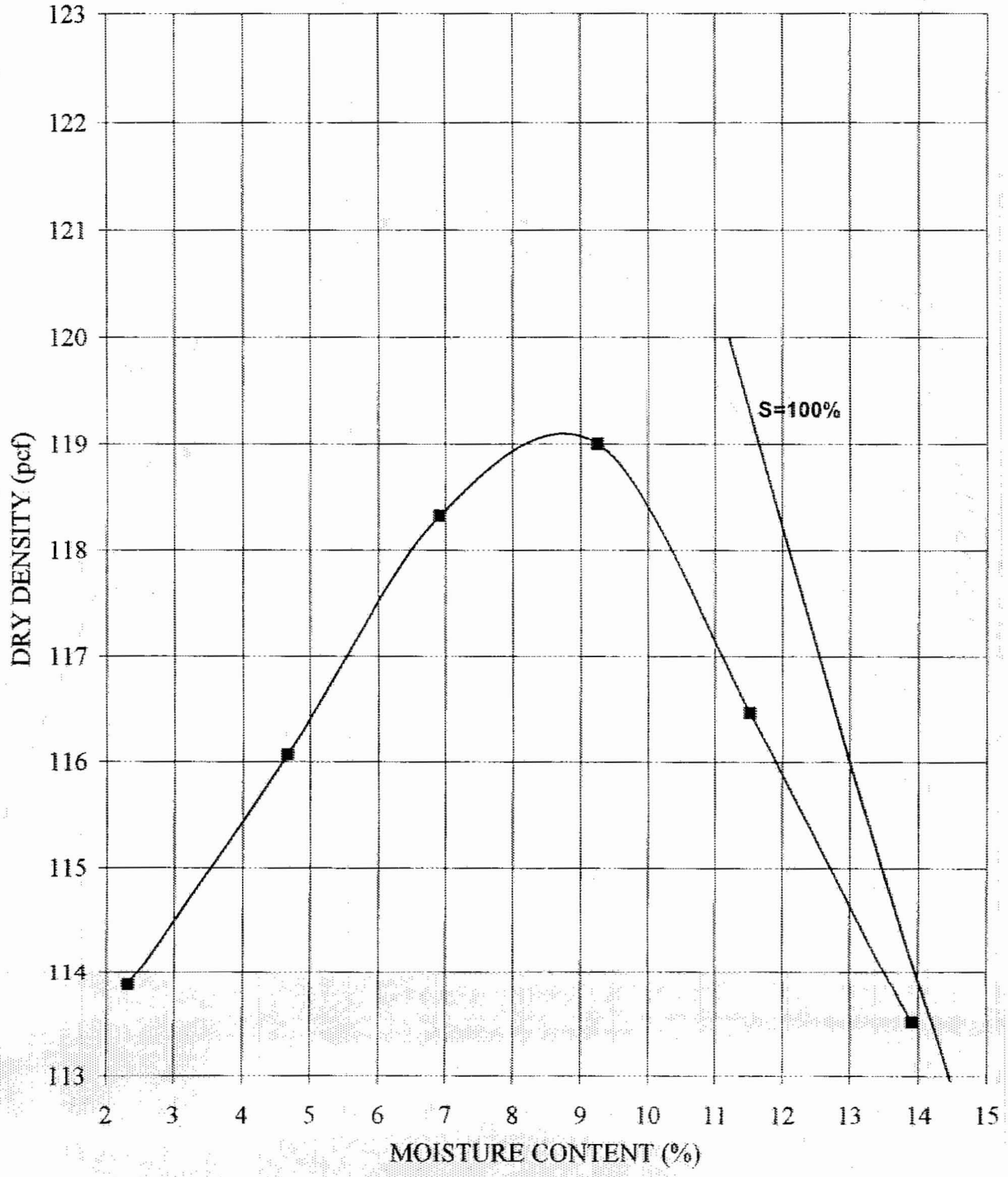


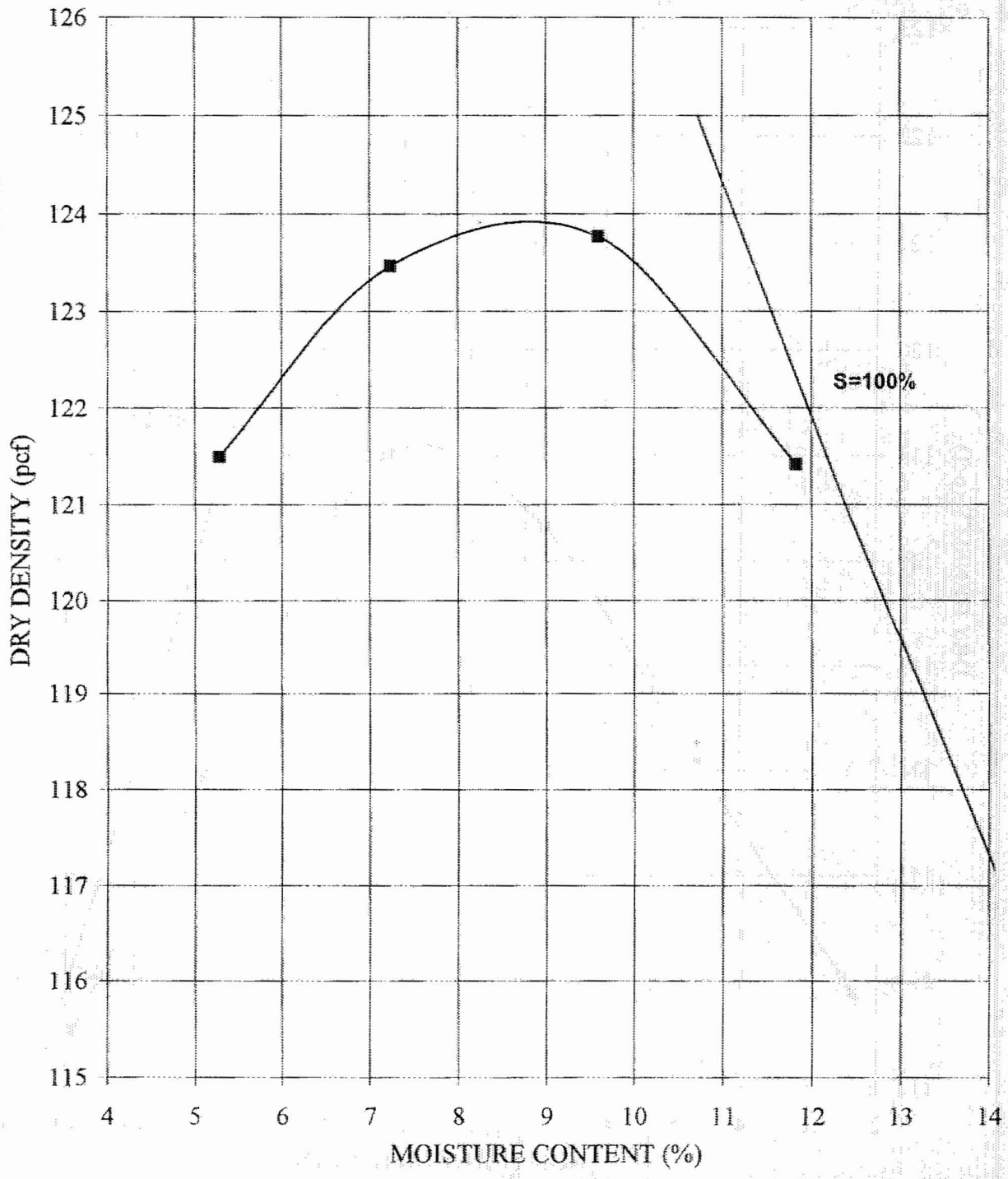

**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/26/2006 |
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| B-435 | 5.0-6.0 | Silty SAND, brown | SM | | | | |
| Assumed Specific Gravity: | 2.45 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 100.0 | | | |
| **Maximum Dry Density (pcf):** | **119.1** | **Optimum Moisture Content (%):** | | **8.9** | | | |

