																	
B-206	8	18.5	SPT	0	74	26			SM	13.4															5.2	4.2	6.2
B-206	10	28.5	SPT	0	68	32	27	5	SM	30.8																	
B-206	12	38.5	SPT	0	64	36	31	5	SM	27.9						NV	NP										
B-206	14	48.5	SPT	0	70	31			SM	26.4																	
B-206	16	58.5	SPT	0	72	28			SM	24.1																	
B-206	18	68.5	SPT	0	78	22	21	1	SM	21.5																	
B-207	1	0	SPT	0	70	30	24	6	SM	9.4						NV	NP										
B-207	5	8.5	SPT	0	81	19			SM	20.8															5.4	5.8	15.4
B-207	6	11	SPT	0	75	25	23	2	SM	19.2						NV	NP										
B-207	7	13.5	SPT	0	79	21			SM	17.8																	
B-207	8	18.5	SPT	0	77	23			SM	21.4																	
B-207	9	23.5	SPT	0	79	22	20	2	SM	32.8																	
B-207	10	28.5	SPT	0	76	24			SM	29.9																	
B-207	11	33.5	SPT	0	64	35	29	6	SM	23.1						NV	NP										
B-207	12	38.5	SPT	6	78	16			SM	16.4																	

Prepared By/Date, JRS: 12/29/06
Checked By/Date, CES 12/29/06

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Source of Sample	Sample No.	Depth (ft)	Sample Type	Gravel [1] (%)	Sand [1] (%)	Fines [1] (%)	Silt [1] (%)	0.005 mm Clay [1] (%)	USCS Note (5)	Natural Moisture Content (%) at e_o SPT	Triaxial or Direct Shear 1	2	3	Cons.	Avg.	LL	PI	G_s	Dry Density (pcf) at e_o Triaxial or Direct Shear 1	2	3	Cons.	Avg.	Wet Density Avg. (pcf)	pH	Chloride (mg/kg)	Sulfate (mg/kg)
B-208	UD-1	8.5	UD	0	16	84	21	63	CH		22.30	25.00			23.7	59	31		97.66	90.15			93.91	116			
B-208	UD-2	18.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-208	UD-3	28.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-209	UD-1	8.5	UD						MH		42.90			42.9	42.9	56	11	2.81	71.22			69.95	70.59	101			
B-209	UD-2	18.5	UD	2	55	43	30	13	SM		56.9	45.50	43.70		48.7	55	12		59.71	64.90	68.52		64.38	96			
B-209	UD-3	28.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-209	UD-4	38.5	UD						ML		29.60			30.7	30.2	NV	NP	2.86	85.87			88.77	87.32	114			
B-210	UD-1	8.5	UD						ML		21.90			22.7	22.3	NV	NP	2.75	88.55			88.57	88.56	108			
B-210	UD-2	18.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-210	UD-3	28.5	UD						ML		26.00			20.7	23.4	NV	NP	2.73	91.87			99.83	95.85	118			
B-210	UD-4	38.5	UD						ML					27.1	27.1	NV	NP	2.78				84.91	84.91	108			
B-211	2	1.5	SPT	0	65	35	31	4	SM	14.8						NV	NP										
B-211	3	3.5	SPT	0	44	56			ML	20.6																	
B-211	4	6	SPT	0	70	30	22	8	SM	28.2						NV	NP										
B-211	5	8.5	SPT	0	71	30			SM	35.4																	
B-211	6	11	SPT	0	62	38	34	4	SM	17.9						NV	NP										
B-211	7	13.5	SPT	0	63	37			SM	26.7																	
B-211	8	18.5	SPT	0	56	44	38	6	SM	22.6						NV	NP										
B-211	9	23.5	SPT	0	70	30			SM	26.7															5.7	3.3 (4)	3.5 (3)
B-211	10	28.5	SPT	0	72	28	24	4	SM	26.0						NV	NP										
B-211	11	33.5	SPT	0	72	28			SM	23.4																	
B-211	12	38.5	SPT	0	69	31	29	2	SM	31.3						NV	NP										
B-215	2	1.5	SPT						ML	21.1																	
B-215	3	3.5	SPT	0	59	41			SM	28.8																	
B-215	4	6	SPT	0	64	36	30	6	SM	34.1																	
B-215	UD-1	8.5	UD						SM		32.50			28.4	30.5	NV	NP	2.78	84.01			87.93	85.97	112			
B-215	5	11	SPT	0	71	29	23	6	SM	25.7						NV	NP										
B-215	6	13.5	SPT	0	75	25			SM	25.6																	
B-215	UD-2	18.5	UD						SM		23.80			24.6	24.2	NV	NP	2.82	90.34			92.00	91.17	113			
B-215	7	23.5	SPT	0	68	32	28	4	SM	22.7																	
B-215	UD-3	28.5	UD	0	70	30			SM		24.20				24.2				86.70				86.70	108			
B-215	8	33.5	SPT	0	68	32			SM	24.6															5.6	1.9 (3)(4)	3.0
B-215	UD-4	38.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-215	9	43.5	SPT	0	59	41	36	5	SM	27.1																	
B-216	2	1.5	SPT	0	57	43	35	8	SM	20.6						NV	NP										
B-216	3	3.5	SPT	0	56	43			SM	22.4																	
B-216	UD-1	6.5	UD	0	5	95	70	25	ML		35.80	35.80			35.8	NV	NP		64.72	63.38			64.05	87			
B-216	4	8.5	SPT	0	17	83	60	23	ML	41.1																	
B-216	5	11	SPT	0	26	74			ML	38.1																	
B-216	UD-2	13.5	UD	0.5	17	83	66	17	ML		37.60	27.60			32.6	NV	NP		74.62	87.76			81.19	108			
B-216	6	18.5	SPT	1	32	68	53	15	ML	49.3						NV	NP										
B-216	UD-3	23.5	UD	0	15	84	63	21	ML		35.00	35.40	35.80		35.4	NV	NP		72.86	80.86	90.94		81.55	110			
B-216	7	28.5	SPT	34	34	33			GM	24.5															6.0	1.8 (3)	4.6 (3)
B-216	8	32	SPT	76	12	12			GM	10.1																	
B-216	9	38.5	SPT	0	27	72	65	7	ML	28.6																	
B-216	10	43.5	SPT	14	50	36			SM	24.7																	

CHANGED DRY DENSITY, EFFECTING AVG DRY DENSITY AND AVG. WET DENSITY.

