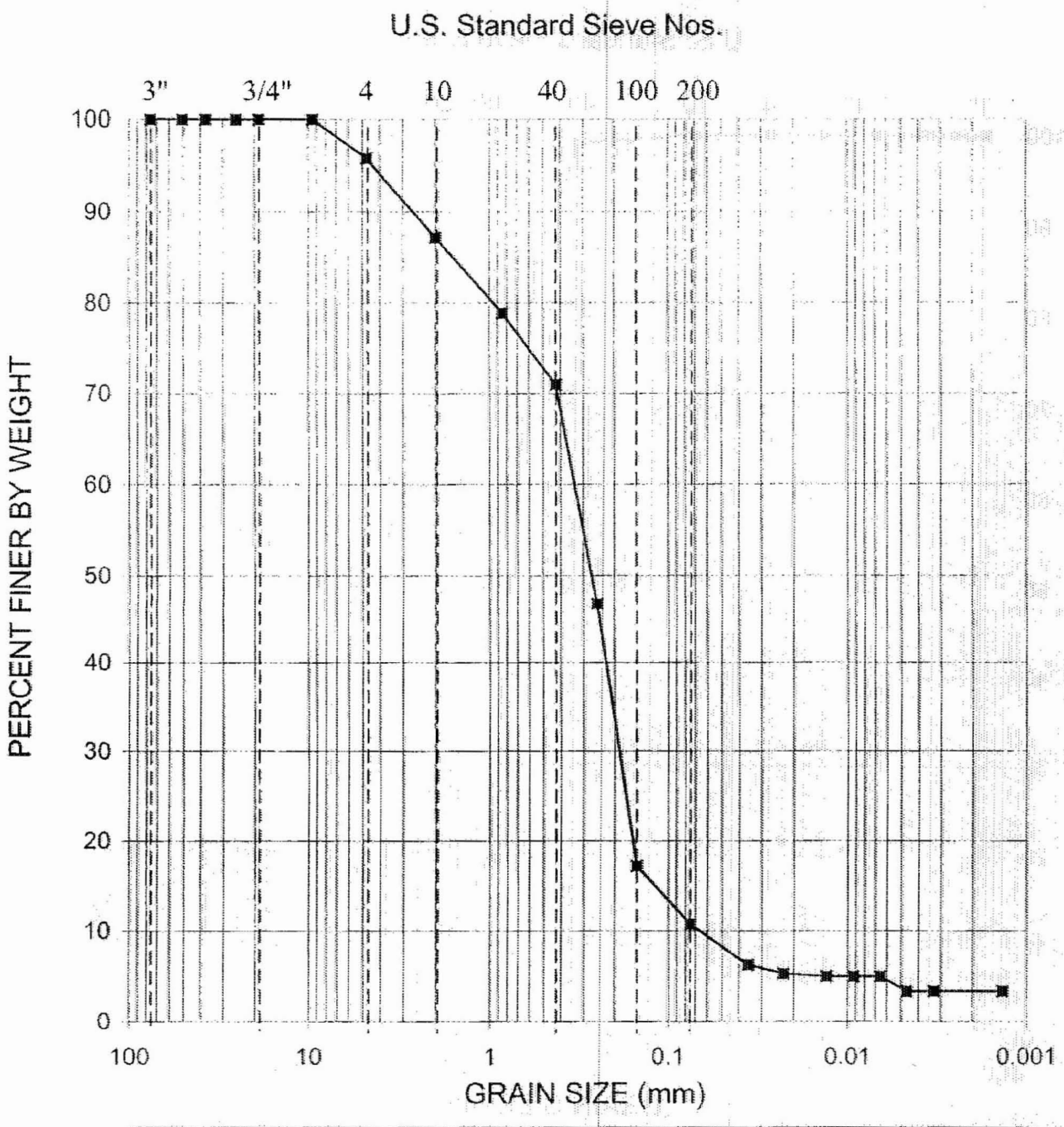


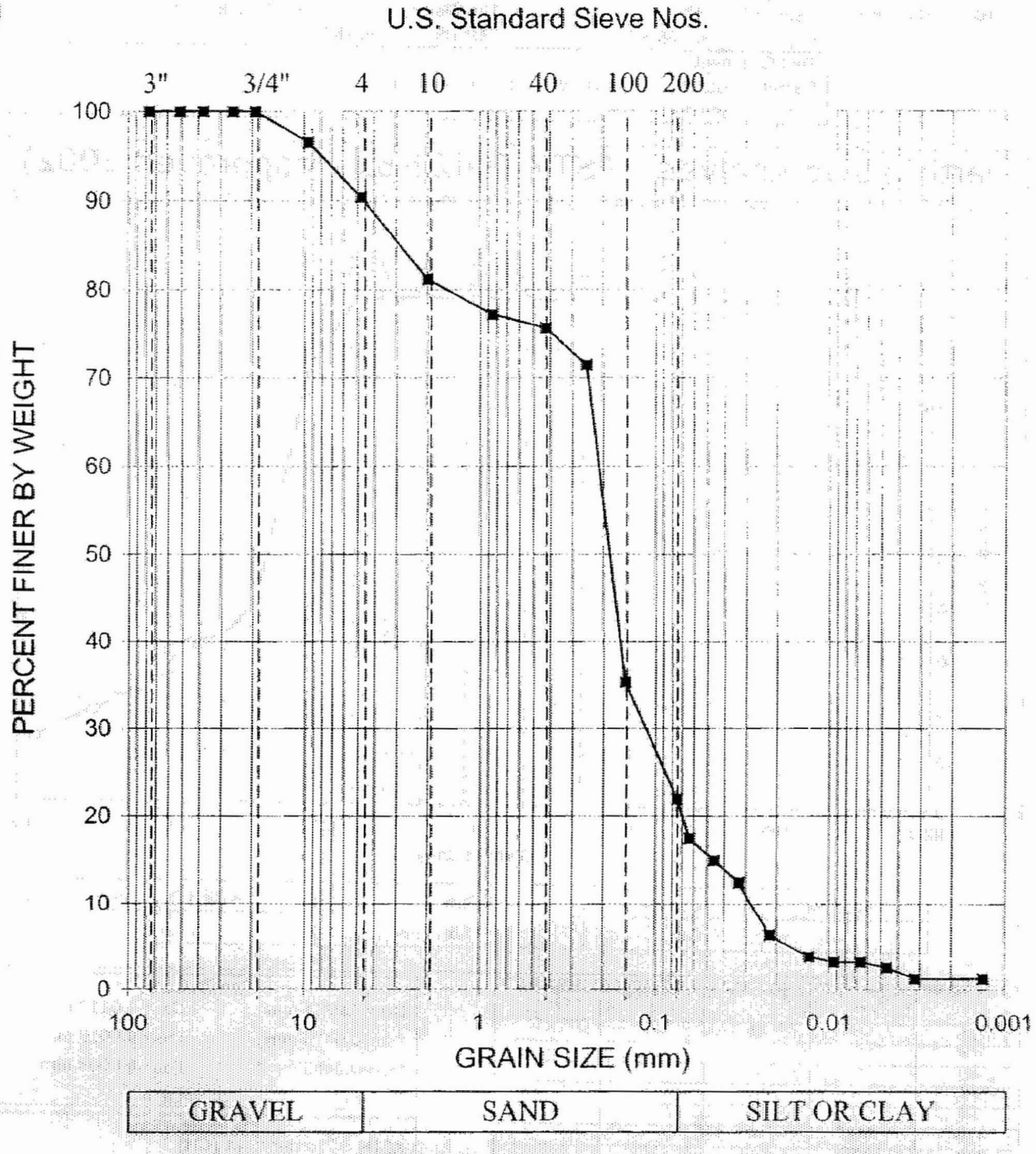

**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 9/7/2006 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-328 | 43.5 | Poorly Graded SAND, with silt, trace shells, dark gray | SP-SM | NP | NP |

