

**FINAL DATA REPORT  
Revision 0  
GEOTECHNICAL EXPLORATION AND TESTING  
SUPPLEMENT 2  
DOMINION POWER  
NORTH ANNA NUCLEAR POWER STATION  
NORTH ANNA 3 PROJECT  
MINERAL, LOUISA COUNTY, VIRGINIA**

**December 16, 2009**

**VOLUME 1**

**APPENDIX D  
Laboratory Test Data**

**Prepared By:**

**MACTEC ENGINEERING AND CONSULTING, INC.  
RALEIGH, NORTH CAROLINA**

**MACTEC PROJECT No. 6468-09-2473**

**Prepared For:**

**Bechtel Power Corporation  
Subcontractor No. 25161-500-HC4-CY00-00001**

# GEOTECHNICAL LABORATORY TEST ASSIGNMENT

Date 9/28/2009      Job Name North Anna S-COLA      Job No. 25161      Requested By John Davie  
 Assignment 01, Rev. 1

SAMPLE LOCATION				PHYSICAL PROPERTIES								STRENGTH TESTS							COM-PACTION			CONSOLIDATION							
Boring No.	Sample Type (Tube Sample Length)	Top of Sample/Core Run Depth, Ft	Sample/Run Number	Moisture Content	Unit Weight	Specific Gravity	Atterberg Limits	Grain Size Analysis		Chemical Analysis (pH, chloride, sulphate)	Organic Content			Unconsolidated-Undrained Triaxial	Consolidated-Undrained Triaxial (3-stage w/pore-pressure meas.)	Unconfined Compression (Soil)	Confining Pressures (psi)	Direct Shear	TSRC	Unconfined Compression (rock)	Unconfined Compression (rock) w/stress-strain measurements	Standard (A, B, C, D)	Modified (A, B, C, D)	CBR	NOTE: Stress increments and rebound cycles, ksf.				
								Sieve Only	Sieve + Hydrometer																				
M-10(DH)	Jar	11.7	2	x			x		x																				
M-10(DH)	Jar	19.2	4	x			x		x																				
M-10(DH)	Jar	24.2	5	x			x		x																				
M-10(DH)	Jar	29.2	6	x			x		x																				
M-10(DH)	Jar	39.1	8	x			x		x																				
M-10(DH)	Jar	49.1	10	x					x																				
M-10(DH)	Jar	59.1	12	x					x																				
M-10(DH)	Jar	74.1	15	x					x																				
M-10(DH)	Jar	84.1	17	x					x																				
M-10(DH)	Core	116.9	R-7		x															x									
M-10(DH)	Core	133.4	R-10		x															x									
M-10(DH)	Core	153.4	R-15		x															x									
M-10(DH)	Core	177.4	R-20		x															x									
M-10(DH)	Core	196.6	R-24		x															x									

Contact John Davie of Bechtel if there are any questions: Phone (301) 228-7647; e-mail JDAVIE@BECHTEL.COM.

(1) For rock core testing, MACTEC will select suitable (and typical) section of the core run for testing, and note actual depth tested.



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**VOLUME 1**

**APPENDIX D.1  
Soil Index and Particle Size Distribution Tests**

**Prepared By:**

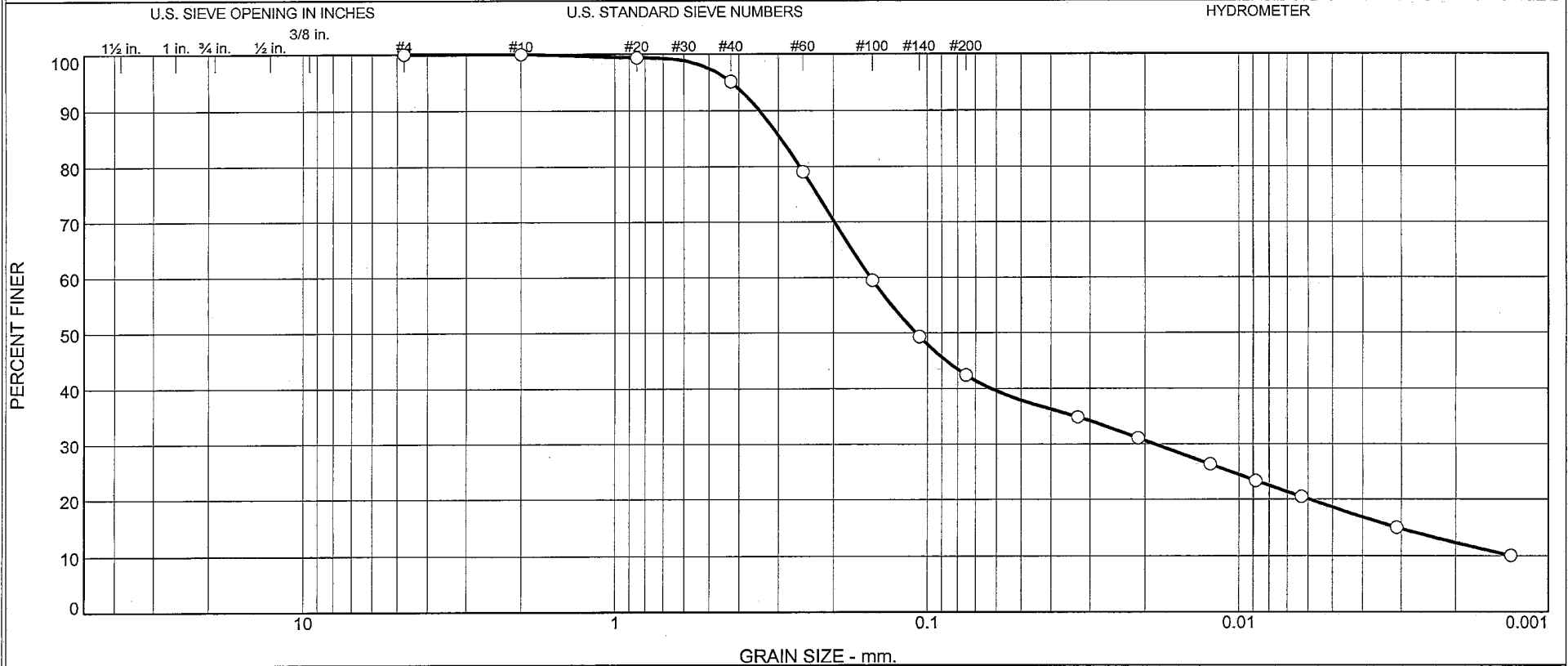
**MACTEC ENGINEERING AND CONSULTING, INC.  
RALEIGH, NORTH CAROLINA**

**MACTEC PROJECT No. 6468-09-2473**

**Prepared For:**

**Bechtel Power Corporation  
Subcontractor No. 25161-500-HC4-CY00-00001**

# Particle Size Distribution Report ASTM D 422-63 (2007)



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	4.9	52.6	30.2	12.3

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-10(DH)	SS-2	11.7-13.2'	9/1/09	SM	Red Silty SAND	48.5	59	50

Client <b>BECHTEL POWER CORPORATION</b> Project <b>North Anna 3 Project</b>	<b>MACTEC Engineering and Consulting, Inc.</b>  <b>Raleigh, North Carolina</b>	○ Specific Gravity is assumed NA = Not Applicable
Project No. <b>6468092473</b> Figure <b>NA</b>		

Tested By: CS

Checked By: MDC

DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 11.7-13.2'

**Sample Number:** SS-2

**Material Description:** Red Silty SAND

**Date:** 9/1/09

**Natural Moisture:** 48.5

**Liquid Limit:** 59

**Plastic Limit:** 50

**USCS Class.:** SM

**Testing Remarks:** Specific Gravity is assumed

NA = Not Applicable

**Tested by:** CS

**Checked by:** MDC

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
242.46	0.00	0.00	#4	0.00	100.0
			#10	0.00	100.0
52.63	0.00	0.00	#20	0.35	99.3
			#40	2.59	95.1
			#60	11.03	79.0
			#100	21.36	59.4
			#140	26.69	49.3
			#200	30.28	42.5

**Hydrometer Test Data**

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 52.62

Hygrosopic moisture correction:

Moist weight and tare = 29.31

Dry weight and tare = 29.06

Tare weight = 15.53

Hygrosopic moisture = 1.8%

Table of composite correction values:

Temp., deg. C: 10.2 29.5

Comp. corr.: -8.0 -4.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.700

Hydrometer type = 152H

Hydrometer effective depth equation:  $L = 16.294964 - 0.164 * x R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.0	24.0	18.2	0.0133	25.0	12.2	0.0328	34.9
5.00	21.0	22.0	16.2	0.0133	23.0	12.5	0.0210	31.1
15.00	21.0	19.5	13.7	0.0133	20.5	12.9	0.0123	26.3
30.00	20.8	18.0	12.2	0.0133	19.0	13.2	0.0088	23.3
60.00	20.8	16.5	10.7	0.0133	17.5	13.4	0.0063	20.5
250.00	21.6	13.5	7.9	0.0132	14.5	13.9	0.0031	15.0
1440.00	21.1	11.0	5.3	0.0133	12.0	14.3	0.0013	10.1

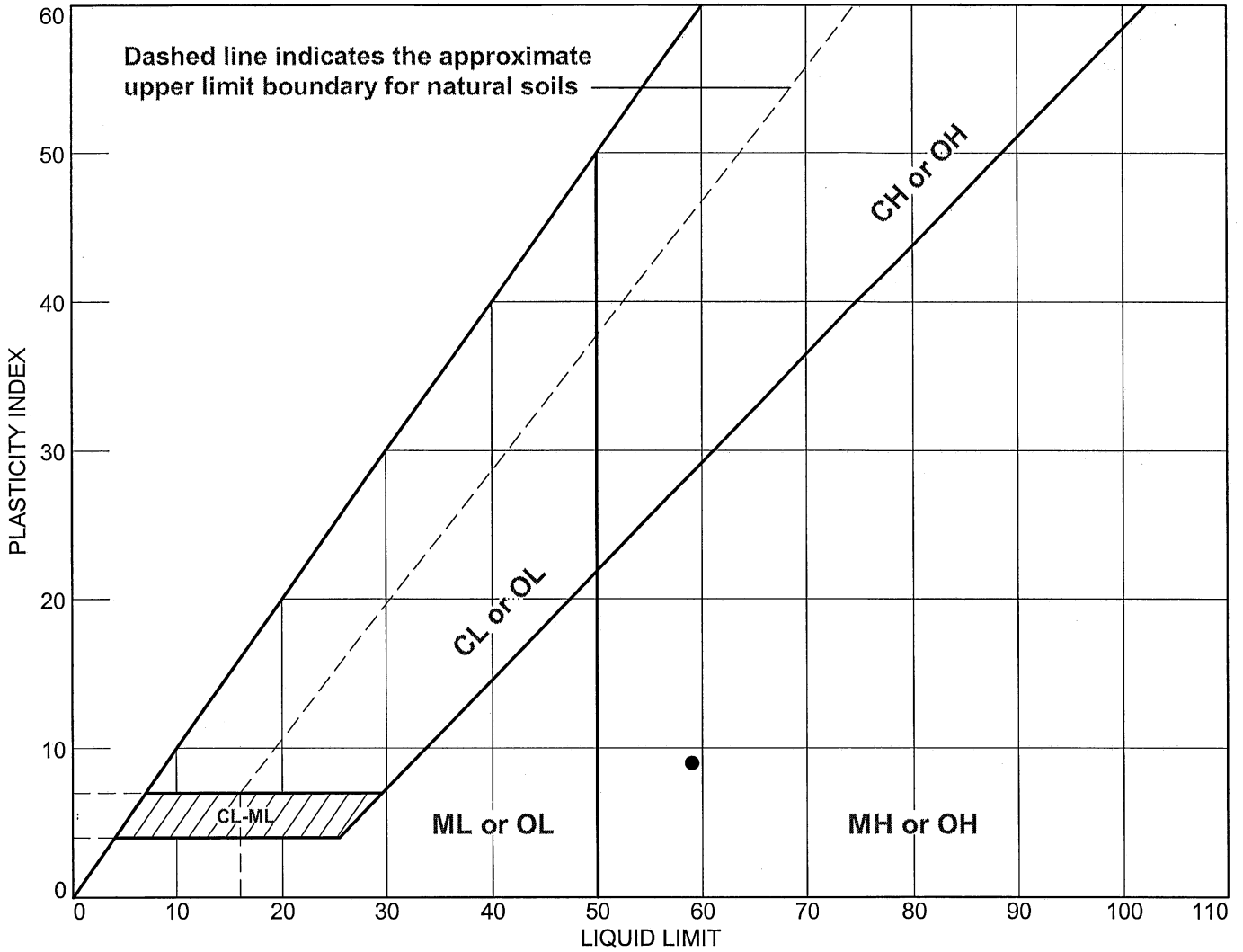
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	4.9	52.6	57.5	30.2	12.3	42.5

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
	0.0031	0.0059	0.0186	0.1091	0.1526	0.2564	0.2943	0.3444	0.4232