Prepared By/Date, JRS 12/29/06
Checked By/Date, CEJ 12/29/06

Table F-1 (Rev. 1)
SUMMARY OF SOIL TESTS
SCE+G COL
MACTEC ENGINEERING AND CONSULTING, INC.
PROJECT # 6234-06-3534S

Source of Sample	Sample No.	Depth (ft)	Sample Type	Gravel [1] (%)	Sand [1] (%)	Fines [1] (%)	Silt [1] (%)	0.005 mm Clay [1] (%)	USCS Note (5)	Natural Moisture Content (%) at e_o SPT	Triaxial or Direct Shear 1	2	3	Cons.	Avg.	LL	PI	G_s	Dry Density (pcf) at e_o Triaxial or Direct Shear 1	2	3	Cons.	Avg.	Wet Density Avg. (pcf)	pH	Chloride (mg/kg)	Sulfate (mg/kg)
B-217	2	1.5	SPT	2	31	67	26	41	ML	26.6						NV	NP										
B-217	3	3.5	SPT	0	57	43			SM	28.9																	
B-217	4	6	SPT	0	56	43	23	20	SM	23.7																	
B-217	UD-1	8.5	UD	0	65	35	25	10	SM		29.00	26.50			27.8	NV	NP		86.37	89.48			87.93	112			
B-217	5	10.5	SPT	0	56	44	35	9	SM	21.3						NV	NP								5.4	5.9	3.3 (3)
B-217	6	13.5	SPT	0	71	29			SM	27.9																	
B-217	UD-2	18.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-217	7	23.5	SPT	0	70	30	24	6	SM	26.5																	
B-217	8	33.5	SPT	0	60	40			SM	45.8																	
B-217	UD-4	38.5	UD	(2)	(2)	(2)			(2)							(2)	(2)										
B-217	9	43.5	SPT	6	69	25			SM	19.0																	
B-217	10	48.5	SPT	44	39	17	15	2	SM	13.3																	
B-220	2	1.5	SPT	0	32	68	26	42	MH	20.5																	
B-220	3	3.5	SPT	0	26	74			MH	25.4																	
B-220	4	6	SPT						MH	25.1						73	20										
B-220	5	8.5	SPT	0	36	64	22	42	MH	23.7															5.5	3.4	3.7 (3)
B-220	6	11	SPT	0	76	24			SM	23.0																	
B-220	7	13.5	SPT	0	58	42	27	15	SM	21.3																	
B-220	8	18.5	SPT	0	59	41			SM	25.2																	
B-220	9	23.5	SPT	0	62	38			SM	22.8																	
B-220	11	33.5	SPT	0	70	30	26	4	SM	20.6																	
B-220	12A	41	SPT	0	75	25			SM	19.3																	
B-220	14	48.5	SPT	6	55	39	35	4	SM	27.9																	
B-220	16	58.5	SPT	3	56	42	38	4	SM	22.6																	
B-222	UD-1	8.5	UD						ML					26.7	26.7	NV	NP	2.71				90.49	90.49	115			
B-222	UD-2	18.5	UD						ML		23.80			20.8	22.3	NV	NP	2.84	86.95			92.61	89.78	110			
B-222	UD-3	28.5	UD	0	64	36			SM		20.30				20.3				87.10				87.10	105			
B-222	UD-4	38.5	UD	(2)	(2)	(2)	(2)	(2)	(2)									(2)									
B-301	2	1.5	SPT	1	72	27			SM	12.9																	
B-301	3A	3.5	SPT						SM	12.6						NV	NP										
B-301	3B	3.5	SPT						CH	62.6																	
B-301	4	6	SPT	0	65	35	27	8	SM	18.9															5.7	4.7	12.0
B-301	6	11	SPT	0	75	25			SM	15.1																	
B-301	7	13.5	SPT	0	71	29	26	3	SM	15.9						NV	NP										
B-301	8	18.5	SPT	0	76	24			SM	15.7															5.3	3.2	4.0 (3)
B-301	9	23.5	SPT	0	77	23			SM	14.7																	
B-301	10	28.5	SPT	0	76	24	22	2	SM	15.9						NV	NP										
B-301	11	33.5	SPT	0	74	26			SM	17.0																	
B-301	12	38.5	SPT	0	74	26			SM	19.6																	
B-301	13	43.5	SPT	0	64	36	33	3	SM	33.4																	
B-301	14	48.5	SPT	0	79	20	19	1	SM	18.4						NV	NP										
B-301	15	53.5	SPT	1	78	22			SM	20.9																	
B-305	2	1.5	SPT	0	68	32			SM	18.6																	
B-305	3	3.5	SPT	0	54	46	22	24	SM	30.3						NV	NP										
B-305	5	8.5	SPT	0	71	29			SM	38.0															5.2	8.5	4.0 (3)
B-305	7	13.5	SPT	0	69	31			SM	39.9																	
B-305	8	18.5	SPT	0	66	34	29	5	SM	26.4																	
B-305	10	28.5	SPT	0	75	25			SM	26.8																	
B-305	12	38.5	SPT	0	73	28	25	3	SM	29.5																	
B-305	14	48.5	SPT	0	76	24			SM	27.6																	