Schnabel Engineering




**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | | Contract No. | 06120048.00 | | Date: | 8/26/2006 |
|---|---|---|---|---|---|---|---|
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| B-328 | 53.5 | Silty SAND, trace shells, green | SM | | | | |

Schnabel Engineering

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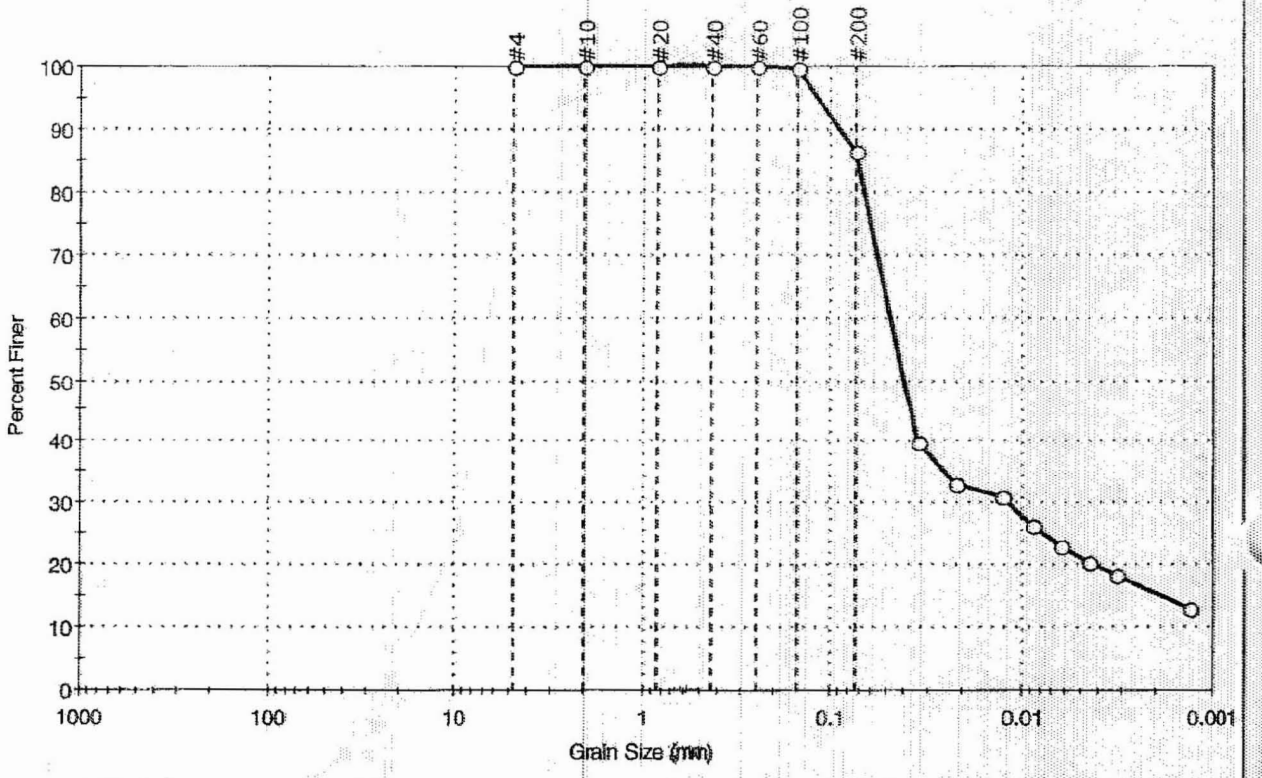
| | | | |
|---|---|---|---|
| Client: | Schnabel Engineering, Inc. | | |
| Project: | Subsurface Investigation Calvert Cliffs Nuclear PP | | |
| Location: | Calvert County, MD | Project No: | GTX-6880 |
| Boring ID: | B-328 | Sample Type: tube | Tested By: sam |
| Sample ID: | S-16 | Test Date: 10/17/06 | Checked By: mcm |
| Depth : | 63.5-65.5 ft | Test Id: 95788 | |
| Test Comment: | --- | | |
| Sample Description: | Moist, dark gray organic silt | | |
| Sample Comment: | --- | | |

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




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| --- | 0.0 | 13.5 | 86.5 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| #4 | 4.75 | 100 | | |
| #10 | 2.00 | 100 | | |
| #20 | 0.84 | 100 | | |
| #40 | 0.42 | 100 | | |
| #60 | 0.25 | 100 | | |
| #100 | 0.15 | 100 | | |
| #200 | 0.074 | 87 | | |
| --- | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0340 | 40 | | |
| --- | 0.0217 | 33 | | |
| --- | 0.0125 | 31 | | |
| --- | 0.0088 | 26 | | |
| --- | 0.0063 | 23 | | |
| --- | 0.0045 | 20 | | |
| --- | 0.0032 | 18 | | |
| --- | 0.0013 | 13 | | |
| | | | | |

**Coefficients**

| | |
|---|---|
| $D_{85}$ = 0.0721 mm | $D_{30}$ = 0.0117 mm |
| $D_{60}$ = 0.0476 mm | $D_{15}$ = 0.0019 mm |
| $D_{50}$ = 0.0403 mm | $D_{10}$ = 0.0008 mm |
| $C_u$ = N/A | $C_c$ = N/A |

**Classification**

ASTM organic silt (OH)

AASHTO Clayey Soils (A-7-5 (36))

