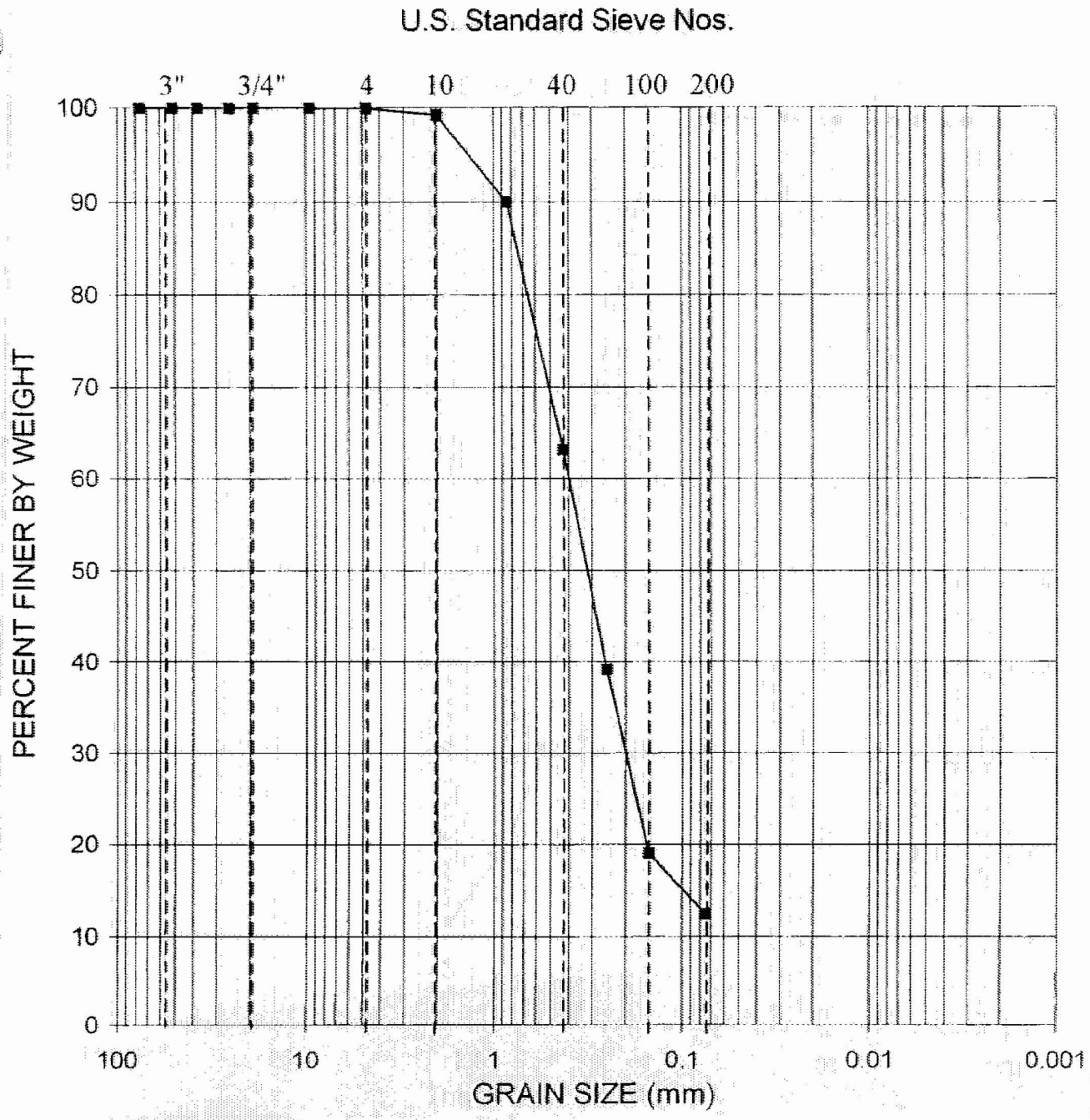


GRADATION CURVE

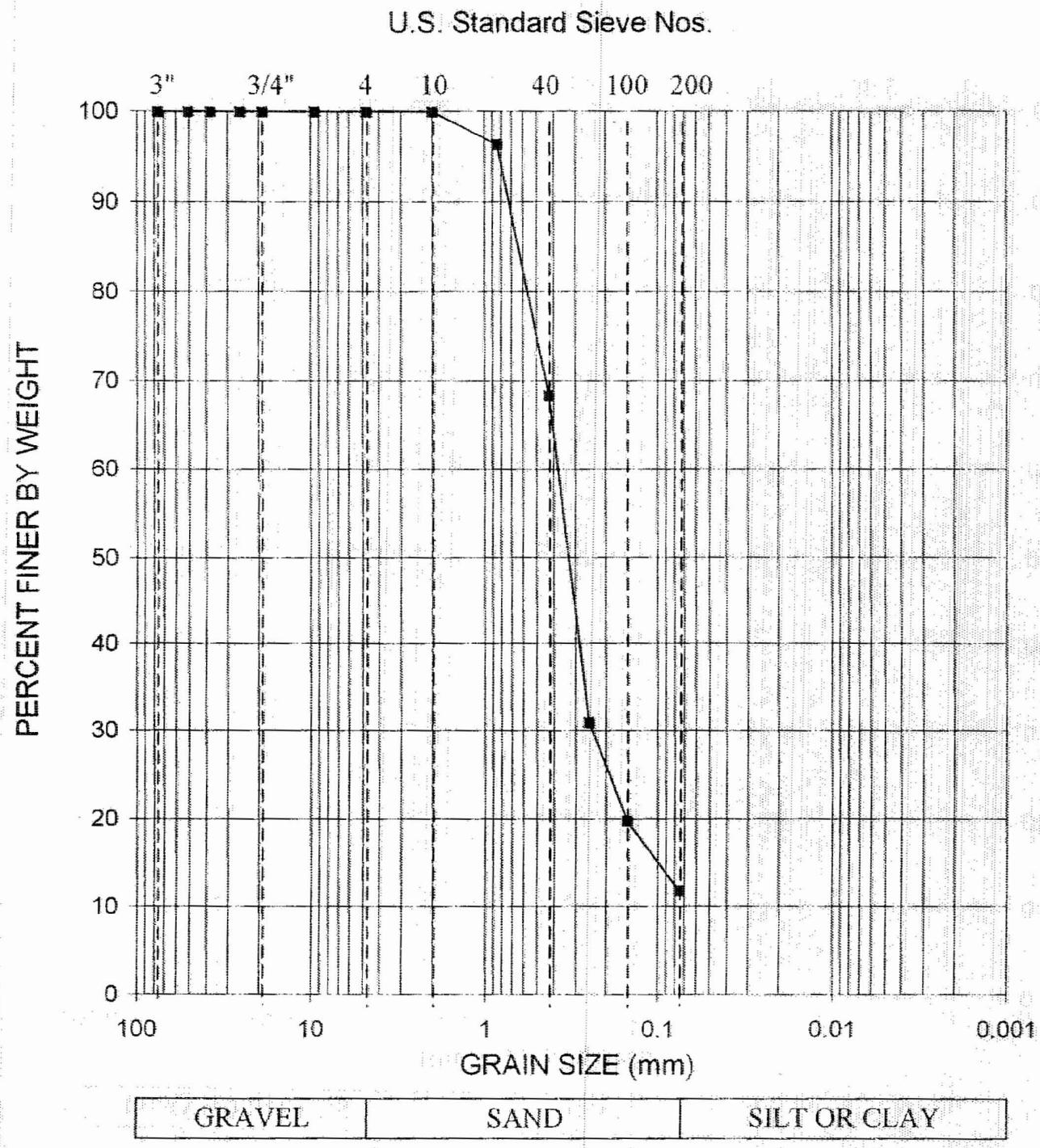
ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland	Contract No.:	06120048.00	Date:	9/14/2006

