**LOG OF BORING NO. DH3-3**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Location</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>Split Spoon</td>
<td>See Drawing No. C00553-1</td>
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<tr>
<td></td>
<td>Shelby Tube</td>
<td>Surface El.: 1052.7 feet</td>
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<td></td>
<td>Rock Core</td>
<td>Brown SANDY CLAY to CLAYEY SAND with some sandstone fragments, damp, dense</td>
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<td>- boulder @ 65 ft.</td>
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<td>70</td>
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<td>Gray SANDSTONE, fine to medium grained, medium hard to hard</td>
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<td>- iron-stained vertical fracture (70.8' - 71.1')</td>
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<td>80</td>
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<td>90</td>
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<td>Completion Depth: 105.1 feet</td>
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<td>Date Boring Started: 12/6/00</td>
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<td>Engineer/Geologist: JEN/CEM</td>
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<td>Project No.: C00553</td>
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</tbody>
</table>

**Remarks:** Groundwater was first noted at a depth of 35 ft. during drilling operations.

Continued Next Page

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
## LOG OF BORING NO. DH3-3

**Project Description:** Big Branch Slurry Impoundment Investigation  
**Location:** See Drawing No. C00553-1  
**Surface El.:** 1052.7 feet

### MATERIAL DESCRIPTION

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Material Description</th>
</tr>
</thead>
</table>
| 0.0 - 95.0 | Split Spoon | COAL  
- unconfined compressive strength  
  (93.0' - 93.3') - 3,600 psi |
| 95.0 - 101.8 | Shelby Tube |  
- unconfined compressive strength  
  (95.5' - 95.8') - 3,780 psi |
| 101.8 - 105.1 | Rock Core | Gray CLAY SHALE, very soft to soft, becoming sandier and medium hard with depth  
Gray SANDSTONE with shale laminations, medium hard to hard, fine to medium grained |
| 105.1 - 120.0 | | BOTTOM OF TEST BORING @ 105.1 ft. |

### Remarks:
- Groundwater was first noted at a depth of 35 ft. during drilling operations.
**LOG OF BORING NO. DH3-4**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface El.:** 1053.9 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silty and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tbody>
<tr>
<td>18.0</td>
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</table>

**Material Description**

- Coarse COAL REFUSE

- Brown CLAYEY SAND with sandstone fragments, damp, medium dense to dense
  - Shelby tube (20.0’ - 21.2’) brown and gray clayey sand with sandstone fragments
  - Mostly sandstone fragments (25.0’ - 26.5’)
  - Attempted Shelby tube @ 25.0 ft.
    (no recovery)

- SPOIL/FILL -

**Completion Depth:** 105.1 feet

**Date Boring Started:** 12/7/00

**Date Boring Completed:** 12/7/00

**Engineer/Geologist:** JEN/CEM

**Project No.:** C00553

**Remarks:** Groundwater was first noted at a depth of 35 ft. during drilling operations.

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*
**LOG OF BORING NO. DH3-4**

**Project Description:** Big Branch Slurry Impoundment Investigation

**Martin County, Kentucky**

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<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>ROD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tr>
<td>35</td>
<td>Split Spoon</td>
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<td>40</td>
<td>Shelby Tube</td>
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<tr>
<td>45</td>
<td>Rock Core</td>
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<td>4-5-29</td>
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<td>SPOIL/FILL</td>
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<tr>
<td>Completion Depth:</td>
<td>105.1 feet</td>
<td>Remarks:</td>
<td>Groundwater was first noted at a depth of 35 ft. during drilling operations.</td>
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</table>

**Date Boring Started:** 12/7/00

**Date Boring Completed:** 12/7/00

**Engineer/Geologist:** JEN/CEM

**Project No.:** C00553

---

The stratification lines represent approximate strata boundaries.