**Sample/Test Description**

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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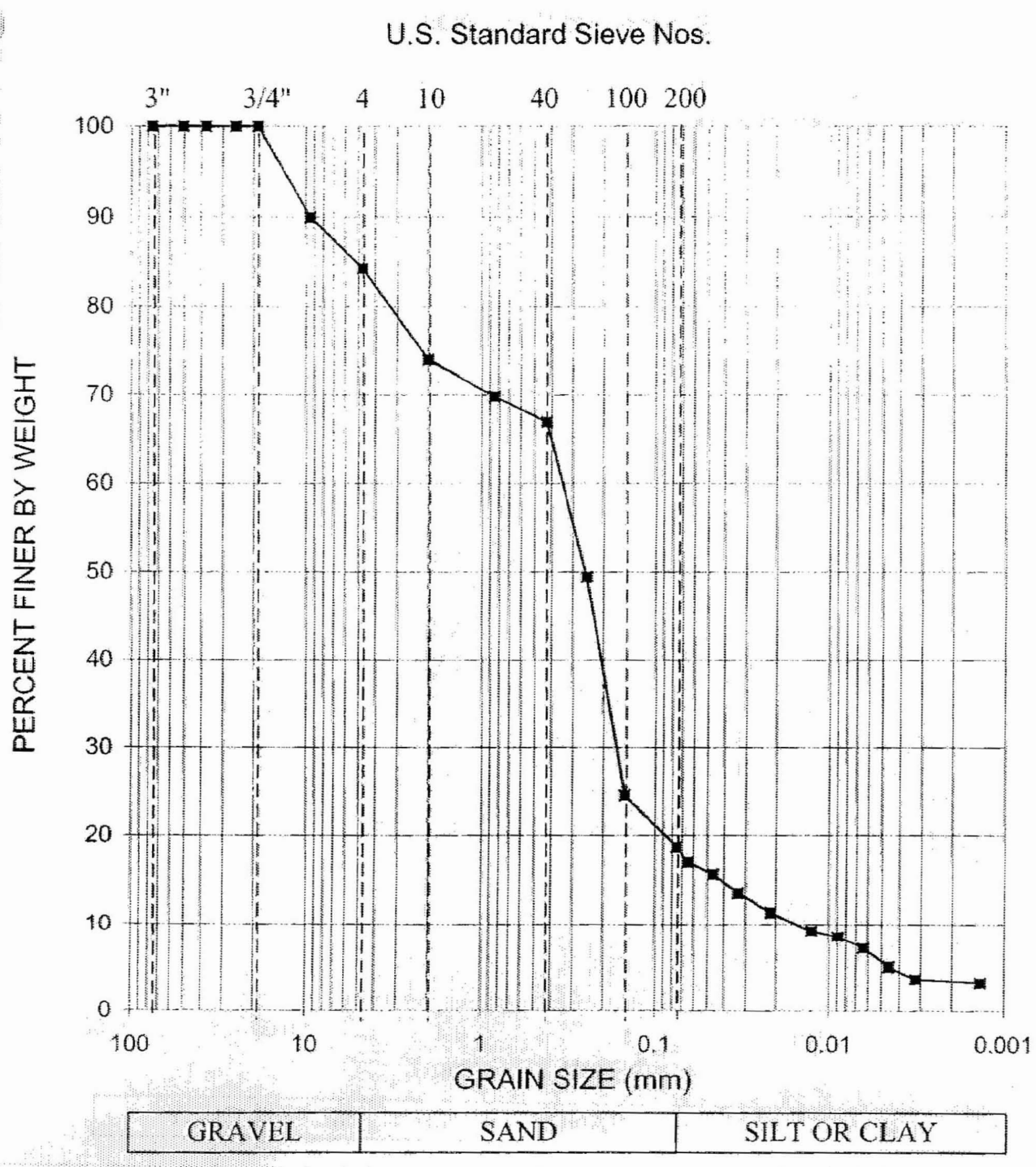


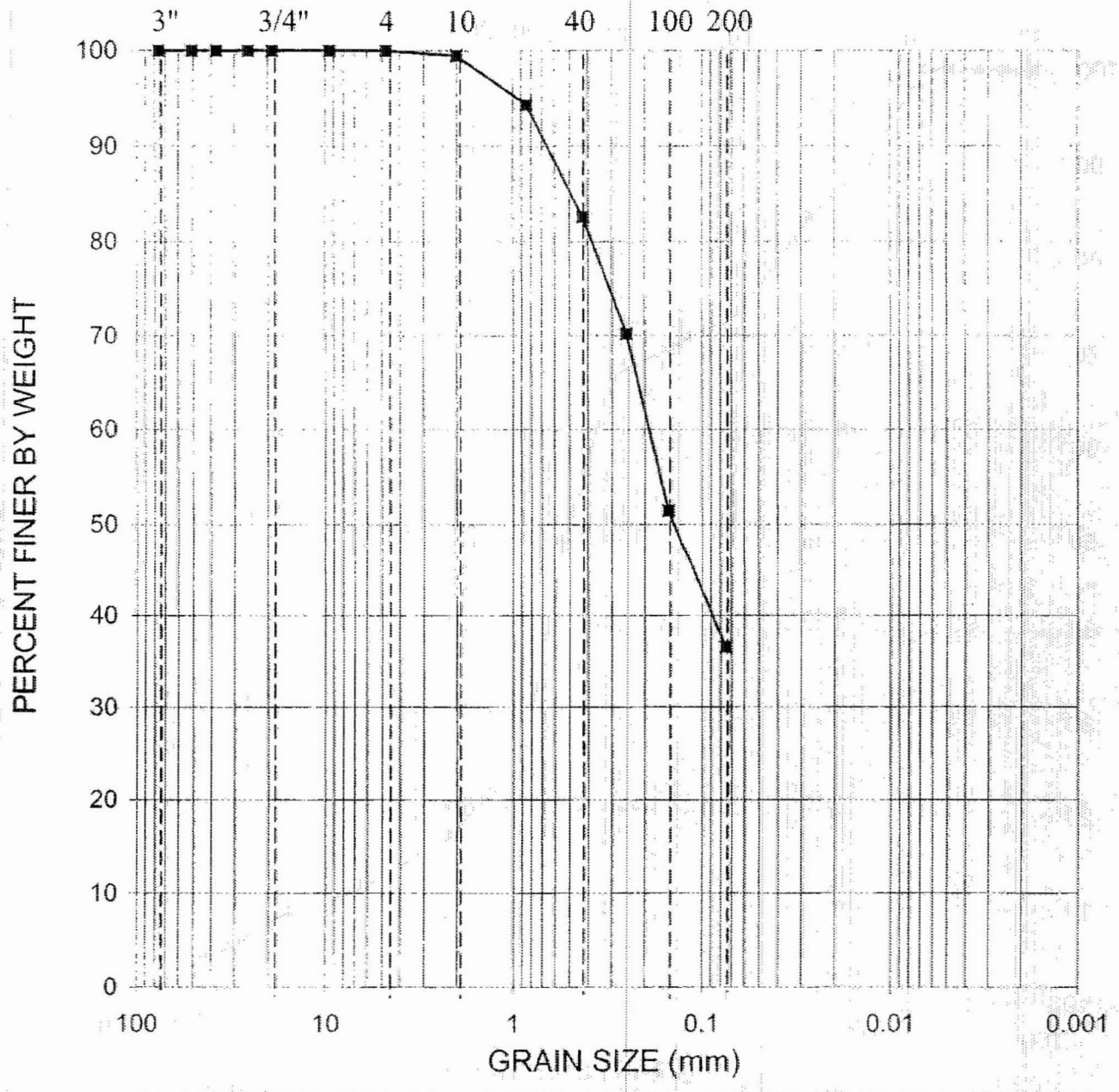

**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 9/8/2006 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-328 | 83.5 | Silty SAND, with shells, gray | SM | NP | NP |

Schnabel Engineering




**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 8/22/2006 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-328 | 103.5 | Silty SAND, dark green | SM | | |

