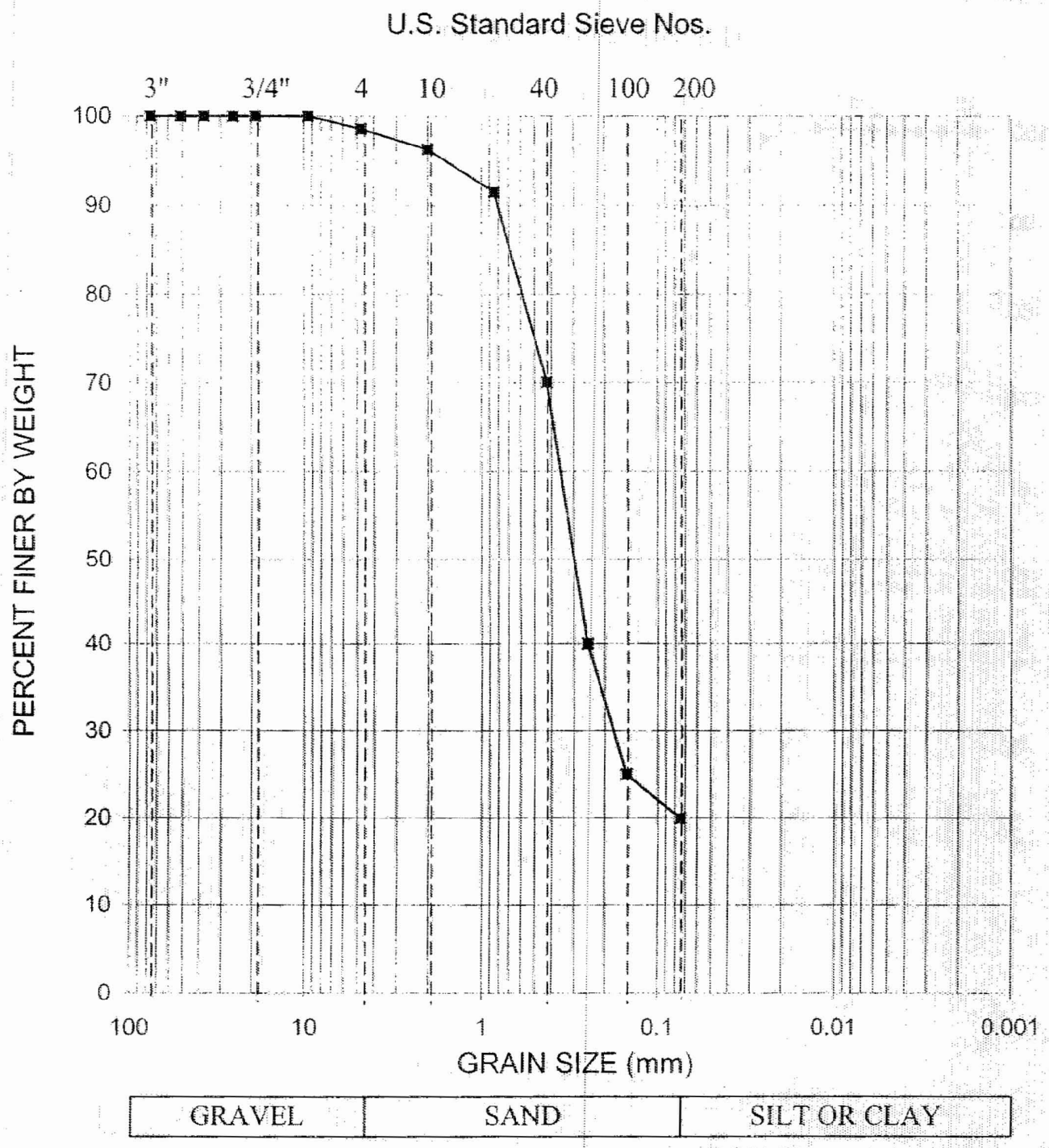


**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: 06120048.00 | Date: 8/21/2006 |
|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-319 | 23.5 | Clayey SAND, trace gravel, light brown | SC | | |

Schnabel

Schnabel Engineering

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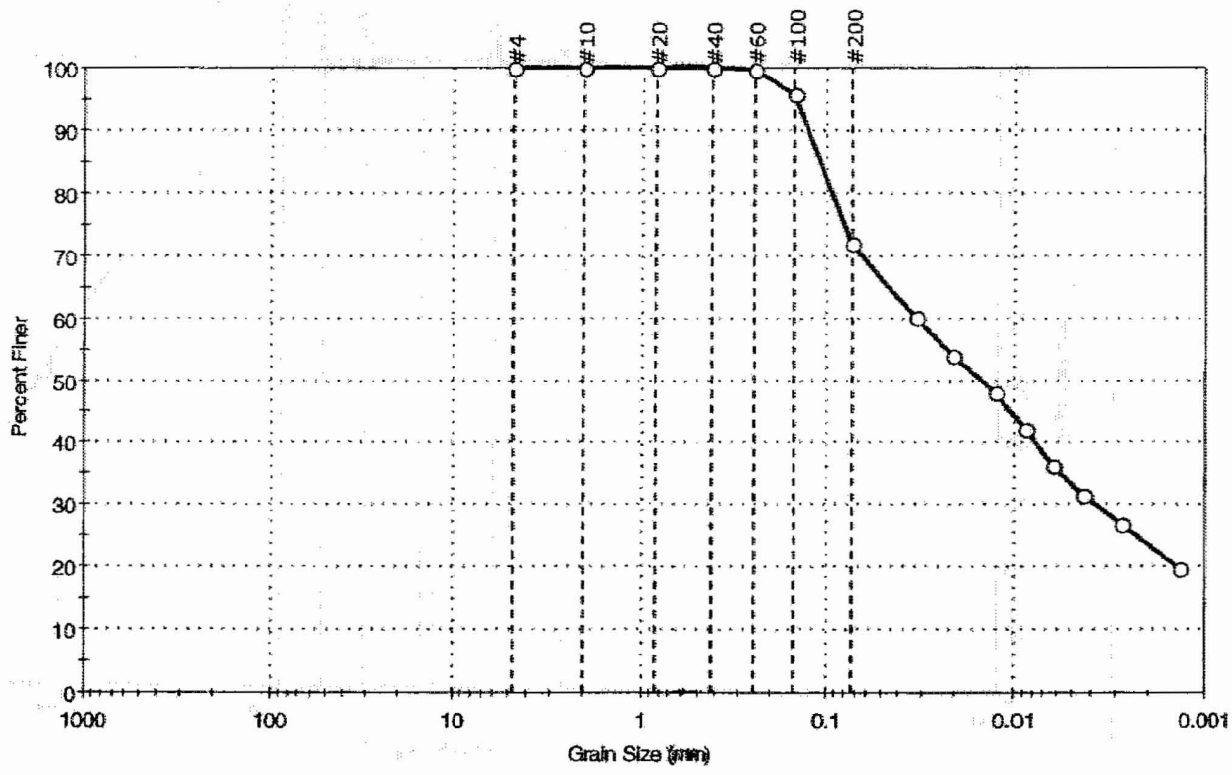
| | | | |
|---|---|---|---|
| Client: | Schnabel Engineering, Inc. | | |
| Project: | Subsurface Investigation Calvert Cliffs Nuclear PP | | |
| Location: | Calvert County, MD | Project No: | GTX-6880 |
| Boring ID: B-319 | Sample Type: tube | Tested By: | sam |
| Sample ID: S-10 | Test Date: 09/08/06 | Checked By: | mcm |
| Depth : 33.5-35.5 ft | Test Id: 95775 | | |
| Test Comment: --- | | | |
| Sample Description: | Moist, dark gray clay with sand | | |
| Sample Comment: --- | | | |