Prepared By/Date, JRS. 12/29/06
Checked By/Date, CBS 12/29/06

Table F-1 (Rev. 1)
SUMMARY OF SOIL TESTS
SCE+G COL
MACTEC ENGINEERING AND CONSULTING, INC.
PROJECT # 6234-06-3534S

Source of Sample	Sample No.	Depth (ft)	Sample Type	Gravel [1] (%)	Sand [1] (%)	Fines [1] (%)	Silt [1] (%)	0.005 mm Clay [1] (%)	USCS Note (5)	Natural Moisture Content (%) at e_o						LL	PI	G_s	Dry Density (pcf) at e_o					Wet Density Avg. (pcf)	pH	Chloride (mg/kg)	Sulfate (mg/kg)
										SPT	Triaxial or Direct Shear			Cons.	Avg.				Triaxial or Direct Shear			Cons.	Avg.				
											1	2	3						1	2	3						
B-306	2	1.5	SPT	0	21	79	39	40	ML	29.9						NV	NP										
B-306	3	3.5	SPT	0	70	30			SM	34.2																	
B-306	4	6	SPT	0	45	55	40	15	ML	29.6																	
B-306	6	11	SPT	0	57	43			SM	29.9						NV	NP								5.2	7.0	5.4 (3)
B-306	8	18.5	SPT	0	31	68	60	8	ML	29.6																	
B-306	9	23.5	SPT	1	23	77			MH	52.1						62	13										
B-306	11	33.5	SPT	0	71	30	27	3	SM	25.6																	
B-306	12	38.5	SPT	0	60	40			SM	31.6																	
B-307	1	0	SPT						MH	34.7						63	25										
B-307	2	1.5	SPT	0	8	93	34	59	MH	29.3						76	19										
B-307	3	3.5	SPT	0	16	84			MH	27.9																	
B-307	4	6	SPT	0	17	83	47	36	MH	27.8															5.2	8.4	6.7
B-307	5	8.5	SPT	0	67	33			SM	11.0																	
B-307	6	11	SPT	0	61	38			SM	13.8																	
B-307	7A	16	SPT	0	44	56	30	26	ML	46.5						NV	NP										
B-307	9	23.5	SPT	2	38	60			ML	31.0																	
B-307	10	28.5	SPT	0	58	42	37	5	SM	22.5																	
B-307	11	33.5	SPT	10	67	24			SM	23.8																	
B-307	12	38.5	SPT	0	54	46	41	5	SM	36.3																	
B-309	UD-1	8.5	UD	0	65	36	26	10	SM		32.3	12.4			22.4	NV	NP		83.65	90.72			87.19	107			
B-309	UD-2	18.5	UD	(2)	(2)	(2)			SM							(2)	(2)										
B-309	UD-3	28.5	UD	0	30	70	48	22	ML		26.6	26.8			27.7	NV	NP		77.83	85.07			81.45	104			
B-309	UD-4	38.5	UD	0	51	49			SM		21.7				21.7				88.60				88.60	108			
B-311	1	0	SPT	0	11	88	33	55	MH	30.9						70	19										
B-311	2	1.5	SPT	0	26	74			MH	35.0																	
B-311	3	3.5	SPT	0	36	64	26	38	MH	30.5						77	25										
B-311	4	6	SPT	0	30	70			ML	34.1																	
B-311	5	8.5	SPT	0	49	51	34	17	ML	29.1						NV	NP										
B-311	6	11	SPT	0	68	32			SM	26.5																	
B-311	7	13.5	SPT	0	76	24			SM	20.0															5.3	4.5	6.0
B-311	8	18.5	SPT	0	10	90	75	15	ML	28.8																	
B-311	9	23.5	SPT	0	57	44			SM	24.6																	
B-311	10	28.5	SPT	0	28	72	53	19	ML	34.0																	
B-311	11	33.5	SPT	0	40	60			ML	35.0																	
B-311	12	38.5	SPT	0	34	66	50	16	ML	39.7																	
B-311	13	43.5	SPT	0	56	45			SM	43.2																	
B-311	14	48.5	SPT	0	75	25	22	3	SM	21.1																	
B-311	15	53.5	SPT	18	60	21			SM	13.4															5.9	2.9	7.3
B-317	1	0	SPT						MH	28.5						64	27										
B-317	2	1.5	SPT	3	81	16			SM	24.6																	
B-317	3	3.5	SPT	0	38	62	33	29	MH	26.1						58	11										
B-317	4	6	SPT	0	29	72	31	41	MH	29.5																	
B-317	5	8.5	SPT	0	92	8			SW-SM	24.4															5.0	6.5	14.5
B-317	6	11	SPT	0	33	67	43	24	MH	26.4																	
B-317	7	13.5	SPT	0	37	63	35	28	MH	33.2						57	16										
B-317	8	18.5	SPT	0	29	71			ML	31.8																	
B-317	9	23.5	SPT	1	54	44			SM	32.4																	
B-319	UD-1	8.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-319	UD-2	18.5	UD	1	71	28			SM		19.50				19.5				91.60				91.60	109			
B-319	UD-3	28.5	UD						ML		22.90			26.8	24.9	NV	NP	2.75	89.36			94.34	91.85	115			
B-319	UD-4	38.5	UD						ML					19.6	19.6	NV	NP	2.75				102.80	102.8	123			