Schnabel Engineering

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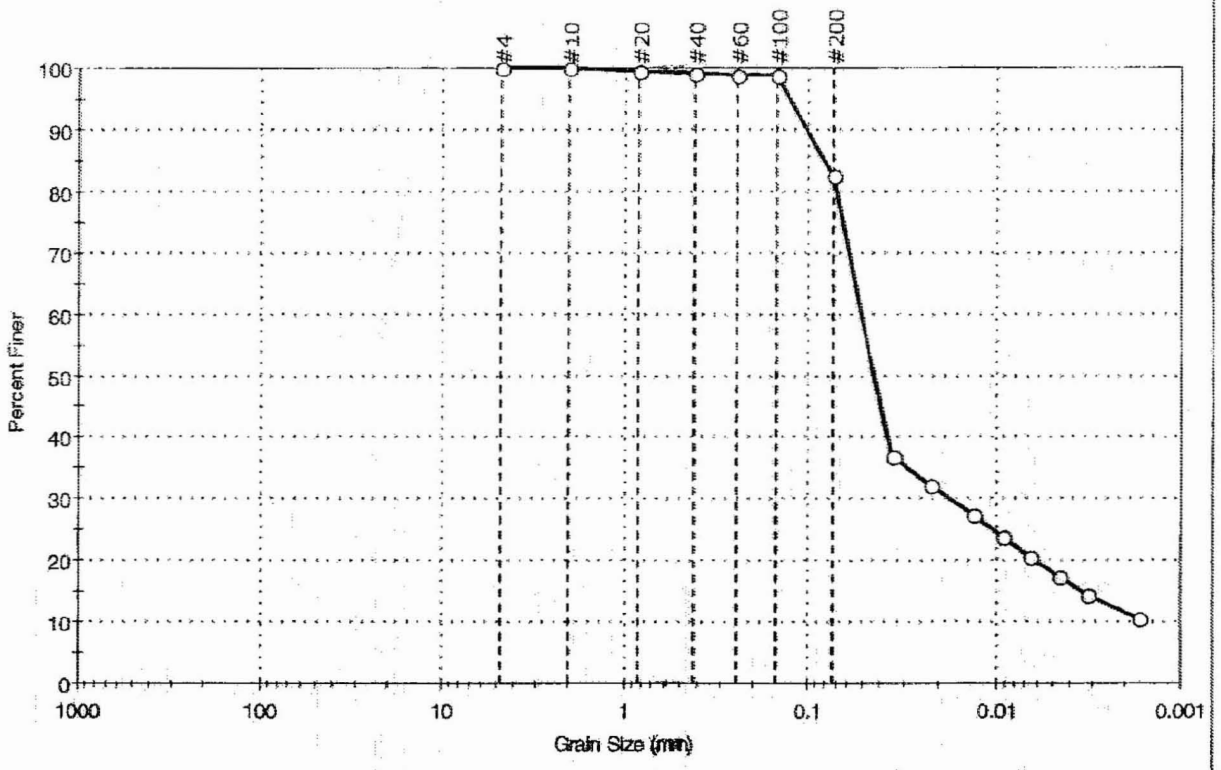
| | | | | | |
|---|---|---|---|---|---|
| Client: | Schnabel Engineering, Inc. | | | | |
| Project: | Subsurface Investigation Calvert Cliffs Nuclear PP | | | | |
| Location: | Calvert County, MD | | | Project No: | GTX-6880 |
| Boring ID: | B-328 | Sample Type: | tube | Tested By: | sam |
| Sample ID: | S-28 | Test Date: | 09/12/06 | Checked By: | mcm |
| Depth : | 123.5-125.5 ft | Test Id: | 97096 | | |
| Test Comment: | --- | | | | |
| Sample Description: | Moist, olive gray silt with sand | | | | |
| Sample Comment: | --- | | | | |

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




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 17.4 | 82.6 |

| 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 | 99 | | |
| #60 | 0.25 | 99 | | |
| #100 | 0.15 | 99 | | |
| #200 | 0.074 | 83 | | |
| --- | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| — | 0.0349 | 37 | | |
| — | 0.0224 | 32 | | |
| — | 0.0130 | 28 | | |
| — | 0.0093 | 24 | | |
| — | 0.0066 | 21 | | |
| — | 0.0046 | 17 | | |
| — | 0.0032 | 14 | | |
| — | 0.0017 | 11 | | |
| | | | | |

**Coefficients**

| | |
|---|---|
| $D_{85}$ = 0.0821 mm | $D_{30}$ = 0.0173 mm |
| $D_{60}$ = 0.0510 mm | $D_{15}$ = 0.0035 mm |
| $D_{50}$ = 0.0432 mm | $D_{10}$ = 0.0015 mm |
| $C_u$ = N/A | $C_c$ = N/A |

**Classification**

ASTM elastic silt with sand (MH)

AASHTO Clayey Soils (A-7-5 (32))