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




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 28.0 | 72.0 |

| 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 | 96 | | |
| #200 | 0.074 | 72 | | |
| --- | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0328 | 60 | | |
| --- | 0.0207 | 54 | | |
| --- | 0.0122 | 48 | | |
| --- | 0.0087 | 42 | | |
| --- | 0.0063 | 36 | | |
| --- | 0.0044 | 32 | | |
| --- | 0.0028 | 27 | | |
| --- | 0.0014 | 20 | | |
| | | | | |

**Coefficients**

| | |
|---|---|
| $D_{85}$ = 0.1081 mm | $D_{30}$ = 0.0038 mm |
| $D_{60}$ = 0.0326 mm | $D_{15}$ = N/A |
| $D_{50}$ = 0.0145 mm | $D_{10}$ = N/A |
| $C_u$ = N/A | $C_c$ = N/A |

**Classification**

ASTM lean clay with sand (CL)

AASHTO Clayey Soils (A-7-6 (28))

**Sample/Test Description**

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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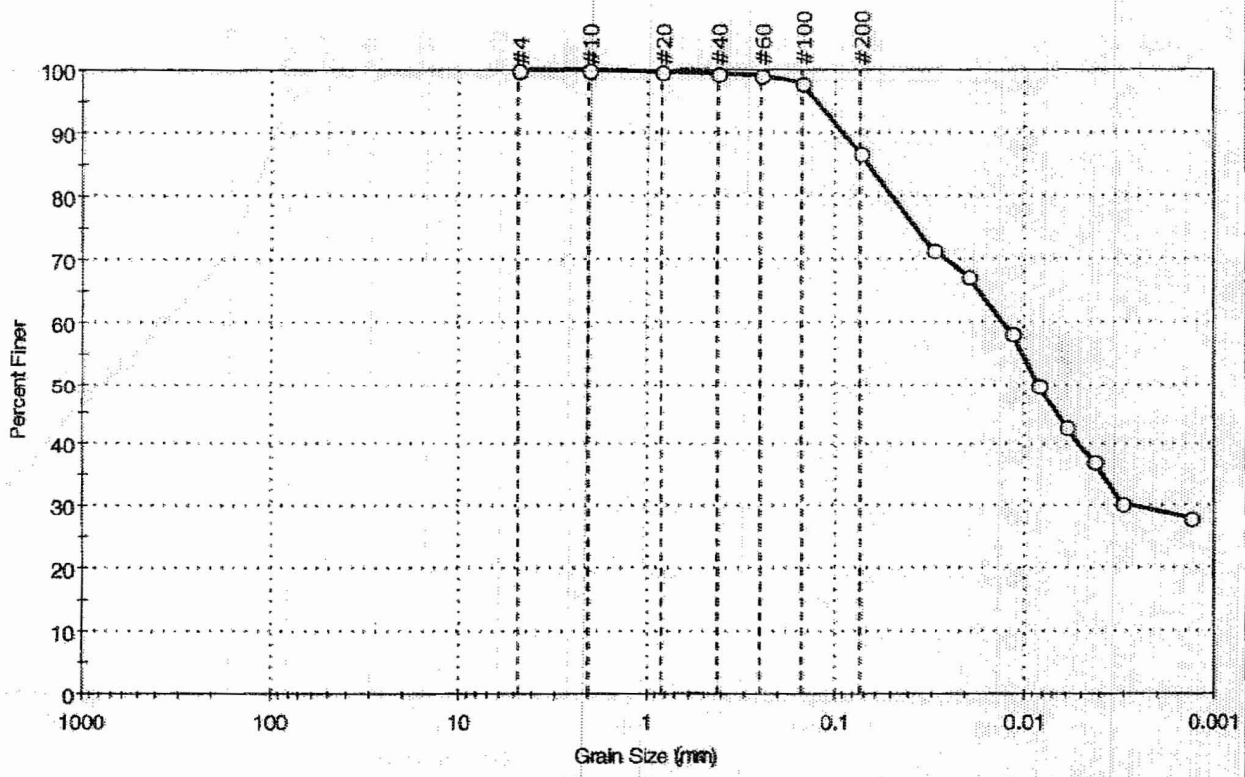
| | | | |
|---|---|---|---|
| Client: | Schnabel Engineering, Inc. | | |
| Project: | Subsurface Investigation Calvert Cliffs Nuclear PP | | |
| Location: | Calvert County, MD | Project No: | GTX-6880 |
| Boring ID: B-319 | Sample Type: tube | Tested By: | sam |
| Sample ID: S-12 | Test Date: 09/07/06 | Checked By: | mcm |
| Depth : 43.5-45.2 ft | Test Id: 95776 | | |
| Test Comment: --- | | | |
| Sample Description: | Moist, dark gray clay | | |
| Sample Comment: | --- | | |

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




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 13.3 | 86.7 |

| 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 | 99 | | |
| #60 | 0.25 | 99 | | |
| #100 | 0.15 | 98 | | |
| #200 | 0.074 | 87 | | |
| --- | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0296 | 71 | | |
| --- | 0.0190 | 67 | | |
| --- | 0.0114 | 58 | | |
| --- | 0.0083 | 50 | | |
| --- | 0.0060 | 43 | | |
| --- | 0.0043 | 37 | | |
| --- | 0.0031 | 30 | | |
| --- | 0.0013 | 28 | | |
| | | | | |

**Coefficients**

$D_{85}$ = 0.0670 mm  $D_{30}$ = 0.0027 mm
$D_{60}$ = 0.0127 mm  $D_{15}$ = N/A
$D_{50}$ = 0.0083 mm  $D_{10}$ = N/A
$C_u$ = N/A  $C_c$ = N/A

**Classification**

ASTM fat clay (CH)

AASHTO Clayey Soils (A-7-6 (46))