Schnabel

Schnabel Engineering

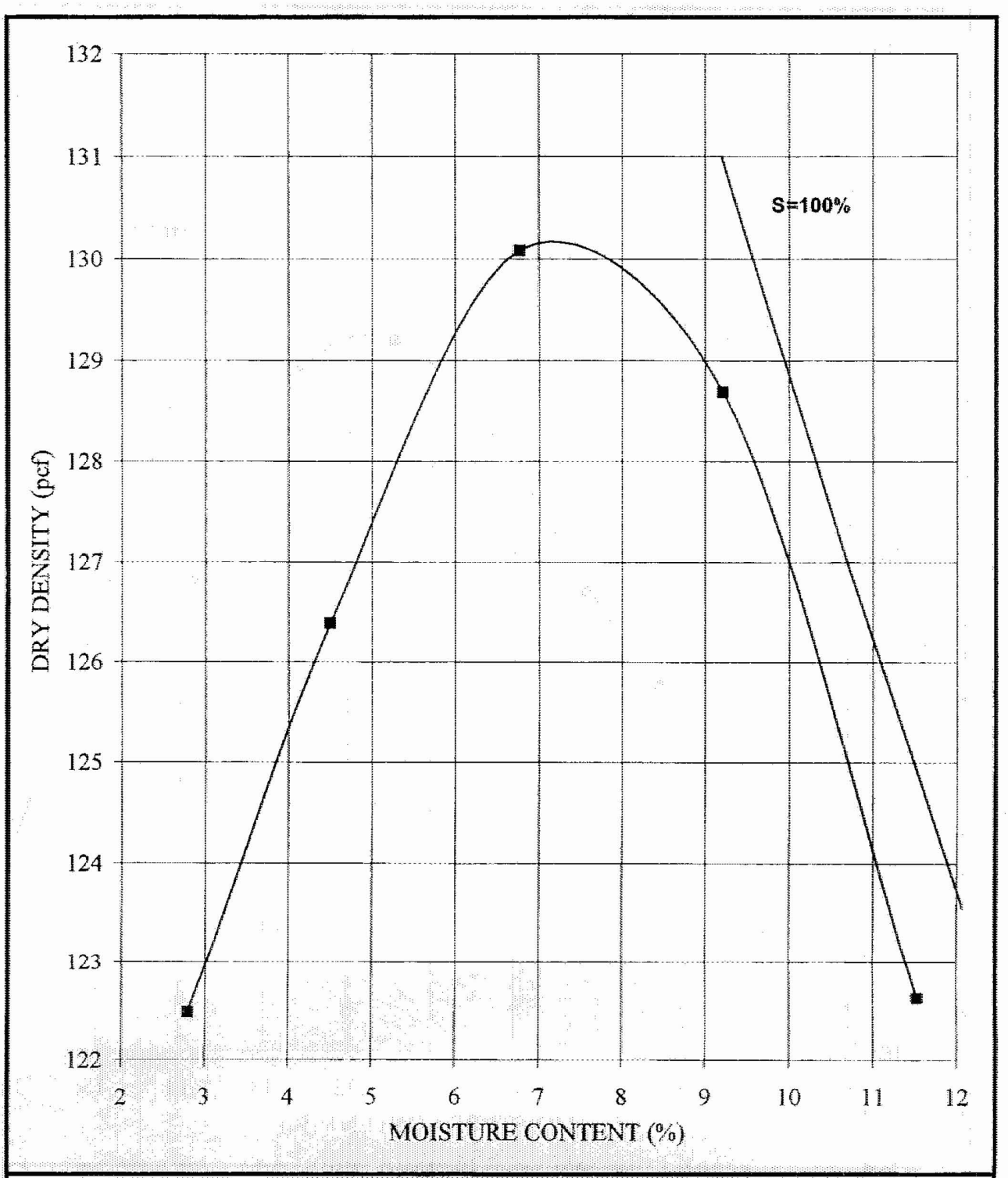



**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/15/2006 |
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| B-435 | 7.0-8.0 | Poorly Graded SAND, with silt, trace gravel, light brown | SP-SM | | | | |
| Assumed Specific Gravity: | 2.55 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 99.2 | | | |
| **Maximum Dry Density (pcf):** | **123.9** | **Optimum Moisture Content (%):** | | **8.9** | | | |

Schnabel Engineering



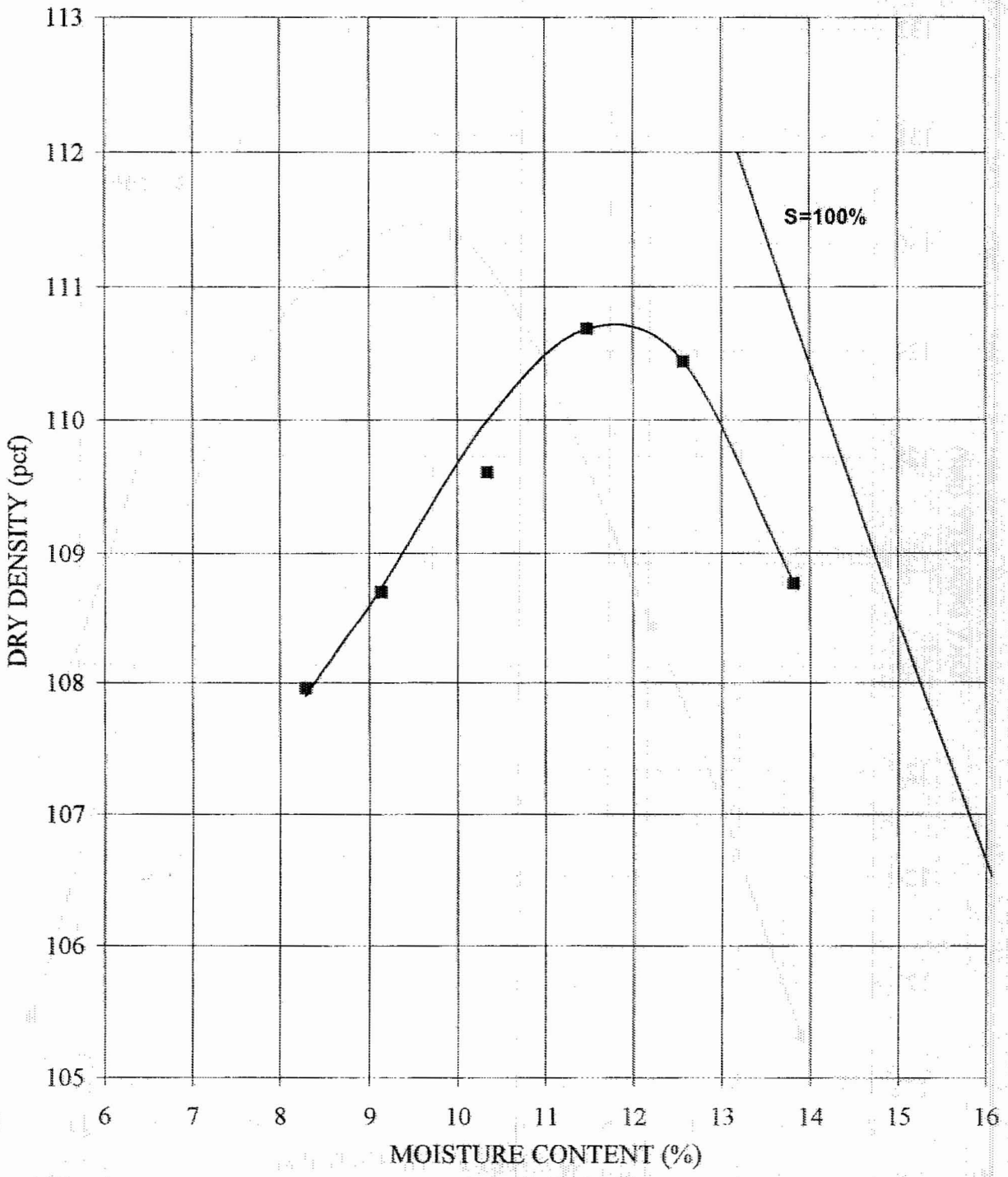

**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/15/2006 |
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| B-435 | 9.0-10.0 | Clayey SAND, brown | SC | 34 | 17 | | |
| Assumed Specific Gravity: | 2.60 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 100.0 | | | |
| **Maximum Dry Density (pcf):** | **130.2** | **Optimum Moisture Content (%):** | | 7.3 | | | |

Schnabel

Schnabel Engineering



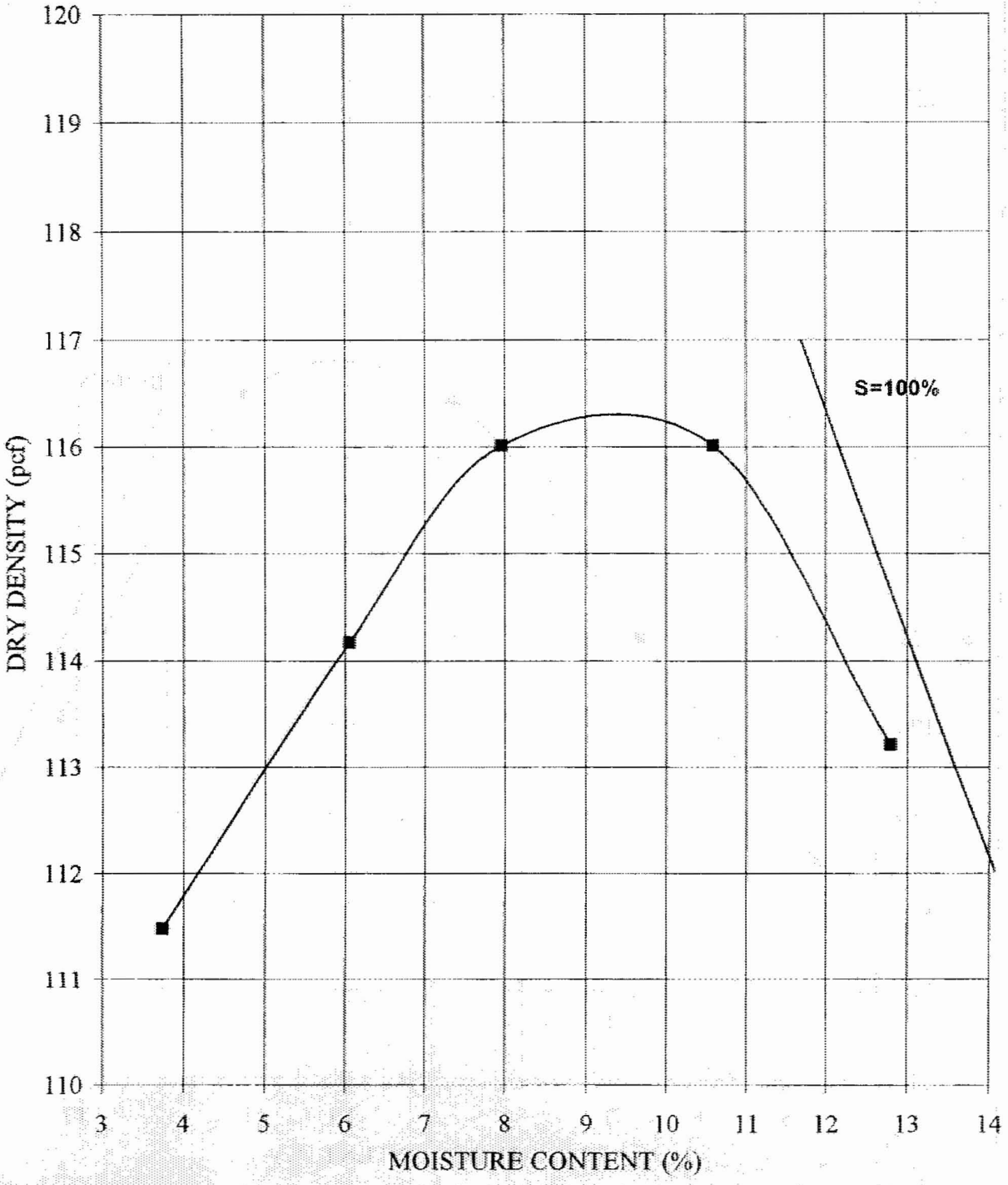

**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/11/2006 |
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| TP-B-715 | 5.5-6.5 | Poorly Graded SAND, with silt, trace gravel, tan | SP-SM | | | | |
| Assumed Specific Gravity: | 2.35 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 99.1 | | | |
| **Maximum Dry Density (pcf):** | **110.7** | **Optimum Moisture Content (%):** | | **11.8** | | | |