<b>Fineness Modulus</b>
0.57

# LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring M-10(DH)	SS-2	11.7-13.2'	48.5	50	59	9	SM

<b>MACTEC Engineering and Consulting, Inc.</b>  Raleigh, North Carolina	<b>Client:</b> BECHTEL POWER CORPORATION <b>Project:</b> North Anna 3 Project
	<b>Project No.:</b> 6468092473  Figure NA

Tested By: CS Checked By: MDC DSC 11-12-09



**LIQUID AND PLASTIC LIMIT TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 11.7-13.2'

**Sample Number:** SS-2

**Material Description:** Red Silty SAND

**USCS:** SM

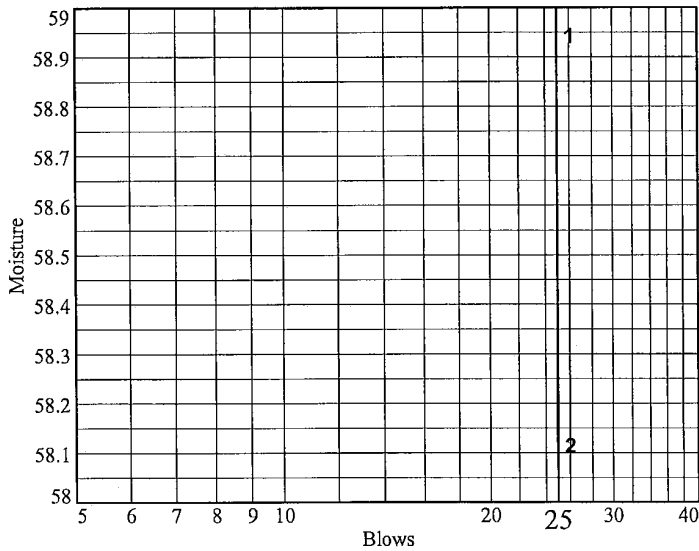
**AASHTO:** A-5(2)

**Tested by:** CS

**Checked by:** MDC

**Liquid Limit Data**

Run No.	1	2	3	4	5	6
Wet+Tare	26.74	25.12				
Dry+Tare	22.72	20.00				
Tare	15.90	11.19				
# Blows	26	26				
Moisture	58.9	58.1				



Liquid Limit= 59  
 Plastic Limit= 50  
 Plasticity Index= 9  
 Natural Moisture= 48.5  
 Liquidity Index= -0.2

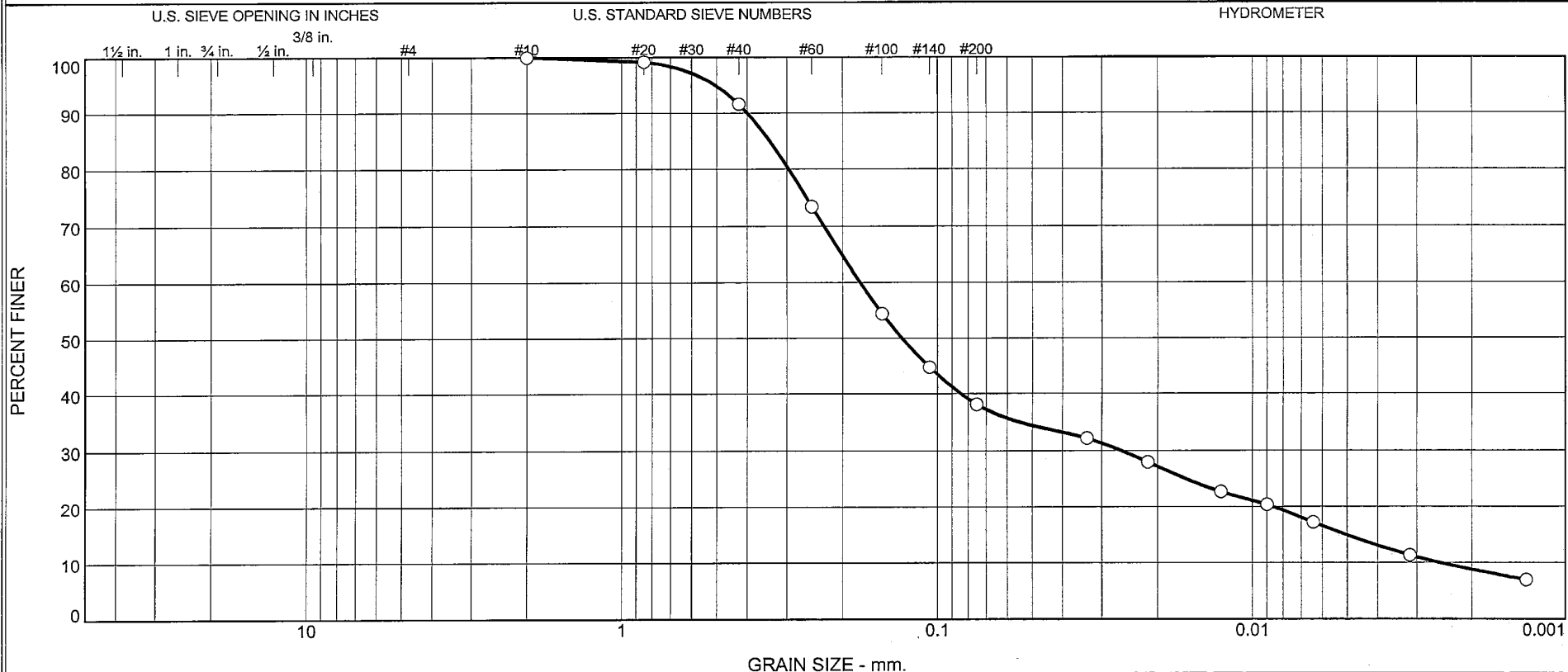
**Plastic Limit Data**

Run No.	1	2	3	4
Wet+Tare	23.21	24.95		
Dry+Tare	20.66	21.86		
Tare	15.62	15.68		
Moisture	50.6	50.0		

**Natural Moisture Data**

Wet+Tare	Dry+Tare	Tare	Moisture
92.45	78.55	49.88	48.5

# Particle Size Distribution Report ASTM D 422-63 (2007)



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	8.4	53.5	29.4	8.7

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-10(DH)	SS-4	19.2-20.7'	9/1/09	SM	Strong Brown Silty SAND	35.9	54	48

Client <b>BECHTEL POWER CORPORATION</b>	<b>MACTEC Engineering and Consulting, Inc.</b>	○ Specific Gravity is assumed NA = Not Applicable
Project <b>North Anna 3 Project</b>		
Project No. <b>6468092473</b> Figure <b>NA</b>		
<b>Raleigh, North Carolina</b>		

Tested By: CS

Checked By: MDC

DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 19.2-20.7'

**Sample Number:** SS-4

**Material Description:** Strong Brown Silty SAND

**Date:** 9/1/09

**Natural Moisture:** 35.9

**Liquid Limit:** 54

**Plastic Limit:** 48

**USCS Class.:** SM

**Testing Remarks:** Specific Gravity is assumed

NA = Not Applicable

**Tested by:** CS

**Checked by:** MDC

**Steve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
243.11	0.00	0.00	#10	0.00	100.0
48.46	0.00	0.00	#20	0.39	99.2
			#40	4.08	91.6
			#60	12.88	73.4
			#100	22.10	54.4
			#140	26.78	44.7
			#200	29.99	38.1

**Hydrometer Test Data**

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 48.46

Hygroscopic moisture correction:

Moist weight and tare = 27.58

Dry weight and tare = 27.17

Tare weight = 15.27

Hygroscopic moisture = 3.4%

Table of composite correction values:

Temp., deg. C: 10.2 29.5

Comp. corr.: -8.0 -4.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.700

Hydrometer type = 152H

Hydrometer effective depth equation:  $L = 16.294964 - 0.164 * x R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.0	21.0	15.2	0.0133	22.0	12.7	0.0334	32.2
5.00	21.0	19.0	13.2	0.0133	20.0	13.0	0.0214	27.9
15.00	21.0	16.5	10.7	0.0133	17.5	13.4	0.0126	22.7
30.00	20.6	15.5	9.7	0.0133	16.5	13.6	0.0090	20.4
60.00	20.6	14.0	8.2	0.0133	15.0	13.8	0.0064	17.2
250.00	21.6	11.0	5.4	0.0132	12.0	14.3	0.0032	11.3
1440.00	21.2	9.0	3.3	0.0132	10.0	14.7	0.0013	6.9

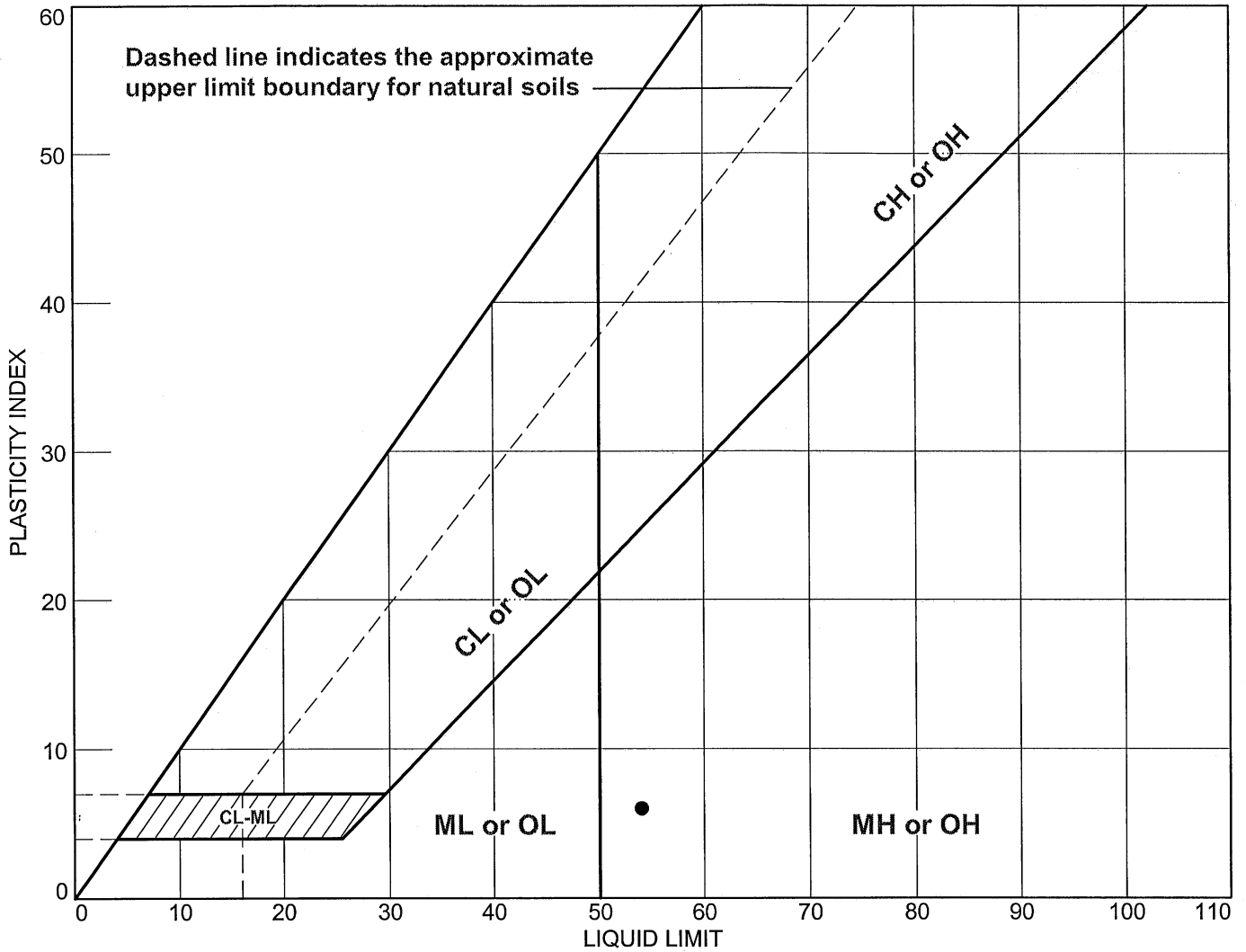
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	8.4	53.5	61.9	29.4	8.7	38.1

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
0.0025	0.0051	0.0086	0.0261	0.1298	0.1764	0.2963	0.3404	0.3999	0.5038

Fineness Modulus	C <sub>u</sub>	C <sub>c</sub>
0.68	69.41	1.51

# LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	Boring M-10(DH)	SS-4	19.2-20.7'	35.9	48	54	6	SM

<b>MACTEC Engineering and Consulting, Inc.</b>  Raleigh, North Carolina	<b>Client:</b> BECHTEL POWER CORPORATION <b>Project:</b> North Anna 3 Project
	<b>Project No.:</b> 6468092473  Figure NA