In situations, the transition may be gradual.
**LOG OF BORING NO. DH3-4**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
</tr>
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<tbody>
<tr>
<td>00</td>
<td>Split Spoon</td>
<td></td>
<td>100</td>
<td>94</td>
</tr>
<tr>
<td>65</td>
<td>Shelby Tube</td>
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<td>96</td>
<td>74</td>
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<tr>
<td>66.6 - 66.8</td>
<td></td>
<td></td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>87.6</td>
<td>Rock Core</td>
<td></td>
<td></td>
<td>50/1&quot;</td>
</tr>
</tbody>
</table>

**Material Description:**
- Gray SANDSTONE, medium hard to hard, medium grained, with occasional coal laminations
- diagonal fracture @ 62.5 ft.
- iron-stained diagonal fracture (66.6' - 66.8')

**Remarks:** Groundwater was first noted at a depth of 35 ft. during drilling operations.

**Completion Depth:** 105.1 feet  
**Date Boring Started:** 12/7/00  
**Date Boring Completed:** 12/7/00  
**Engineer/Geologist:** JEN/CEM  
**Project No.:** C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
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<th>Recovery %</th>
<th>ROD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</thead>
<tbody>
<tr>
<td>97.0</td>
<td>Broken Coal and Mine Rubble</td>
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<tr>
<td>98.1</td>
<td>Gray CLAY SHALE, very soft to soft, becoming sandier and medium hard increasing depth</td>
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<tr>
<td>100.8</td>
<td>Gray SANDSTONE with shale laminations, medium hard, fine to medium grained</td>
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<tr>
<td>105.1</td>
<td>Bottom of Test Boring @ 105.1 ft.</td>
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</tbody>
</table>

Remarks: Groundwater was first noted at a depth of 35 ft. during drilling operations.
**LOG OF BORING NO. DH4-1**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
**Surface El.:** 1050.9 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>ROD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tbody>
<tr>
<td>111.2 feet</td>
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</table>

**Remarks:** Groundwater was first noted at a depth of 43 ft. during drilling operations.

**Completion Depth:** 111.2 feet  
**Date Boring Started:** 12/14/00  
**Date Boring Completed:** 12/18/00  
**Engineer/Geologist:** JEN/JTS  
**Project No.:** C00553

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*
LOG OF BORING NO. DH4-1

Project Description:  Big Branch Slurry Impoundment Investigation
                      Martin County, Kentucky

Location:  See Drawing No. C00553-1
Surface Elevation:  1050.9 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silts and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.0</td>
<td>Coarse COAL REFUSE</td>
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<tr>
<td>43.0</td>
<td>Brown and gray CLAYEY SAND with sandstone fragments, damp to wet, medium dense to dense</td>
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</table>

- very sandy (43.0' - 51.0')

Completion Depth:  111.2 feet
Date Boring Started:  12/14/00
Date Boring Completed:  12/18/00
Engineer/Geologist:  JEN/JTS
Project No.:  C00553

Remarks:  Groundwater was first noted at a depth of 43 ft. during drilling operations.

Continued Next Page

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DH4-1

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1050.9 feet

Depth, feet  Sample Type  Symbol / USCS  Recovery %  ROD  Penetration Bows / 6 inches  Gravel %  Sand %  Silt and Clay %  Water Content %  Liquid Limit  Plastic Limit

Brown and gray CLAYEY SAND with sandstone fragments, damp to wet, medium dense to dense
- root traces (61.0' - 63.0')
- SPOIL/FILL -

Brown SANDY CLAY to CLAYEY SAND with some sandstone fragments, damp, dense to very dense
- some gray mottling and trace coal fragments (67.0' - 69.0')

Brown SANDSTONE, soft, weathered, friable, fine grained

COAL

Completion Depth: 111.2 feet
Date Boring Started: 12/14/00
Date Boring Completed: 12/18/00
Engineer/Geologist: JEN/JTS
Project No.: C00553

Remarks: Groundwater was first noted at a depth of 43 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