Boring No.	Depth (ft)	Sample Description	Class.	LL	PI
B-423	2.5	Silty SAND, brown	SM		

Schnabel

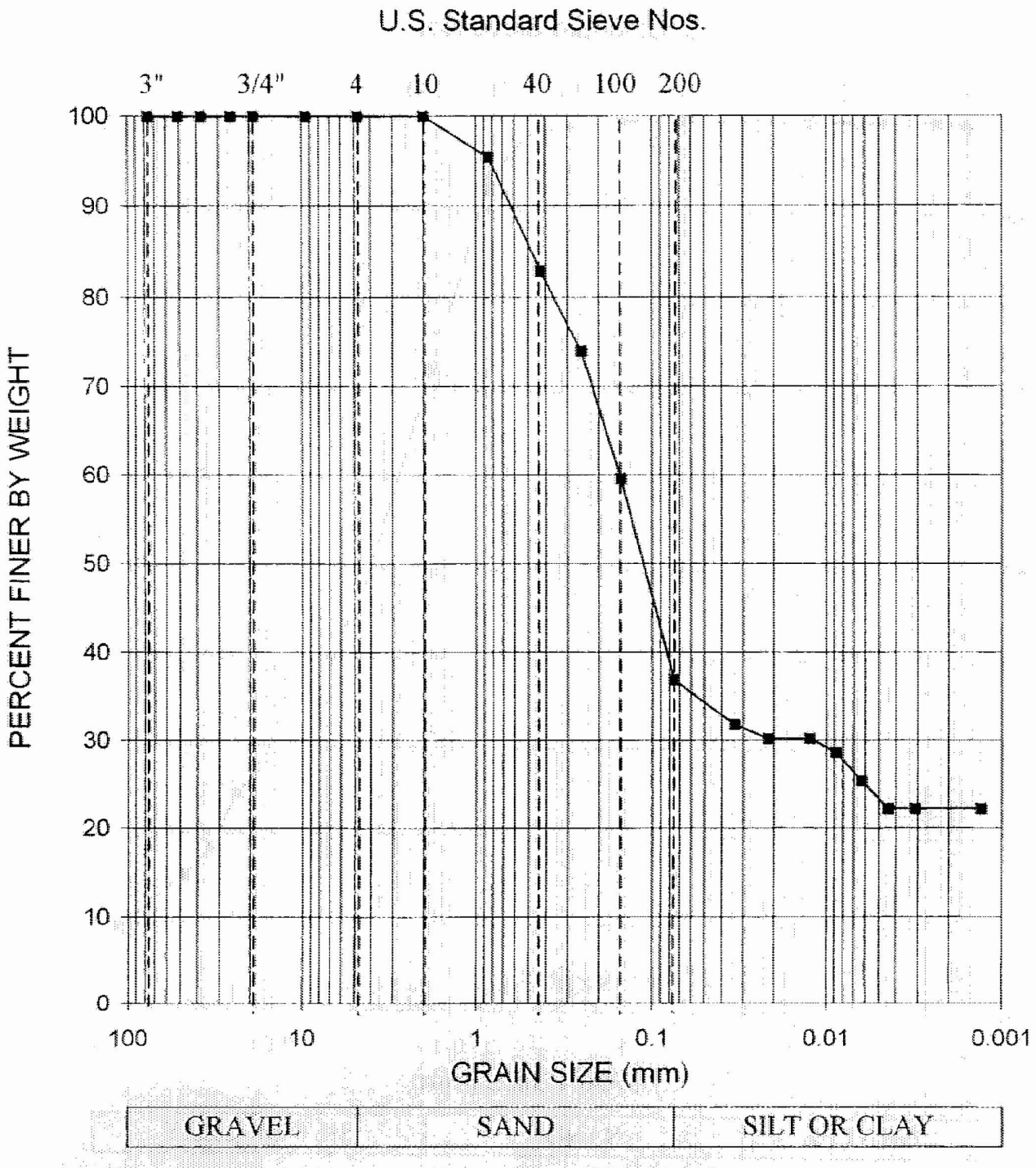
Schnabel Engineering



GRADATION CURVE

ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland		Contract No.:	06120048.00	Date:	9/14/2006
Boring No.	Depth (ft)	Sample Description	Class.	LL	PI	
B-423	23.5	Poorly Graded SAND, with silt, brown	SP-SM			Schnabel Engineering



GRADATION CURVE

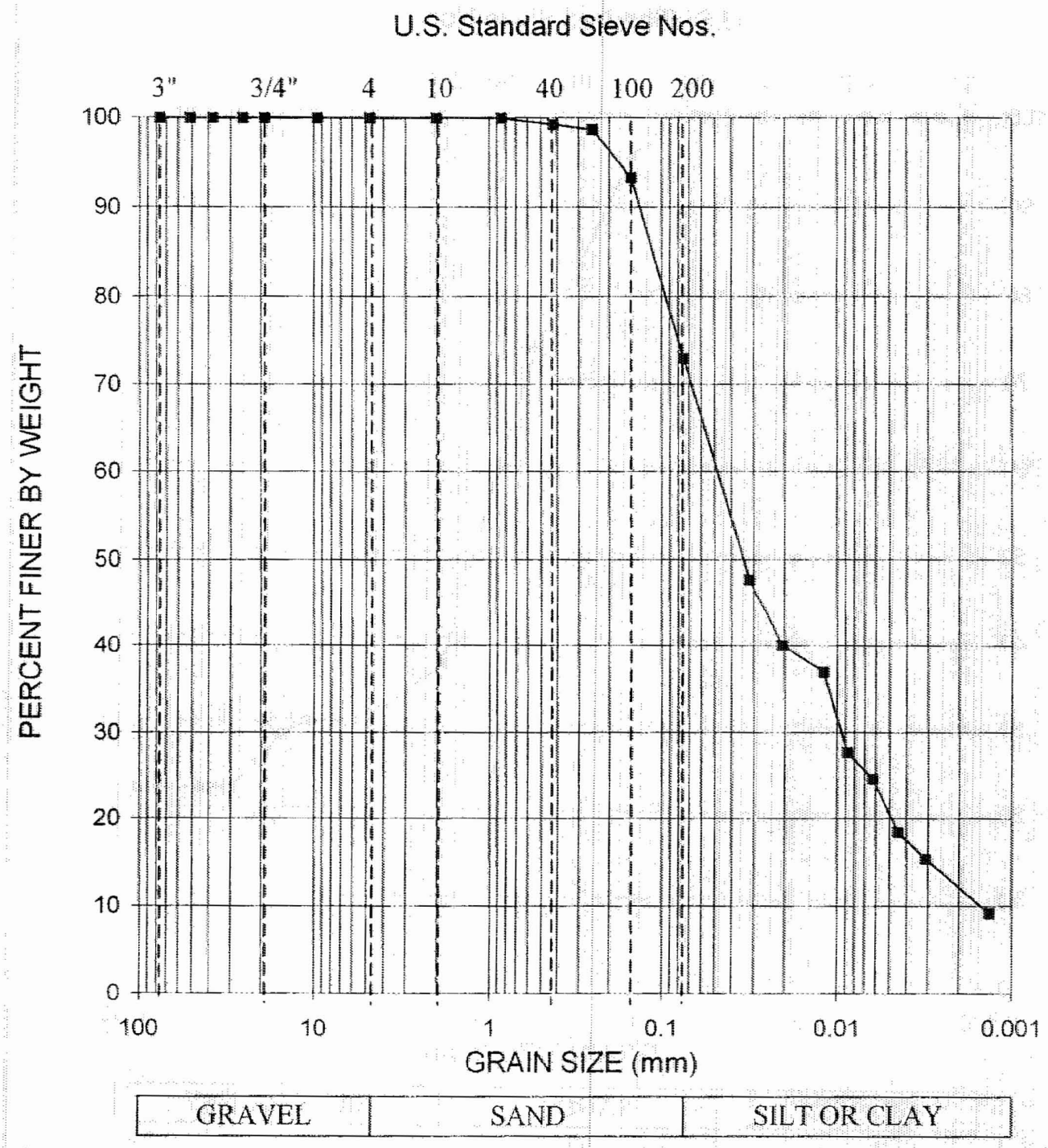
ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland	Contract No.	06120048.00	Date:	9/21/2006