**Sample/Test Description**

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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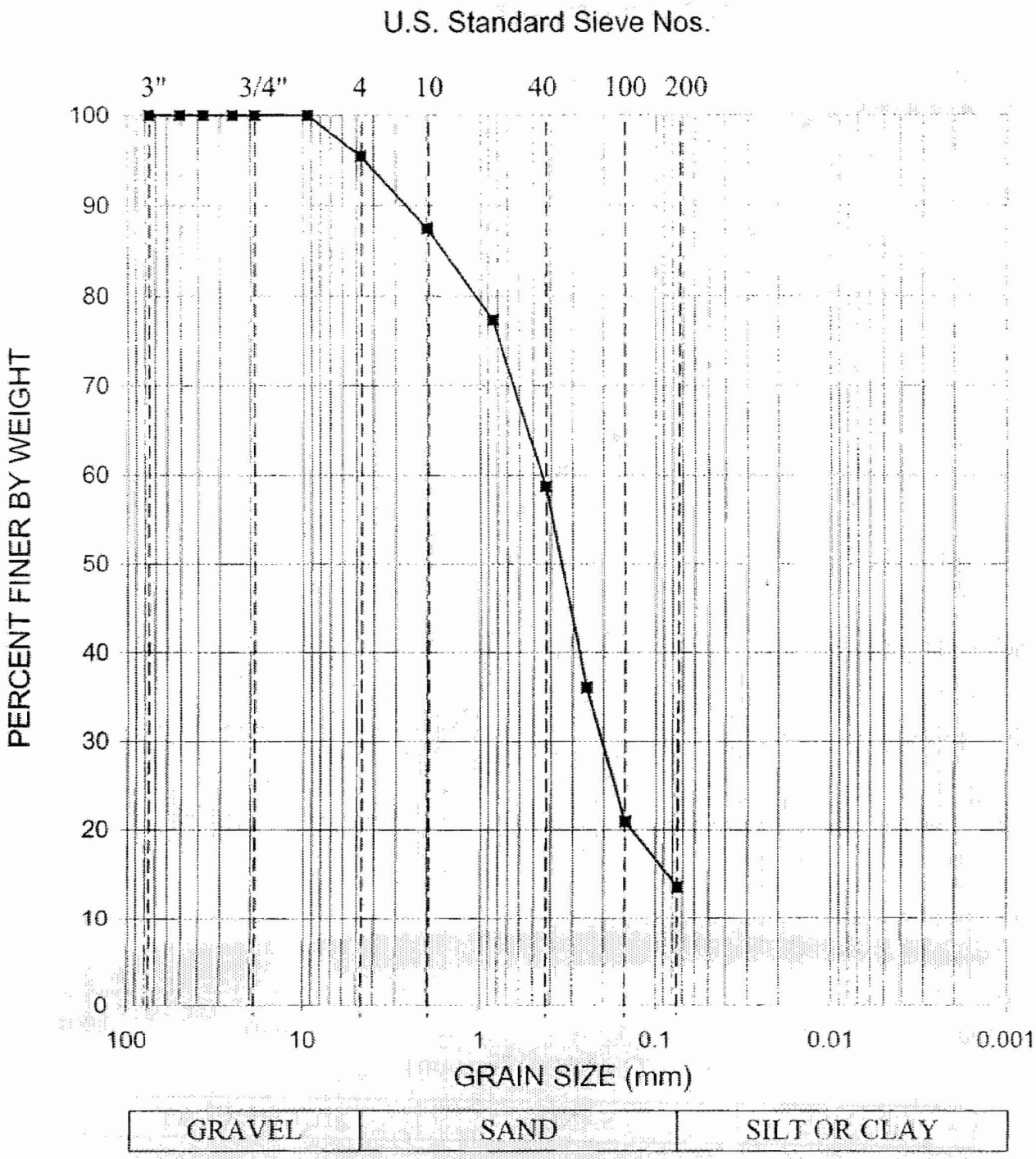


**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: 06120048.00 | Date: 8/21/2006 |
|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-319 | 73.5 | Silty SAND, trace shells, gray | SM | | |

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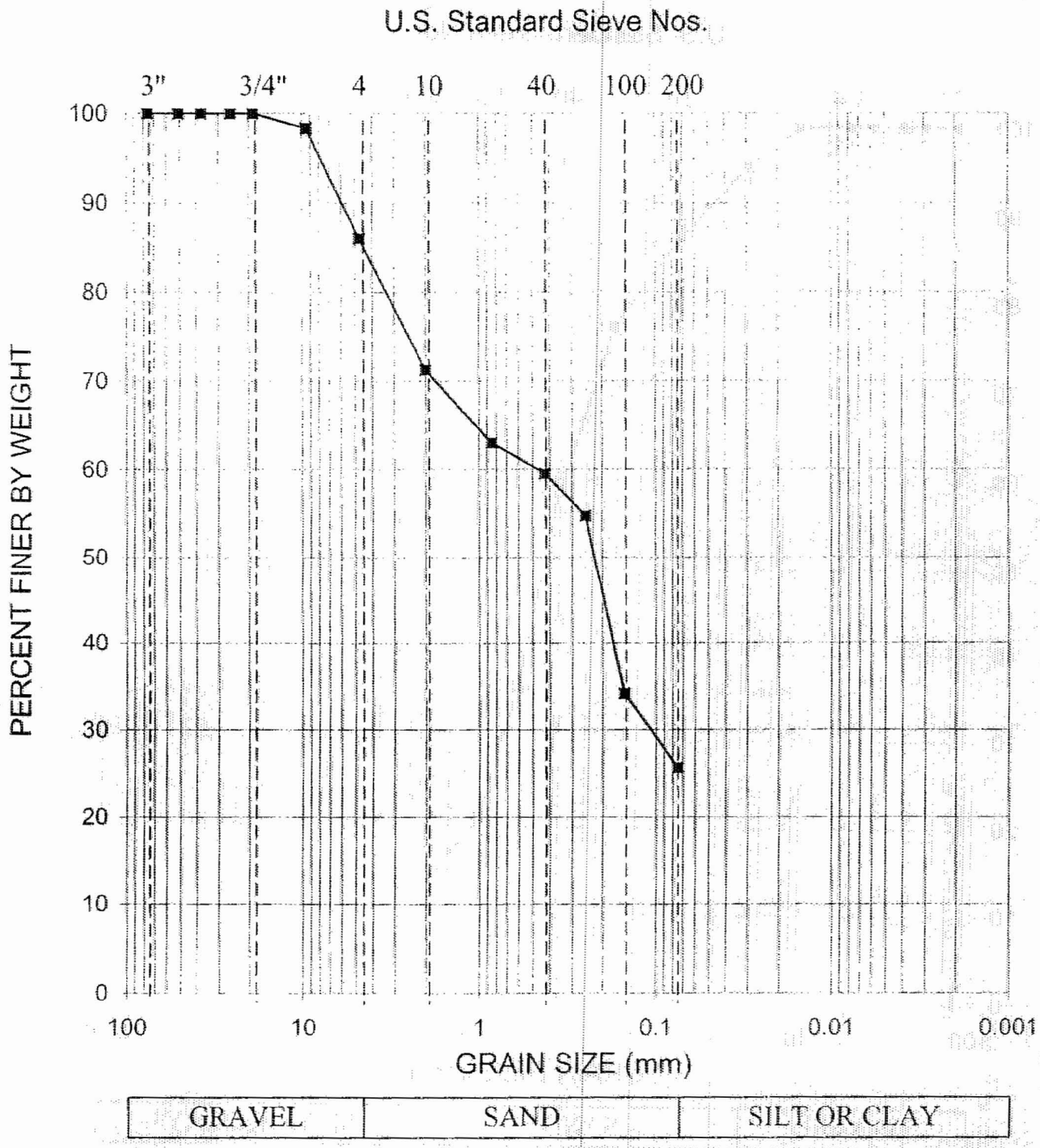


**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: 06120048.00 | Date: 8/21/2006 |
|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-319 | 83.5 | Silty SAND, trace cemented sand , green | SM | | |