Schnabel

Schnabel Engineering



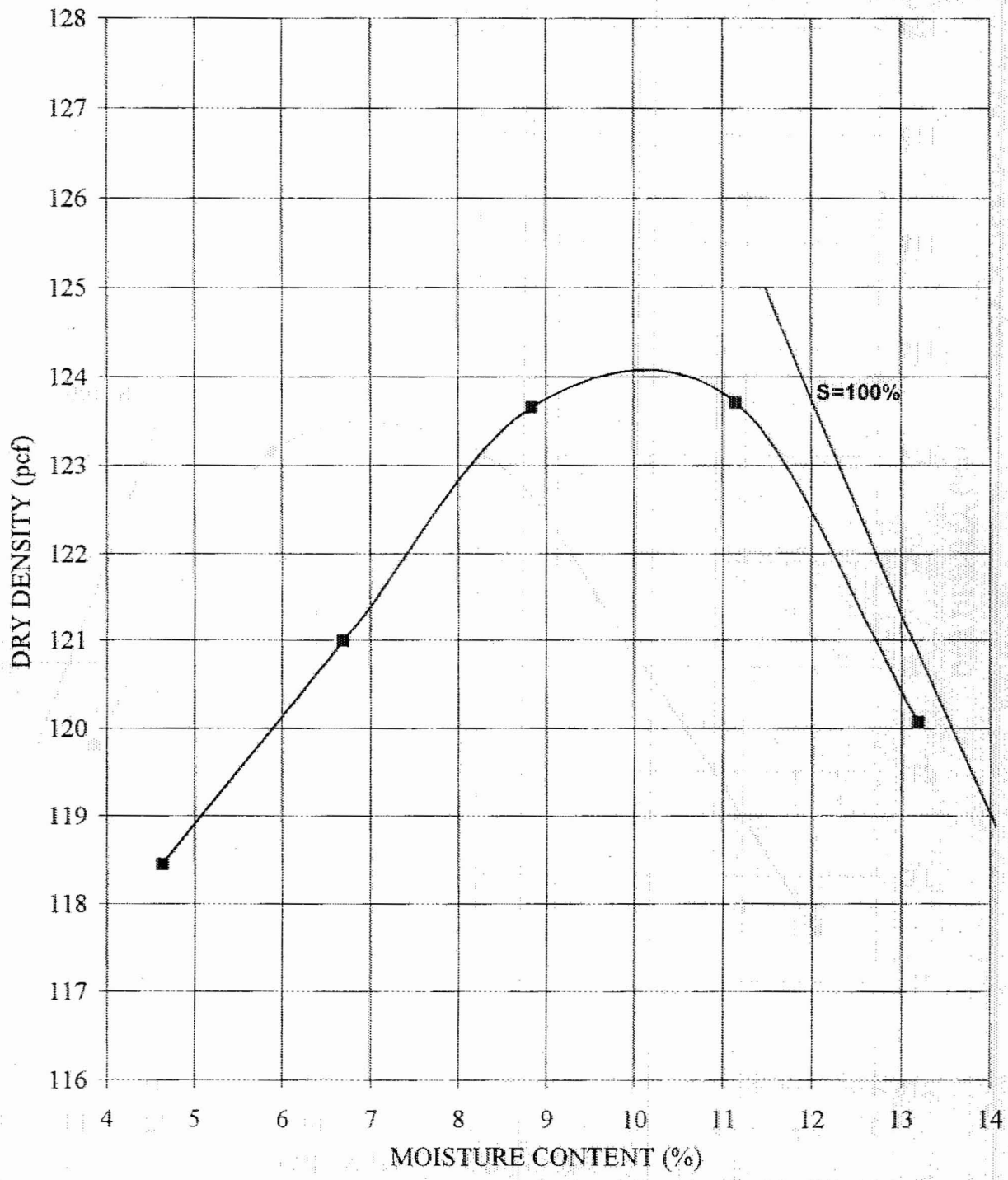

**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/15/2006 |
| Boring No. | Depth (ft) | Sample Description | Class | LL | PI | | |
| TP-B-716 | 6.0-7.0 | Poorly Graded SAND, with silt, trace gravel , brown | SP-SM | | | | |
| Assumed Specific Gravity: | | 2.40 | % Passing 3/4" Sieve: | 100.0 | | | |
| | | | % Passing #4 Sieve: | 99.0 | | | |
| **Maximum Dry Density (pcf):** | | **116.3** | **Optimum Moisture Content (%):** | 9.4 | | | |

Schnabel

Schnabel Engineering

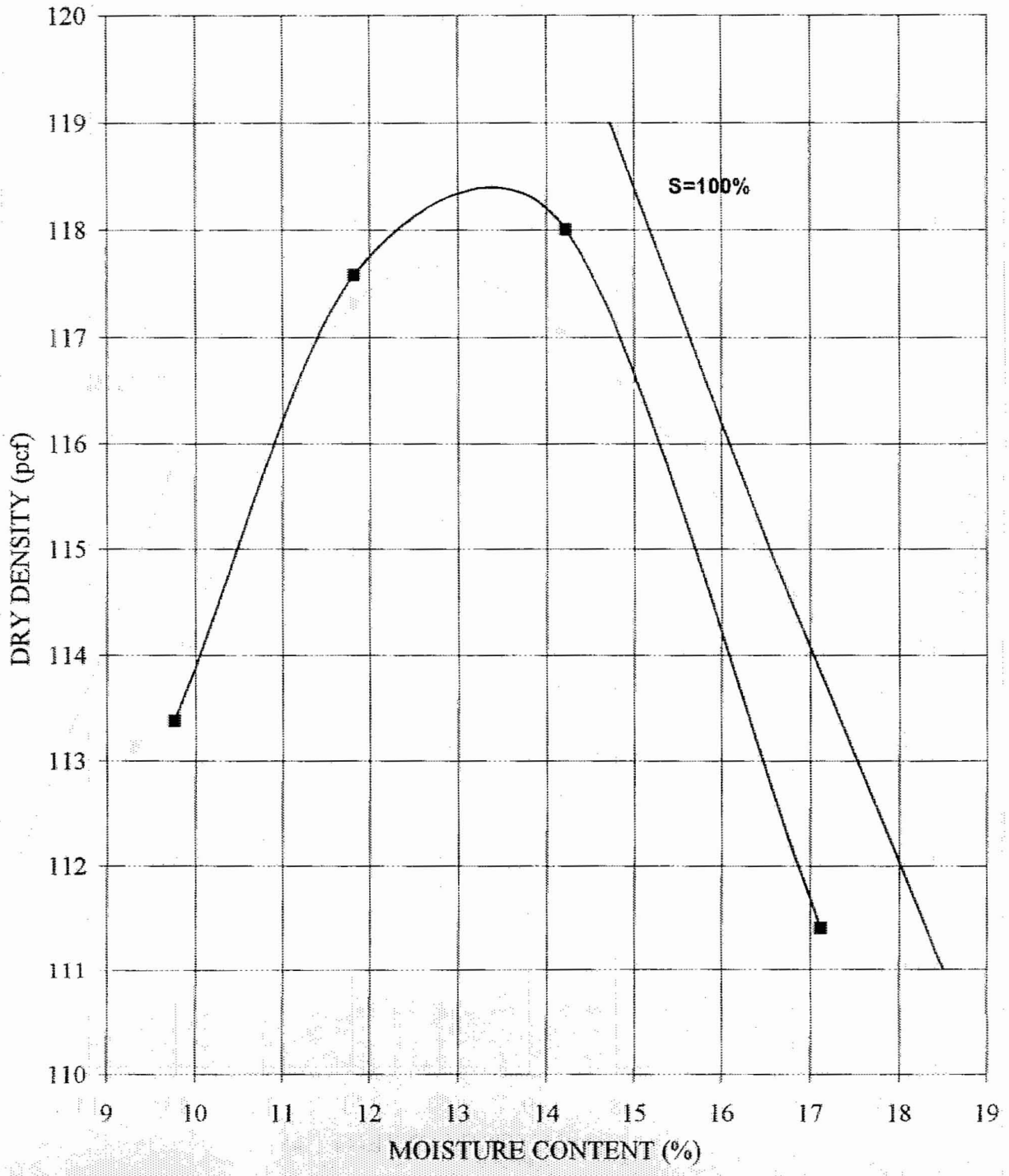



**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/15/2006 |
| Boring No. | Depth (ft) | Sample Description | | Class. | LL | PI | |
| TP-B-717 | 7.0-8.0 | Poorly Graded SAND, with silt, trace gravel, light brown | | SP-SM | | | |
| Assumed Specific Gravity: | | 2.60 | % Passing 3/4" Sieve: | | 100.0 | | |
| | | | % Passing #4 Sieve: | | 97.4 | | |
| **Maximum Dry Density (pcf):** | | **123.8** | **Optimum Moisture Content (%):** | | **10.2** | | |