Boring No.	Depth (ft)	Sample Description	Class.	LL	PI
B-423	38.5	Clayey SAND, light gray-brown	SC	43	28

Schnabel

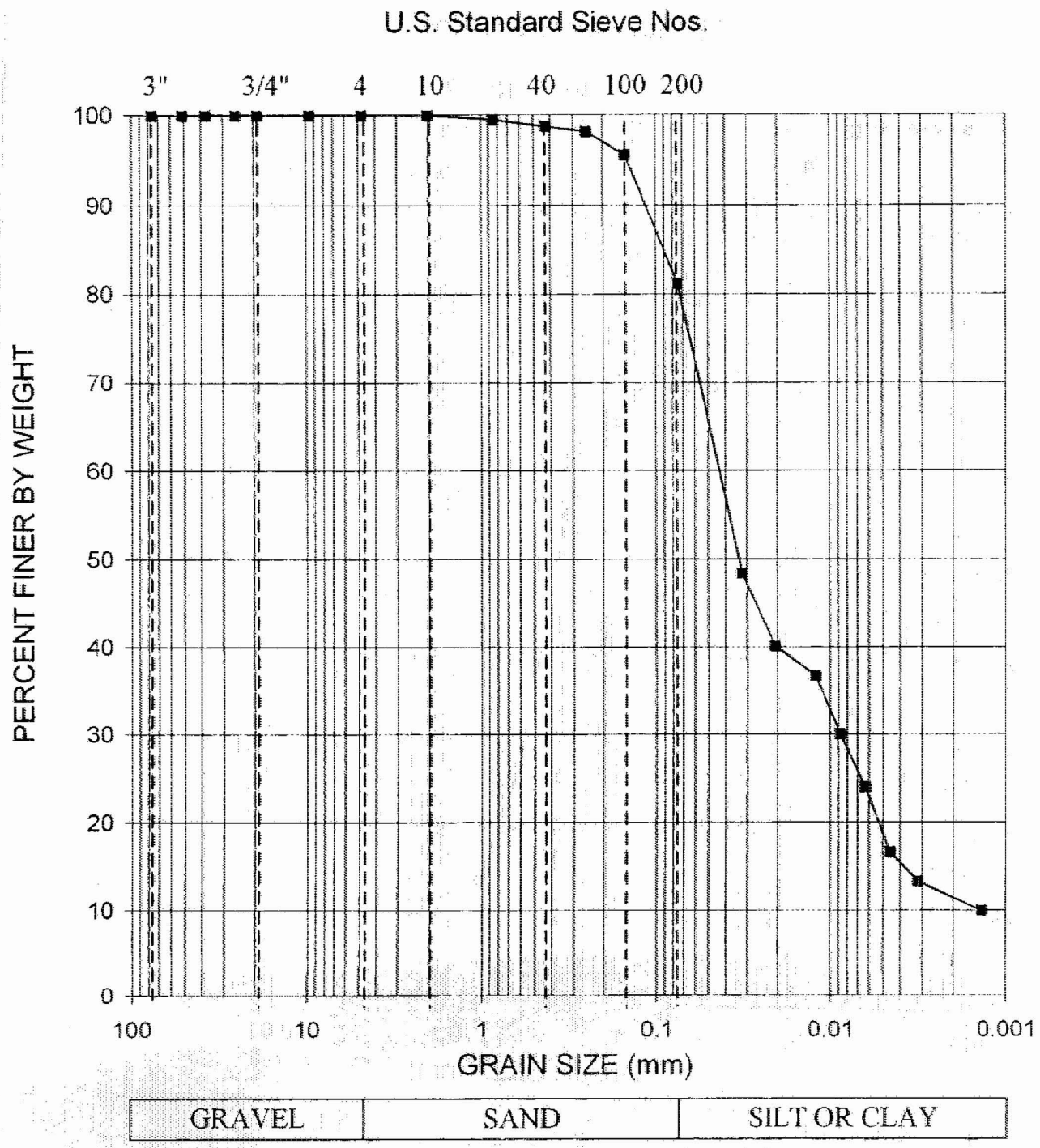
Schnabel Engineering



GRADATION CURVE

ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland		Contract No.: 06120048.00		Date: 9/21/2006	
Boring No.	Depth (ft)	Sample Description	Class.	LL	PI	
B-423	43.5	FAT CLAY, with sand, gray	CH	55	35	Schnabel Engineering