Tested By: CS Checked By: MDC DSC 11-12-09

**LIQUID AND PLASTIC LIMIT TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 19.2-20.7'

**Sample Number:** SS-4

**Material Description:** Strong Brown Silty SAND

**USCS:** SM

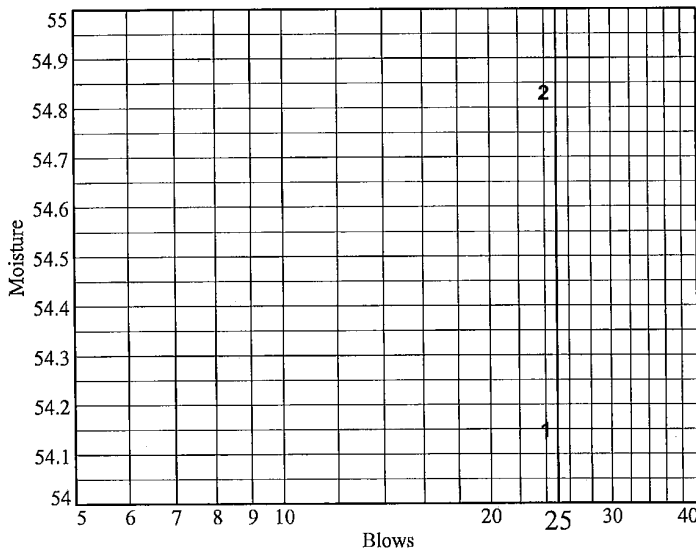
**AASHTO:** A-5(0)

**Tested by:** CS

**Checked by:** MDC

**Liquid Limit Data**

Run No.	1	2	3	4	5	6
Wet+Tare	22.47	23.99				
Dry+Tare	18.49	19.45				
Tare	11.14	11.17				
# Blows	24	24				
Moisture	54.1	54.8				



Liquid Limit= 54  
 Plastic Limit= 48  
 Plasticity Index= 6  
 Natural Moisture= 35.9  
 Liquidity Index= -2.0

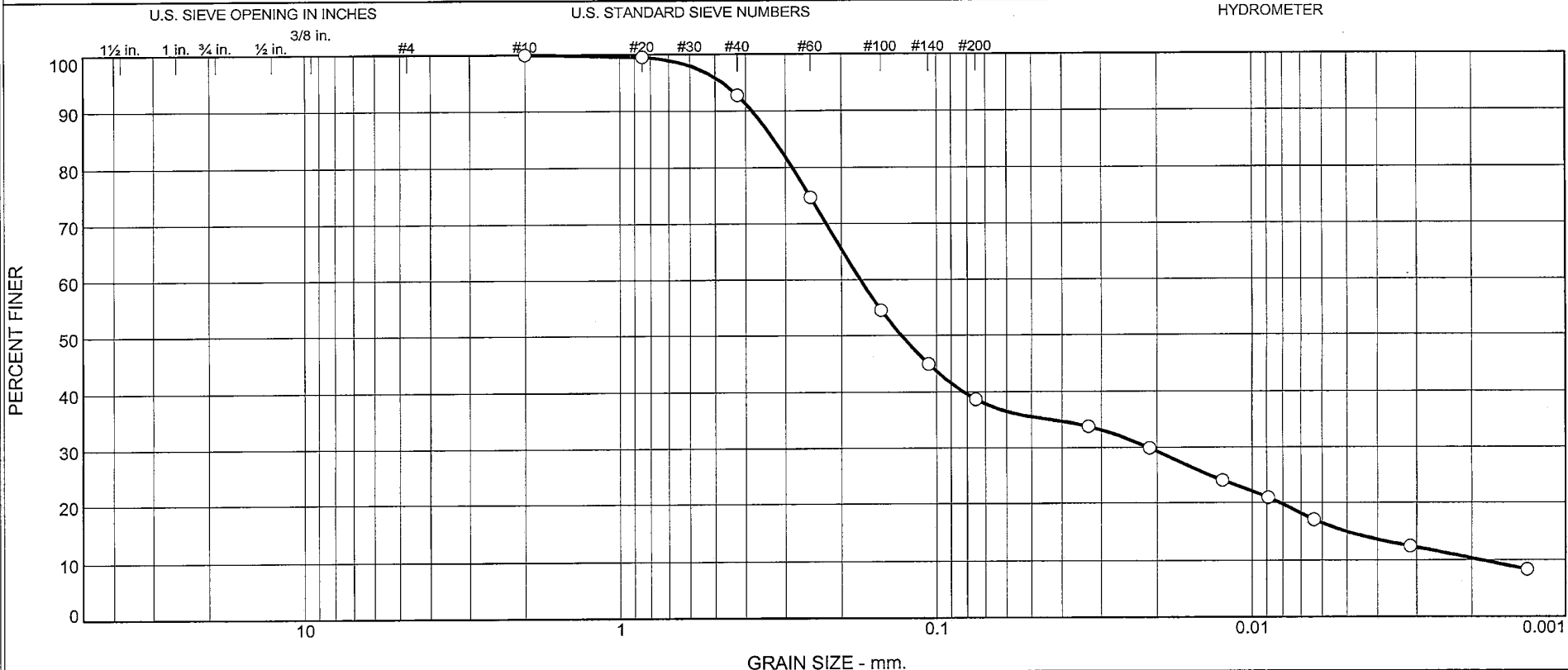
**Plastic Limit Data**

Run No.	1	2	3	4
Wet+Tare	25.61	26.84		
Dry+Tare	22.38	23.20		
Tare	15.69	15.54		
Moisture	48.3	47.5		

**Natural Moisture Data**

Wet+Tare	Dry+Tare	Tare	Moisture
105.76	90.93	49.59	35.9

# Particle Size Distribution Report ASTM D 422-63 (2007)



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	7.3	54.0	28.4	10.3

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-10(DH)	SS-5	24.2-25.7'	9/1/09	SM	Strong Brown Silty SAND	53.7	59	47

Client <b>BECHTEL POWER CORPORATION</b>	<b>MACTEC Engineering and Consulting, Inc.</b>	○ Specific Gravity is assumed NA = Not Applicable
Project <b>North Anna 3 Project</b>		
Project No. <b>6468092473</b> Figure <b>NA</b>		
<b>Raleigh, North Carolina</b>		

Tested By: CS

Checked By: MDC

DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 24.2-25.7'

**Sample Number:** SS-5

**Material Description:** Strong Brown Silty SAND

**Date:** 9/1/09

**Natural Moisture:** 53.7

**Liquid Limit:** 59

**Plastic Limit:** 47

**USCS Class.:** SM

**Testing Remarks:** Specific Gravity is assumed

NA = Not Applicable

**Tested by:** CS

**Checked by:** MDC

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
272.86	0.00	0.00	#10	0.00	100.0
50.98	0.00	0.00	#20	0.25	99.5
			#40	3.70	92.7
			#60	12.92	74.7
			#100	23.21	54.5
			#140	28.06	45.0
			#200	31.24	38.7

**Hydrometer Test Data**

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 50.98

Hygroscopic moisture correction:

Moist weight and tare = 24.35

Dry weight and tare = 24.24

Tare weight = 11.24

Hygroscopic moisture = 0.8%

Table of composite correction values:

Temp., deg. C: 10.2 29.5

Comp. corr.: -8.0 -4.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.700

Hydrometer type = 152H

Hydrometer effective depth equation:  $L = 16.294964 - 0.164 * x R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.2	23.0	17.3	0.0132	24.0	12.4	0.0329	33.8
5.00	21.2	21.0	15.3	0.0132	22.0	12.7	0.0211	29.9
15.00	21.2	18.0	12.3	0.0132	19.0	13.2	0.0124	24.0
30.00	20.9	16.5	10.7	0.0133	17.5	13.4	0.0089	21.0
60.00	20.9	14.5	8.7	0.0133	15.5	13.8	0.0064	17.1
250.00	21.5	12.0	6.3	0.0132	13.0	14.2	0.0031	12.4
1440.00	21.2	10.0	4.3	0.0132	11.0	14.5	0.0013	8.4



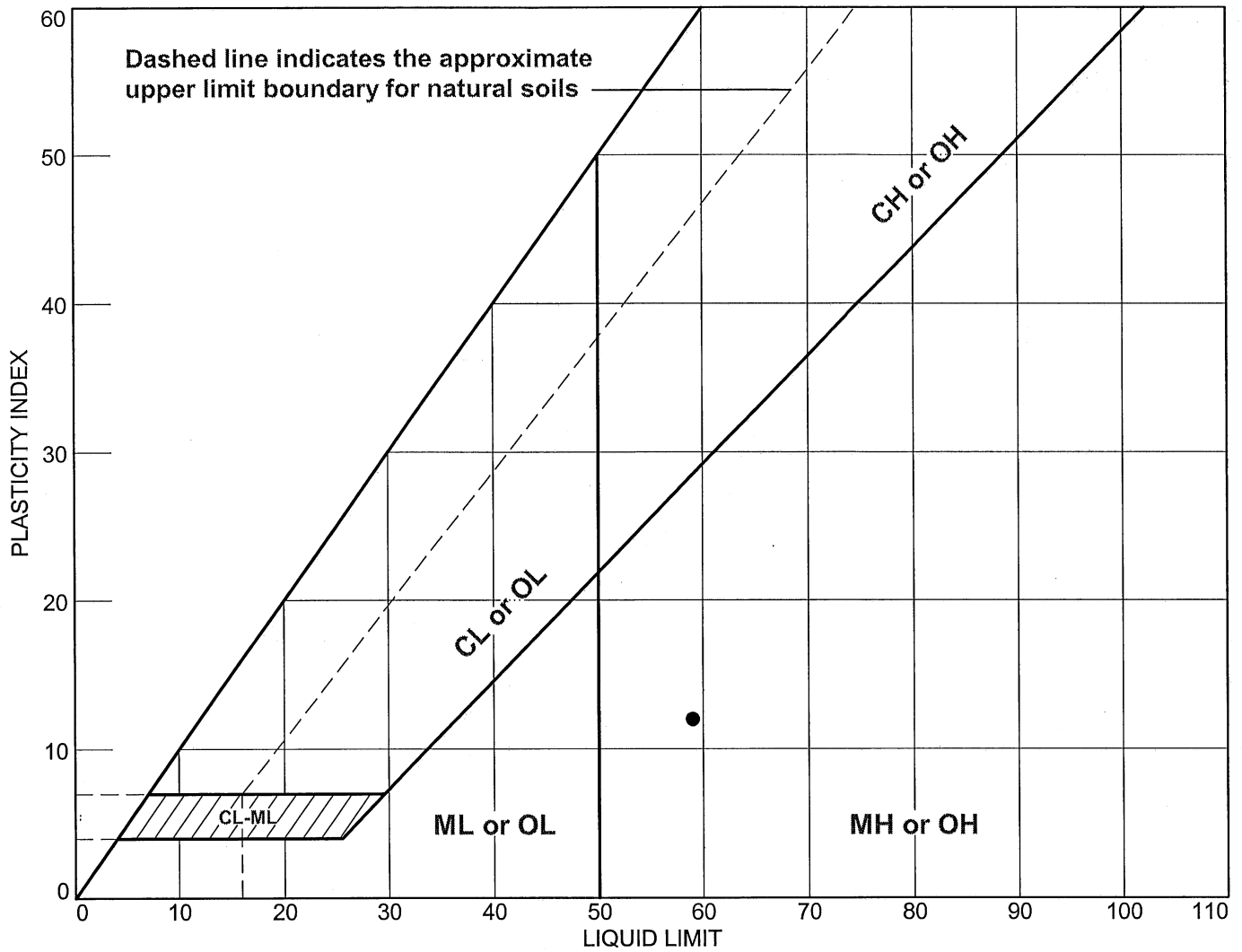
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	7.3	54.0	61.3	28.4	10.3	38.7

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
0.0019	0.0051	0.0082	0.0213	0.1296	0.1747	0.2857	0.3271	0.3825	0.4750

Fineness Modulus	C <sub>u</sub>	C <sub>c</sub>
0.66	93.28	1.39

# LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring M-10(DH)	SS-5	24.2-25.7'	53.7	47	59	12	SM

MACTEC Engineering and Consulting, Inc.