Schnabel Engineering

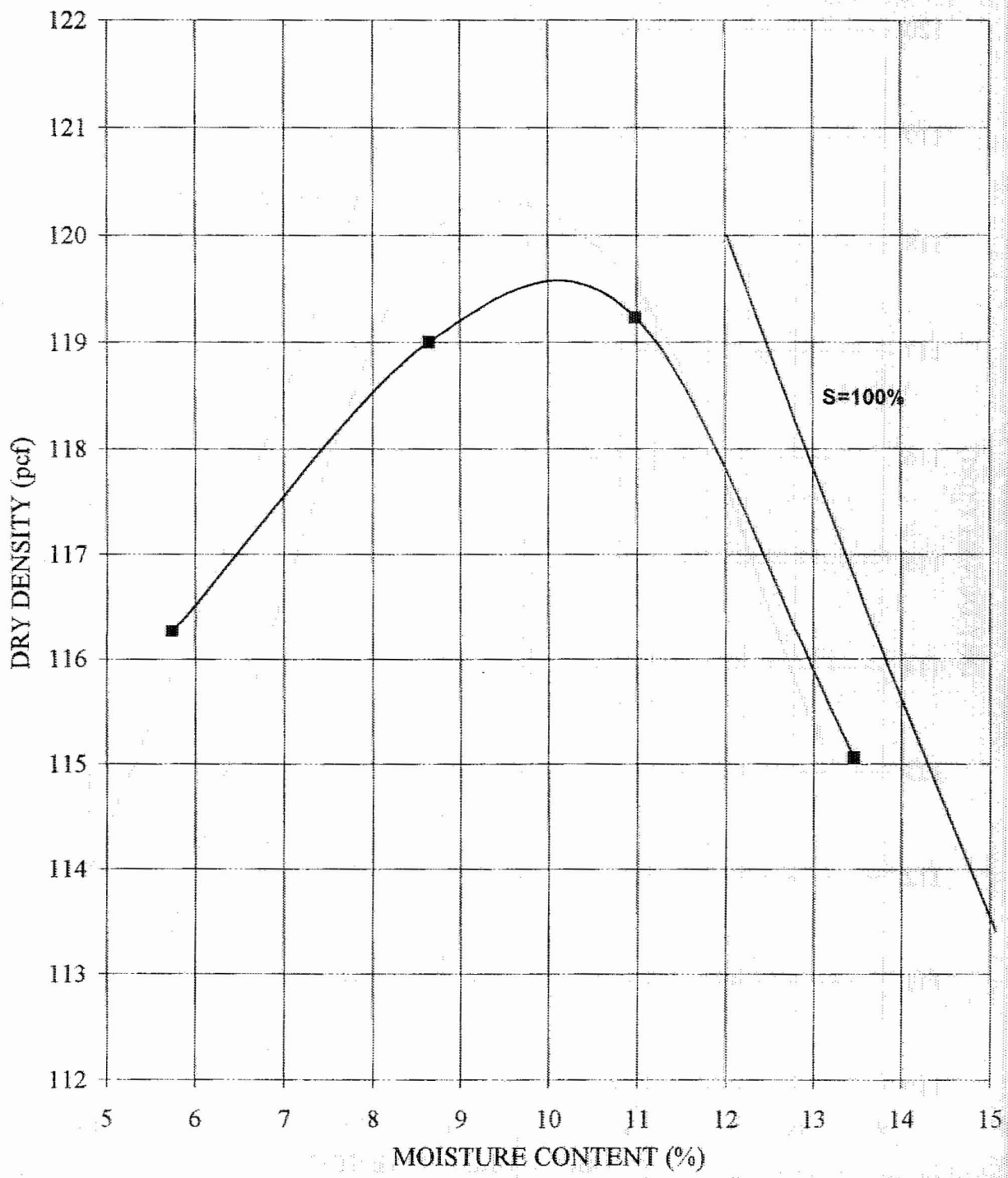



**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/28/2006 |
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| TP-B-719 | 0.5-1.5 | LEAN CLAY, with sand, dark brown | CL | 35 | 13 | | |
| Assumed Specific Gravity: | | 2.65 | % Passing 3/4" Sieve: | 100.0 | | | |
| | | | % Passing #4 Sieve: | 100.0 | | | |
| **Maximum Dry Density (pcf):** | | **118.4** | **Optimum Moisture Content (%):** | **13.5** | | | |

Schnabel Engineering

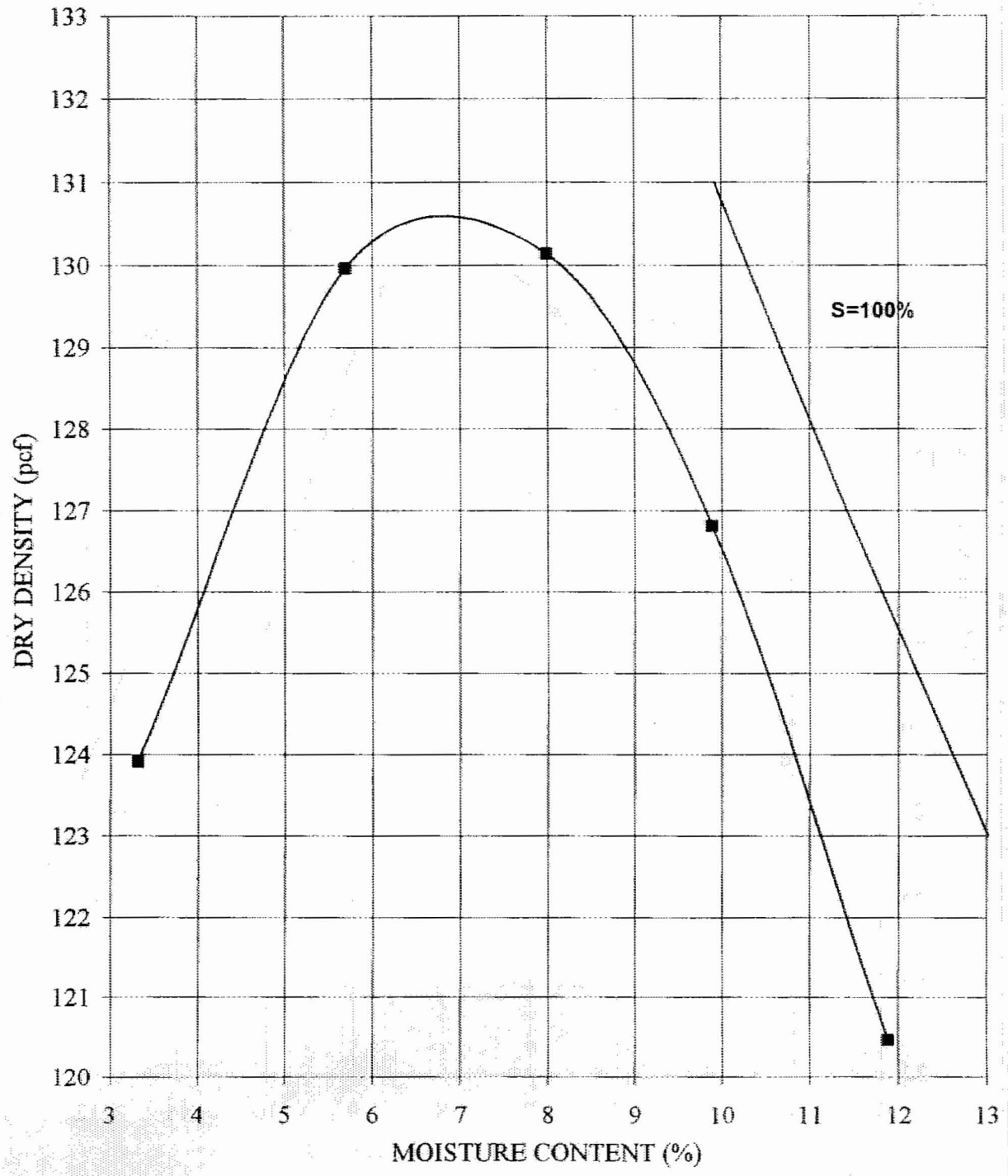



**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/18/2006 |
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| TP-B-719 | 7.0-8.0 | Silty SAND, gray | SM | 35 | 13 | | |
| Assumed Specific Gravity: | 2.50 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 100.0 | | | |
| **Maximum Dry Density (pcf):** | **119.6** | **Optimum Moisture Content (%):** | | **10.0** | | | |

Schnabel Engineering

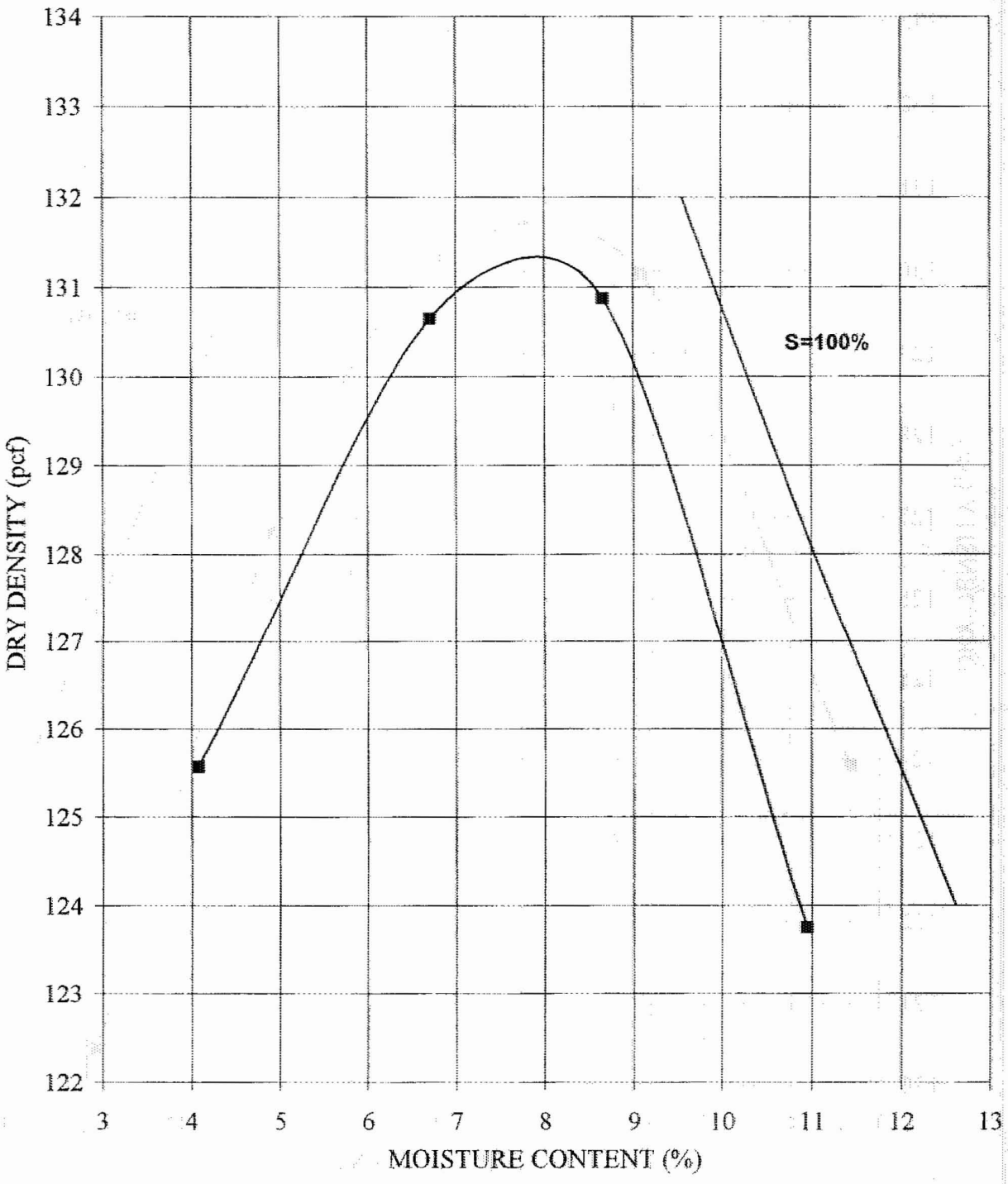



**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 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 | | |
| TP-B-727 | 6.0-7.0 | Silty SAND, dark brown | SM | | | | |
| Assumed Specific Gravity: | 2.65 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 100.0 | | | |
| **Maximum Dry Density (pcf):** | **130.5** | **Optimum Moisture Content (%):** | | **6.8** | | | |