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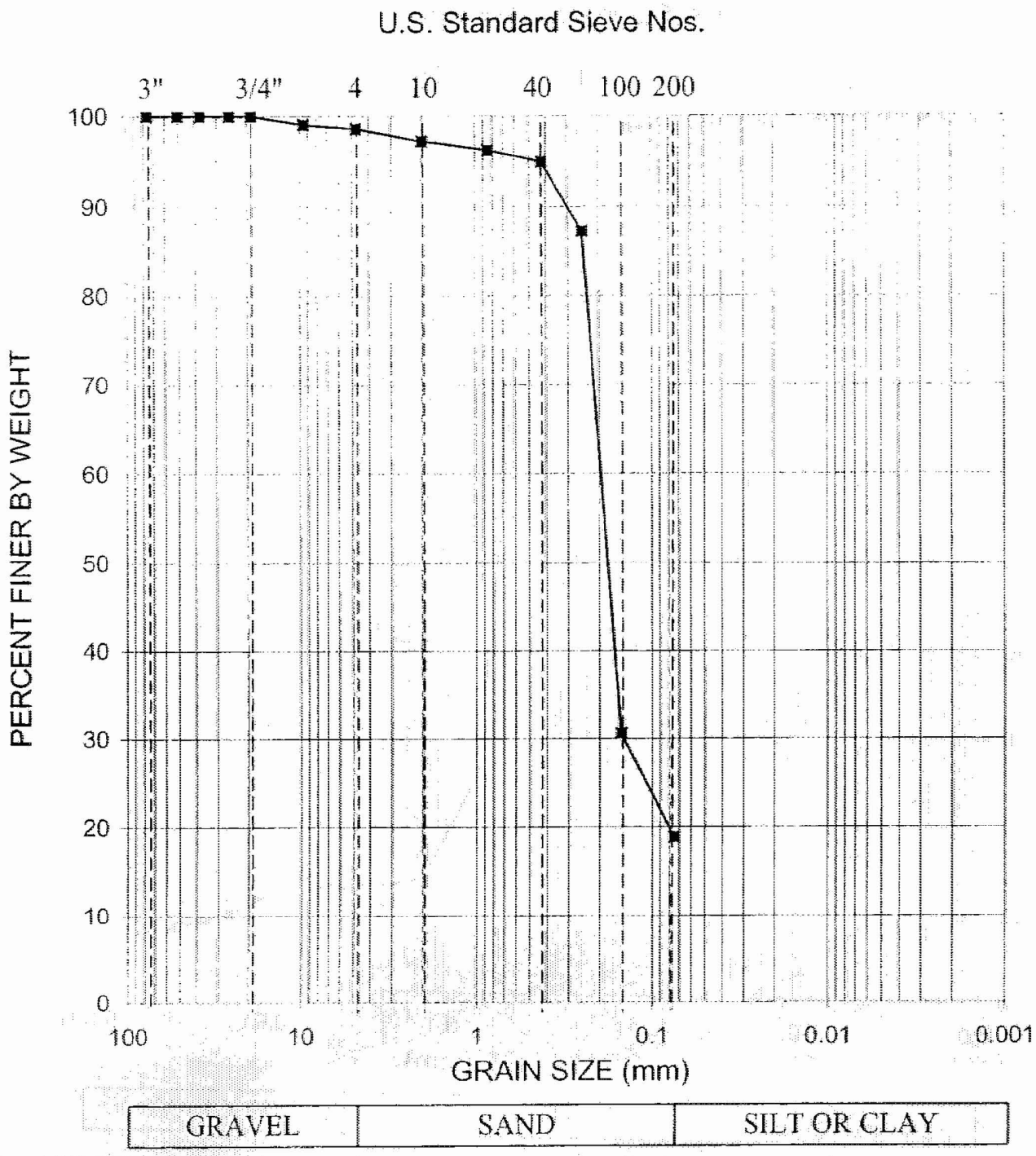


**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: | 06120048.00 | Date: | 8/21/2006 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-319 | 88.5 | Silty SAND, trace shells, gray | SM | | |

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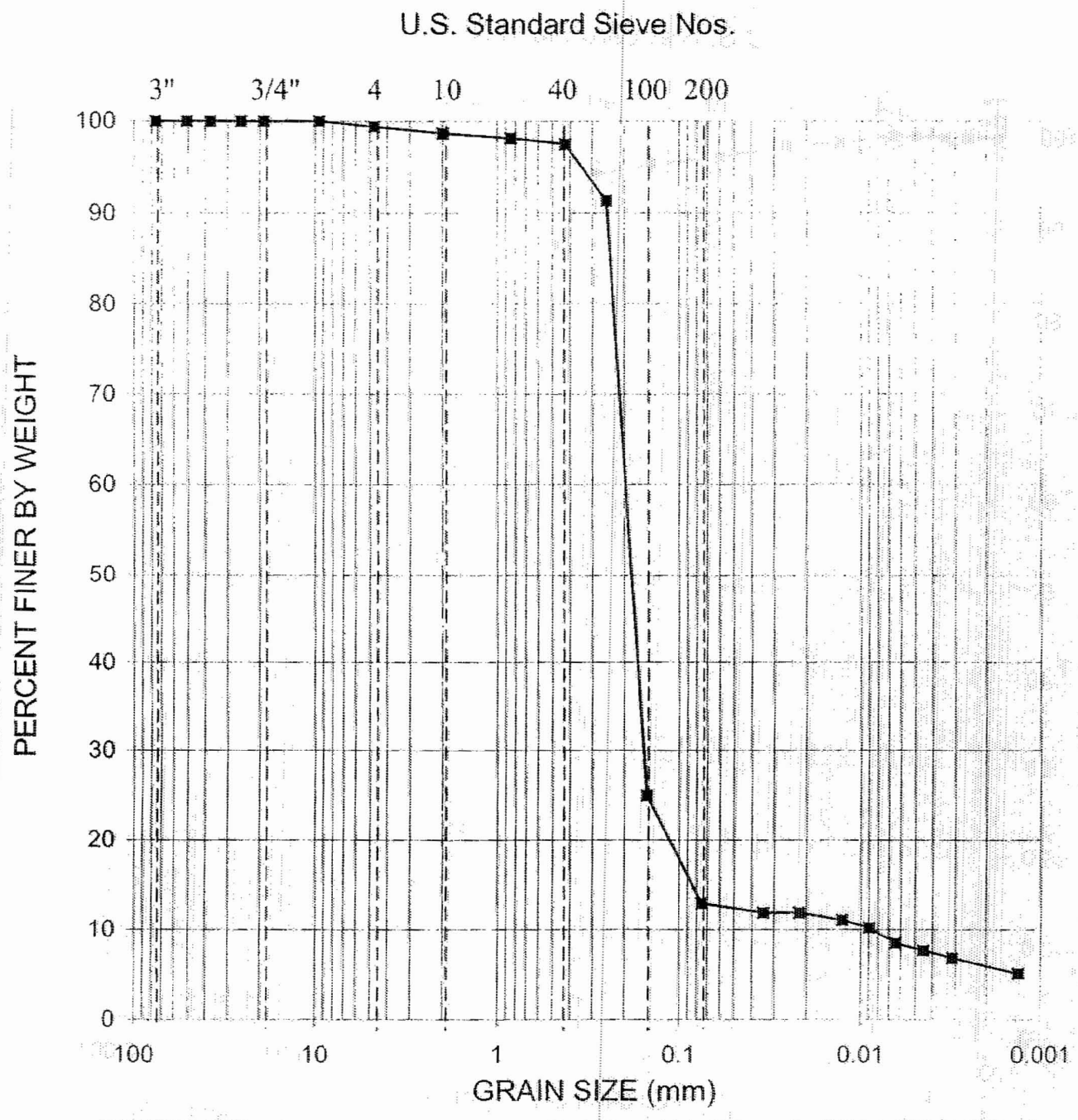


**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: 06120048.00 | Date: 8/31/2006 |
|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-319 | 98.5 | Silty SAND, trace shells, dark green | SM | NP | NP |