Continued Next Page
LOG OF BORING NO. DH4-1

Project Description: Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
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<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
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<th>Plastic Limit</th>
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<tr>
<td>Gray CLAY SHALE, very soft to soft, becoming sandier and medium hard with depth</td>
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<tr>
<td>100</td>
<td>Shelby Tube</td>
<td>100</td>
<td>92</td>
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<tr>
<td>Gray SANDSTONE with shale laminations, medium hard, fine to medium grained</td>
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<td>101.4</td>
<td>Rock Core</td>
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<td>- iron-stained (107.5' - 108.0')</td>
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<tr>
<td>Bottom of Test Boring @ 111.2 ft.</td>
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</tbody>
</table>

Remarks: Groundwater was first noted at a depth of 43 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DHP-1

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1056.0 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</thead>
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</tr>
<tr>
<td>1.5</td>
<td>Coarse COAL REFUSE</td>
<td></td>
<td>1.5</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>Brown CLAYEY SAND with sandstone fragments, damp, medium dense</td>
<td></td>
<td></td>
<td>9-8-4</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>30.0</td>
<td>- trace slurry (15.0' - 16.5')</td>
<td></td>
<td></td>
<td>6-9-7</td>
<td></td>
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<tr>
<td></td>
<td>- boulders (21.7' - 27.0')</td>
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<td></td>
<td>3-5-6</td>
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<tr>
<td></td>
<td>- SPOIL/FILL</td>
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<td>50/0°</td>
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</table>

Completion Depth: 107.0 feet
Date Boring Started: 12/5/00
Date Boring Completed: 12/6/00
Engineer/Geologist: JEN/JTS
Project No.: C00553

Remarks: Water was noted at a depth of 75.5 ft. upon drilling completion.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

Continued Next Page
LOG OF BORING NO. DHP-1

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1056.0 feet

MATERIAL DESCRIPTION

- Brown SANDY CLAY to CLAYEY SAND with some sandstone fragments, damp, very dense
  - 39.5
  - Recovery %
  - RQD
  - Penetration Blows / 6 inches
  - 18-28-28

- Brown SANDSTONE, medium hard, medium grained, moderately weathered, friable
  - 50/0°
  - 85
  - 20

- w/occasional carbonaceous laminations (43.0' - 53.8')
  - 99
  - 80

- gray, hard from 43 ft.
  - 100
  - 97

Completion Depth: 107.0 feet
Remarks: Water was noted at a depth of 75.5 ft. upon drilling completion.

Date Boring Started: 12/5/00
Date Boring Completed: 12/6/00
Engineer/Geologist: JEN/JTS
Project No.: C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHP-1**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface El.:** 1056.0 feet

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>ROQ</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel</th>
<th>Sand</th>
<th>Silt and Clay</th>
<th>Water Content</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>Split Spoon</td>
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<td></td>
<td></td>
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<tr>
<td>70</td>
<td>Shelby Tube</td>
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<tr>
<td>75</td>
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<td>Rock Core</td>
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</table>

**MATERIAL DESCRIPTION**

Gray **SANDSTONE**, hard, medium grained

- iron-stained (63.5' - 66.4')
- fractured (65.9' - 66.4')

- iron-stained (70.0' - 72.8') and (76.4' - 76.6')

- iron-stained vertical fracture (77.0' - 77.4')

Gray **SHALE**, soft to medium hard

100 81

**Completion Depth:** 107.0 feet

**Date Boring Started:** 12/5/00  
**Date Boring Completed:** 12/6/00  
**Engineer/Geologist:** JEN/JTS  
**Project No.:** C00553

**Remarks:** Water was noted at a depth of 75.5 ft. upon drilling completion.

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*
### LOG OF BORING NO. DHP-1

**Project Description:** Big Branch Slurry Impoundment Investigation  
**Martin County, Kentucky**

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Shelby Tube</td>
<td>90.8</td>
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</table>

**COAL**
- unconfined compressive strength  
  
  (91.3' - 91.5') - 3,970 psi

- unconfined compressive strength  
  
  (96.6' - 96.9') - 4,040 psi

- unconfined compressive strength  
  
  (97.5' - 97.8') - 2,940 psi

**Gray CLAY SHALE:** very soft to soft, becoming sandler and medium hard with depth

| 105.6       |             | 99         | 24  |                          |          |       |                |                |             |               |