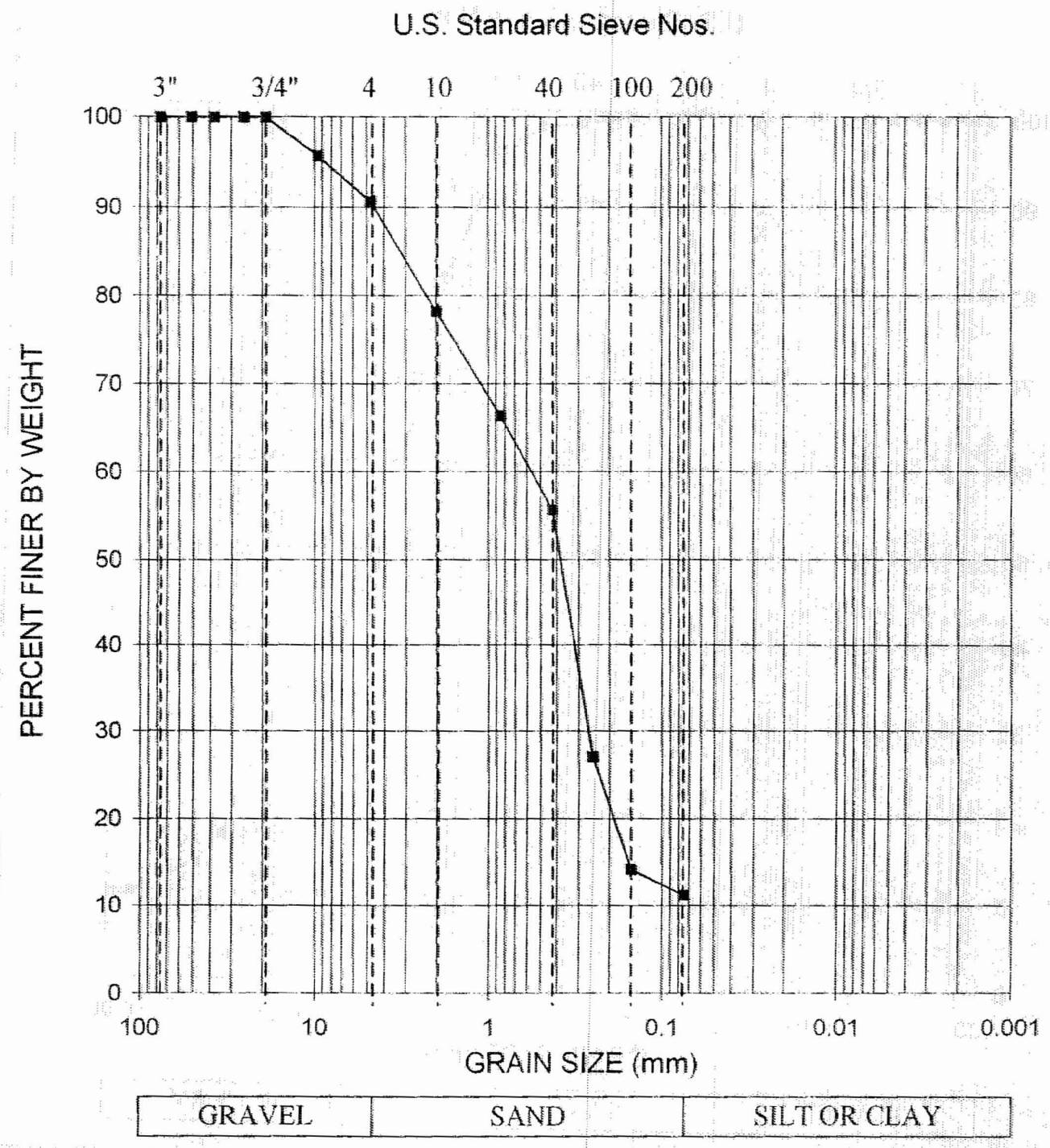
GRADATION CURVE

ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland		Contract No.	06120048.00	Date:	9/22/2006
Boring No.	Depth (ft)	Sample Description	Class.	LL	PI	
B-423	53.5	FAT CLAY, with sand , dark gray	CH	80	46	

Schnabel

Schnabel Engineering



GRADATION CURVE

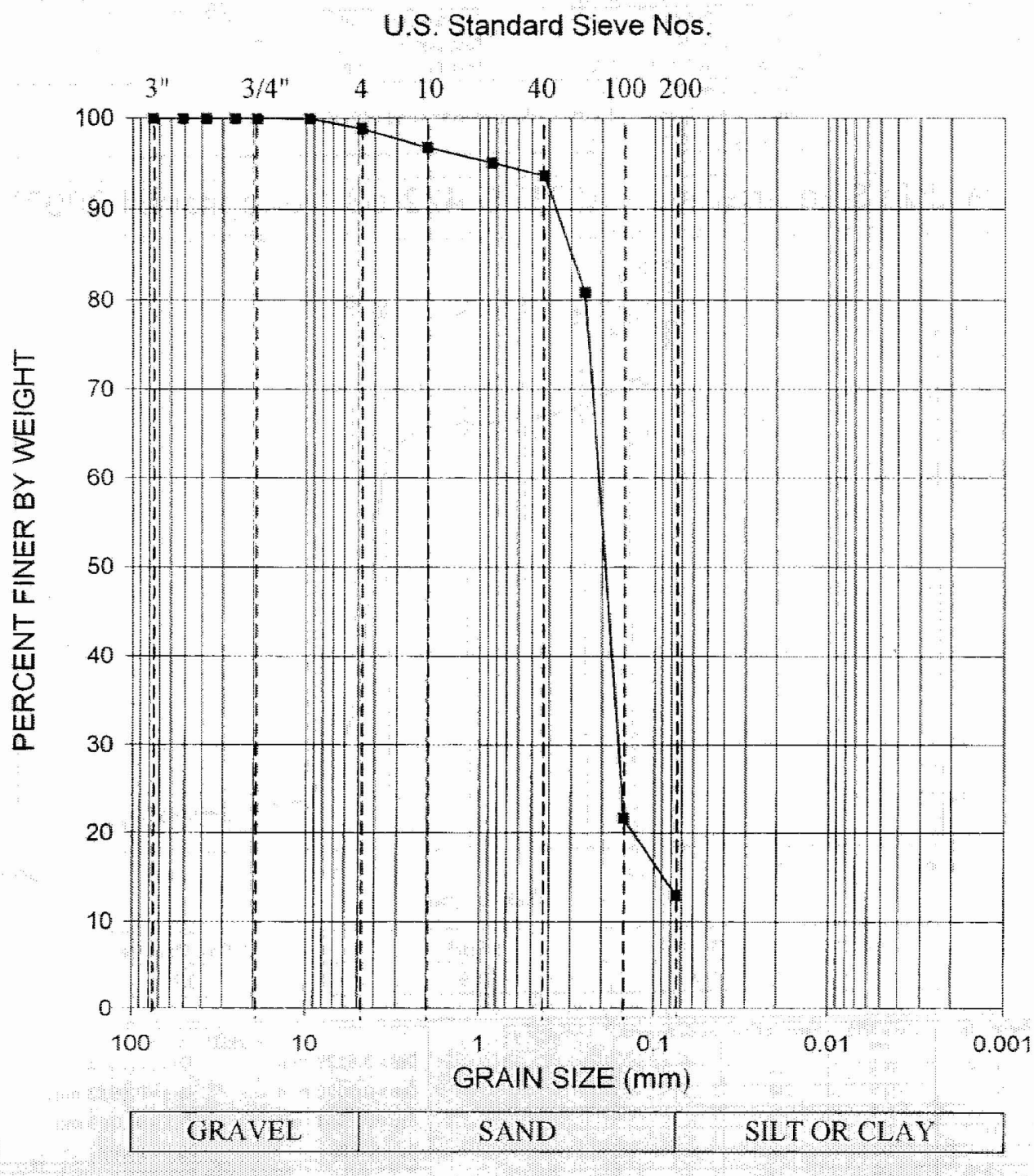
ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland	Contract No.: 06120048.00	Date: 9/14/2006

Boring No.	Depth (ft)	Sample Description	Class.	LL	PI
B-423	78.5	Sandy SILT, trace shells, green	ML		

Schnabel

Schnabel Engineering



GRADATION CURVE

ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland		Contract No.: 06120048.00		Date: 9/14/2006	
Boring No.	Depth (ft)	Sample Description	Class.	LL	PI	
B-423	93.5	Silty SAND, trace shells, gray	SM			Schnabel Engineering