Client: BECHTEL POWER CORPORATION

Project: North Anna 3 Project

Raleigh, North Carolina

Project No.: 6468092473

Figure NA

Tested By: CS

Checked By: MDC

DSC 1112-09

**LIQUID AND PLASTIC LIMIT TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 24.2-25.7'

**Sample Number:** SS-5

**Material Description:** Strong Brown Silty SAND

**USCS:** SM

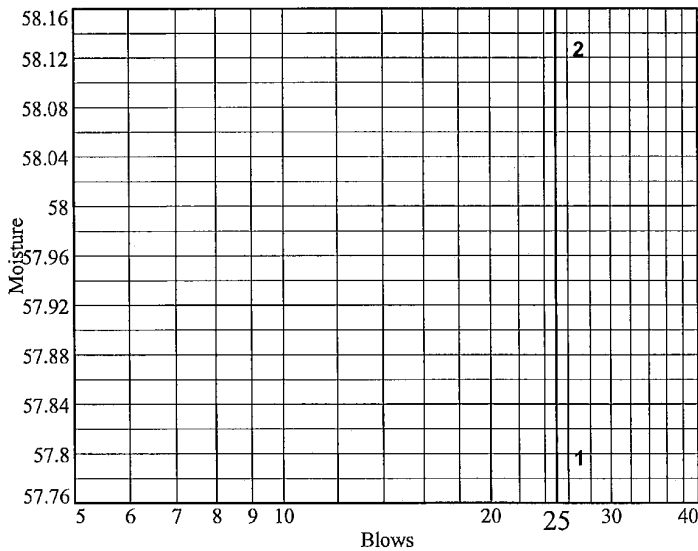
**AASHTO:** A-7-5(2)

**Tested by:** CS

**Checked by:** MDC

**Liquid Limit Data**

Run No.	1	2	3	4	5	6
Wet+Tare	28.36	27.63				
Dry+Tare	23.69	23.16				
Tare	15.61	15.47				
# Blows	27	27				
Moisture	57.8	58.1				



Liquid Limit= 59  
 Plastic Limit= 47  
 Plasticity Index= 12  
 Natural Moisture= 53.7  
 Liquidity Index= 0.6

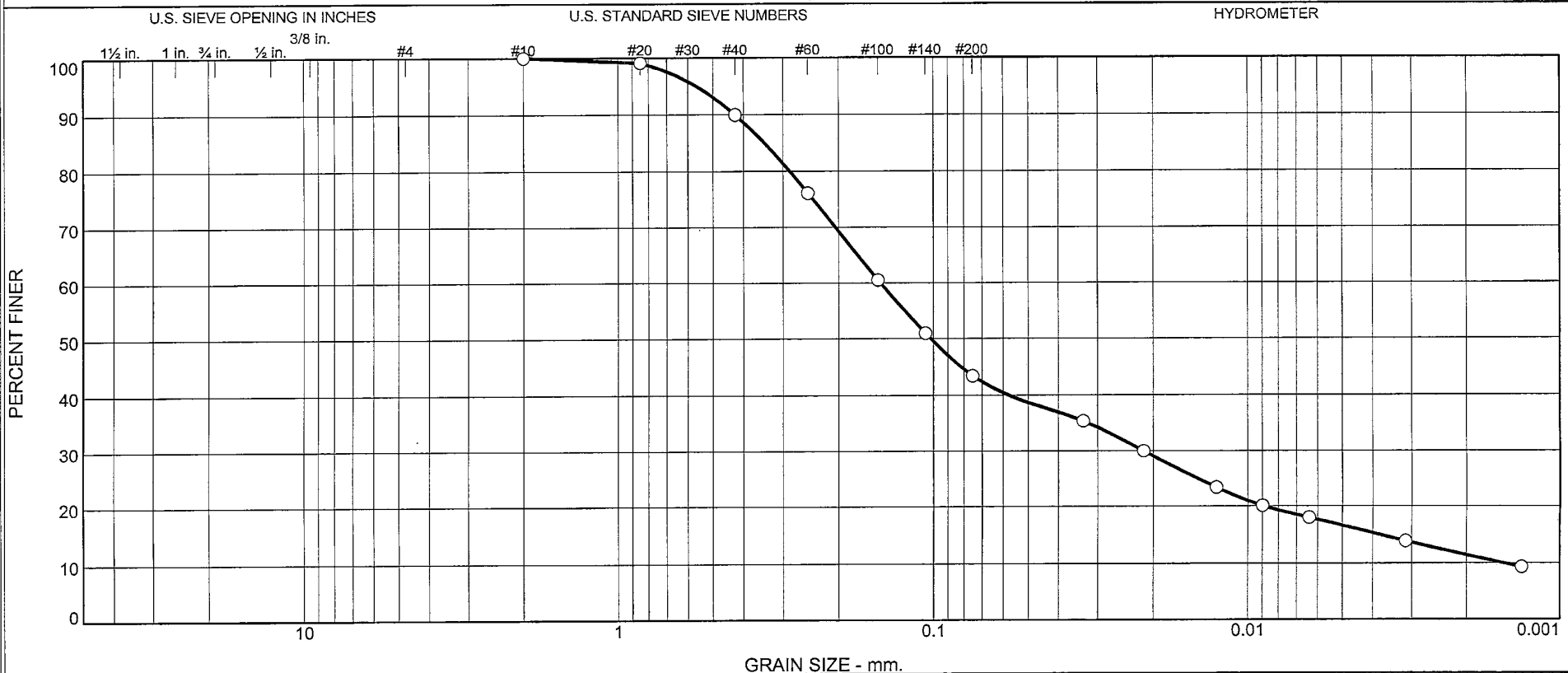
**Plastic Limit Data**

Run No.	1	2	3	4
Wet+Tare	26.36	36.56		
Dry+Tare	22.86	29.86		
Tare	15.49	15.50		
Moisture	47.5	46.7		

**Natural Moisture Data**

Wet+Tare	Dry+Tare	Tare	Moisture
126.23	99.69	50.29	53.7

# Particle Size Distribution Report ASTM D 422-63 (2007)



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	10.0	46.6	31.9	11.5

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-10(DH)	SS-6	29.2-30.7'	9/1/09	SM	Yellowish Brown Silty SAND	66.7	51	44

Client <b>BECHTEL POWER CORPORATION</b>	<b>MACTEC Engineering and Consulting, Inc.</b>	○ Specific Gravity is assumed NA = Not Applicable
Project <b>North Anna 3 Project</b>		
Project No. <b>6468092473</b> Figure <b>NA</b>		
<b>Raleigh, North Carolina</b>		

Tested By: CS      Checked By: MDC      DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 29.2-30.7'

**Sample Number:** SS-6

**Material Description:** Yellowish Brown Silty SAND

**Date:** 9/1/09

**Natural Moisture:** 66.7

**Liquid Limit:** 51

**Plastic Limit:** 44

**USCS Class.:** SM

**Testing Remarks:** Specific Gravity is assumed

NA = Not Applicable

**Tested by:** CS

**Checked by:** MDC

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
206.01	0.00	0.00	#10	0.00	100.0
46.68	0.00	0.00	#20	0.43	99.1
			#40	4.68	90.0
			#60	11.17	76.1
			#100	18.44	60.5
			#140	22.90	50.9
			#200	26.40	43.4

**Hydrometer Test Data**

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 46.68

Hygroscopic moisture correction:

Moist weight and tare = 28.03

Dry weight and tare = 27.65

Tare weight = 15.56

Hygroscopic moisture = 3.1%

Table of composite correction values:

Temp., deg. C: 10.2 29.5

Comp. corr.: -8.0 -4.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.700

Hydrometer type = 152H

Hydrometer effective depth equation:  $L = 16.294964 - 0.164 * x R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	20.8	22.0	16.2	0.0133	23.0	12.5	0.0333	35.4
5.00	20.8	19.5	13.7	0.0133	20.5	12.9	0.0214	29.9
15.00	20.8	16.5	10.7	0.0133	17.5	13.4	0.0126	23.4
30.00	20.8	15.0	9.2	0.0133	16.0	13.7	0.0090	20.1
60.00	21.0	14.0	8.2	0.0133	15.0	13.8	0.0064	18.0
250.00	21.6	12.0	6.4	0.0132	13.0	14.2	0.0031	13.9
1440.00	21.2	10.0	4.3	0.0132	11.0	14.5	0.0013	9.4

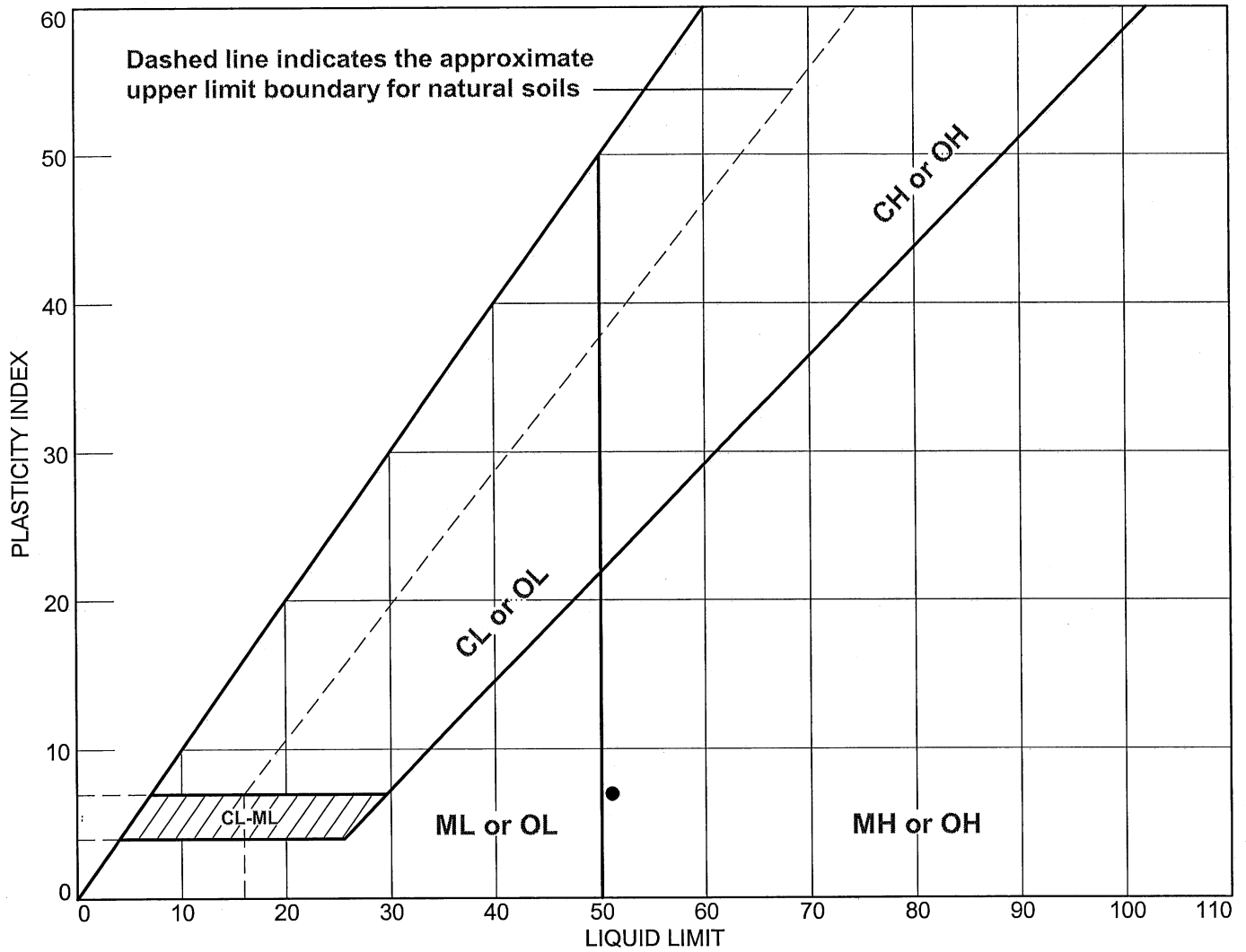
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	10.0	46.6	56.6	31.9	11.5	43.4

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
0.0015	0.0038	0.0089	0.0215	0.1021	0.1475	0.2859	0.3437	0.4255	0.5660

Fineness Modulus	C <sub>u</sub>	C <sub>c</sub>
0.63	97.76	2.08

# LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring M-10(DH)	SS-6	29.2-30.7'	66.7	44	51	7	SM

MACTEC Engineering and Consulting, Inc.