Schnabel Engineering

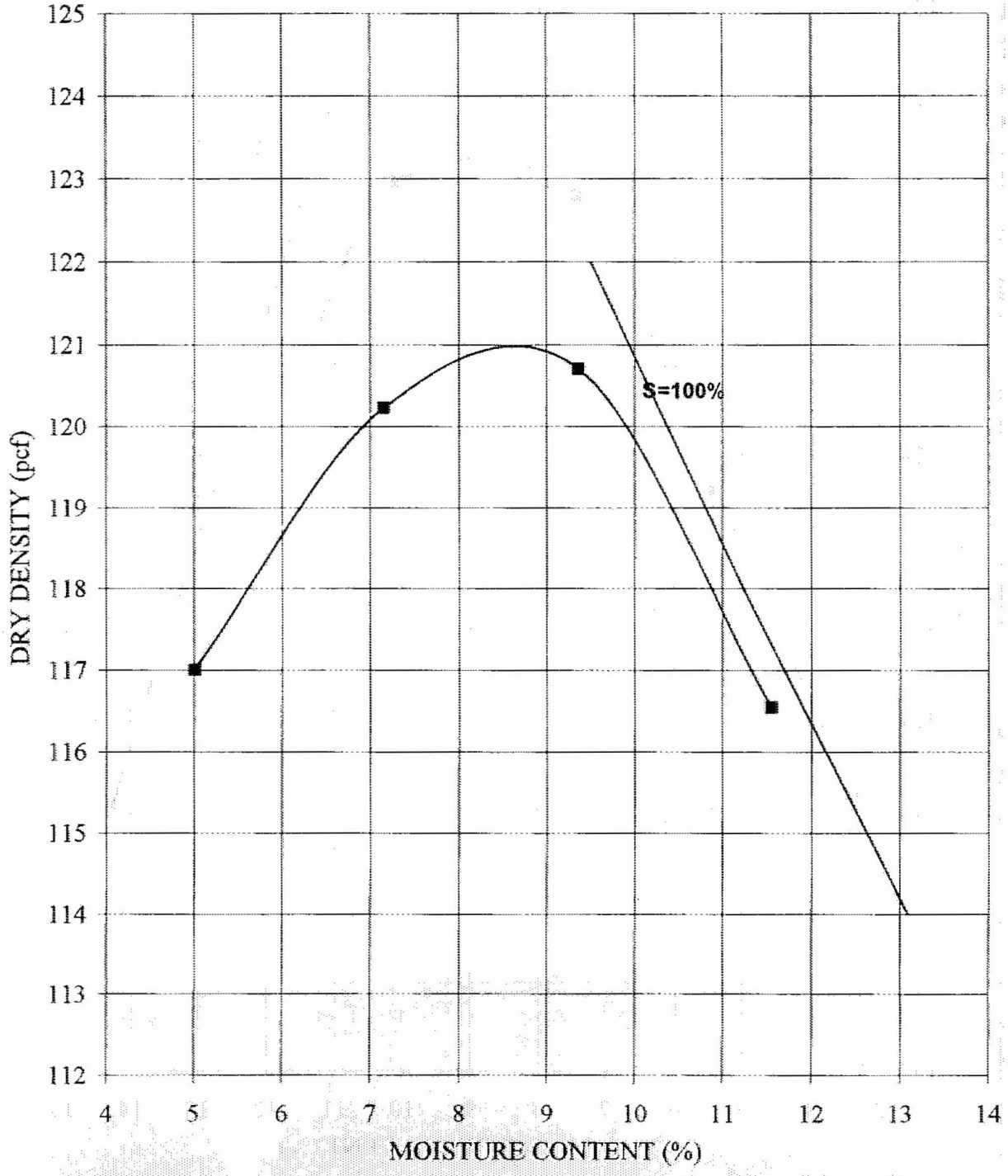



**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 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 | | |
| TP-B-744 | 1.5-2.5 | Sandy LEAN CLAY, dark brown | CL | 25 | 8 | | |
| Assumed Specific Gravity: | 2.65 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 100.0 | | | |
| **Maximum Dry Density (pcf):** | **131.2** | **Optimum Moisture Content (%):** | | **8.0** | | | |

Schnabel Engineering



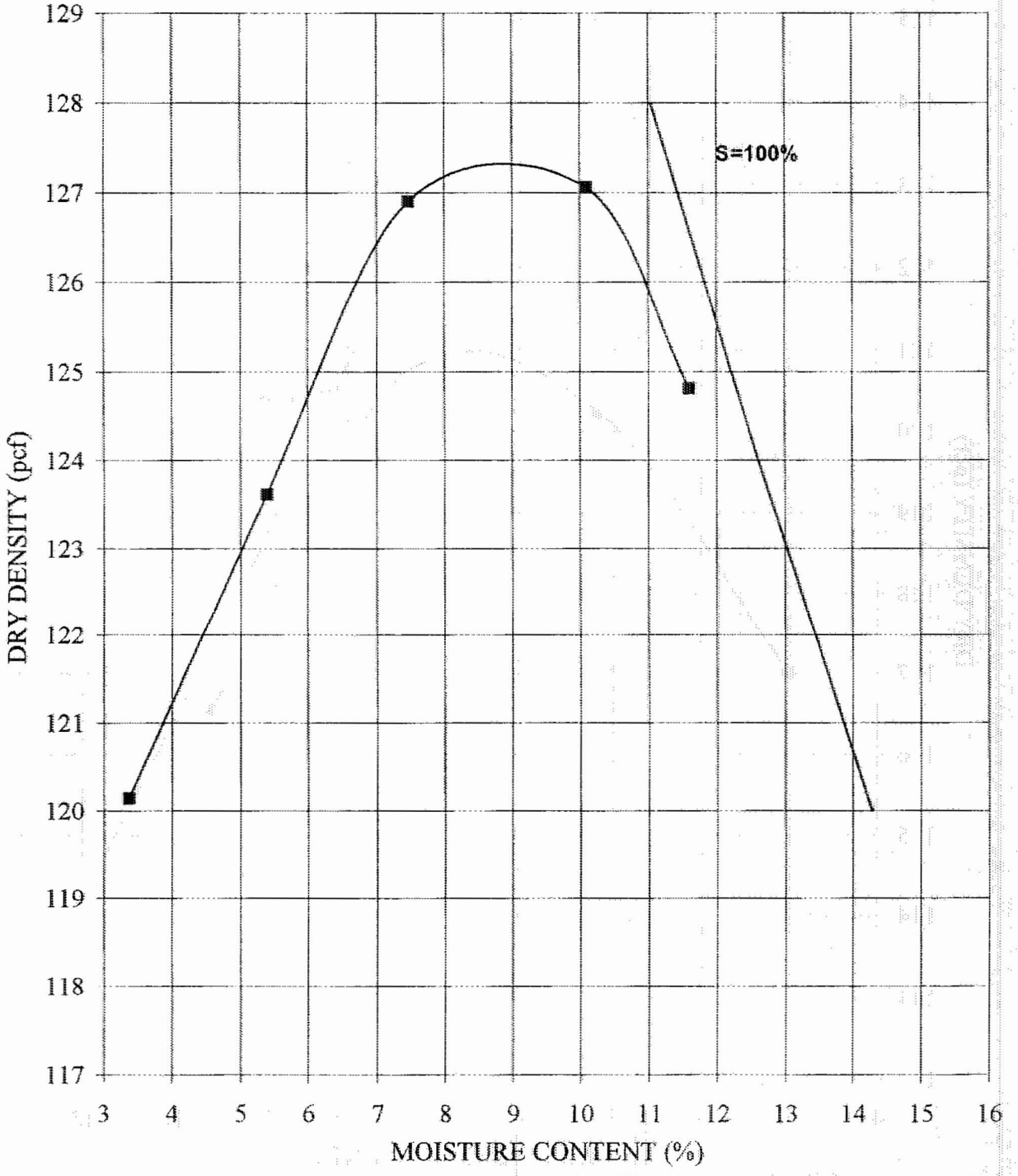

**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 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 | | |
| TP-B-758 | 2.0-3.0 | Poorly Graded SAND, with silt, trace gravel , brown | SP-SM | | | | |
| Assumed Specific Gravity: | | 2.40 | % Passing 3/4" Sieve: | 100.0 | | | |
| | | | % Passing #4 Sieve: | 99.2 | | | |
| **Maximum Dry Density (pcf):** | | **121.0** | **Optimum Moisture Content (%):** | **8.8** | | | |