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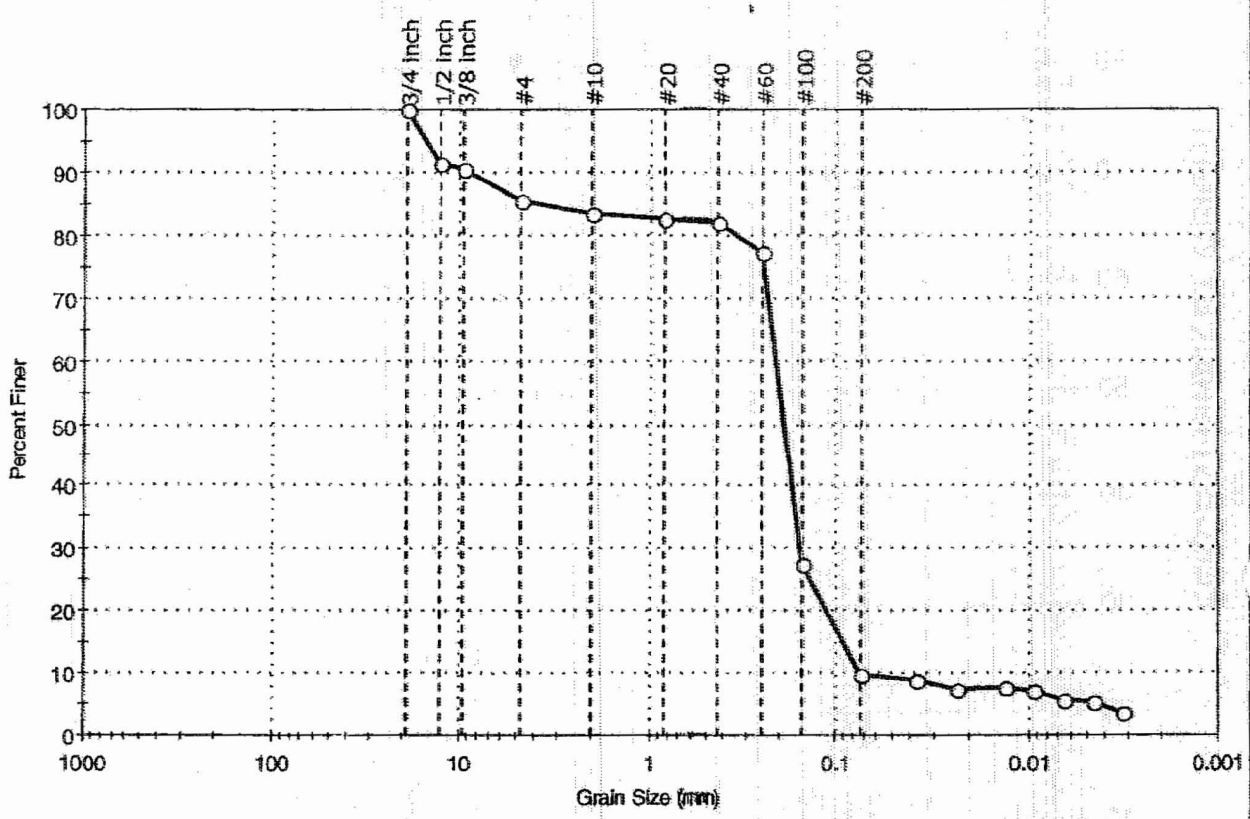
Client:	Schnabel Engineering, Inc.		
Project:	Subsurface Investigation Calvert Cliffs Nuclear PP		
Location:	Calvert County, MD	Project No:	GTX-6880
Boring ID: B-423	Sample Type: tube	Tested By:	sam
Sample ID: S-24	Test Date: 10/25/06	Checked By:	mcm
Depth : 103.5-105.3 ft	Test ID: 98379		
Test Comment:	---		
Sample Description:	Moist, dark olive gray sand with clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	14.4	75.9	9.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
3/4 inch	19.00	100		
1/2 inch	12.70	92		
3/8 inch	9.51	91		
#4	4.75	86		
#10	2.00	84		
#20	0.84	83		
#40	0.42	82		
#60	0.25	77		
#100	0.15	27		
#200	0.074	10		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0373	9		
---	0.0231	7		
---	0.0132	8		
---	0.0093	7		
---	0.0066	6		
---	0.0046	5		
---	0.0032	3		

Coefficients

D_{85} = 3.6129 mm	D_{30} = 0.1531 mm
D_{60} = 0.2090 mm	D_{15} = 0.0913 mm
D_{50} = 0.1884 mm	D_{10} = 0.0749 mm
C_u = 2.790	C_c = 1.497

Classification

ASTM: Poorly graded sand with silty clay (SP-SC)

AASHTO: Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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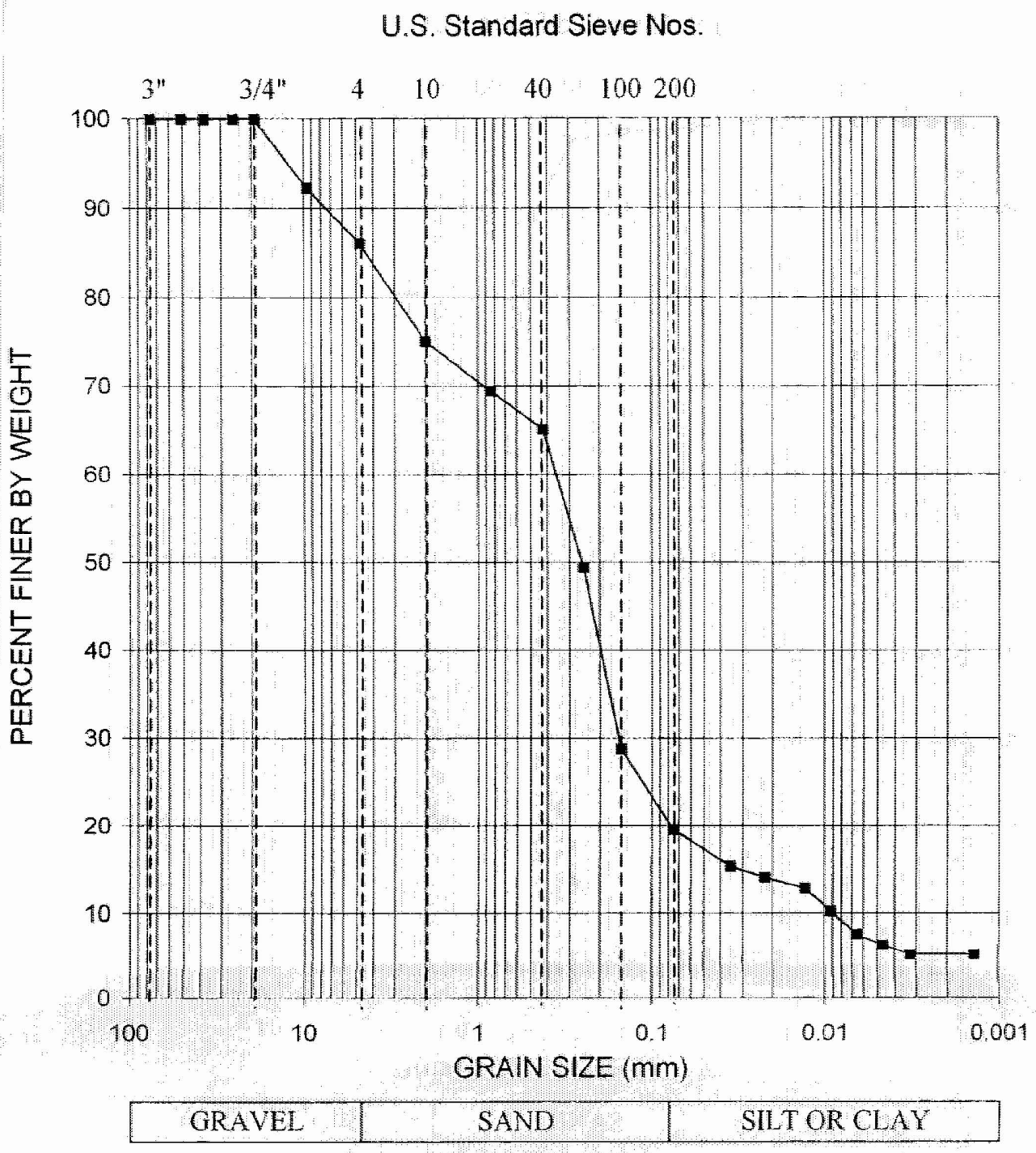