Client: BECHTEL POWER CORPORATION

Project: North Anna 3 Project

Raleigh, North Carolina

Project No.: 6468092473

Figure NA

Tested By: CS

Checked By: MDC

DSC 11-12-09

**LIQUID AND PLASTIC LIMIT TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 29.2-30.7'

**Sample Number:** SS-6

**Material Description:** Yellowish Brown Silty SAND

**USCS:** SM

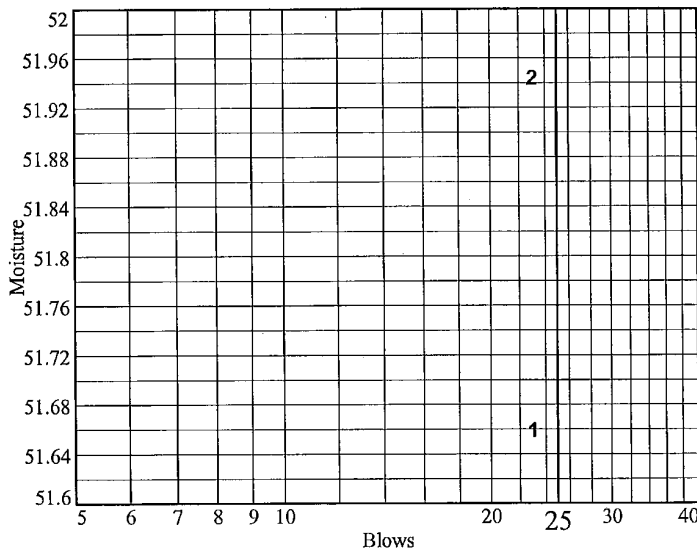
**AASHTO:** A-5(1)

**Tested by:** CS

**Checked by:** MDC

**Liquid Limit Data**

Run No.	1	2	3	4	5	6
Wet+Tare	30.08	27.59				
Dry+Tare	25.10	23.45				
Tare	15.46	15.48				
# Blows	23	23				
Moisture	51.7	51.9				



Liquid Limit= 51  
 Plastic Limit= 44  
 Plasticity Index= 7  
 Natural Moisture= 66.7  
 Liquidity Index= 3.2

**Plastic Limit Data**

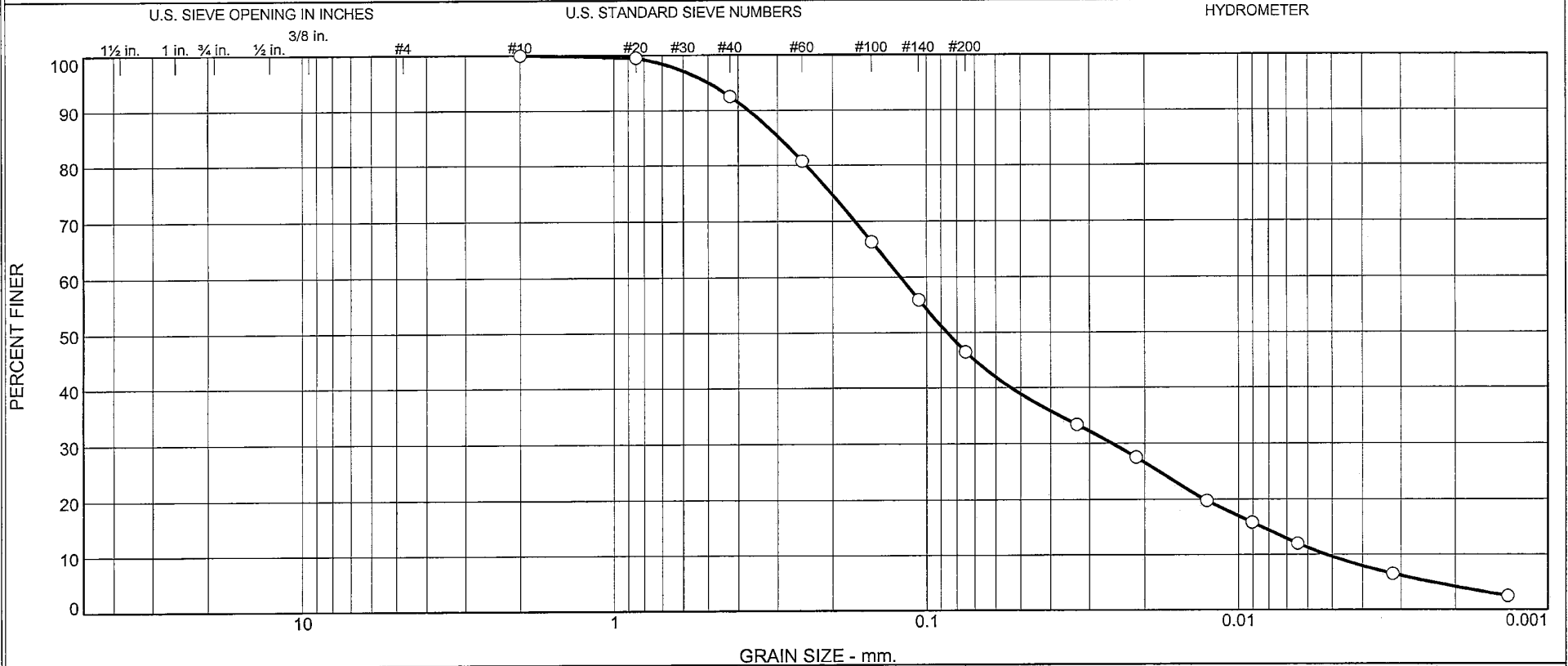
Run No.	1	2	3	4
Wet+Tare	27.30	26.68		
Dry+Tare	23.70	23.25		
Tare	15.47	15.55		
Moisture	43.7	44.5		

**Natural Moisture Data**

Wet+Tare	Dry+Tare	Tare	Moisture
185.01	131.20	50.54	66.7



# Particle Size Distribution Report ASTM D 422-63 (2007)



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	7.4	46.1	42.4	4.1

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-10(DH)	SS-8	39.1-40.6'	9/1/09	SM	Yellowish Brown Silty SAND	30.6	42	36

Client <b>BECHTEL POWER CORPORATION</b>		<b>MACTEC Engineering and Consulting, Inc.</b>	○ Specific Gravity is assumed NA = Not Applicable
Project <b>North Anna 3 Project</b>			
Project No. <b>6468092473</b>	Figure <b>NA</b>		

Tested By: CS

Checked By: MDC

DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 39.1-40.6'

**Sample Number:** SS-8

**Material Description:** Yellowish Brown Silty SAND

**Date:** 9/1/09

**Natural Moisture:** 30.6

**Liquid Limit:** 42

**Plastic Limit:** 36

**USCS Class.:** SM

**Testing Remarks:** Specific Gravity is assumed

NA = Not Applicable

**Tested by:** CS

**Checked by:** MDC

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
252.78	0.00	0.00	#10	0.00	100.0
53.06	0.00	0.00	#20	0.26	99.5
			#40	3.93	92.6
			#60	10.23	80.7
			#100	17.86	66.3
			#140	23.39	55.9
			#200	28.38	46.5

**Hydrometer Test Data**

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 53.06

Hygroscopic moisture correction:

Moist weight and tare = 25.26

Dry weight and tare = 24.76

Tare weight = 11.27

Hygroscopic moisture = 3.7%

Table of composite correction values:

Temp., deg. C: 10.2 29.5

Comp. corr.: -8.0 -4.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.700

Hydrometer type = 152H

Hydrometer effective depth equation:  $L = 16.294964 - 0.164 * x R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.1	23.0	17.3	0.0133	24.0	12.4	0.0330	33.4
5.00	21.1	20.0	14.3	0.0133	21.0	12.9	0.0213	27.6
15.00	21.0	16.0	10.2	0.0133	17.0	13.5	0.0126	19.8
30.00	20.9	14.0	8.2	0.0133	15.0	13.8	0.0090	15.9
60.00	20.9	12.0	6.2	0.0133	13.0	14.2	0.0065	12.0
250.00	21.6	9.0	3.4	0.0132	10.0	14.7	0.0032	6.5
1440.00	21.2	7.0	1.3	0.0132	8.0	15.0	0.0014	2.5

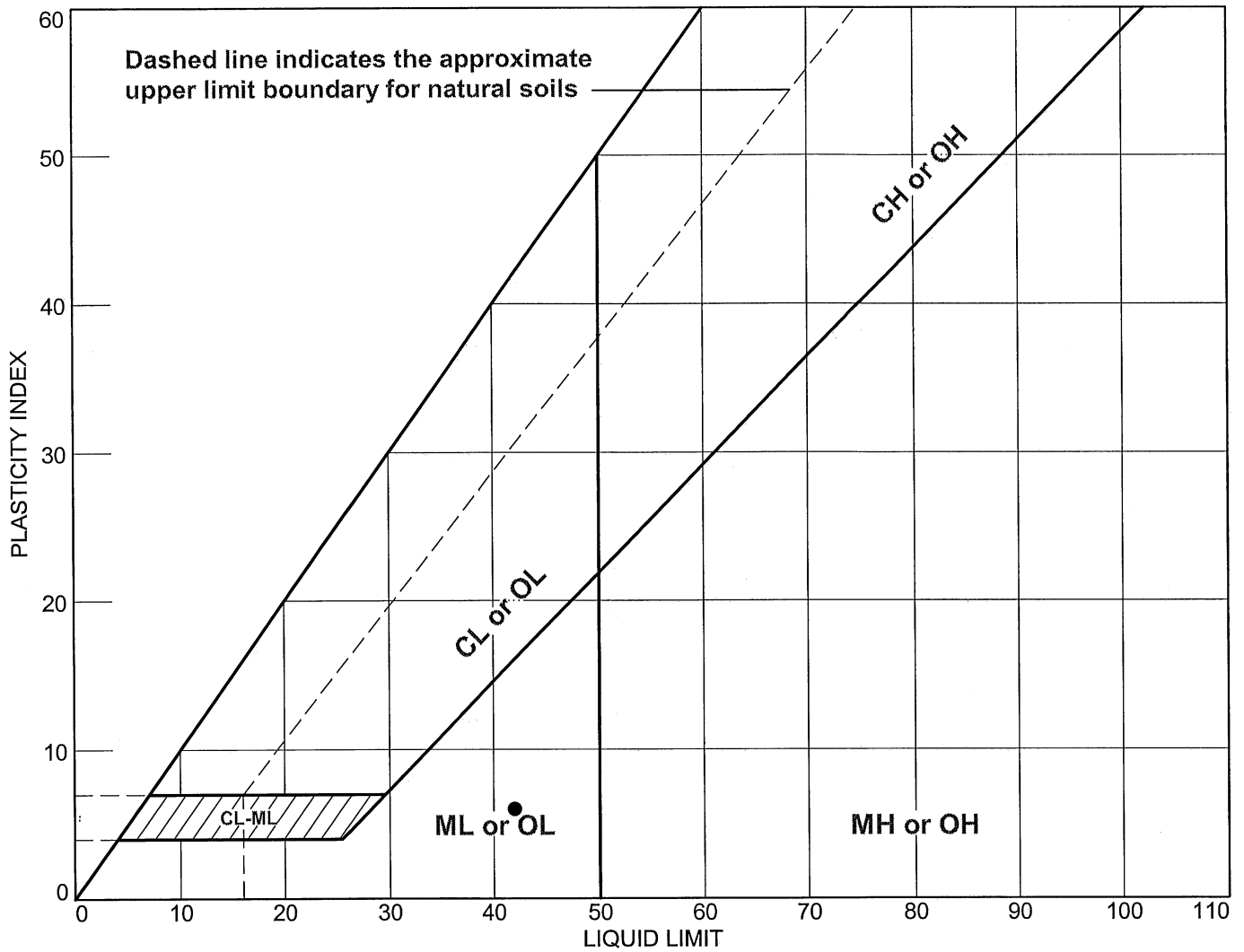
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	7.4	46.1	53.5	42.4	4.1	46.5

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
0.0052	0.0084	0.0128	0.0253	0.0861	0.1215	0.2432	0.2962	0.3702	0.4974

Fineness Modulus	C <sub>u</sub>	C <sub>c</sub>
0.51	23.17	1.01

# LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring M-10(DH)	SS-8	39.1-40.6'	30.6	36	42	6	SM

MACTEC Engineering and Consulting, Inc.

Client: BECHTEL POWER CORPORATION

Project: North Anna 3 Project

Raleigh, North Carolina

Project No.: 6468092473

Figure NA

Tested By: CS

Checked By: MDC

DSC 11-12-09

**LIQUID AND PLASTIC LIMIT TEST DATA**

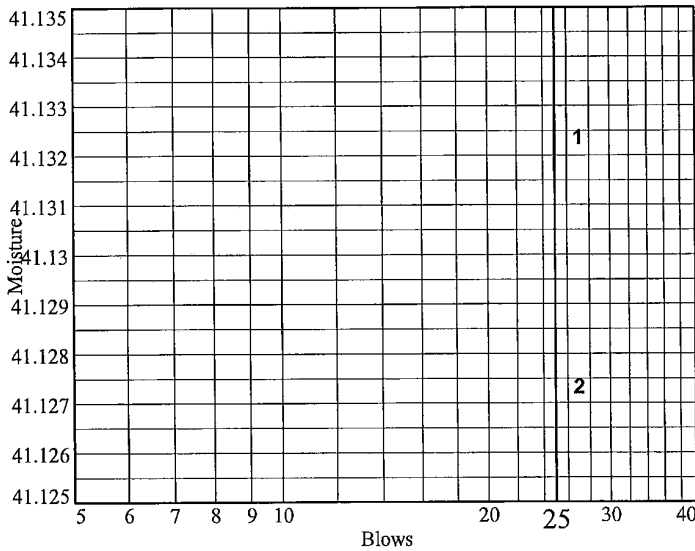
11/4/2009

**Client:** BECHTEL POWER CORPORATION  
**Project:** North Anna 3 Project  
**Project Number:** 6468092473  
**Location:** Boring M-10(DH)  
**Depth:** 39.1-40.6'  
**Material Description:** Yellowish Brown Silty SAND  
**USCS:** SM  
**Tested by:** CS

**Sample Number:** SS-8  
**AASHTO:** A-5(1)  
**Checked by:** MDC

**Liquid Limit Data**

Run No.	1	2	3	4	5	6
Wet+Tare	28.18	24.64				
Dry+Tare	23.24	20.70				
Tare	11.23	11.12				
# Blows	27	27				
Moisture	41.1	41.1				