Prepared By/Date, JBS 12/29/06
Checked By/Date, CES 12/27/06

Table F-1 (Rev. 1)
SUMMARY OF SOIL TESTS
SCE+G COL
MACTEC ENGINEERING AND CONSULTING, INC.
PROJECT # 6234-06-3534S

Source of Sample	Sample No.	Depth (ft)	Sample Type	Gravel [1] (%)	Sand [1] (%)	Fines [1] (%)	Silt [1] (%)	0.005 mm Clay [1] (%)	USCS Note (5)	Natural Moisture Content (%) at e_o SPT	Triaxial or Direct Shear 1	2	3	Cons.	Avg.	LL	PI	G_s	Dry Density (pcf) at e_o Triaxial or Direct Shear 1	2	3	Cons.	Avg.	Wet Density Avg. (pcf)	pH	Chloride (mg/kg)	Sulfate (mg/kg)
B-320	2	1.5	SPT	0	35	65	39	26	ML	23.9						NV	NP										
B-320	3	3.5	SPT	0	70	30			SM	29.5						NV	NP										
B-320	4	6	SPT	0	61	39	26	13	SM	20.4																	
B-320	5	8.5	SPT	0	63	37			SM	25.3															4.9	6.4	6.1 (3)
B-320	6	11	SPT	0	62	38	31	7	SM	33.4																	
B-320	7	13.5	SPT	0	65	35			SM	23.3																	
B-320	8	18.5	SPT	0	58	42			SM	30.0																	
B-320	9	23.5	SPT	0	69	31	27	4	SM	27.5																	
B-320	10	28.5	SPT	0	69	31			SM	22.5																	
B-320	11	33.5	SPT	0	73	27	23	4	SM	17.2																	
B-320	12	38.5	SPT	1	73	26			SM	24.1															6.0	7.3	16.6
B-320	13	43.5	SPT	0	46	54	49	5	ML	44.2						NV	NP										
B-321	UD-2	18.5	UD	0	66	34	25	9	SM		19.90	19.40			19.7	NV	NP		88.67	92.90			90.79	109			
B-321	UD-3	28.5	UD						SM					16.7	16.7	NV	NP	2.83				102.60	102.6	120			
B-322	UD-1	8.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-322	UD-2	18.5	UD	0	71	29	20	9	SM		16.90	13.90	14.90		15.2	NV	NP		85.96	95.15	83.74		88.28	102			
B-322	UD-3	28.5	UD	(2)	(2)	(2)	(2)	(2)	(2)							(2)	(2)										
B-325	2	1.5	SPT	0	56	44			SM	29.0																	
B-325	UD-1	3.5	UD	0	44	57			ML		38.00				38.0				78.20				78.2	108			
B-325	3	6	SPT	1	51	48	36	12	SM	39.9						NV	NP										
B-325	4	11	SPT	0	58	42	32	10	SM	18.0																	
B-325	UD-3	13.5	UD						SM		30.70			20.9	25.8	NV	NP	2.77	74.67			91.14	82.91	104			
B-325	5	16	SPT	0	65	34	26	8	SM	22.3						NV	NP										
B-325	UD-4	18.5	UD	(2)	(2)	(2)			(2)							(2)	(2)										
B-325	6	21	SPT	0	71	29			SM	35.6															5.6	3.4	10.3
B-325	7	26	SPT	0	71	29	22	7	SM	16.6						NV	NP										
B-325	8	31	SPT	1	67	32			SM	19.9																	
B-325	9	36	SPT	0	70	31	26	5	SM	16.4						NV	NP										
B-325	UD-8	38.5	UD						SM		23.50			18.5	21.0	NV	NP	2.69	93.47			101.30	97.39	118			
B-325	10	41	SPT	0	55	45	39	6	SM	23.9																	
B-325	11	46	SPT	2	34	64			ML	24.1																	
B-325	13	53.5	SPT	No Recovery																							

(1) Due to computer roundoff, particle size fractions may total 100 ± 1. Fines include silt plus clay.
(2) These results included with RCTS Tests in Attachment I.
(3) Estimated result. Result is less than STL laboratory reporting limit. Actual value will not exceed values shown.
(4) The associated method blank contains the target analyte at a reportable level. The actual value may be less than value shown
(5) USCS Symbol is based on visual-manual method where incomplete classification testing was performed.

Prepared By/Date: JRS 11/30/06
Reviewed By/Date: CBS 11/30/06

Table F-2 (Rev. 1)
SUMMARY OF REMOLDED SOIL TESTS
SCE+G COL
MACTEC ENGINEERING AND CONSULTING, INC.
PROJECT # 6234-06-3534S

Source of Sample	Depth (ft)	Material Description	Gravel (%)	Sand (%)	Fines (%)	Silt (%)	Clay (%)	USCS	Natural Moisture (%)	LL	PL	PI	Max Dry Density (pcf)	Optimum Moisture (%)	CBR Soaked (at 0.1")	CBR Unsoaked (at 0.1")
Test Pit - TP-201	1' - 6'	SAND, Silty (SM), Red, Micaceous	0	57	43	28	15	SM	23.4	NV	NP	NP	107.8	17.0	7.0	27.1
Test Pit - TP-227	3' - 5'	SILT, Sandy (ML), Red, Micaceous	0	46	54	39	15	ML	27.8	NV	NP	NP	107.0	17.9	6.9	31.6
Test Pit - TP-301	0' - 3'	SAND, Silty, (SM), Yellowish Brown, Micaceous	0	68	32	24	8	SM	21.1	NV	NP	NP	105.7	16.1	6.3	28.2
Test Pit - TP-405	0' - 4'	SAND, Silty (SM), Dark Yellowish Brown, Micaceous	0	64	36	32	4	SM	27.3	NV	NP	NP	108.8	15.3	3.6	21.9
Test Pit - TP-MM1	n/a	SAND (SW), Dark Gray, Washed Granitic Screenings from Stockpile	2	95	3	-	-	SW (1)	5.0	-	-	-	122.9	10.7	21.9	32.4
Test Pit - TP-MM2	n/a	SAND (SW-SM) with Silt, Dark Gray, Unwashed Granitic Screenings from Stockpile	4	86	10	5	5	SW-SM (1)	1.7	-	-	-	125.2	8.2	25.8	29.2

(1) USCS Syumbol based on visual-manual examination if no test performed for LL and PI.
See individual test reports for complete test results.