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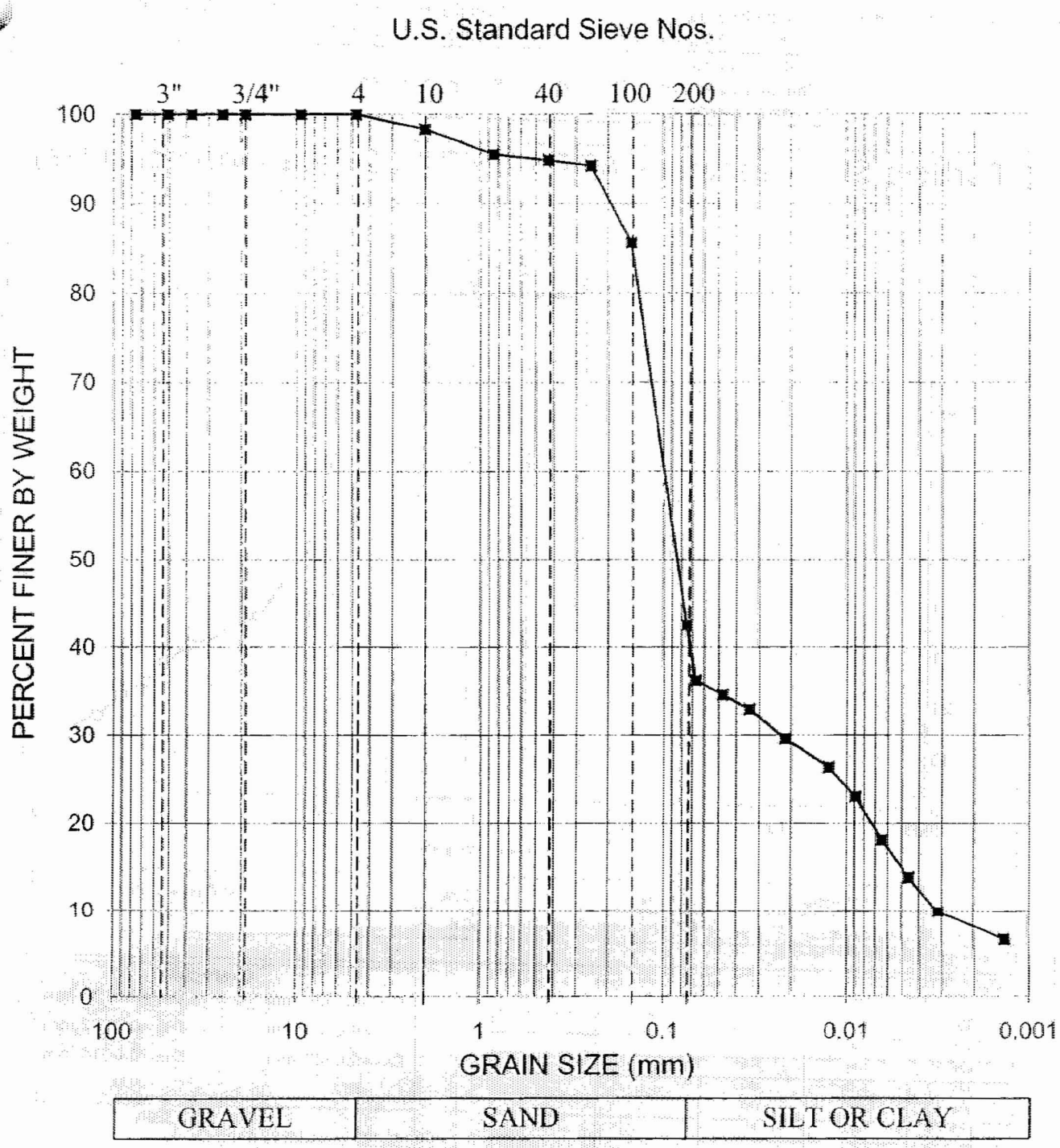


**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: 06120048.00 | Date: 8/31/2006 |
|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-320 | 33.5 | Clayey SAND, dark gray | SC | 33 | 15 |

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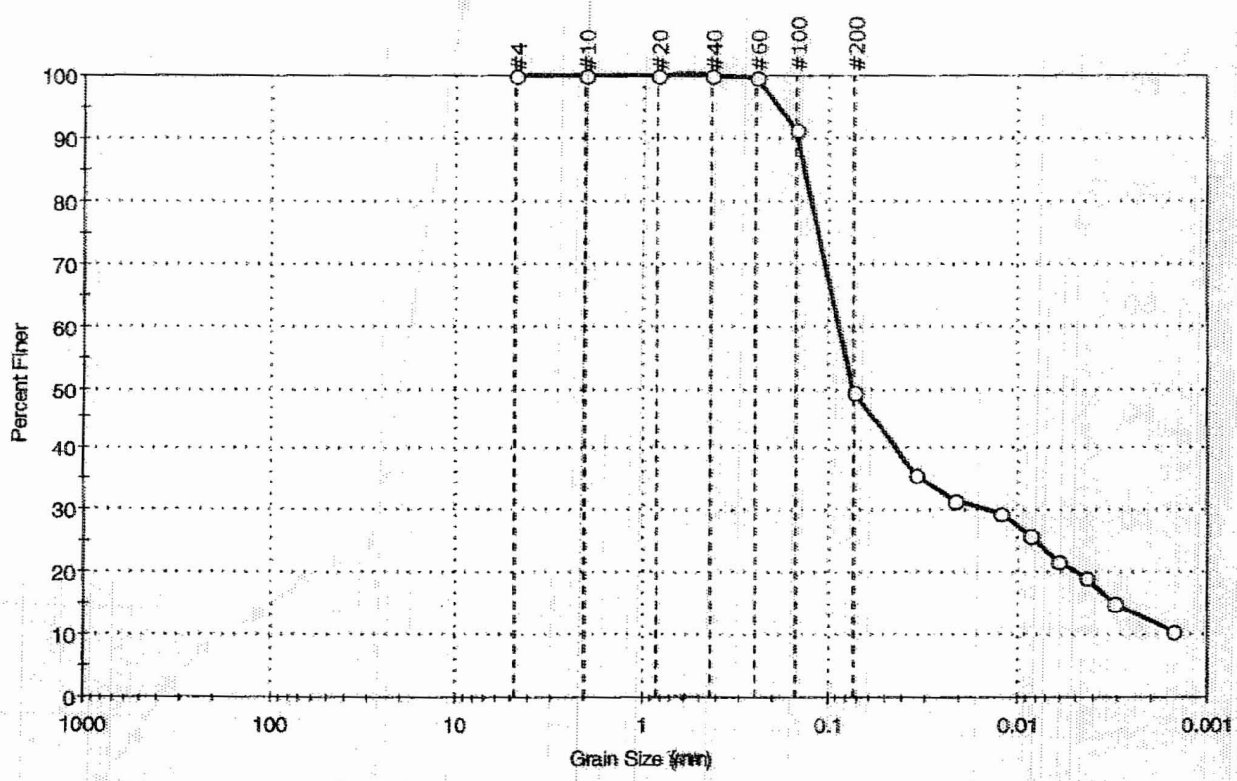
| | | | |
|---|---|---|---|
| Client: | Schnabel Engineering, Inc. | | |
| Project: | Subsurface Investigation Calvert Cliffs Nuclear PP | | |
| Location: | Calvert County, MD | Project No: | GTX-6880 |
| Boring ID: B-320 | Sample Type: tube | Tested By: | sam |
| Sample ID: S-11 | Test Date: 10/12/06 | Checked By: | mcm |
| Depth : 38.5-40.5 ft | Test Id: 100202 | | |