**Sample/Test Description**

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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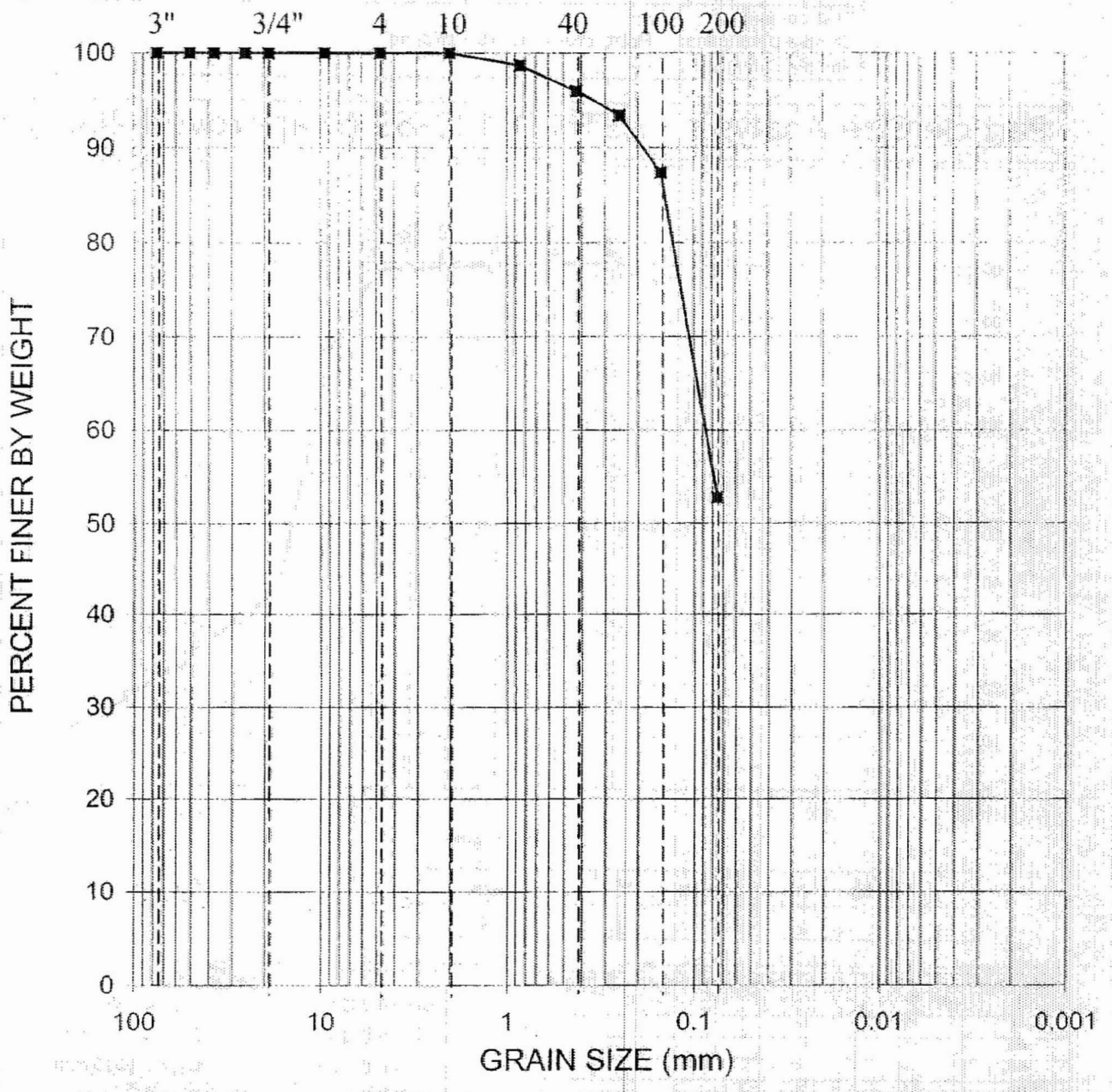
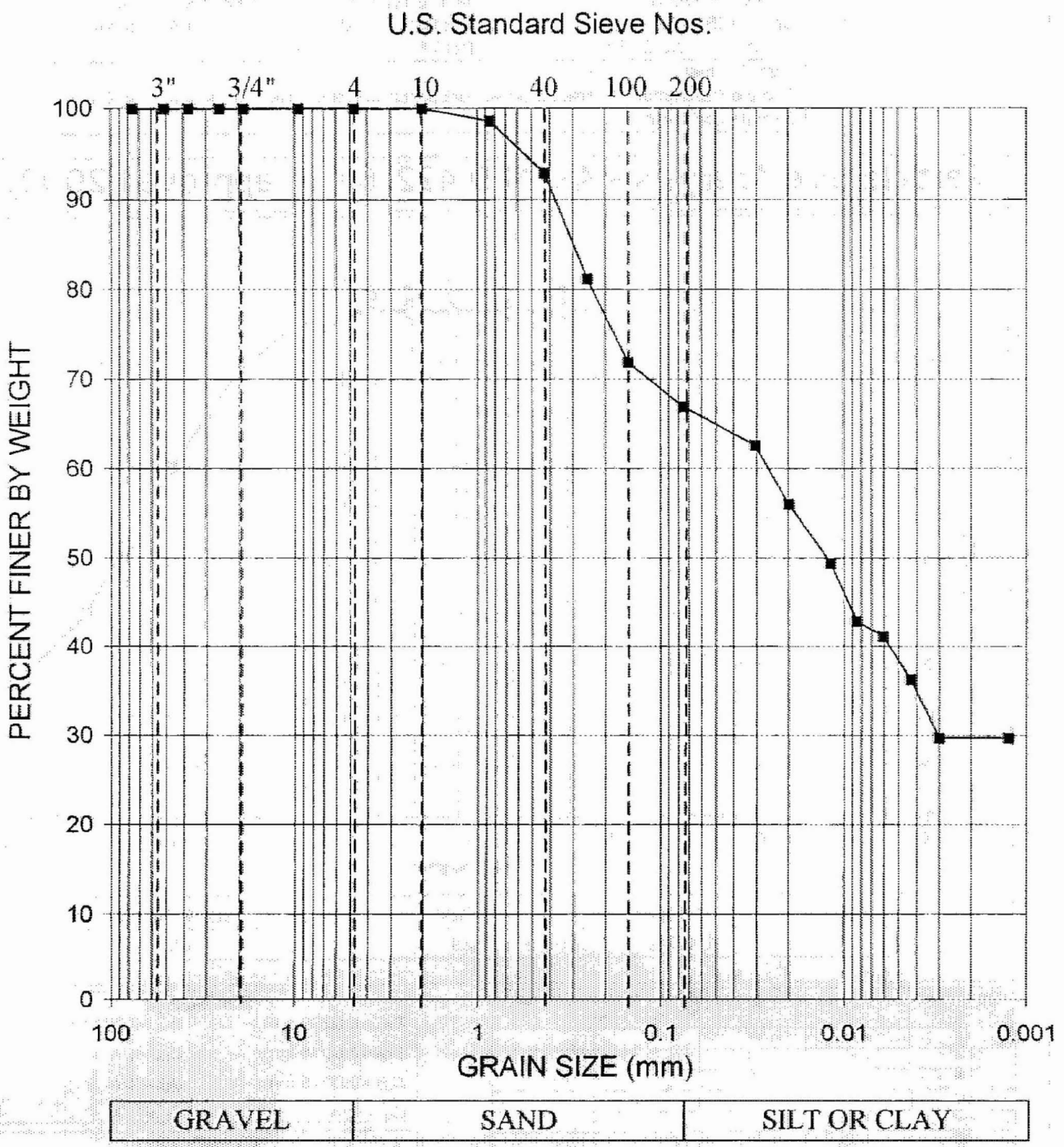



**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 8/28/2006 | |
|---|---|---|---|---|---|---|
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | |
| B-328 | 133.5 | SANDY ELASTIC SILT, dark green | MH | 70 | 19 | 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: | 10/11/2006 |
|---|---|---|---|---|---|---|---|
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| B-331 | 5 | Sandy LEAN CLAY, brown | CL | 43 | 28 | | |

Schnabel Engineering

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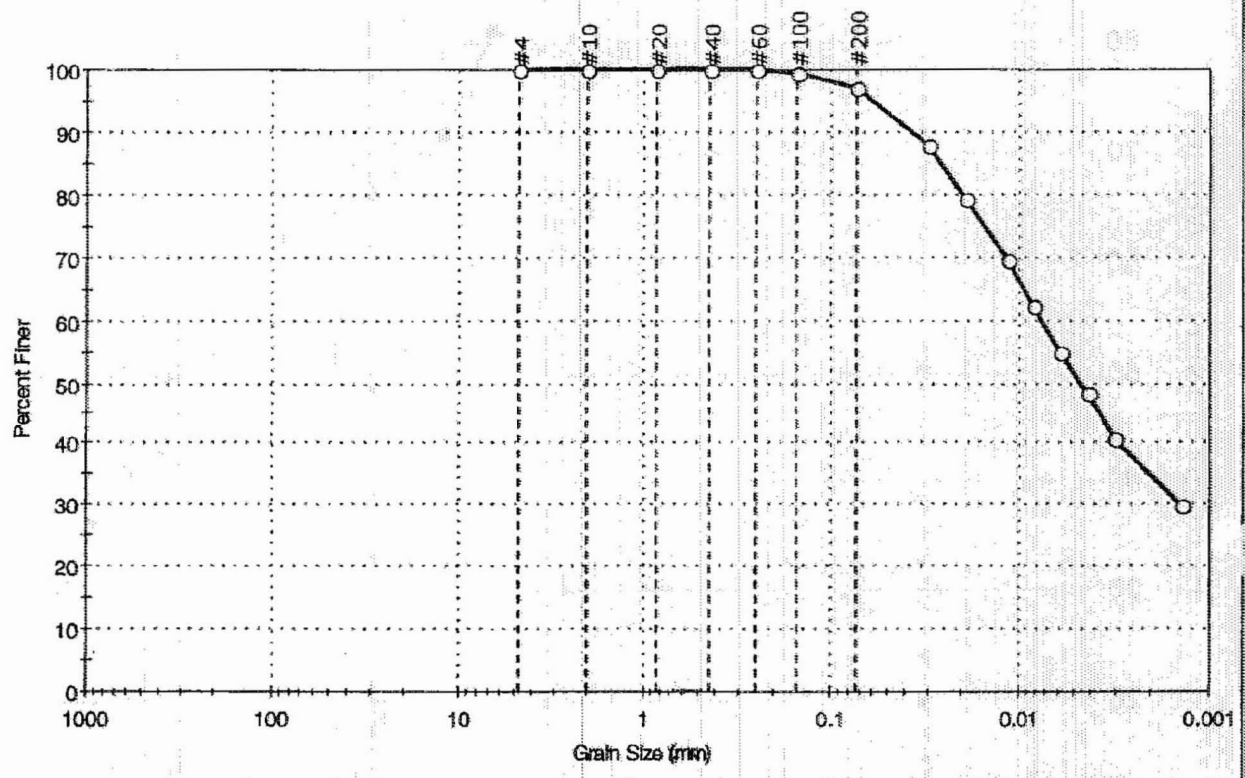
| | | | | | |
|---|---|---|---|---|---|
| Client: | Schnabel Engineering, Inc. | | | | |
| Project: | Subsurface Investigation Calvert Cliffs Nuclear PP | | | | |
| Location: | Calvert County, MD | | | Project No: | GTX-6880 |
| Boring ID: | B-331 | Sample Type: | tube | Tested By: | sam |
| Sample ID: | S-7 | Test Date: | 10/17/06 | Checked By: | mcm |
| Depth : | 18.5-20.5 ft | Test Id: | 100409 | | |
| Test Comment: | --- | | | | |
| Sample Description: | Moist, mottled dark greenish gray, dusky red, and reddish brown clay | | | | |
| Sample Comment: | --- | | | | |