GRADATION CURVE

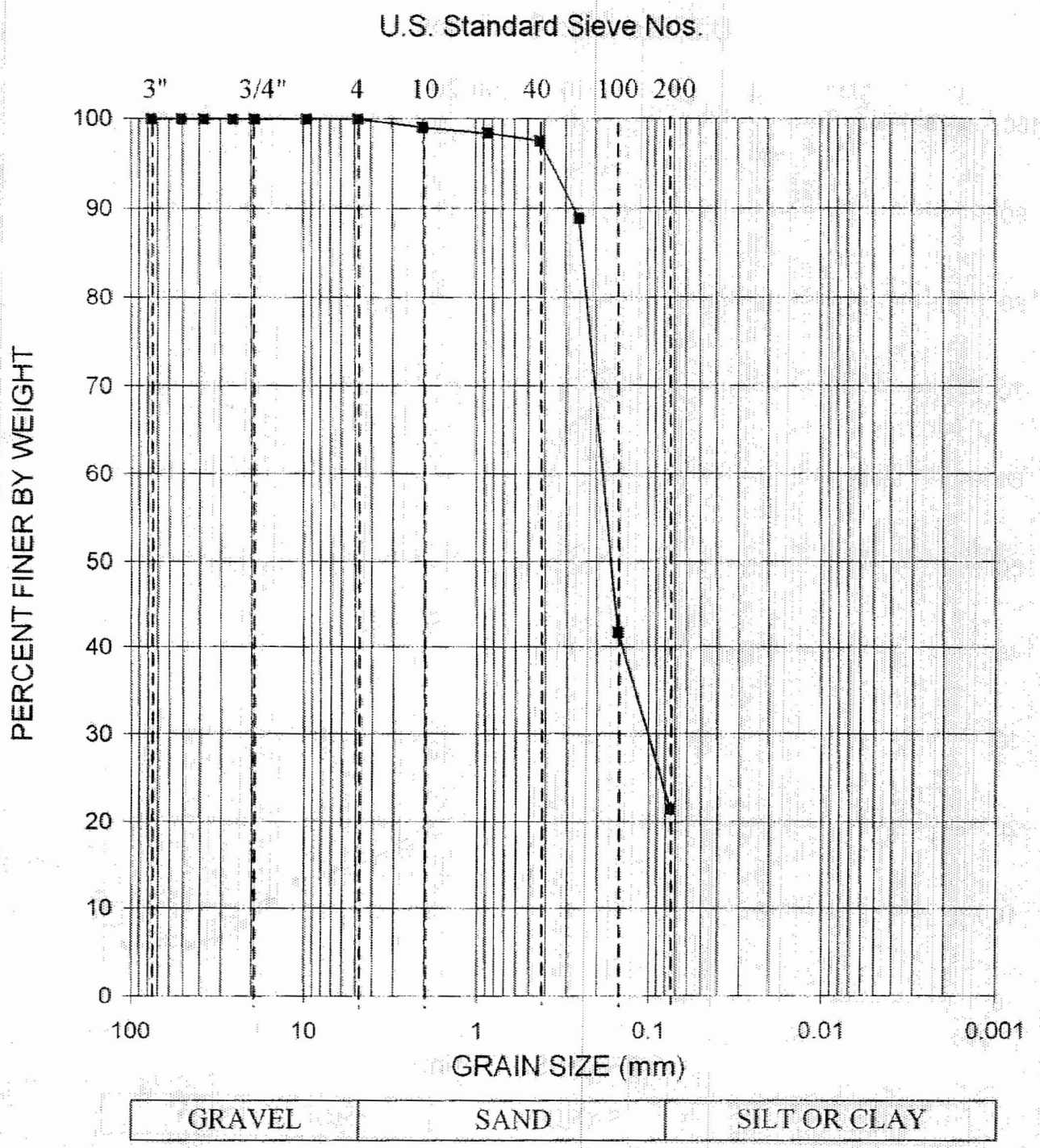
ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland	Contract No.: 06120048.00	Date: 9/22/2006

Boring No.	Depth (ft)	Sample Description	Class.	LL	PI
B-423	118.5	Silty SAND, trace shells, green	SM	NP	NP