Schnabel

Schnabel Engineering



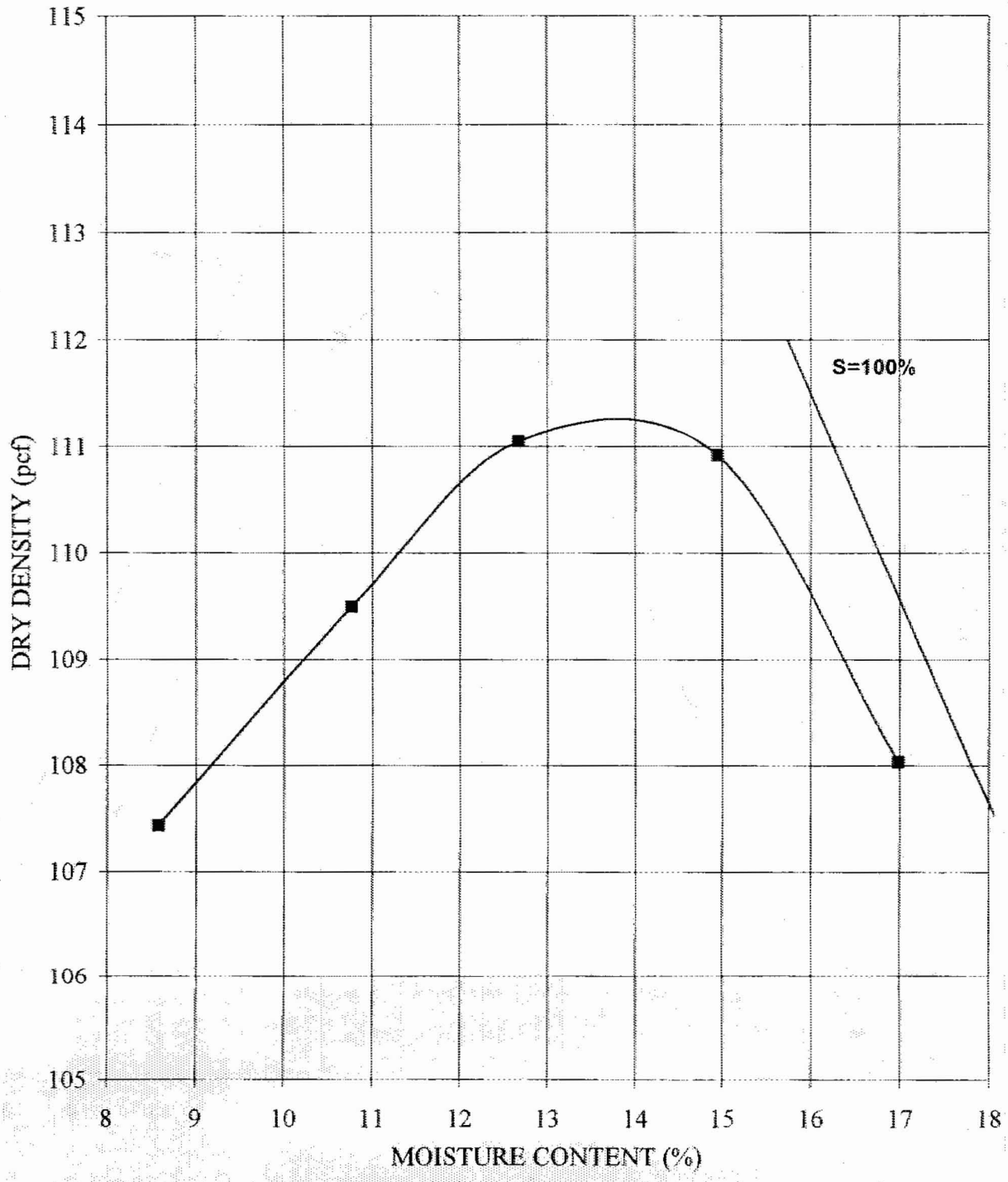

**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/18/2006 |
|---|---|---|---|---|---|---|---|
| Boring No. | Depth (ft) | Sample Description | | Class. | LL | PI | |
| TP-B-758 | 7.5-8.5 | Silty SAND, trace gravel, light brown | | SM | | | |
| Assumed Specific Gravity: | | 2.65 | % Passing 3/4" Sieve: | | 100.0 | | |
| | | | % Passing #4 Sieve: | | 97.4 | | |
| **Maximum Dry Density (pcf):** | | **127.3** | **Optimum Moisture Content (%):** | | **8.9** | | |

Schnabel

Schnabel Engineering

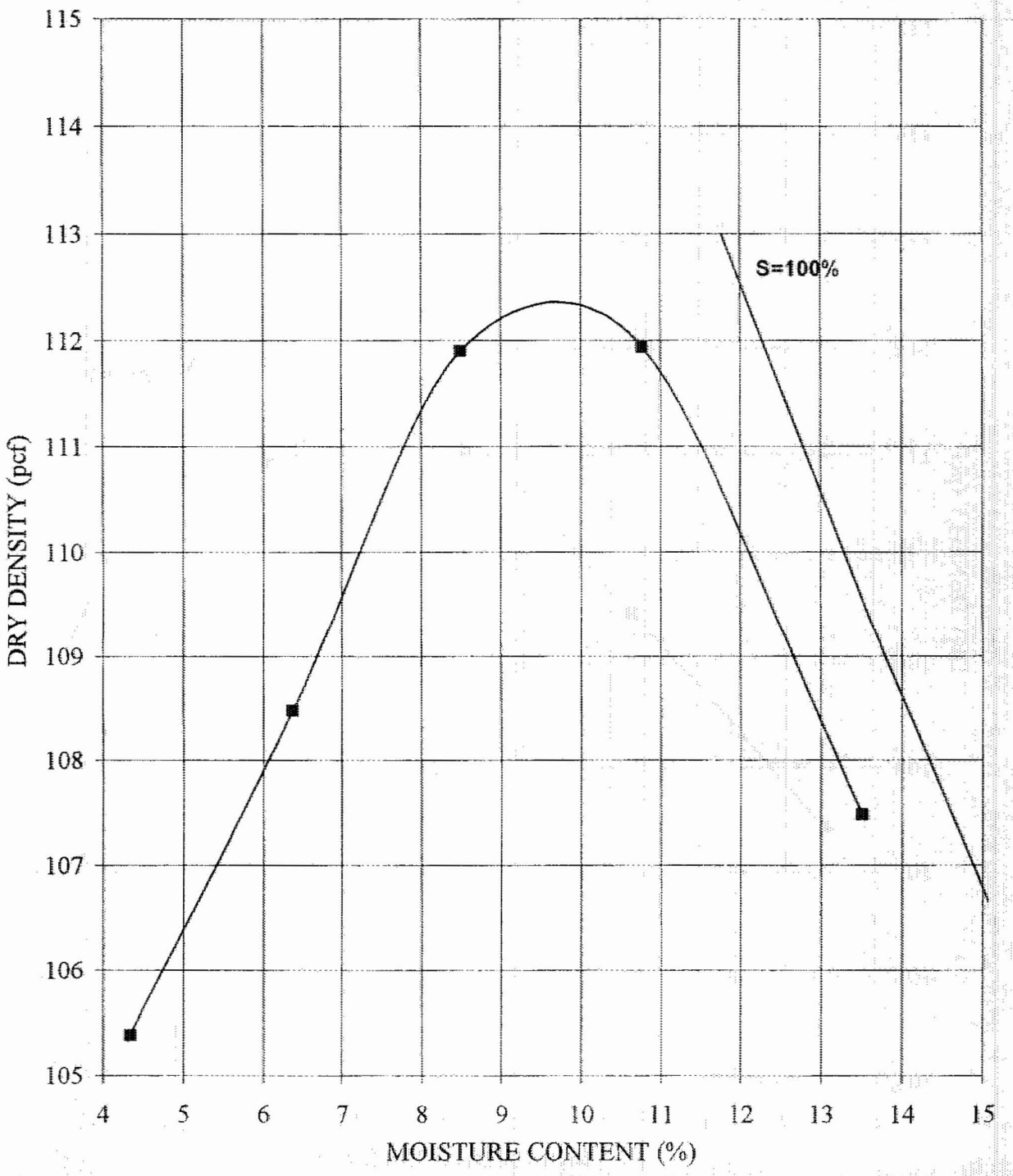



**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/11/2006 |
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| TP-C-309 | 2.0-3.0 | Poorly Graded SAND, trace silt and gravel, brown | SP | | | | |
| Assumed Specific Gravity: | | 2.50 | % Passing 3/4" Sieve: | 100.0 | | | |
| | | | % Passing #4 Sieve: | 98.8 | | | |
| **Maximum Dry Density (pcf):** | | **111.2** | **Optimum Moisture Content (%):** | **13.9** | | | |

Schnabel Engineering



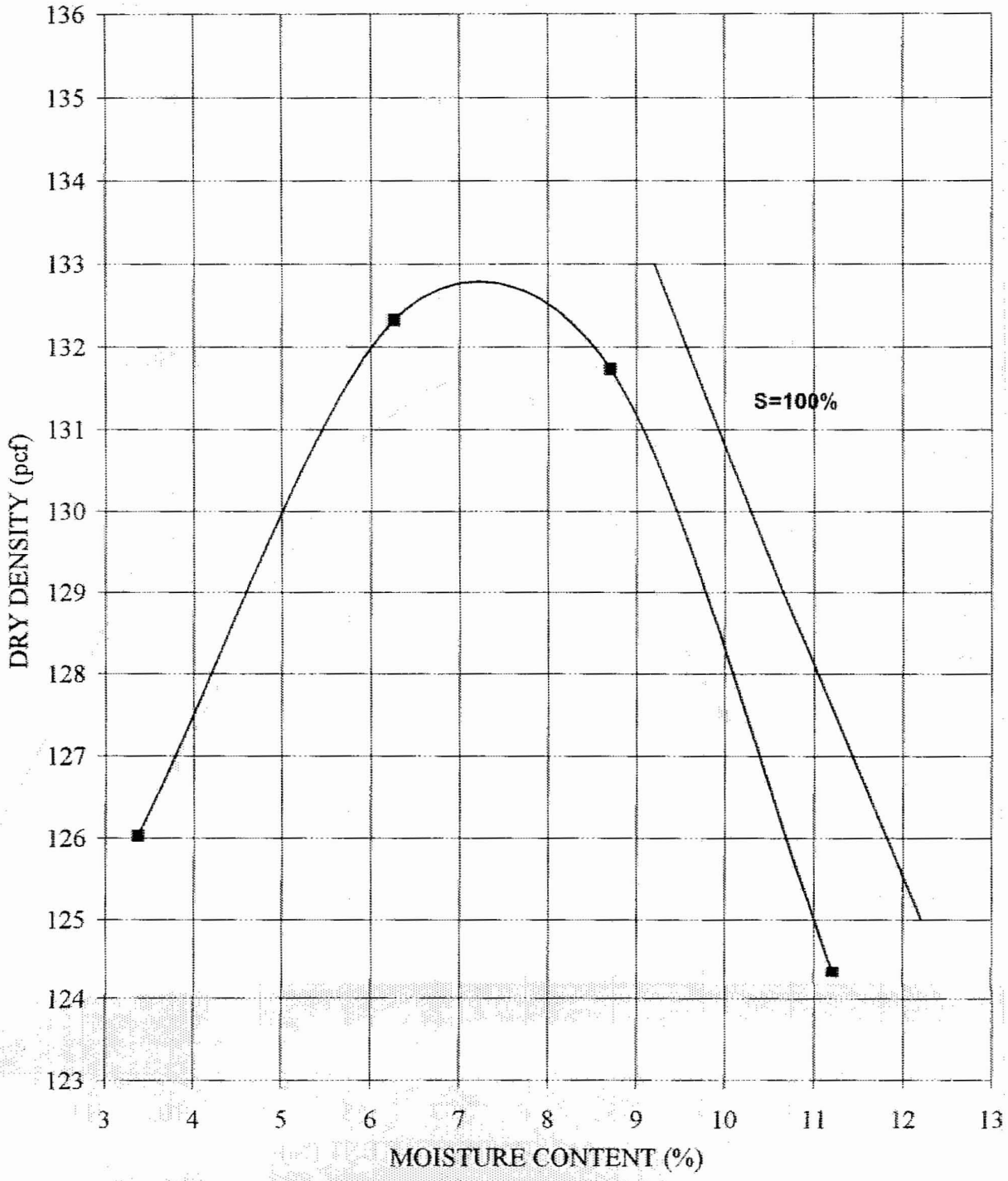

**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/26/2006 |
| Boring No. | Depth (ft) | Sample Description | | Class. | LL | PI | |
| TP-C-309 | 7.0-8.0 | Poorly Graded SAND, with silt, light brown | | SP-SM | | | |
| Assumed Specific Gravity: | 2.30 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 100.0 | | | |
| **Maximum Dry Density (pcf):** | **112.3** | **Optimum Moisture Content (%):** | | **9.8** | | | |