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




| %Cobble | %Gravel | %Sand | %Silt & Clay Size |
|---|---|---|---|
| -- | 0.0 | 2.9 | 97.1 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| #4 | 4.75 | 100 | | |
| #10 | 2.00 | 100 | | |
| #20 | 0.84 | 100 | | |
| #40 | 0.42 | 100 | | |
| #60 | 0.25 | 100 | | |
| #100 | 0.15 | 99 | | |
| #200 | 0.074 | 97 | | |
| --- | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0300 | 88 | | |
| --- | 0.0192 | 79 | | |
| --- | 0.0113 | 69 | | |
| --- | 0.0082 | 62 | | |
| --- | 0.0059 | 55 | | |
| --- | 0.0042 | 48 | | |
| --- | 0.0030 | 41 | | |
| --- | 0.0014 | 30 | | |

**Coefficients**

| | |
|---|---|
| $D_{85}$ = 0.0258 mm | $D_{30}$ = 0.0014 mm |
| $D_{60}$ = 0.0074 mm | $D_{15}$ = N/A |
| $D_{50}$ = 0.0046 mm | $D_{10}$ = N/A |
| $C_u$ = N/A | $C_c$ = N/A |

**Classification**

ASTM fat clay (CH)

AASHTO Clayey Soils (A-7-6 (41))

**Sample/Test Description**

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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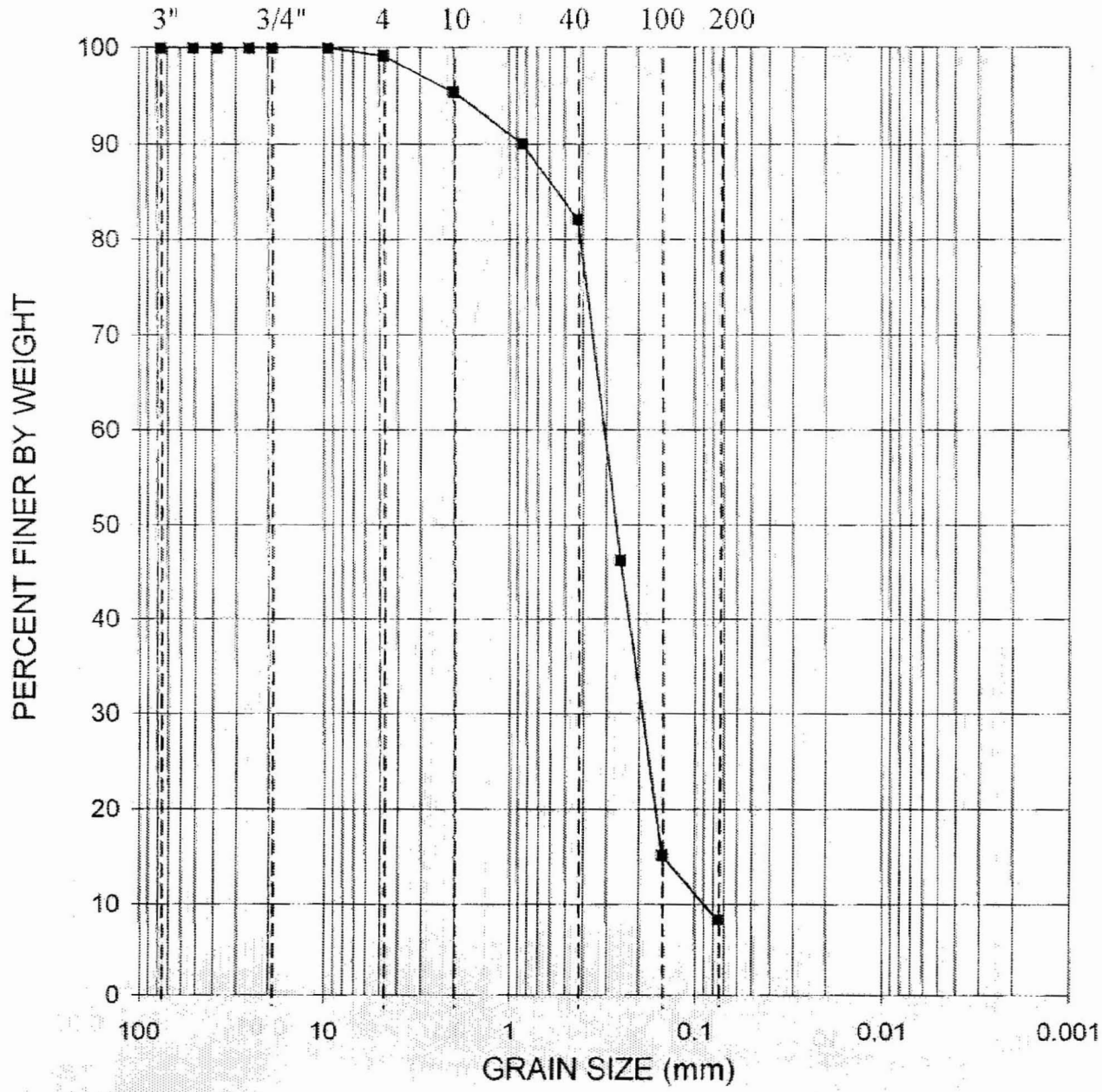