**Gray SANDSTONE** with shale laminations, medium hard, fine to medium grained.

**Bottom of Test Boring @ 107 ft.**

### Remarks:
- Water was noted at a depth of 75.5 ft. upon drilling completion.

**Completion Depth:** 107.0 feet  
**Date Boring Started:** 12/5/00  
**Date Boring Completed:** 12/6/00  
**Engineer/Geologist:** JEN/HTS  
**Project No.:** C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHP-2**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1055.7 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>ROD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</table>

**MATERIAL DESCRIPTION**

AUGER WITHOUT SAMPLING

**Completion Depth:** 105.0 feet  
Date Boring Started: 1/9/00  
Date Boring Completed: 1/9/00  
Engineer/Geologist: JEN/CEM  
Project No.: C00553

**Remarks:** Groundwater was first noted at a depth of 45 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHP-2**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface Elevation:** 1055.7 feet

**Sample Type:**
- Split Spoon
- Shelby Tube
- Rock Core

**MATERIAL DESCRIPTION**

**AUGER WITHOUT SAMPLING**

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>ROQ</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</thead>
<tbody>
<tr>
<td>50.0</td>
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</tbody>
</table>

Gray **SANDSTONE**, medium hard to hard, medium grained
- soft weathered zone @ 53.2 ft.

- iron-stained (53.2' - 54.0') and (56.7' - 57.5')

- diagonal fracture @ 51.3 ft. and 56.8 ft.

**Completion Depth:** 105.0 feet

**Remarks:** Groundwater was first noted at a depth of 45 ft. during drilling operations.

**Continued Next Page**

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
# LOG OF BORING NO. DHP-2

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1055.7 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>SYMBOL / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tbody>
<tr>
<td>65</td>
<td>Split Spoon</td>
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<td>70</td>
<td>Shelby Tube</td>
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<td>75</td>
<td>Rock Core</td>
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<tr>
<td>80</td>
<td>Gray SANDSTONE, medium hard to hard, medium grained</td>
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<tr>
<td>85</td>
<td>- low-angle fracture @ 62.3 ft.</td>
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<tr>
<td>89</td>
<td>- fractured (62.8' - 63.8')</td>
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<tr>
<td>90</td>
<td>- iron-stained, w/occasional vugs (62.8' - 67.8')</td>
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<tr>
<td>90</td>
<td>- clay seam (66.8' - 67.0')</td>
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<tr>
<td>90</td>
<td>- iron-stained (70.9' - 71.9')</td>
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<tr>
<td>90</td>
<td>- iron-stained vertical fracture (81.3' - 84.3') and (87.0' - 87.3')</td>
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<tr>
<td>90</td>
<td>- iron-stained (80.0' - 87.5')</td>
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</table>

**Completion Depth:** 105.0 feet  
**Remarks:** Groundwater was first noted at a depth of 45 ft. during drilling operations.

---

Continued Next Page
LOG OF BORING NO. DHP-2

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1055.7 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
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<tr>
<td>95.0</td>
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<tr>
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</tbody>
</table>

MATERIAL DESCRIPTION

Dark gray CARBONACEOUS SHALE, medium hard

COAL

Gray CLAY SHALE, very soft to soft

Bottom of Test Boring @ 105 ft.

Completion Depth: 105.0 feet
Remarks: Groundwater was first noted at a depth of 45 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DHX-1

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1055.8 feet

Depth, feet   Sample Type
0.5
1.0   Split Spoon
10.0   Shelby Tube
15.0   Rock Core

MATERIAL DESCRIPTION

Coarse COAL REFUSE

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

- boulder (15.0 - 16.5 ft.)
- boulder (20.0 - 22.0 ft.)
- boulder (25.0 - 26.0 ft.)