Prepared By/Date, BAR 11/20/06
Checked By/Date, GES 11/28/06

Table F-3
SUMMARY OF ROCK CORE TESTS
SCE+G COL
MACTEC ENGINEERING AND CONSULTING, INC.
PROJECT # 6234-06-3534

Source of Sample	Depth (ft)	Rock Type	Length to Diameter Ratio	Unit Wt. (pcf)	Unconfined Compressive Strength (psi)	Unconfined Compressive Strength (psi) (L/D Correction)	Modulus (psi)	Poisson's Ratio	Type of Break	Maximum Mineral Grain Size > Diameter/10 (Y or N)
B-201	53.00	Granodiorite	2.18	171	22,918	23,134	NA	NA	Cone	Y
B-201	58.08	Granodiorite	2.21	171	23,056	23,298	7,830,000	0.35	Cone	Y
B-201	65.65	Granodiorite	2.22	170	9,361	9,464	NA	NA	Columnar	Y
B-201	70.70	Granodiorite	2.22	169	18,760	18,967	NA	NA	Columnar	Y
B-201	81.70	Granodiorite	2.21	170	24,258	24,512	8,080,000	0.35	Cone	Y
B-201	92.10	Granodiorite	2.22	168	23,593	23,858	NA	NA	Cone & Shear	Y
B-201	101.30	Quartz Diorite	2.19	181	28,396	28,675	NA	NA	Cone & Shear	N
B-201	109.73	Quartz Diorite	2.21	180	29,501	29,809	9,730,000	0.32	Cone & Shear	N
B-201	131.20	Quartz Diorite	2.21	184	23,027	23,269	NA	NA	Shear	N
B-201	151.53	Quartz Diorite	2.18	184	23,278	23,494	NA	NA	Shear	N
B-201	191.48	Quartz Diorite	2.23	185	19,005	19,222	9,390,000	0.30	Columnar	N
B-201	238.10	Quartz Diorite	2.19	183	25,081	25,325	NA	NA	Cone	N
B-201	271.23	Quartz Diorite	2.22	188	21,922	22,161	NA	NA	Columnar	N
B-201	311.90	Quartz Diorite	2.22	185	21,552	21,790	8,880,000	0.30	Shear	N
B-201	349.06	Biotite Gneiss	2.22	165	28,594	28,908	NA	NA	Shear	N
B-203	56.20	Quartz Diorite	2.00	185	28,367	28,372	9,190,000	0.32	Cone & Shear	N
B-203	61.45	Granodiorite	2.12	172	25,112	25,266	NA	NA	Cone	Y
B-203	63.10	Granodiorite	2.18	169	34,660	34,987	NA	NA	Cone & Shear	N
B-203	71.87	Granodiorite	2.12	182	29,052	29,231	10,110,000	0.30	Cone & Shear	N
B-203	83.13	Quartz Diorite to Migmatite	2.10	184	30,453	30,611	NA	NA	Cone	N
B-203	99.09	Quartz Diorite	2.13	184	22,418	22,566	NA	NA	Cone & Shear	N
B-203	114.55	Quartz Diorite	2.10	184	30,880	31,042	9,390,000	0.33	Cone & Shear	N
B-203	133.35	Quartz Diorite	2.10	184	24,139	24,264	NA	NA	Columnar	N
B-203	148.12	Quartz Diorite	2.18	183	22,777	22,991	NA	NA	Cone & Shear	N
B-205	68.50	Quartz Diorite	2.18	182	25,217	25,451	NA	NA	Columnar	Y
B-205	72.54	Quartz Diorite	2.24	181	24,074	24,360	9,990,000	0.30	Shear	N
B-205	91.40	Quartz Diorite	2.22	182	21,417	21,659	NA	NA	Cone & Shear	N
B-205	124.32	Quartz Diorite	2.20	184	29,753	30,056	NA	NA	Cone & Shear	N
B-205	155.50	Quartz Diorite	2.20	183	27,113	27,388	9,730,000	0.29	Cone & Shear	N
B-206	78.70	Quartz Diorite	2.11	181	25,164	25,310	9,030,000	0.34	Cone & Shear	N
B-206	79.55	Quartz Diorite	2.11	179	13,352	13,433	NA	NA	Shear	N
B-206	88.70	Granodiorite	2.12	170	24,578	24,729	NA	NA	Cone & Shear	Y
B-206	104.69	Quartz Diorite	2.11	180	25,308	25,450	6,830,000	0.21	Shear	N
B-206	125.02	Quartz Diorite	2.13	184	15,860	15,964	NA	NA	Cone & Shear	N
B-206	146.50	Quartz Diorite	2.14	186	22,782	22,954	NA	NA	Cone & Shear	Y
B-206	177.58	Quartzite	2.13	166	37,596	37,857	9,340,000	0.27	Columnar	N
B-206	212.50	Granodiorite	2.13	171	27,257	27,443	NA	NA	Cone & Shear	Y
B-207	52.00	Granodiorite	2.12	170	40,784	41,037	9,360,000	0.37	Columnar	Y
B-207	58.90	Granodiorite	2.11	169	34,459	34,654	NA	NA	Cone & Shear	N
B-207	80.63	Granodiorite	2.22	186	NA [1]	NA	NA	NA	NA	Y
B-207	121.30	Biotite Gneiss	2.11	167	37,211	37,435	9,500,000	0.31	Cone & Shear	N
B-207	159.15	Granodiorite	2.11	172	25,829	25,980	NA	NA	Cone & Shear	Y