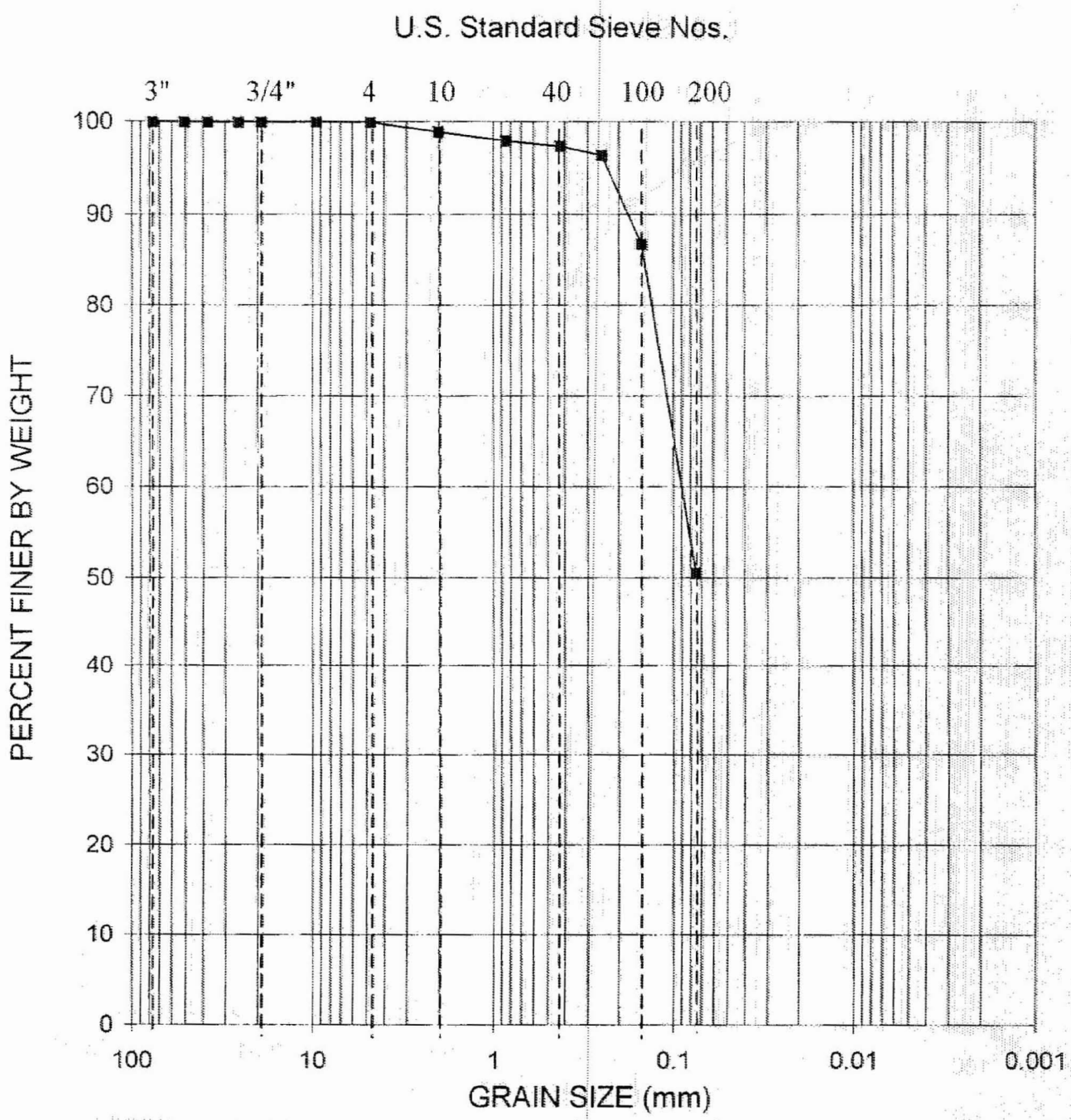

**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 10/3/2006 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-331 | 33.5 | Poorly Graded SAND, with silt, trace shells, dark green | SP-SM | | |

Schnabel Engineering



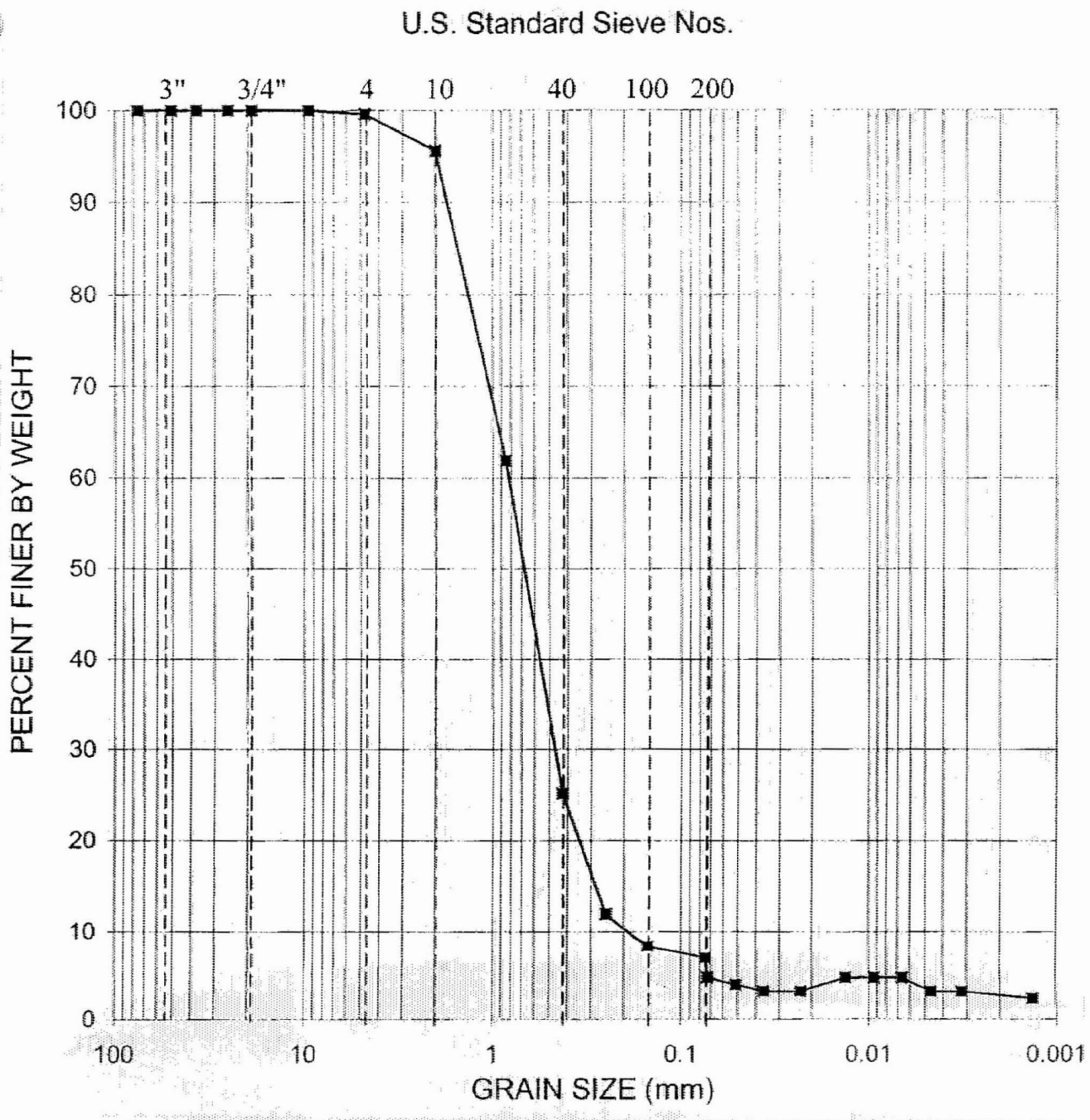

**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 10-03-06 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-331 | 43.5 | Sandy SILT, contains shells, gray | SM | | |