Schnabel

Schnabel Engineering

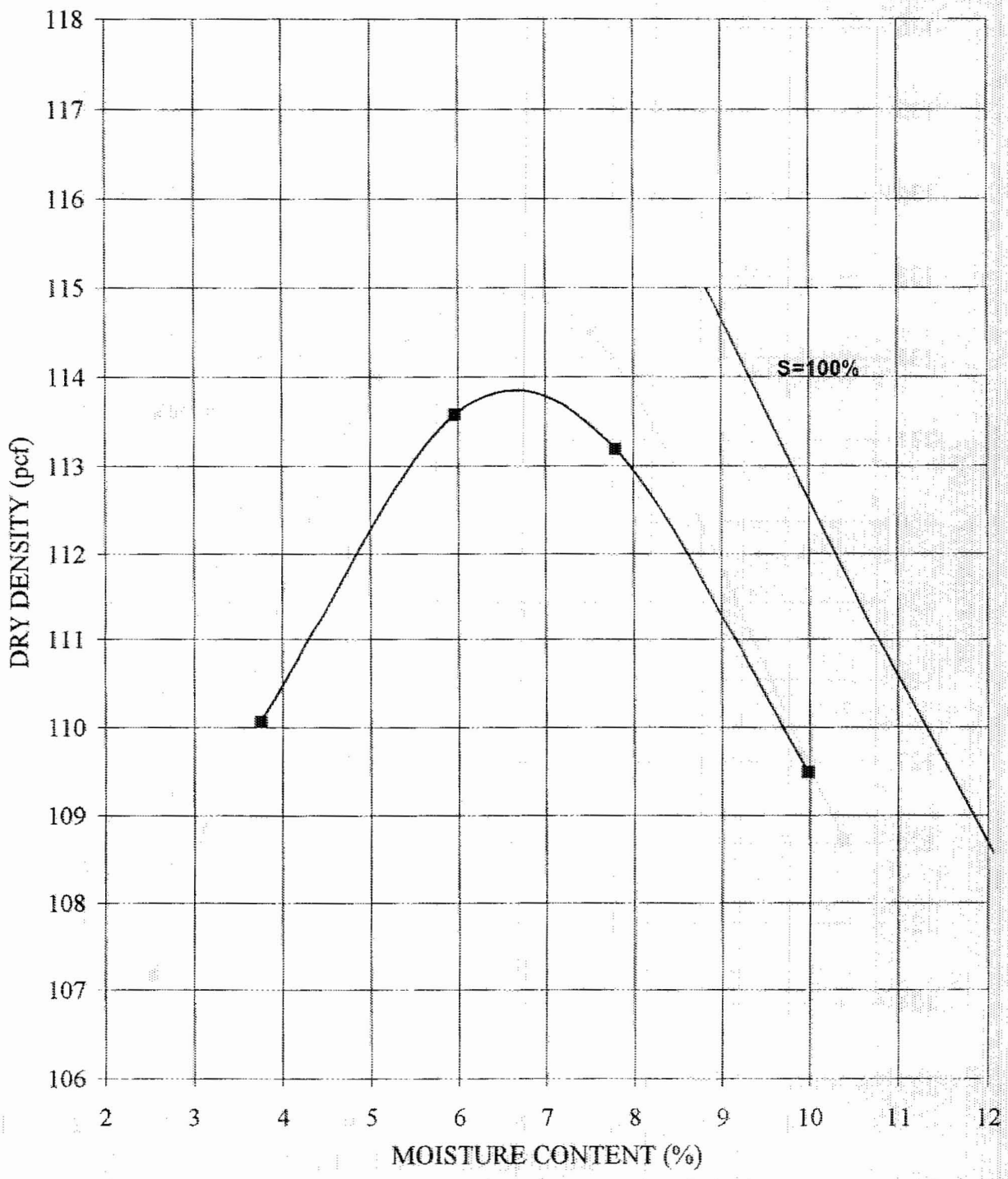



**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9-18-06 |
| Boring No. | Depth (ft) | Sample Description | Class. | LL | PI | | |
| TP-C-723 | 2.5-3.5 | Clayey SAND, dark brown | SC | 30 | 15 | | |
| Assumed Specific Gravity: | 2.65 | % Passing 3/4" Sieve: | | 100.0 | | | |
| | | % Passing #4 Sieve: | | 100.0 | | | |
| **Maximum Dry Density (pcf):** | **132.8** | **Optimum Moisture Content (%):** | | 7.3 | | | |

Schnabel Engineering




**MOISTURE-DENSITY RELATION**

ASTM D-1557 Method A

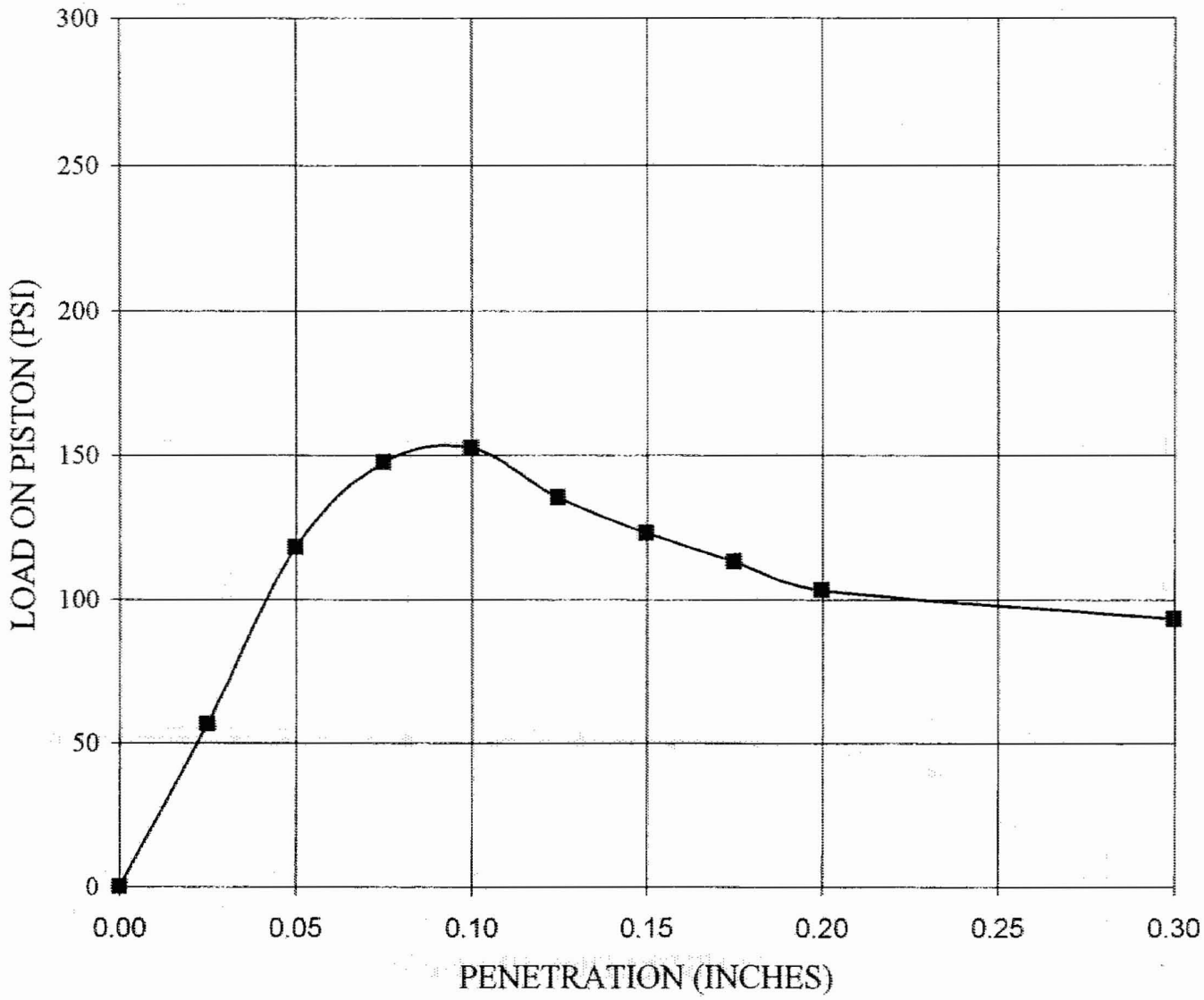
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | | | Contract No.: | 06120048.00 | Date: | 9/26/2006 |
| Boring No. | Depth (ft) | Sample Description | | Class. | LL | PI | |
| TP-C-723 | 6.0-7.0 | Poorly Graded SAND, with silt, trace gravel, brown | | SP-SM | 30 | 15 | |
| Assumed Specific Gravity: | | 2.20 | % Passing 3/4" Sieve: | | 100.0 | | |
| | | | % Passing #4 Sieve: | | 98.8 | | |
| **Maximum Dry Density (pcf):** | | **113.8** | **Optimum Moisture Content (%):** | | **6.8** | | |