Liquid Limit= 42  
 Plastic Limit= 36  
 Plasticity Index= 6  
 Natural Moisture= 30.6  
 Liquidity Index= -0.9

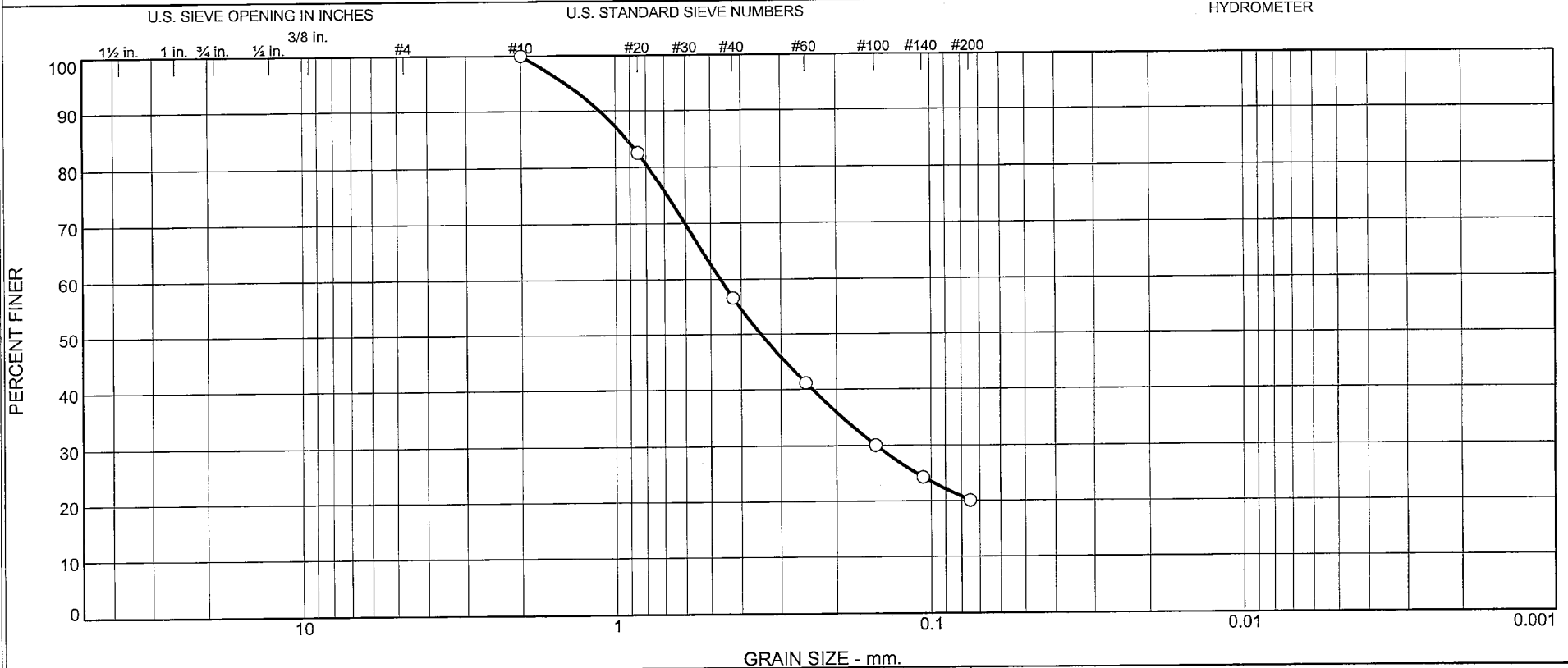
**Plastic Limit Data**

Run No.	1	2	3	4
Wet+Tare	19.71	26.14		
Dry+Tare	17.42	23.37		
Tare	11.08	15.60		
Moisture	36.1	35.6		

**Natural Moisture Data**

Wet+Tare	Dry+Tare	Tare	Moisture
166.38	139.20	50.39	30.6

# Particle Size Distribution Report ASTM D 6913-04e2



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	43.4	36.5	20.1	

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-10(DH)	SS-10	49.1-50.6'	9/1/09	SM (visual)	Pale Brown Silty SAND (visual)	16.4	ND	ND

Client <b>BECHTEL POWER CORPORATION</b>		<b>MACTEC Engineering and Consulting, Inc.</b>	Raleigh, North Carolina	○ ND = Not Determined NA = Not Applicable ASTM D 6913-04e2 Method B
Project <b>North Anna 3 Project</b>				
Project No. <b>6468092473</b>	Figure <b>NA</b>			

Tested By: CS      Checked By: MDC      DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 49.1-50.6'

**Sample Number:** SS-10

**Material Description:** Pale Brown Silty SAND (visual)

**Date:** 9/1/09

**Natural Moisture:** 16.4

**Liquid Limit:** ND

**Plastic Limit:** ND

**USCS Class.:** SM (visual)

**Testing Remarks:** ND = Not Determined

NA = Not Applicable

ASTM D 6913-04e2 Method B

**Tested by:** CS

**Checked by:** MDC

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
294.04	0.00	0.00	#10	0.00	100.0
54.09	0.00	0.00	#20	9.44	82.5
			#40	23.50	56.6
			#60	31.81	41.2
			#100	37.84	30.0
			#140	40.93	24.3
			#200	43.23	20.1

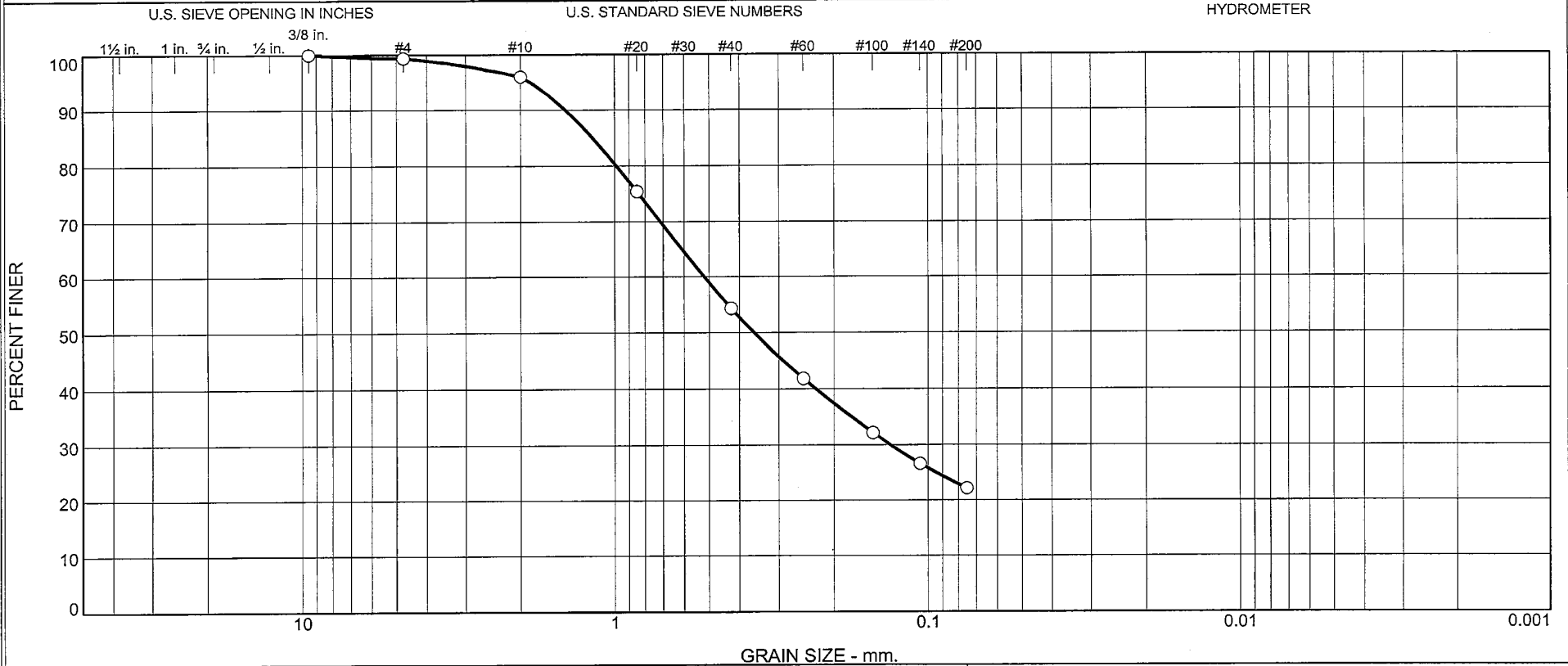
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	43.4	36.5	79.9			20.1

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
			0.1497	0.3471	0.4672	0.7872	0.9219	1.1221	1.4490

<b>Fineness Modulus</b>
1.63

# Particle Size Distribution Report ASTM D 6913-04e2



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.7	3.3	41.8	32.1	22.1	

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-10(DH)	SS-12	59.1-60.6	9/2/09	SM (visual)	Very Pale Brown Silty SAND (visual)	15.1	ND	ND

Client <b>BECHTEL POWER CORPORATION</b>	<b>MACTEC Engineering and Consulting, Inc.</b>	○ ND = Not Determined NA = Not Applicable ASTM D 6913-04e2 Method B
Project <b>North Anna 3 Project</b>		
Project No. <b>6468092473</b> Figure <b>NA</b>		
<b>Raleigh, North Carolina</b>		

Tested By: CS

Checked By: MDC

DSC 11-12-09



**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 59.1-60.6

**Sample Number:** SS-12

**Material Description:** Very Pale Brown Silty SAND (visual)

**Date:** 9/2/09

**Natural Moisture:** 15.1

**Liquid Limit:** ND

**Plastic Limit:** ND

**USCS Class.:** SM (visual)

**Testing Remarks:** ND = Not Determined

NA = Not Applicable

ASTM D 6913-04e2 Method B

**Tested by:** CS

**Checked by:** MDC

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
365.85	0.00	0.00	3/8"	0.00	100.0
			#4	2.42	99.3
			#10	14.64	96.0
103.77	0.00	0.00	#20	22.26	75.4
			#40	45.15	54.2
			#60	58.54	41.8
			#100	69.02	32.1
			#140	75.01	26.6
			#200	79.83	22.1

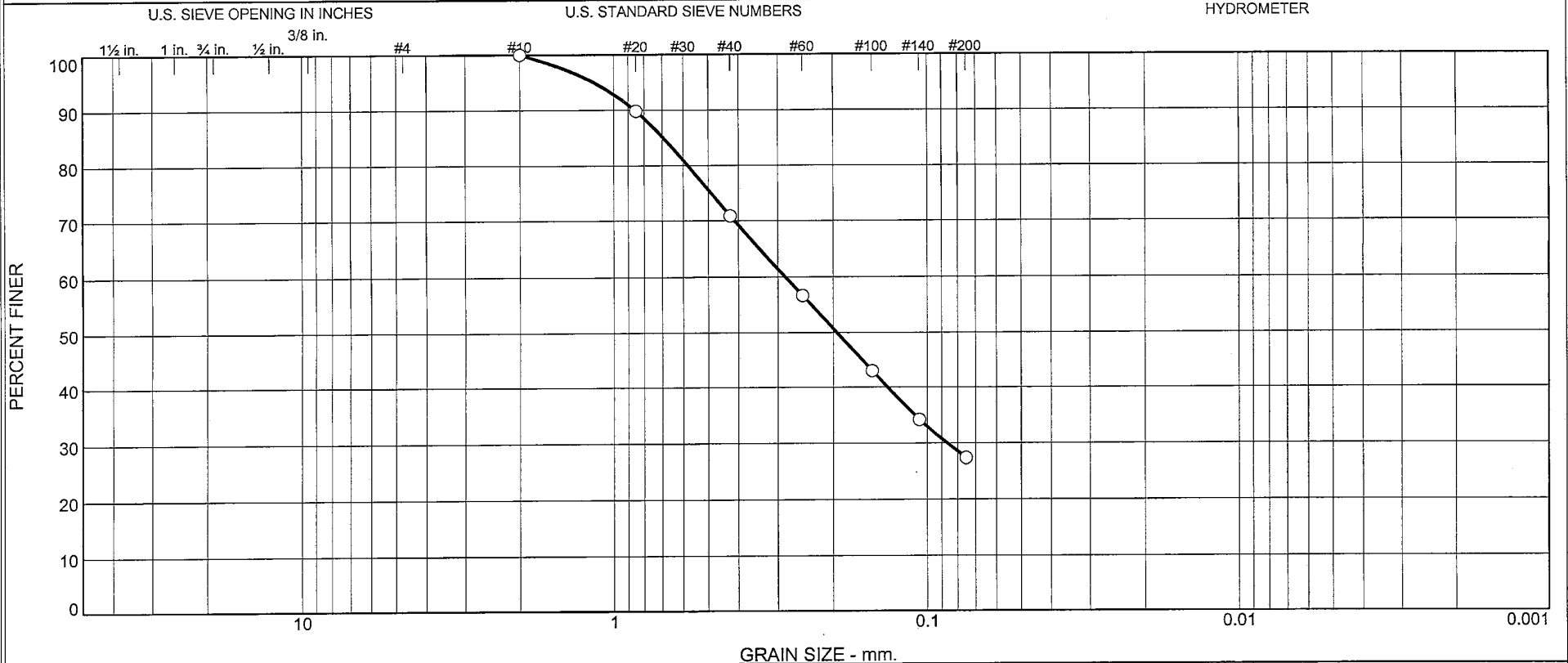
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.7	0.7	3.3	41.8	32.1	77.2			22.1