Schnabel

Schnabel Engineering



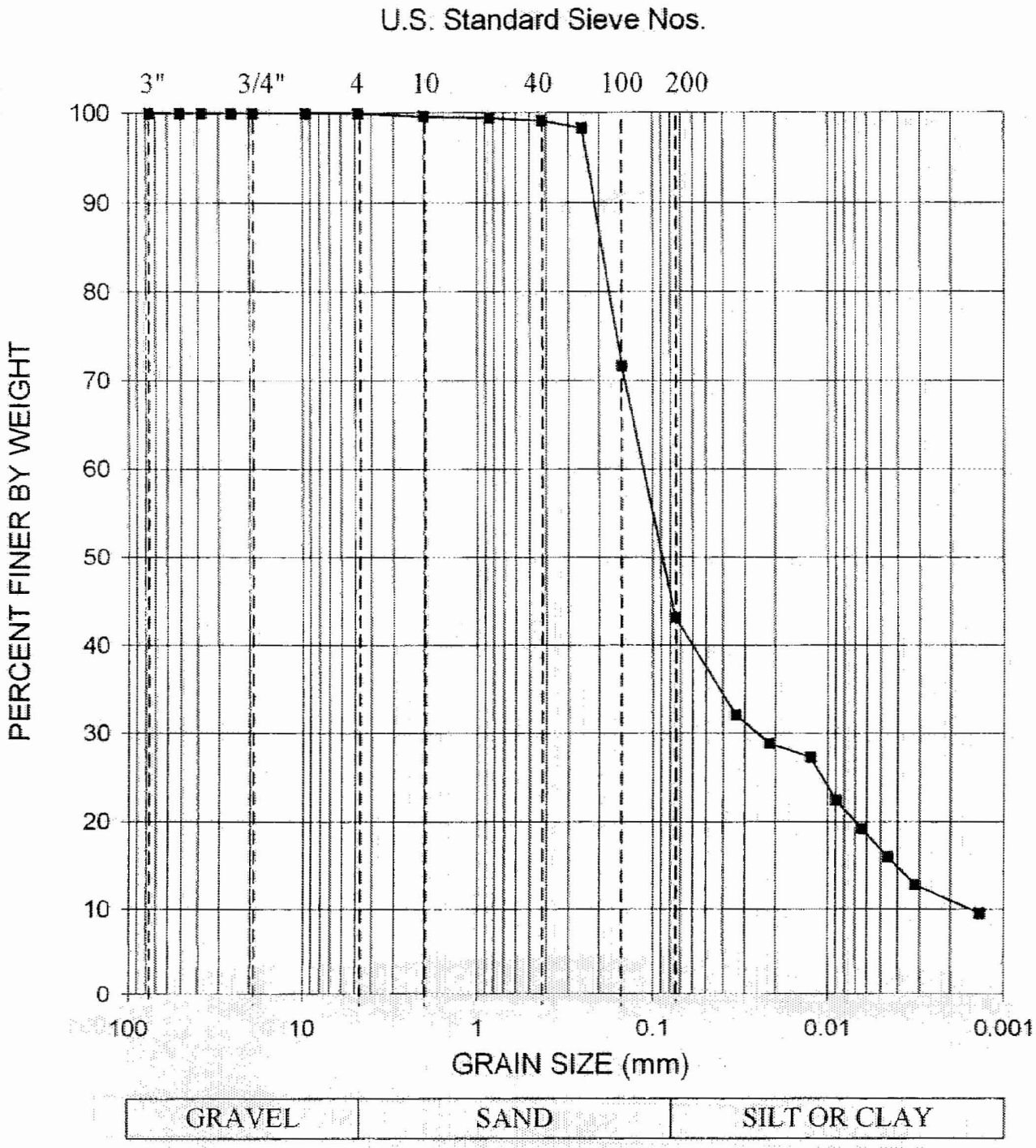
GRADATION CURVE

ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland		Contract No.:	06120048.00	Date:	9/14/2006
Boring No.	Depth (ft)	Sample Description	Class.	LL	PI	
B-423	128.5	Silty SAND, contains shells, green	SM			

Schnabel

Schnabel Engineering



GRADATION CURVE

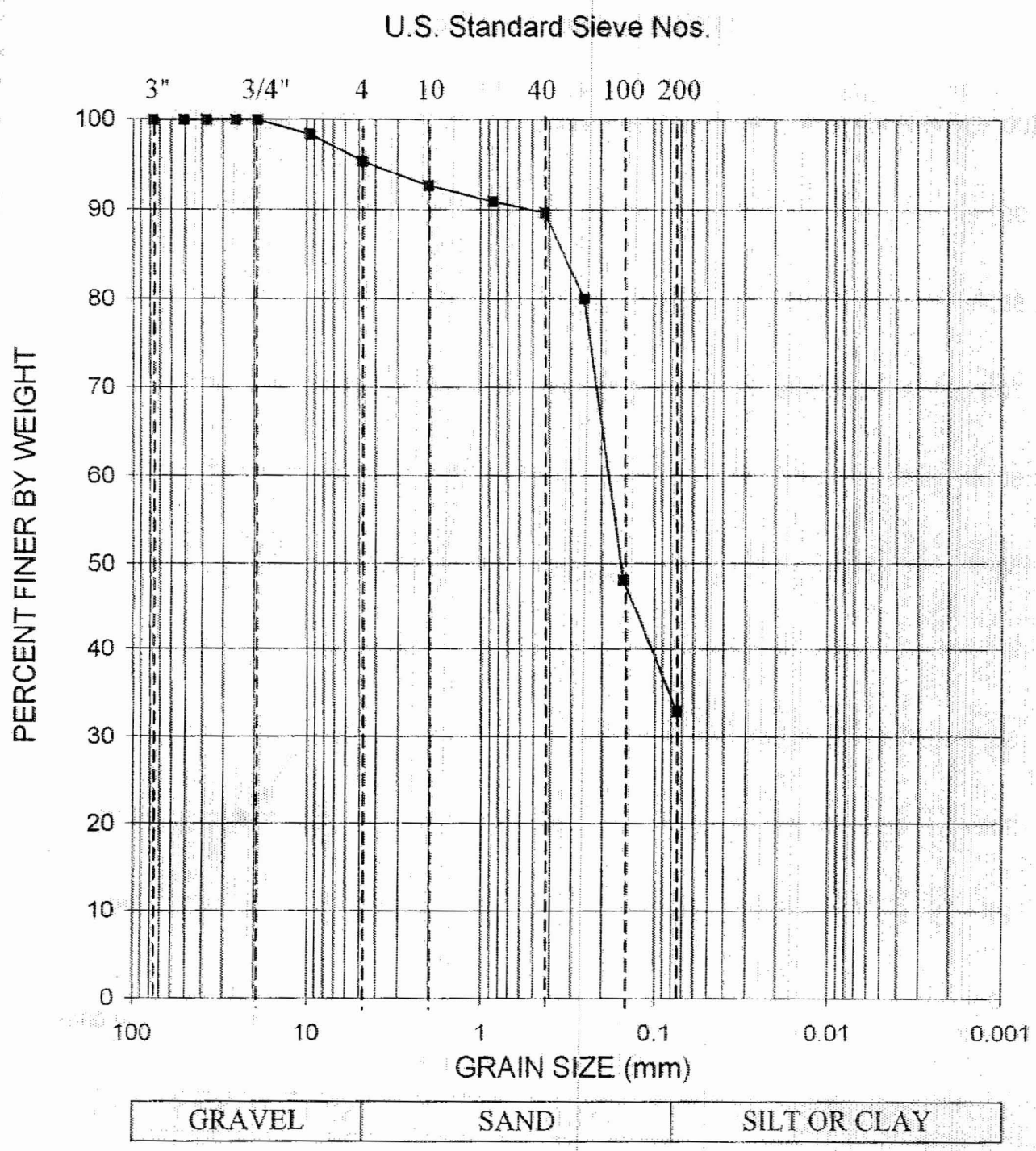
ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland	Contract No.:	06120048.00	Date:	9/22/2006

Boring No.	Depth (ft)	Sample Description	Class.	LL	PI
B-423	138.5	Silty SAND, contains shells, green	SM		

Schnabel

Schnabel Engineering



GRADATION CURVE

ASTM D422

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland		Contract No.:	06120048.00	Date:	9/14/2006
Boring No.	Depth (ft)	Sample Description	Class.	LL	PI	
B-423	148.5	Silty SAND, trace shells, green	SM			Schnabel Engineering