Test Comment: ---
Sample Description: Moist, very dark gray clayey sand
Sample Comment: ---

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




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 50.6 | 49.4 |

| 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 | 92 | | |
| #200 | 0.074 | 49 | | |
| --- | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0339 | 36 | | |
| --- | 0.0211 | 32 | | |
| --- | 0.0122 | 30 | | |
| --- | 0.0086 | 26 | | |
| --- | 0.0062 | 22 | | |
| --- | 0.0044 | 19 | | |
| --- | 0.0032 | 15 | | |
| --- | 0.0015 | 11 | | |

**Coefficients**

$D_{85}$ = 0.1336 mm  $D_{30}$ = 0.0137 mm
$D_{60}$ = 0.0882 mm  $D_{15}$ = 0.0032 mm
$D_{50}$ = 0.0747 mm  $D_{10}$ = 0.0014 mm
$C_u$ = N/A  $C_c$ = N/A

**Classification**

ASTM  Clayey sand (SC)

AASHTO  Clayey Soils (A-6 (8))

**Sample/Test Description**

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---

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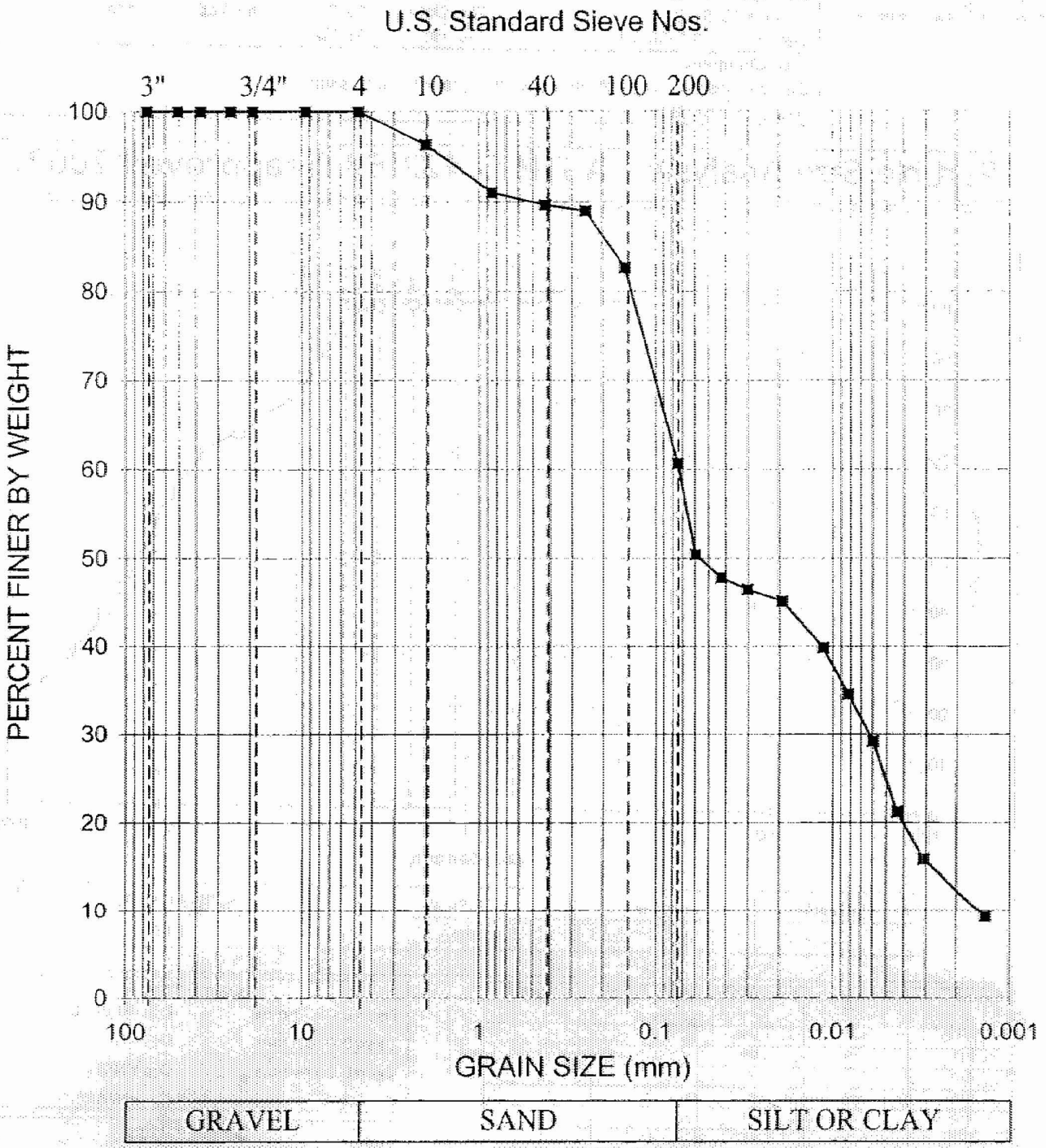


**GRADATION CURVE**

ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: 06120048.00 | Date: 9/6/2006 |
|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-320 | 43.5 | Sandy FAY CLAY, dark gray | CH | 56 | 37 |

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Schnabel Engineering

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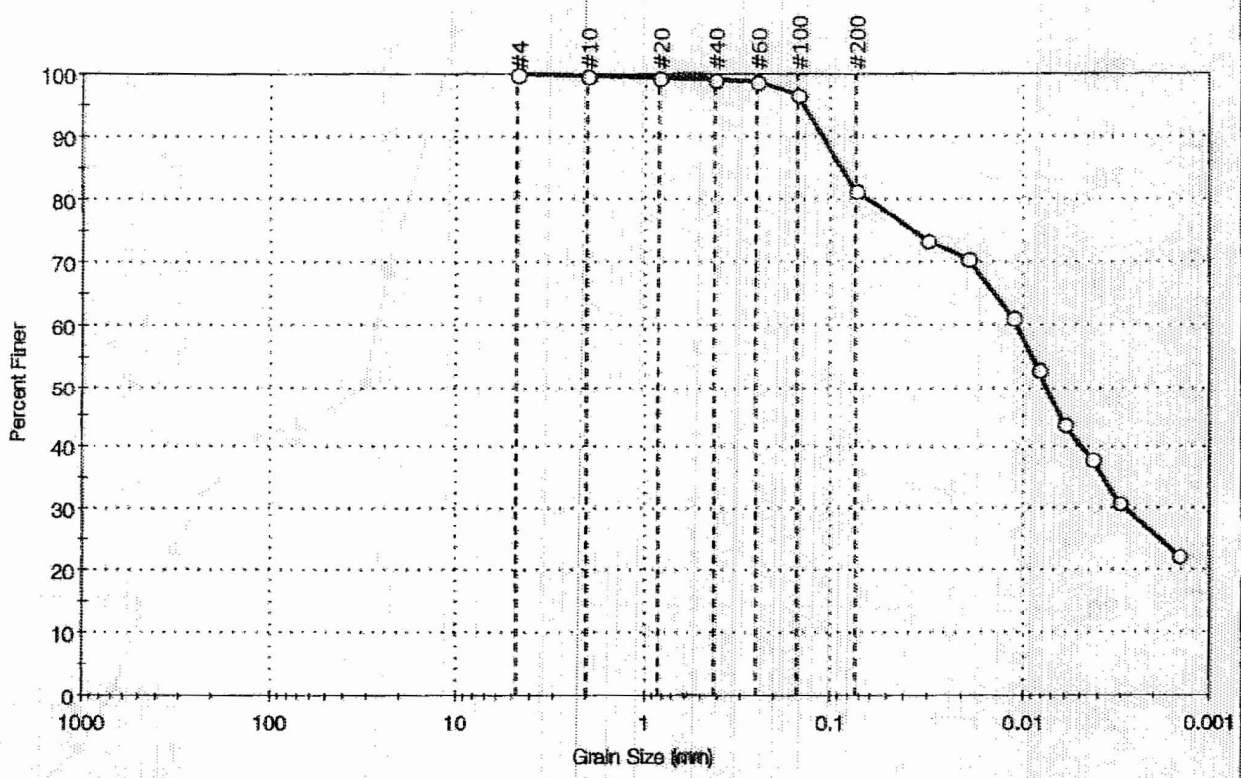
| | | | |
|---|---|---|---|
| Client: | Schnabel Engineering, Inc. | | |
| Project: | Subsurface Investigation Calvert Cliffs Nuclear PP | | |
| Location: | Calvert County, MD | Project No: | GTX-6880 |
| Boring ID: B-320 | Sample Type: tube | Tested By: | sam |
| Sample ID:S-13 | Test Date: 09/29/06 | Checked By: | mcm |
| Depth : 48.5-50.0 ft | Test Id: 95767 | | |
| Test Comment: --- | | | |
| Sample Description: | Moist, dark olive gray clay with sand | | |
| Sample Comment: --- | | | |