Prepared By/Date, BAR 11/28/06
Checked By/Date, CES 11/28/06

Table F-3
SUMMARY OF ROCK CORE TESTS
SCE+G COL
MACTEC ENGINEERING AND CONSULTING, INC.
PROJECT # 6234-06-3534

Source of Sample	Depth (ft)	Rock Type	Length to Diameter Ratio	Unit Wt. (pcf)	Unconfined Compressive Strength (psi)	Unconfined Compressive Strength (psi) (L/D Correction)	Modulus (psi)	Poisson's Ratio	Type of Break	Maximum Mineral Grain Size > Diameter/10 (Y or N)
B-215	54.25	Quartz Diorite	2.33	183	24,578	24,976	8,940,000	0.34	Cone & Shear	N
B-215	58.43	Quartz Diorite	2.33	182	18,644	18,942	NA	NA	Cone & Shear	N
B-215	66.45	Quartz Diorite	2.33	184	22,795	23,164	NA	NA	Cone & Shear	N
B-216	56.20	Biotite Amphibole Gneiss	2.22	184	15,322	15,495	NA	NA	Columnar	N
B-216	60.14	Biotite Amphibole Gneiss	2.22	192	25,838	26,126	8,520,000	0.20	Shear	N
B-217	76.05	Biotite Amphibole Gneiss	2.26	189	21,587	21,865	NA	NA	Cone	N
B-217	97.73	Biotite Amphibole Gneiss	2.24	179	33,847	34,262	10,970,000	0.34	Cone & Shear	N
B-217	104.85	Migmatite	2.31	180	32,087	32,577	NA	NA	Cone	Y
B-217	136.00	Quartz Diorite	2.31	182	20,760	21,069	NA	NA	Cone & Shear	Y
B-220	87.24	Hornblende Gneiss	2.25	193	20,133	20,385	NA	NA	Columnar	N
B-220	95.85	Hornblende Gneiss	2.28	191	20,711	20,997	12,310,000	0.23	Shear	N
B-301A	61.00	Granodiorite	2.20	188	31,666	31,991	NA	NA	Cone & Shear	N
B-301A	66.77	Granodiorite	2.20	171	24,115	24,364	8,110,000	0.31	Cone & Shear	Y
B-301A	76.72	Quartz Diorite	2.21	192	15,769	15,939	NA	NA	Columnar	N
B-301A	85.64	Quartz Diorite	2.19	191	25,084	25,322	NA	NA	Cone	N
B-301A	94.10	Quartz Diorite	2.20	190	22,789	23,026	9,130,000	0.29	Cone & Shear	N
B-301A	106.08	Quartz Diorite	2.21	182	24,938	25,206	NA	NA	Cone & Shear	N
B-301A	113.74	Quartz Diorite	2.21	184	27,770	28,068	NA	NA	Cone	N
B-301A	125.90	Migmatite	2.18	191	45,009	45,419	14,960,000	0.30	Crush	N
B-301A	156.23	Migmatite	2.19	171	22,941	23,168	NA	NA	Cone	Y
B-301A	195.18	Granodiorite	2.18	170	25,408	25,639	NA	NA	Cone & Shear	Y
B-301A	234.13	Quartz Diorite	2.19	179	23,704	23,940	8,200,000	0.28	Cone & Shear	N
B-301A	274.85	Quartz Diorite	2.19	183	29,359	29,639	NA	NA	Cone & Shear	N
B-301A	311.50	Migmatite/Quartz Diorite	2.19	167	27,306	27,573	NA	NA	Cone	Y
B-301A	349.10	Migmatite	2.20	168	28,813	29,102	7,570,000	0.35	Shear	N
B-305	61.00	Granodiorite	2.12	171	22,282	22,419	NA	NA	Cone & Shear	Y
B-305	62.90	Granodiorite	2.10	170	24,315	24,449	8,380,000	0.30	Cone & Shear	Y
B-305	73.50	Granodiorite Migmatite	2.11	189	41,021	41,252	NA	NA	Crush	N
B-305	95.23	Hornblende Gneiss	2.14	185	25,713	25,898	NA	NA	Cone & Shear	N
B-305	123.55	Amphibolite Schist	2.11	183	26,553	26,705	7,390,000	0.35	Columnar	N
B-305	165.15	Granodiorite	2.14	174	27,997	28,200	NA	NA	Cone & Shear	N
B-306	48.25	Granodiorite	2.10	172	22,091	22,210	NA	NA	Cone	Y
B-306	52.55	Quartz Diorite	2.11	188	31,079	31,257	9,370,000	0.28	Cone	Y
B-306	62.20	Hornblende Gneiss	2.11	191	37,616	37,833	NA	NA	Crush	N
B-306	76.43	Granodiorite	2.11	179	23,200	23,332	NA	NA	Cone & Shear	N
B-306	96.40	Quartz Diorite	2.12	188	26,164	26,324	NA	NA	Cone & Shear	N
B-306	123.47	Granodiorite	2.12	185	26,139	26,300	8,560,000	0.35	Cone & Shear	Y
B-306	152.19	Hornblende Gneiss	2.12	186	35,689	35,911	NA	NA	Cone	Y
B-306	187.60	Granodiorite	2.13	178	23,523	23,678	8,930,000	0.30	Cone & Shear	Y

Prepared By/Date, Bar 1/28/06
Checked By/Date, CES 1/28/06

Table F-3
SUMMARY OF ROCK CORE TESTS
SCE+G COL
MACTEC ENGINEERING AND CONSULTING, INC.
PROJECT # 6234-06-3534

Source of Sample	Depth (ft)	Rock Type	Length to Diameter Ratio	Unit Wt. (pcf)	Unconfined Compressive Strength (psi)	Unconfined Compressive Strength (psi) (L/D Correction)	Modulus (psi)	Poisson's Ratio	Type of Break	Maximum Mineral Grain Size > Diameter/10 (Y or N)
B-307	41.08	Biotite Gneiss	2.11	167	26,350	26,505	NA	NA	Crush	N
B-307	49.10	Granodiorite	2.10	170	22,267	22,384	8,390,000	0.29	Shear	Y
B-307	69.32	Migmatite	2.12	186	29,760	29,944	NA	NA	Cone & Shear	N
B-307	99.05	Migmatite	2.06	181	22,227	22,297	NA	NA	Cone & Shear	N
B-307	134.45	Granodiorite Migmatite	2.10	172	21,305	21,415	9,020,000	0.35	Cone & Shear	Y
B-307	171.71	Granodiorite Migmatite	2.11	185	15,149	15,237	NA	NA	Cone & Shear / Split	N
B-317	50.75	Migmatite	2.24	186	55,506	56,169	NA	NA	Cone/Crush	N
B-317	71.48	Amphibole Schist	2.22	189	15,834	16,012	11,730,000	0.40	Cone	N
B-317	90.44	Migmatite Gneiss	2.22	167	33,255	33,622	NA	NA	Crush	Y
B-317	132.79	Migmatite	2.26	186	26,959	27,306	NA	NA	Cone & Shear	N
B-320	52.08	Migmatite	1.99	181	NA (2)	NA	NA	NA	NA	N
B-320	61.88	Migmatite	2.26	181	28,872	29,249	NA	NA	Cone & Shear	N
B-320	77.68	Migmatite	2.13	187	27,465	27,649	NA	NA	Cone & Shear	N
B-320	100.43	Granodiorite Migmatite	2.18	170	28,966	29,239	NA	NA	Columnar	N
B-325	60.31	Granodiorite	2.30	172	21,804	22,120	NA	NA	Cone & Shear	Y
B-325	67.58	Migmatite	2.27	176	24,286	24,615	9,110,000	0.30	Cone & Shear	N

Note: (1) Specimen broke along mineral filled fracture during end preparation - specimen used for unit weight only.
(2) Specimen did not meet minimum length to diameter ratio for compressive strength - specimen used for unit weight only.