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
			0.1321	0.3606	0.5195	0.9889	1.1797	1.4410	1.8660

<b>Fineness Modulus</b>
1.76

# Particle Size Distribution Report ASTM D 6913-04e2



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	29.2	43.4	27.4	

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-10(DH)	SS-15	74.1-75.6	9/2/09	SM (visual)	Very Dark Bluish Gray Silty SAND (visual)	29.9	ND	ND

Client <b>BECHTEL POWER CORPORATION</b>	<b>MACTEC Engineering and Consulting, Inc.</b>	○ ND = Not Determined NA = Not Applicable ASTM D 6913-04e2 Method B
Project <b>North Anna 3 Project</b>		
Project No. <b>6468092473</b> Figure <b>NA</b>		
<b>Raleigh, North Carolina</b>		

Tested By: CS

Checked By: MDC

DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 74.1-75.6

**Sample Number:** SS-15

**Material Description:** Very Dark Bluish Gray Silty SAND (visual)

**Date:** 9/2/09

**Natural Moisture:** 29.9

**Liquid Limit:** ND

**Plastic Limit:** ND

**USCS Class.:** SM (visual)

**Testing Remarks:** ND = Not Determined

NA = Not Applicable

ASTM D 6913-04e2 Method B

**Tested by:** CS

**Checked by:** MDC

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
346.65	0.00	0.00	#10	0.00	100.0
102.83	0.00	0.00	#20	10.45	89.8
			#40	30.00	70.8
			#60	44.61	56.6
			#100	58.62	43.0
			#140	67.70	34.2
			#200	74.67	27.4

**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	29.2	43.4	72.6			27.4

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
			0.0865	0.1948	0.2845	0.5812	0.6951	0.8566	1.1564

<b>Fineness Modulus</b>
1.19



**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-10(DH)

**Depth:** 84.1-85.6'

**Sample Number:** SS-17

**Material Description:** Very Pale Brown Silty SAND (visual)

**Date:** 9/2/09

**Natural Moisture:** 15.1

**Liquid Limit:** ND

**Plastic Limit:** ND

**USCS Class.:** SM (visual)

**Testing Remarks:** ND = Not Determined

NA = Not Applicable

ASTM D 6913-04e2 Method B

**Tested by:** CS

**Checked by:** MDC

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
369.27	0.00	0.00	#4	0.00	100.0
			#10	0.37	99.9
49.68	0.00	0.00	#20	8.46	82.9
			#40	21.26	57.1
			#60	28.66	42.3
			#100	34.03	31.5
			#140	36.95	25.6
			#200	39.24	21.0

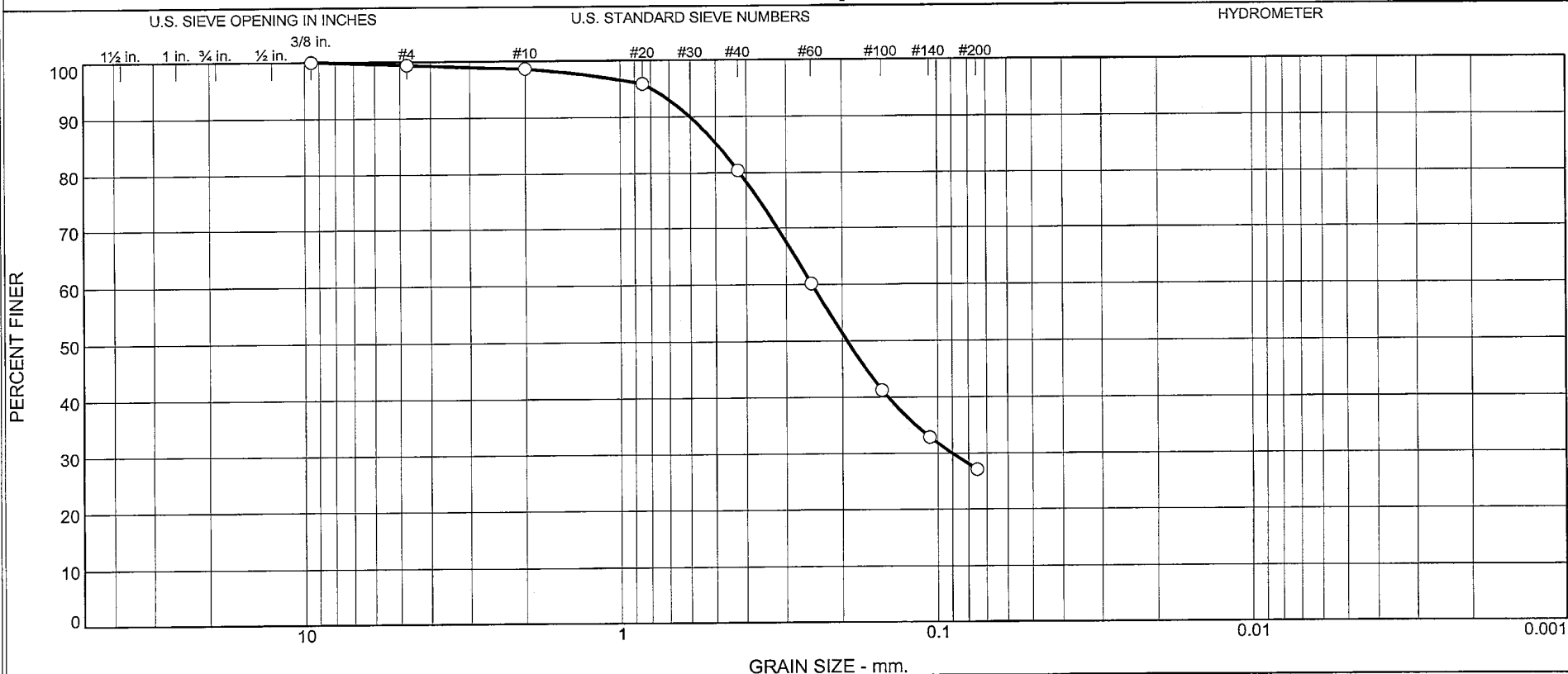
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	42.8	36.1	79.0			21.0

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
			0.1385	0.3377	0.4608	0.7812	0.9082	1.0859	1.3676

<b>Fineness Modulus</b>
1.60

# Particle Size Distribution Report ASTM D 6913-04e2



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.6	0.8	18.2	53.3	27.1	

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-30(DH)	SS-1	8.7-10.2'	9/1/09	SM (visual)	Yellow Silty SAND (visual)	17.0	ND	ND

Client <b>BECHTEL POWER CORPORATION</b>		<b>MACTEC Engineering and Consulting, Inc.</b>	○ ND = Not Determined NA = Not Applicable ASTM D 6913-04e2 Method B
Project <b>North Anna 3 Project</b>			
Project No. <b>6468092473</b>	Figure <b>N/A</b>		

Tested By: CS

Checked By: BS      DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-30(DH)

**Depth:** 8.7-10.2'

**Sample Number:** SS-1

**Material Description:** Yellow Silty SAND (visual)

**Date:** 9/1/09

**Natural Moisture:** 17.0

**Liquid Limit:** ND

**Plastic Limit:** ND

**USCS Class.:** SM (visual)

**Testing Remarks:** ND = Not Determined

NA = Not Applicable

ASTM D 6913-04e2 Method B

**Tested by:** CS

**Checked by:** BS

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
233.76	0.00	0.00	3/8"	0.00	100.0
			#4	1.50	99.4
			#10	3.25	98.6
100.91	0.00	0.00	#20	2.84	95.8
			#40	18.65	80.4
			#60	39.39	60.1
			#100	58.65	41.3
			#140	67.26	32.9
			#200	73.21	27.1

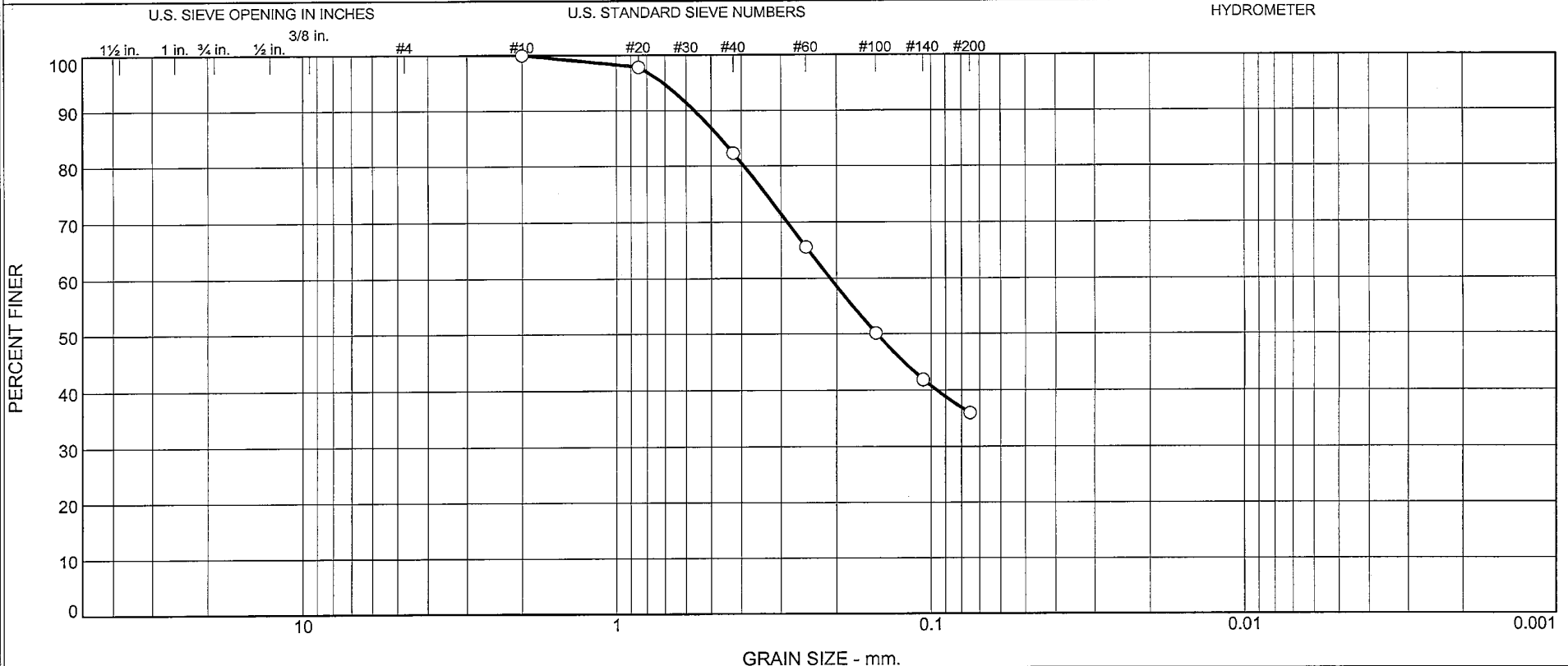
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.6	0.6	0.8	18.2	53.3	72.3			27.1

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
			0.0902	0.1935	0.2493	0.4201	0.4941	0.6020	0.7955

<b>Fineness Modulus</b>
1.06

# Particle Size Distribution Report ASTM D 6913-04e2



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	17.7	46.3	36.0	

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-30(DH)	SS-3	13.7-15.2	9/1/09	SM (visual)	Yellow Silty SAND (visual)	19.8	ND	ND

Client <b>BECHTEL POWER CORPORATION</b>		<b>MACTEC Engineering and Consulting, Inc.</b>	Raleigh, North Carolina	○ ND = Not Determined NA = Not Applicable ASTM D 6913-04e2 Method B
Project <b>North Anna 3 Project</b>				
Project No. <b>6468092473</b>	Figure <b>N/A</b>			

Tested By: CS                      Checked By: BS                      DSC 11-12-09



**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-30(DH)

**Depth:** 13.7-15.2

**Sample Number:** SS-3

**Material Description:** Yellow Silty SAND (visual)

**Date:** 9/1/09

**Natural Moisture:** 19.8

**Liquid Limit:** ND

**Plastic Limit:** ND

**USCS Class.:** SM (visual)

**Testing Remarks:** ND = Not Determined

NA = Not Applicable

ASTM D 6913-04e2 Method B

**Tested by:** CS

**Checked by:** BS

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
218.25	0.00	0.00	#10	0.00	100.0
51.75	0.00	0.00	#20	1.12	97.8
			#40	9.18	82.3
			#60	17.81	65.6
			#100	25.82	50.1
			#140	30.09	41.9
			#200	33.12	36.0