Schnabel Engineering



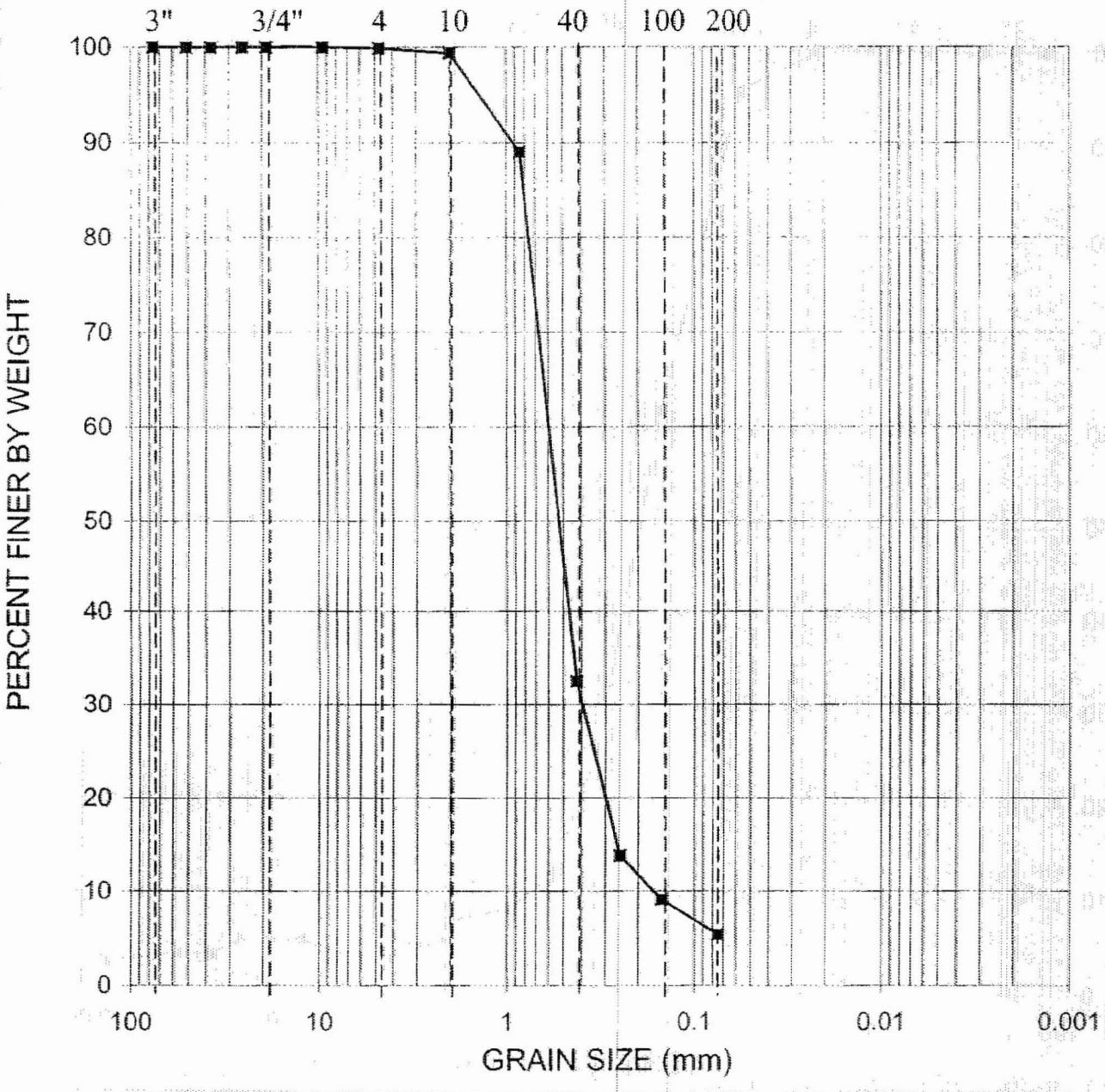

**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 8/26/2006 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-333 | 2.5 | Poorly Graded SAND, with silt, brown | SP-SM | | |

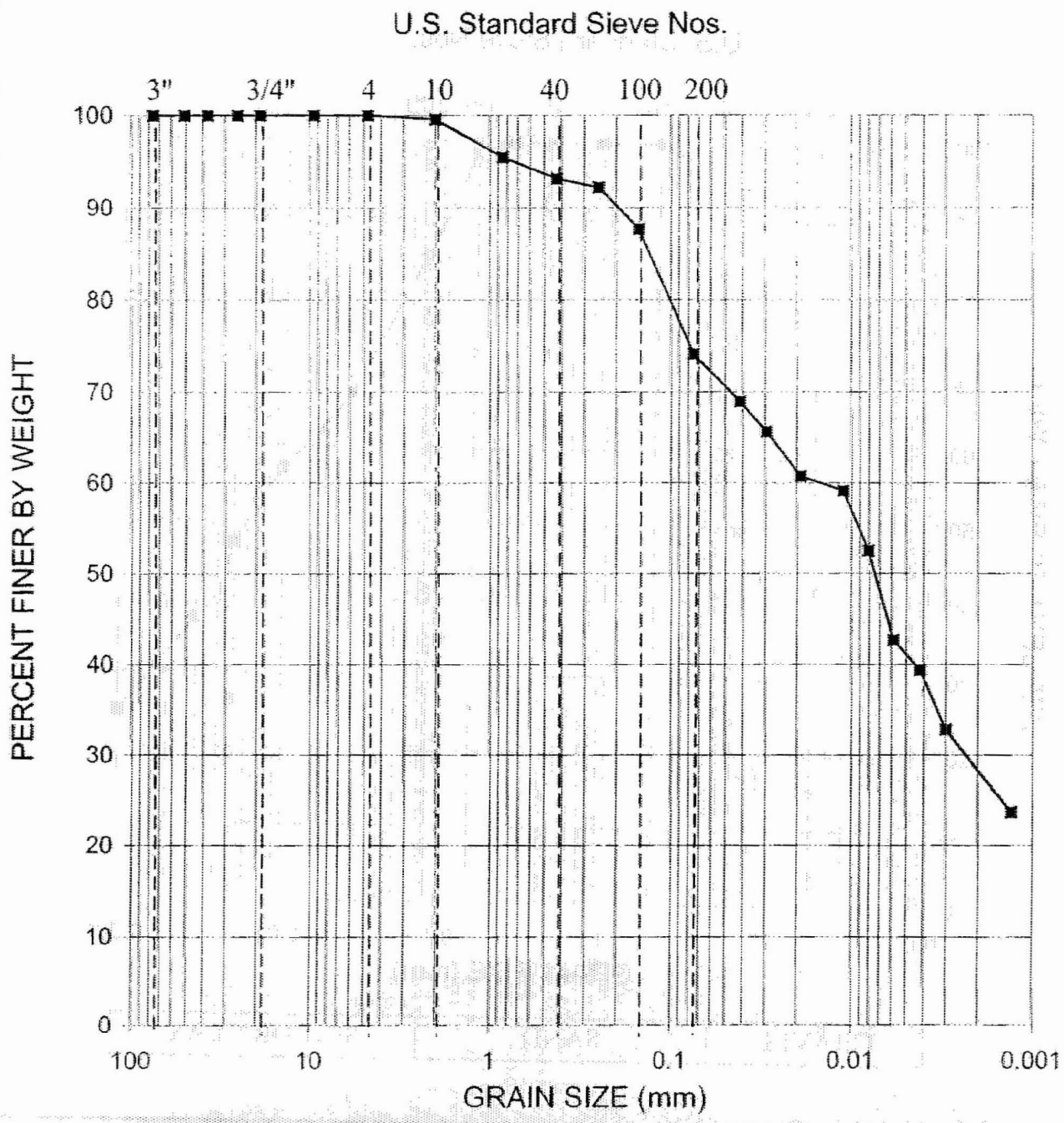
Schnabel Engineering




**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 8/22/2006 | |
|---|---|---|---|---|---|---|
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | |
| B-333 | 7.5 | Poorly Graded SAND, with silt, tan | SP-SM | | | Schnabel Engineering |




**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | | Contract No.: 06120048.00 | | Date: 9/8/2006 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-333 | 23.5 | FAT CLAY, with sand, dark gray | CH | 57 | 24 |

Schnabel Engineering