Prepared By/Date, JRS 11/28/06
Checked By/Date, CES 11-28-06

Table F-4 **LABORATORY EQUIPMENT**

Laboratory equipment used for the testing included the following:

Serial or ID No	MACTEC Office	Identity
210012460	Charlotte	Rammer Modified Proctor Test
SE-001	Charlotte	Straight Edge Proctor Test
4173	Charlotte	Mold Proctor Test
PM5510	Charlotte	Mold Proctor Test
472046	Charlotte	Hydrometer Solution
H4265	Charlotte	Mixing Cup
936-2	Charlotte	Mixer
1512	Charlotte	Balance/Scale
1446/2390	Charlotte	Balance/Scale
472046	Charlotte	Hydrometer
RPA-6866 SLDO-1	Charlotte	Drying Oven
B22-2516 SLDO-2	Charlotte	Drying Oven
98054228	Charlotte	Liquid Limit Device
ID:5,6,4,12,1, 10,7,22,23,15, 16,17,48,45,44,42	Charlotte	Sieves
5635726	Charlotte	Thermometer
6,8,9	Charlotte	CBR Compaction Molds
1,2,3,5,6,7	Charlotte	CBR Weights
UN-2	Charlotte	CBR Penetration Piston
JF-G5, 154054	Charlotte	Dial Gauges
ASP-1, ASP-2, ASP-3	Charlotte	Adjustable Stem and Plate
2(SN4629)	Charlotte	Proving Rings
Q54815	Charlotte	Load Cell
02105539	Charlotte	Caliper/Micrometer for Rock Core
1512	Charlotte	Balance/Scale
C004980 (SN170452)	Charlotte	P-3 Strain Indicator and Recorder
PR-01 through PR-12	Charlotte	Precision Resistors
FP-20	Charlotte	Feeler Gage Set
02636	Charlotte	Digital Indicator
05969	Charlotte	Digital Indicator
61229	Charlotte	Switch and Balance Unit
55898	Charlotte	Strain Indicator
Parallel Bars	Charlotte	Parallel Bars
V- Block	Charlotte	V- Block
1301-40	Charlotte	L- Square
200601788	Charlotte	Surface Plate

Serial or ID No	MACTEC Office	Identity
144	Atlanta	Drying Oven
109	Atlanta	Drying Oven
500, 508	Atlanta	Drying Ovens
2052-2057	Atlanta	Specific Gravity Flasks
418,412,411,143,416	Atlanta	Balance/Scale
448,1142,569,1186, 319,1918,1915,310, 438,743,309,436,437, 457,446,1150,568, 1141,1264,1181,1138, 1876,2424	Atlanta	Sieves
2151 / 52042	Atlanta	Hydrometer
1152,1153,1155,1156, 1157,1158, 1159	Atlanta	Hydrometer Cylinder
36(Previous) 244	Atlanta	Sedimentation Cylinder
9(Previous) 242	Atlanta	Sedimentation Cylinder
11(Previous) 245	Atlanta	Sedimentation Cylinder
25(Previous) 246	Atlanta	Sedimentation Cylinder
1(Previous) 249	Atlanta	Sedimentation Cylinder
5(Previous) 270	Atlanta	Hydrometer Cylinder
41(Previous) 256	Atlanta	Sedimentation Cylinder
31(Previous) 295	Atlanta	Sedimentation Cylinder
23(Previous) 257	Atlanta	Sedimentation Cylinder
26(Previous) 264	Atlanta	Sedimentation Cylinder
42(Previous) 261	Atlanta	Sedimentation Cylinder
1165	Atlanta	Mixer Cup
2354	Atlanta	Mixer
526	Atlanta	Calipers, 8" Digital
2424	Atlanta	Caliper, 8" Digital
306147	Atlanta	Load Cell
300532	Atlanta	Load Cell
306148	Atlanta	Load Cell
ID65	Atlanta	LVDT
ID66	Atlanta	Pressure Transducer
ID67	Atlanta	Pressure Transducer
ID69	Atlanta	Pressure Transducer
ID70	Atlanta	Pressure Transducer
ID73	Atlanta	Pressure Transducer
ID72	Atlanta	Pressure Transducer
1449	Atlanta	Steel Grooving Tool (Liquid Limit Device)

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-201	1	0	10.8
B-201	2	1.5	19.3
B-201	4	6	18.4
B-201	6	11	18.8
B-201	7	13.5	20.1
B-201	8	18.5	24.9
B-201	9	23.5	24.5
B-201	10	28.5	28.6
B-201	11	33.5	9.1
B-201	13	43.5	15.9
B-201	14	48.5	16.0

JRS 11-22-06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-203	2	1.5	15.4
B-203	4	6	20.5
B-203	6	11	24.0
B-203	8	18.5	23.3
B-203	9	23.5	31.1
B-203	11	33.5	29.1
B-203	13	43.5	32.3
B-203	14	48.5	24.6

JRS
11-16-06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-205	2	1.5	34.6
B-205	4	6	22.9
B-205	6	11	31.7
B-205	8	18.5	30.8
B-205	9	23.5	31.6
B-205	10	28.5	34.0
B-205	11	33.5	13.5
B-205	13	43.5	21.5
B-205	14	48.5	7.8

JRS 11-10-06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-206	2	1.5	22.8
B-206	4	6	29.8
B-206	6	11	30.7
B-206	8	18.5	13.4
B-206	10	28.5	30.8
B-206	12	38.5	27.9
B-206	14	48.5	26.4
B-206	16	58.5	24.1
B-206	18	68.5	21.5