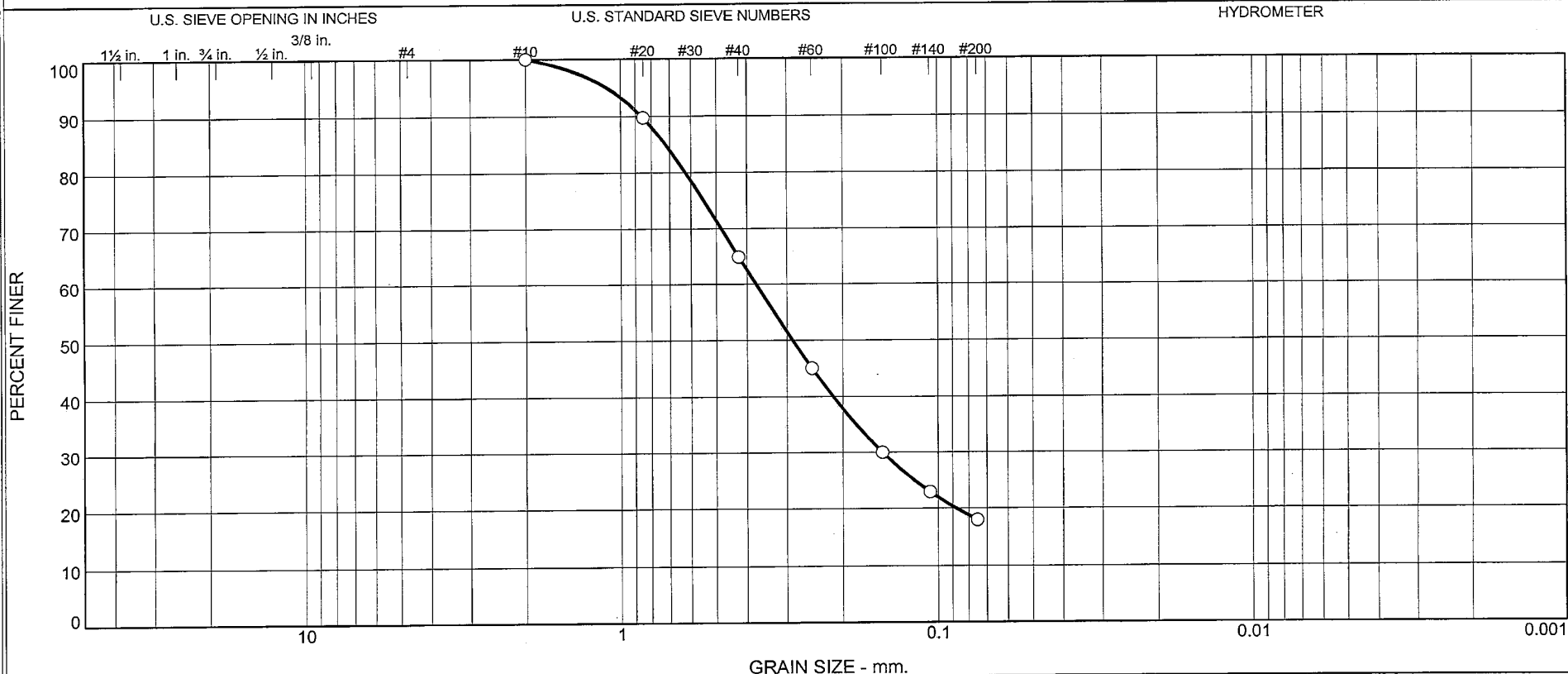
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	17.7	46.3	64.0			36.0

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
				0.1494	0.2097	0.3940	0.4674	0.5646	0.7103

<b>Fineness Modulus</b>
0.88

# Particle Size Distribution Report ASTM D 6913-04e2



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	35.1	46.9	18.0	

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-30(DH)	SS-5	23.7-25.2'	9/1/09	SM (visual)	Pale Yellow Silty SAND (visual)	18.5	ND	ND

Client <b>BECHTEL POWER CORPORATION</b>		<b>MACTEC Engineering and Consulting, Inc.</b>	○ ND = Not Determined NA = Not Applicable ASTM D 6913-04e2 Method B
Project <b>North Anna 3 Project</b>			
Project No. <b>6468092473</b>	Figure <b>N/A</b>		

Tested By: CS

Checked By: BS

DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-30(DH)

**Depth:** 23.7-25.2'

**Sample Number:** SS-5

**Material Description:** Pale Yellow Silty SAND (visual)

**Date:** 9/1/09

**Natural Moisture:** 18.5

**Liquid Limit:** ND

**Plastic Limit:** ND

**USCS Class.:** SM (visual)

**Testing Remarks:** ND = Not Determined

NA = Not Applicable

ASTM D 6913-04e2 Method B

**Tested by:** CS

**Checked by:** BS

**Steve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
346.85	0.00	0.00	#10	0.00	100.0
102.89	0.00	0.00	#20	10.59	89.7
			#40	36.14	64.9
			#60	56.55	45.0
			#100	72.09	29.9
			#140	79.39	22.8
			#200	84.41	18.0

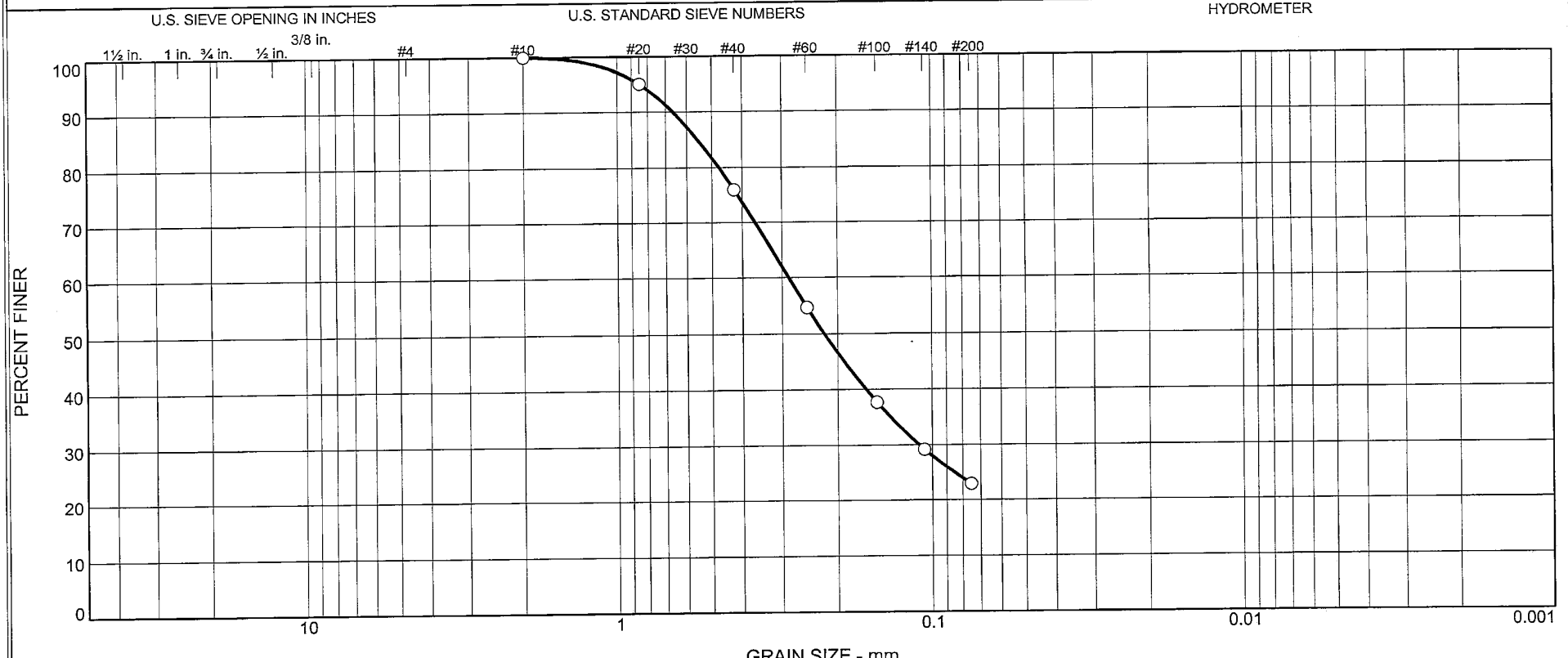
**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	35.1	46.9	82.0			18.0

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
		0.0876	0.1504	0.2879	0.3756	0.6255	0.7230	0.8599	1.1087

<b>Fineness Modulus</b>
1.44

# Particle Size Distribution Report ASTM D 6913-04e2



% Gravel		% Sand			% Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	24.0	53.1	22.9	

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring M-30(DH)	SS-7	33.7-35.2	9/1/09	SM (visual)	Yellow Silty SAND (visual)	14.8	ND	ND

Client <b>BECHTEL POWER CORPORATION</b>		<b>MACTEC Engineering and Consulting, Inc.</b>  Raleigh, North Carolina	○ ND = Not Determined NA = Not Applicable ASTM D 6913-04e2 Method B
Project <b>North Anna 3 Project</b>			
Project No. <b>6468092473</b>	Figure <b>NA</b>		

Tested By: CS

Checked By: BS      DSC 11-12-09

**GRAIN SIZE DISTRIBUTION TEST DATA**

11/4/2009

**Client:** BECHTEL POWER CORPORATION

**Project:** North Anna 3 Project

**Project Number:** 6468092473

**Location:** Boring M-30(DH)

**Depth:** 33.7-35.2

**Sample Number:** SS-7

**Material Description:** Yellow Silty SAND (visual)

**Date:** 9/1/09

**Natural Moisture:** 14.8

**Liquid Limit:** ND

**Plastic Limit:** ND

**USCS Class.:** SM (visual)

**Testing Remarks:** ND = Not Determined

NA = Not Applicable

ASTM D 6913-04e2 Method B

**Tested by:** CS

**Checked by:** BS

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
384.34	0.00	0.00	#10	0.00	100.0
51.82	0.00	0.00	#20	2.58	95.0
			#40	12.45	76.0
			#60	23.52	54.6
			#100	32.29	37.7
			#140	36.72	29.1
			#200	39.95	22.9

**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	24.0	53.1	77.1			22.9

D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
			0.1104	0.2208	0.2862	0.4750	0.5540	0.6647	0.8489

<b>Fineness Modulus</b>
1.14

**FINAL DATA REPORT  
Revision 0  
GEOTECHNICAL EXPLORATION AND TESTING  
SUPPLEMENT 2  
DOMINION POWER  
NORTH ANNA NUCLEAR POWER STATION  
NORTH ANNA 3 PROJECT  
MINERAL, LOUISA COUNTY, VIRGINIA**

**December 16, 2009**

**VOLUME 1**

**APPENDIX D.2  
Rock Core Unconfined Strength Tests**

**Prepared By:**

**MACTEC ENGINEERING AND CONSULTING, INC.  
RALEIGH, NORTH CAROLINA**

**MACTEC PROJECT No. 6468-09-2473**

**Prepared For:**

**Bechtel Power Corporation  
Subcontractor No. 25161-500-HC4-CY00-00001**

North Anna 3 Project

MACTEC Project: 6468-09-2473

# Summary Report for Rock Core Testing



**Summary of Laboratory Testing**  
**Standard Test Method for Compressive Strength and Elastic Moduli of Intact**  
**Rock Core Specimens under Varying States of Stress and Temperatures**  
**ASTM D7012-07e1**

**Project Name: North Anna 3**  
**MACTEC Project No.: 6468-09-2473**

Boring Number	Run Number	Sample Depth (ft)	Diameter (in)	Length (in)	Time to Failure	Unconfined Compressive Strength (psi)	As Received Unit Weight (pcf)
M-10 (DH)	RS-1	117.45-117.9	2.41	5.15	5 min 6 sec	7960	160.1
M-10 (DH)	RS-2	133.75-134.2	2.41	5.09	15 min 13 sec	19640	161.9
M-10 (DH)	RS-3	153.7-154.15	2.41	5.08	16 min 0 sec	33830	163.5
M-10 (DH)	RS-4	177.6-178.05	2.39	5.14	26 min 44 sec	20880	163.3
M-10 (DH)	RS-5	196.7-197.15	2.39	5.18	12 min 59 sec	30780	163.7
M-30 (DH)	RS-6	57.0-57.45	2.40	5.18	14 min 8 sec	28650	162.8
M-30 (DH)	RS-7	95.4-95.85	2.39	5.06	9 min 39 sec	23700	162.7
M-30 (DH)	RS-8	134.9-135.35	2.39	5.26	9 min 47 sec	26200	163.7
M-30 (DH)	RS-9	166.9-167.35	2.40	5.06	7 min 5 sec	24820	164.6
M-30 (DH)	RS-10	197.05-197.5	2.40	5.16	10 min 29 sec	33040	162.6

Created By: DAK 12-1-09  
 Checked By: JHA 12-1-09  
 Reviewed By: MA 12-1-09