Schnabel

Schnabel Engineering

# CALIFORNIA BEARING RATIO RESULTS

## UNSOAKED CBR




**CALIFORNIA BEARING RATIO**

ASTM D-1883

| | | | | | |
|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | Contract No.: | 06120048.00 | Date: | 9/25/2006 |

| Boring No. | Depth (ft) | Sample Description |
|---|---|---|
| TP-B-307 | 4.5-5.5 | Poorly Graded SAND, with silt, brown |

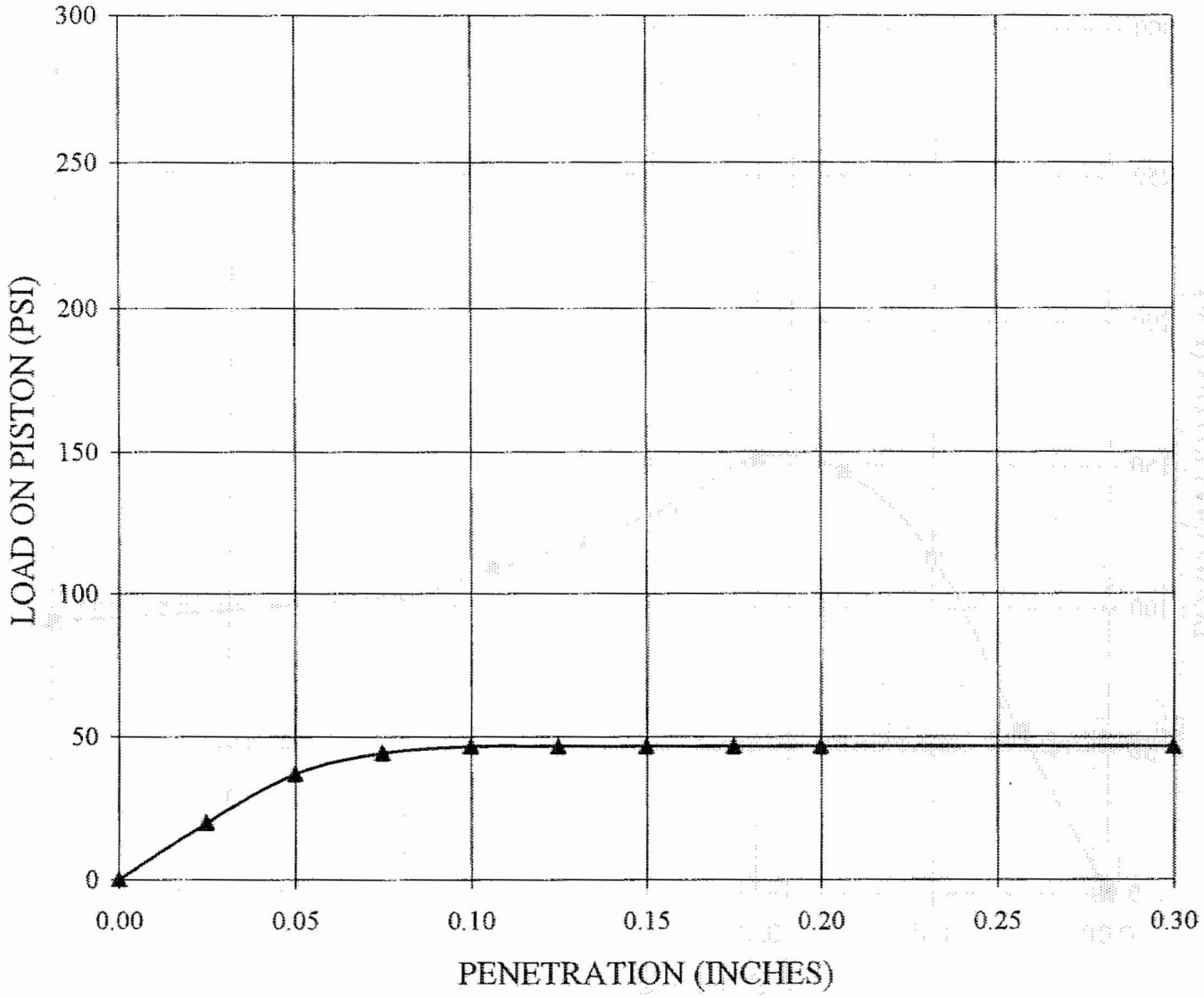
| | | | |
|---|---|---|---|
| **CBR (Unsoaked):** | **14.8** | Soaking Time: | N/A |
| Surcharge: | 50 PSF | Swell: | N/A |

| DRY DENSITY, PCF | | MOISTURE CONTENT, % | |
|---|---|---|---|
| Before Soaking: | 103.8 | Before Soaking: | 9.7 |
| After Soaking: | N/A | After Soaking: | N/A |
| Max. Dry Density: | 109.3 | Optimum Moisture: | 10.5 |

Schnabel

Schnabel Engineering

## SOAKED CBR




## CALIFORNIA BEARING RATIO

ASTM D-1883

| | | | | | |
|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | Contract No.: | 06120048.00 | Date: | 9/25/2006 |

| Boring No. | Depth (ft) | Sample Description |
|---|---|---|
| TP-B-307 | 4.5-5.5 | Poorly Graded SAND, with silt, brown |

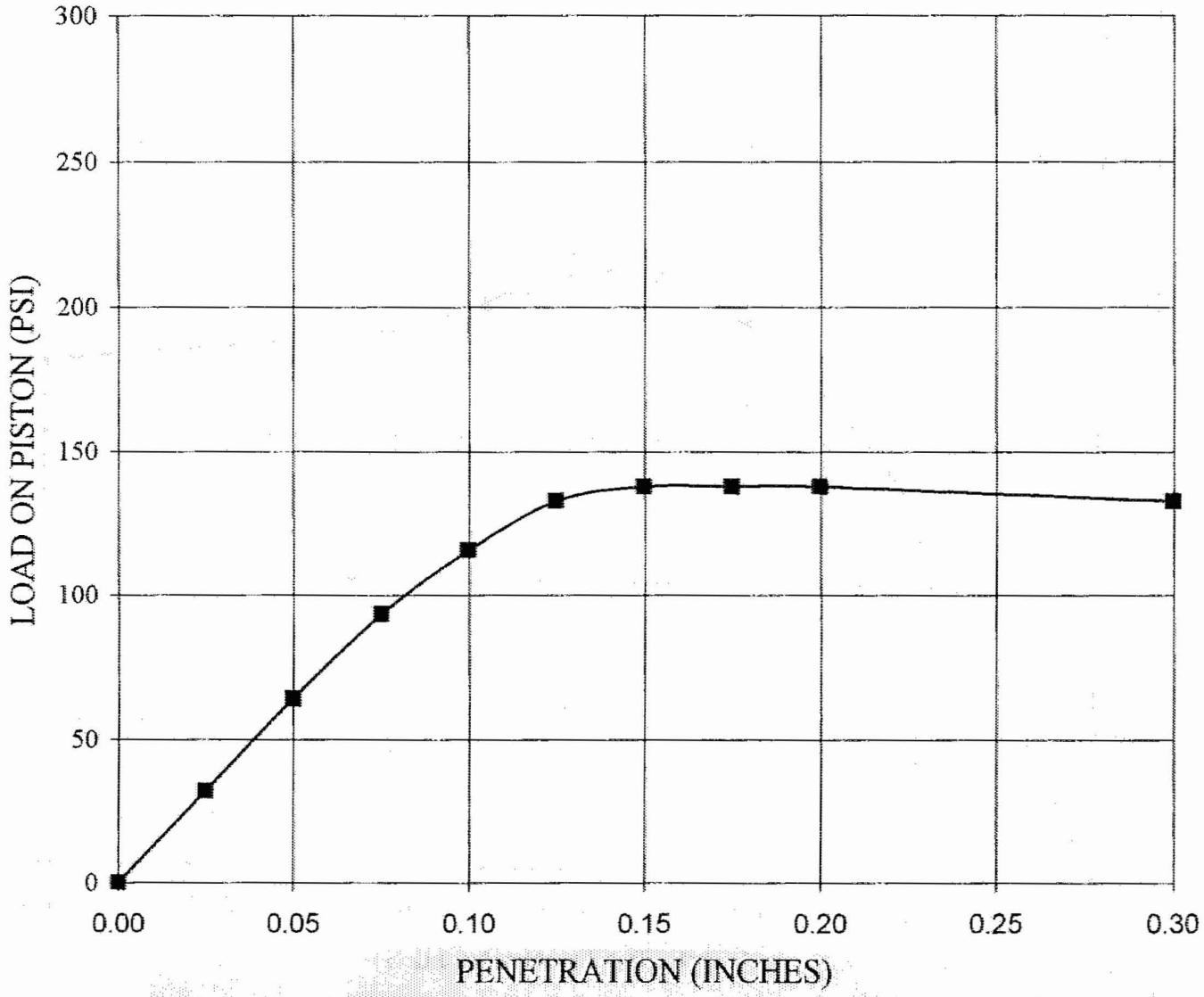
| | | | |
|---|---|---|---|
| **CBR (Soaked):** | **4.4** | Soaking Time: | 4 Days |
| Surcharge: | 50 PSF | Swell: | 0.0% |

| DRY DENSITY, PCF | | MOISTURE CONTENT, % | |
|---|---|---|---|
| Before Soaking: | 103.8 | Before Soaking: | 9.7 |
| After Soaking: | 103.7 | After Soaking: | 12.8 |
| Max. Dry Density: | 109.3 | Optimum Moisture: | 10.5 |

Schnabel

Schnabel Engineering

## UNSOAKED CBR




**CALIFORNIA BEARING RATIO**

ASTM D-1883

| | | | | | |
|---|---|---|---|---|---|
| Project: | Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland | Contract No.: | 06120048.00 | Date: | 9/26/2006 |

| Boring No. | Depth (ft) | Sample Description |
|---|---|---|
| TP-B-315 | 6.0-7.0 | Poorly Graded SAND, with silt, tan |

| | | | |
|---|---|---|---|
| **CBR (Unsoaked):** | **11.6** | Soaking Time: | N/A |
| Surcharge: | 50 PSF | Swell: | N/A |
| DRY DENSITY, PCF | | MOISTURE CONTENT, % | |
| Before Soaking: | 109.2 | Before Soaking: | 11.6 |
| After Soaking: | N/A | After Soaking: | N/A |
| Max. Dry Density: | 114.9 | Optimum Moisture: | 11.4 |

Schnabel

Schnabel Engineering