JRS
11.15.06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-207	1	0	9.4
B-207	5	8.5	20.8
B-207	6	11	19.2
B-207	7	13.5	17.8
B-207	8	18.5	21.4
B-207	9	23.5	32.8
B-207	10	28.5	29.9
B-207	11	33.5	23.1
B-207	12	38.5	16.4

JRS 11.15.06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-211	2	1.5	14.8
B-211	3	3.5	20.6
B-211	4	6	28.2
B-211	5	8.5	35.4
B-211	6	11	17.9
B-211	7	13.5	26.7
B-211	8	18.5	22.6
B-211	9	23.5	26.7
B-211	10	28.5	26.0
B-211	11	33.5	23.4
B-211	12	38.5	31.3

JRS
11.14.06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-215	2	1.5	21.1
B-215	3	3.5	28.8
B-215	4	6	34.1
B-215	5	11	25.7
B-215	6	13.5	25.6
B-215	7	23.5	22.7
B-215	8	33.5	24.6
B-215	9	43.5	27.1

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11.17.06

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Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-216	3	3.5	22.4
B-216	4	8.5	41.1
B-216	5	11	38.1
B-216	6	18.5	49.3
B-216	7	28.5	24.5
B-216	8	32	10.1
B-216	9	38.5	28.6
B-216	10	43.5	24.7

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Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-217	2	1.5	26.6
B-217	3	3.5	28.9
B-217	4	6	23.7
B-217	5	10.5	21.3
B-217	6	13.5	27.9
B-217	7	23.5	26.5
B-217	8	33.5	45.8
B-217	9	43.5	19.0
B-217	10	48.5	13.3

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11-16-06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-220	2	1.5	20.5
B-220	3	3.5	25.4
B-220	4	6	25.1
B-220	5	8.5	23.7
B-220	6	11	23.0
B-220	7	13.5	21.3
B-220	8	18.5	25.2
B-220	9	23.5	22.8
B-220	11	33.5	20.6
B-220	12A	41	19.3
B-220	14	48.5	27.9
B-220	16	58.5	22.6

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11-17-06

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Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-301	2	1.5	12.9
B-301	3A	3.5	12.6
B-301	3B	3.5	62.6
B-301	4	6	18.9
B-301	6	11	15.1
B-301	7	13.5	15.9
B-301	8	18.5	15.7
B-301	9	23.5	14.7
B-301	10	28.5	15.9
B-301	11	33.5	17.0
B-301	12	38.5	19.6
B-301	13	43.5	33.4
B-301	14	48.5	18.4
B-301	15	53.5	20.9

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Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-305	2	1.5	18.6
B-305	3	3.5	30.3
B-305	5	8.5	38.0
B-305	7	13.5	39.9
B-305	8	18.5	26.4
B-305	10	28.5	26.8
B-305	12	38.5	29.5
B-305	14	48.5	27.6

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11-10-06

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Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-306	2	1.5	29.9
B-306	3	3.5	34.2
B-306	4	6	29.6
B-306	6	11	29.9
B-306	8	18.5	29.6
B-306	9	23.5	52.1
B-306	11	33.5	25.6
B-306	12	38.5	31.6

JRS
11-10-06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-307	1	0	34.7
B-307	2	1.5	29.3
B-307	3	3.5	27.9
B-307	4	6	27.8
B-307	5	8.5	11.0
B-307	6	11	13.8
B-307	7A	16	46.5
B-307	9	23.5	31.0
B-307	10	28.5	22.5
B-307	11	33.5	23.8
B-307	12	38.5	36.3

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11-10-06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-311	1	0	30.9
B-311	2	1.5	35.0
B-311	3	3.5	30.5
B-311	4	6	34.1
B-311	5	8.5	29.1
B-311	6	11	26.5
B-311	7	13.5	20.0
B-311	8	18.5	28.8
B-311	9	23.5	24.6
B-311	10	28.5	34.0
B-311	11	33.5	35.0
B-311	12	38.5	39.7
B-311	13	43.5	43.2
B-311	14	48.5	21.1
B-311	15	53.5	13.4

JRS
11-10-06

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Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-317	1	0	28.5
B-317	2	1.5	24.6
B-317	3	3.5	26.1
B-317	4	6	29.5
B-317	5	8.5	24.4
B-317	6	11	26.4
B-317	7	13.5	33.2
B-317	8	18.5	31.8
B-317	9	23.5	32.4

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Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-320	2	1.5	23.9
B-320	3	3.5	29.5
B-320	4	6	20.4
B-320	5	8.5	25.3
B-320	6	11	33.4
B-320	7	13.5	23.3
B-320	8	18.5	30.0
B-320	9	23.5	27.5
B-320	10	28.5	22.5
B-320	11	33.5	17.2
B-320	12	38.5	24.1
B-320	13	43.5	44.2

JRS. 11.15.06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

Boring No.	Sample No.	Depth (Ft)	Moisture Content (%)
B-325	2	1.5	29.0
B-325	3	6	39.9
B-325	4	11	18.0
B-325	5	16	22.3
B-325	6	21	35.6
B-325	7	26	16.6
B-325	8	31	19.9
B-325	9	36	16.4
B-325	10	41	23.9
B-325	11	46	24.1
B-325	13	53.5	No Recovery

JRS 11-16-06

MACTEC

Moisture Content Report
ASTM D2216-05

Project No.	6234-06-3534
Project Name	SCE&G COL
MACTEC Lab Location	Charlotte

(Test Pit) Boring NO.	Sample No.	Depth (Ft)	Moisture Content (%)
TP-201	Buckets 1 & 2	1 – 6	23.4
TP-227	Buckets 1 & 2	3 – 5	27.8
TP-301	Buckets 1 & 2	0 – 3	21.1
TP-405	Buckets 1 & 2	0 - 4	27.3
TP - MM1	Buckets 1 & 2	N/A	5.0
TP - MM2	Buckets 1 & 2	N/A	1.7

JRS 11.29.06