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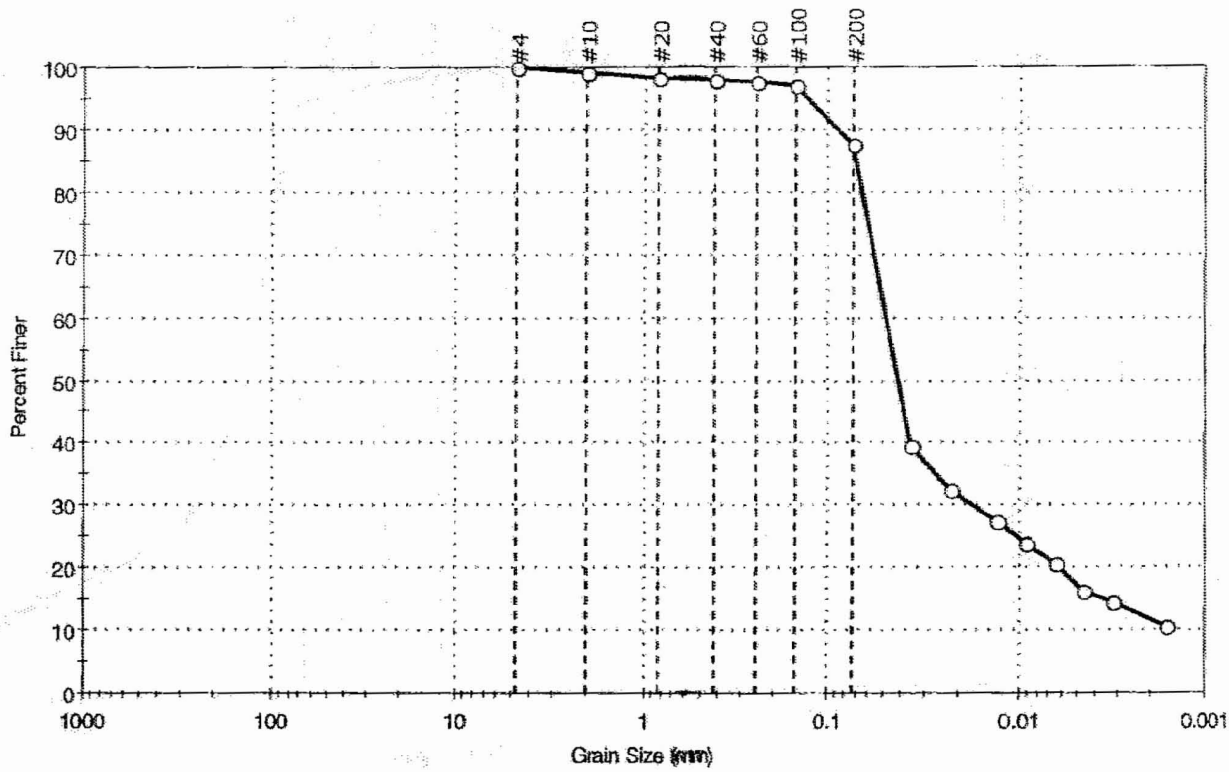
Client:	Schnabel Engineering, Inc.		
Project:	Subsurface Investigation Calvert Cliffs Nuclear PP		
Location:	Calvert County, MD	Project No:	GTX-6880
Boring ID: B-423	Sample Type: tube	Tested By:	sam
Sample ID: S-35	Test Date: 09/12/06	Checked By:	mcm
Depth : 158.5-160.1 ft	Test Id: 95815		
Test Comment: ---			
Sample Description:	Moist, olive gray organic clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	12.4	87.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.84	98		
#40	0.42	98		
#60	0.25	98		
#100	0.15	97		
#200	0.074	88		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
—	0.0354	39		
—	0.0223	32		
---	0.0129	28		
—	0.0092	24		
---	0.0065	21		
---	0.0046	16		
—	0.0032	14		
---	0.0017	11		

Coefficients

D_{85} = 0.0711 mm D_{30} = 0.0171 mm
D_{60} = 0.0485 mm D_{15} = 0.0037 mm
D_{50} = 0.0416 mm D_{10} = 0.0015 mm
C_u = N/A C_c = N/A

Classification

ASTM organic clay (OH)

AASHTO Clayey Soils (A-7-6 (59))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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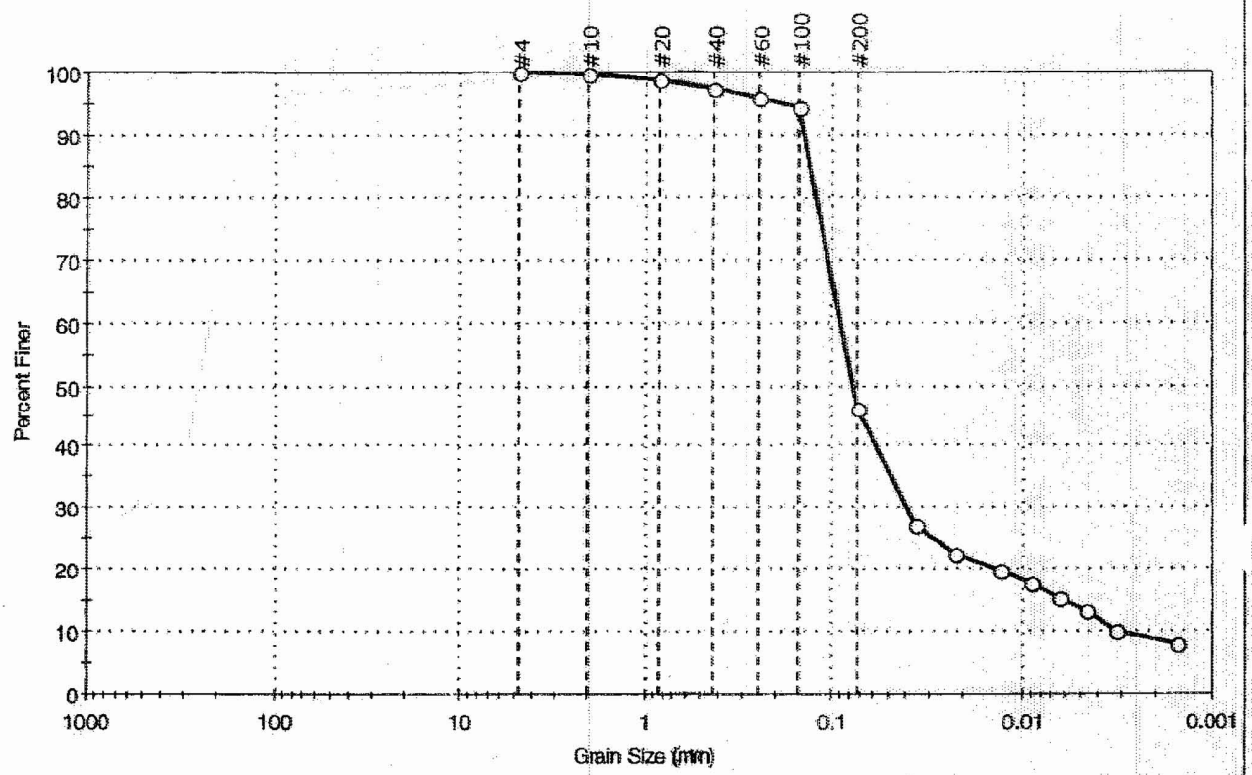
GeoTesting express
a subsidiary of Geocomp Corporation

Client:	Schnabel Engineering, Inc.		
Project:	Subsurface Investigation Calvert Cliffs Nuclear PP		
Location:	Calvert County, MD	Project No:	GTX-6880
Boring ID: B-423	Sample Type: tube	Tested By:	sam
Sample ID: S-39	Test Date: 09/28/06	Checked By:	mcm
Depth : 178.5-179.8 ft	Test Id: 95825		
Test Comment: ---			
Sample Description:	Dry, olive clayey sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	53.6	46.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.84	99		
#40	0.42	97		
#60	0.25	96		
#100	0.15	94		
#200	0.074	46		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0358	27		
---	0.0223	22		
---	0.0128	20		
---	0.0091	18		
---	0.0065	15		
---	0.0046	13		
---	0.0033	10		
---	0.0015	8		

Coefficients

D_{85} = 0.1308 mm D_{30} = 0.0398 mm
D_{60} = 0.0905 mm D_{15} = 0.0060 mm
D_{50} = 0.0781 mm D_{10} = 0.0031 mm
C_u = N/A C_c = N/A

Classification

ASTM Silty sand (SM)

AASHTO Clayey Soils (A-7-5 (13))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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