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




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 18.5 | 81.5 |

| 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 | 97 | | |
| #200 | 0.074 | 82 | | |
| --- | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0303 | 74 | | |
| --- | 0.0190 | 70 | | |
| --- | 0.0112 | 61 | | |
| --- | 0.0081 | 53 | | |
| --- | 0.0059 | 44 | | |
| --- | 0.0042 | 38 | | |
| --- | 0.0031 | 31 | | |
| --- | 0.0015 | 22 | | |
| | | | | |

**Coefficients**

$D_{85}$ = 0.0869 mm  $D_{30}$ = 0.0028 mm
$D_{60}$ = 0.0107 mm  $D_{15}$ = N/A
$D_{50}$ = 0.0074 mm  $D_{10}$ = N/A
$C_u$ = N/A  $C_c$ = N/A

**Classification**

ASTM fat clay with sand (CH)

AASHTO Clayey Soils (A-7-6 (38))

**Sample/Test Description**

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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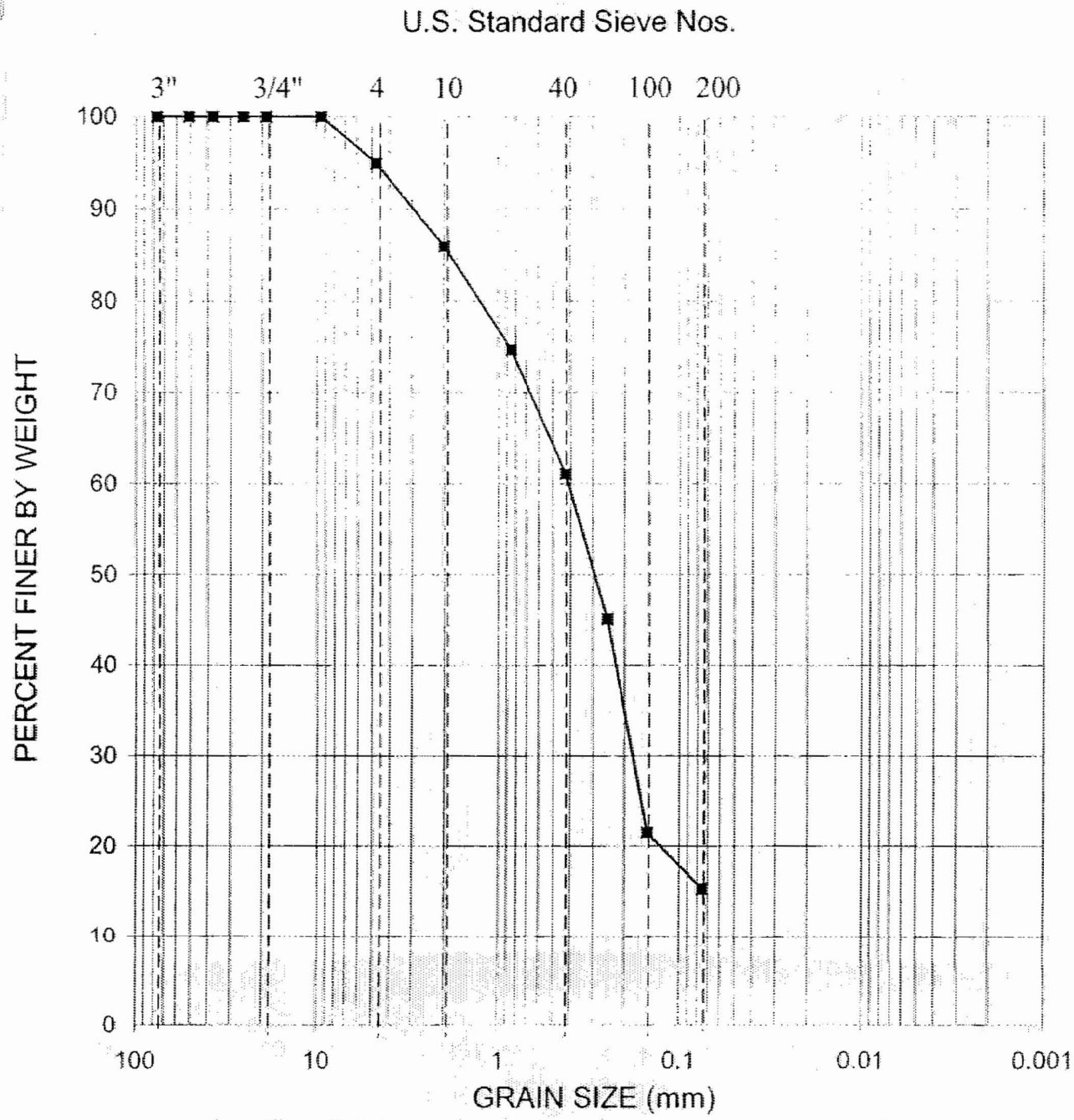



**GRADATION CURVE**

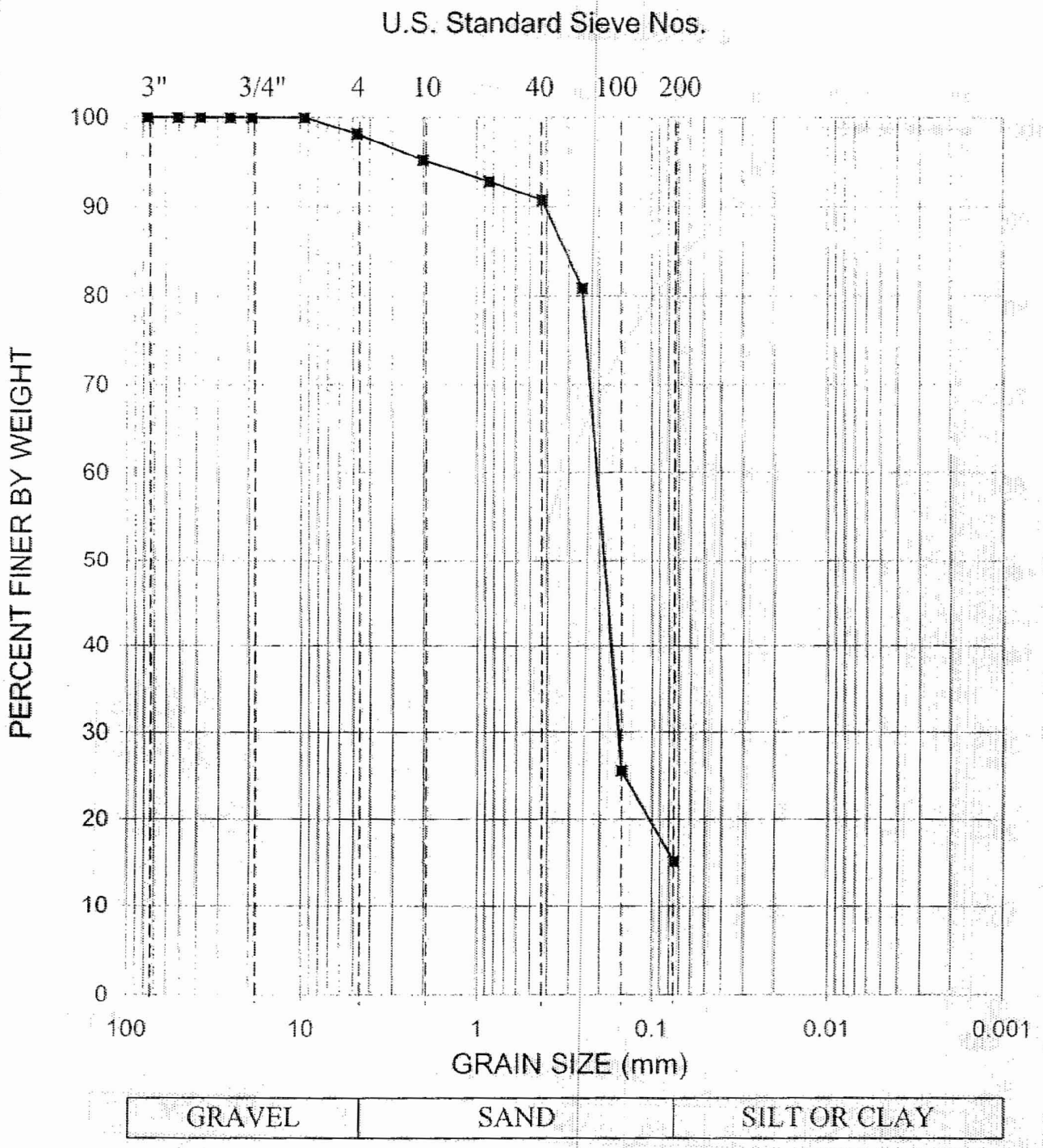
ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: 06120048.00 | Date: 8/21/2006 |
|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-320 | 73.5 | Silty SAND, trace cemented sand, contains shells | SM | | |

Schnabel

Schnabel Engineering




**GRADATION CURVE**

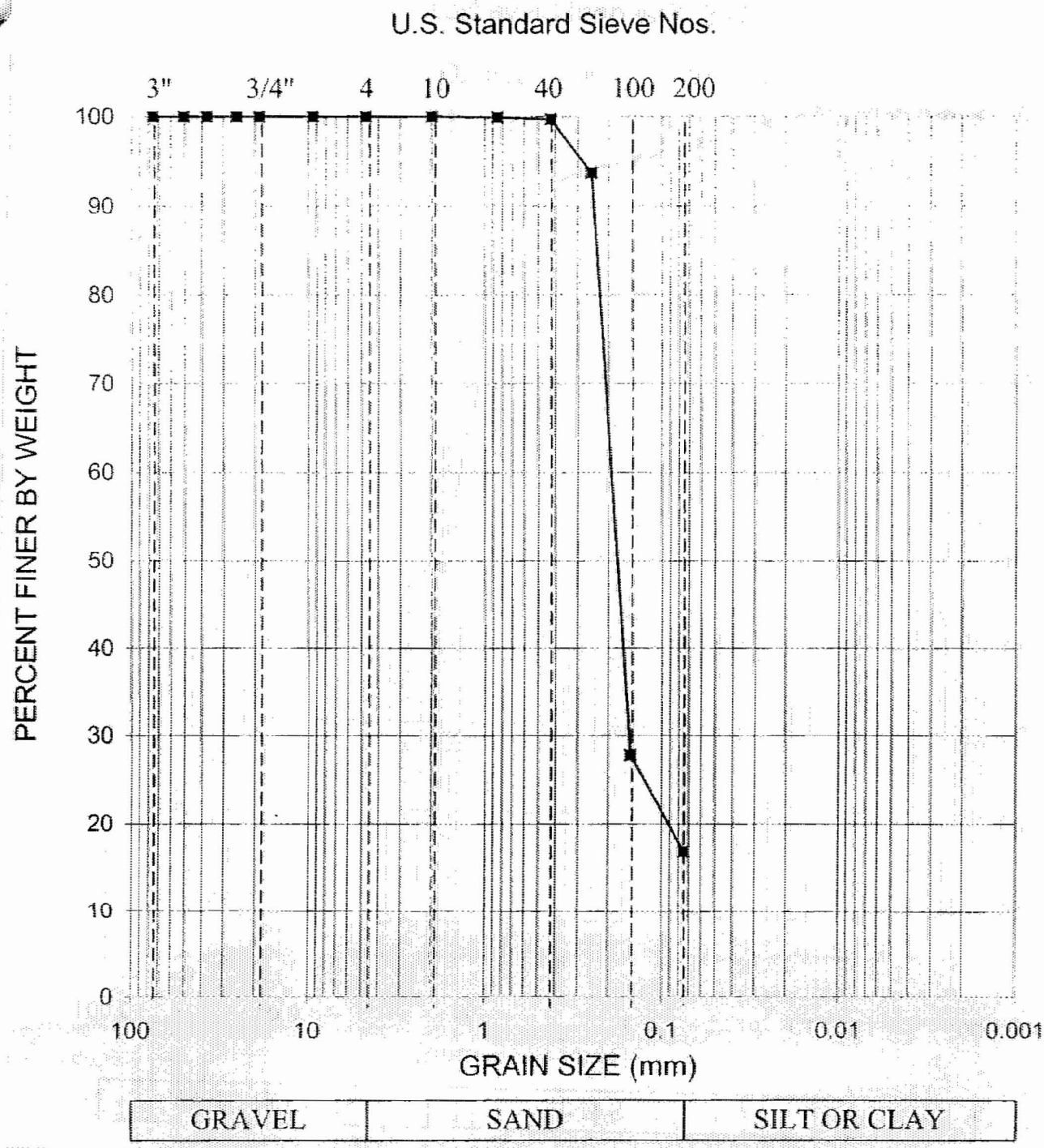
ASTM D422

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs Nuclear Power Plant (CCNPP), Calvert County, Maryland | Contract No.: 06120048.00 | Date: 8/21/2006 |
|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-320 | 93.5 | Silty SAND, trace shells, dark green | SM | | |

Schnabel

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: | 8/21/2006 |
|---|---|---|---|---|---|

| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI |
|---|---|---|---|---|---|
| B-320 | 103.5 | Silty SAND, gray | SM | | |

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Schnabel Engineering