Completion Depth: 106.8 feet
Date Boring Started: 12/11/00
Date Boring Completed: 12/11/00
Engineer/Geologist: JEN/JTS
Project No.: C00553

Remarks: Water was noted at a depth of 84.6 ft. upon drilling completion.
**LOG OF BORING NO. DHX-1**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1055.8 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</thead>
<tbody>
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</tbody>
</table>

**Material Description:**

- **Brown SANDY CLAY to CLAYEY SAND** with some sandstone fragments, damp, medium dense to very dense

- **Gray SANDSTONE:** medium hard to hard, medium grained  
  - brown, weathered and friable  
    (38.0' - 40.4')  
  - with occasional carbonaceous laminations  
    (42.1 - 48.6 ft.)  
  - iron stained vertical fracture (49.7 - 50.0 ft.)  
  - with numerous carbonaceous laminations  
    (48.6 - 56.5 ft.)

**Remarks:** Water was noted at a depth of 84.6 ft. upon drilling completion.

---

**Completion Depth:** 106.8 feet  
**Date Boring Started:** 12/11/00  
**Date Boring Completed:** 12/11/00  
**Engineer/Geologist:** JEN/JTS  
**Project No.:** C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DHX-1

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
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<tr>
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<td>70</td>
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</tbody>
</table>

MATERIAL DESCRIPTION

Gray SANDSTONE, medium hard to hard, medium grained

- fractured (68.0 - 68.3 ft.)
- iron stained (70.2 - 71.8 ft.)
- vertical iron stained fracture (76.6 - 76.9 ft.)
- vertical iron stained fracture (77.8 - 78.4 ft.)

Completion Depth: 106.8 feet
Remarks: Water was noted at a depth of 84.6 ft. upon drilling completion.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-1**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1055.8 feet

### MATERIAL DESCRIPTION

- **Gray SANDSTONE**, iron stained, medium hard to hard, fine to medium grained
  - Void sample (89.4'-91.9') brown silty sand with rock fragments
  - 17.5% gravel
  - 55.0% sand
  - 27.1% silt and clay

- **Gray SHALE**, soft to medium hard
  - With occasional siltstone lenses (96.9'-98.2 ft.)
  - Clayey, soft (98.2'-99.6 ft.)
  - Silty, medium hard (99.6'-103.7 ft.)

- **Gray SANDSTONE** with occasional shale laminations, medium hard, fine grained

**Bottom of Test Boring @ 106.8 ft.**

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
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<tr>
<td>100-105</td>
<td>Shelby Tube</td>
<td>96.9</td>
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<tr>
<td>105-110</td>
<td>Rock Core</td>
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<td>106.8</td>
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**Completion Depth:** 106.8 feet  
**Date Boring Started:** 12/11/00  
**Date Boring Completed:** 12/11/00  
**Engineer/Geologist:** JEN/JTS  
**Project No.:** C00553  

**Remarks:** Water was noted at a depth of 84.6 ft. upon drilling completion.

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*

*Figure 121*
LOG OF BORING NO. DHX-2

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1055.5 feet

Sample Type
- Split Spoon
- Shelby Tube
- Rock Core

MATERIAL DESCRIPTION

Depth, feet | Sample Type | Symbol / USCS | Recovery % | RQD | Penetration Blows / 6 inches | Gravel % | Sand % | Silt and Clay % | Water Content % | Liquid Limit | Plastic Limit
---|---|---|---|---|---|---|---|---|---|---|---|---|
0 | Coarse COAL REFUSE | | 0.7 | | | | | | | | | |

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

AUGER W/O SAMPLING

- SPOIL/FILL -

Completion Depth: 106.6 feet
Date Boring Started: 12/12/00
Date Boring Completed: 12/13/00
Engineer/Geologist: JEN/JTS
Project No.: C00553

Remarks: Water was noted at a depth of 83.9 ft. upon drilling completion.
**LOG OF BORING NO. DHX- 2**

**Project Description:** Big Branch Slurry Impoundment Investigation  
**Location:** See Drawing No. C00553-1  
**Surface El.:** 1055.5 feet  
**Symbol / USCS:**  
- Split Spoon  
- Shelby Tube  
- Rock Core

**MATERIAL DESCRIPTION**

<table>
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<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
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<tr>
<td>Gray SANDSTONE, medium hard to hard, medium grained</td>
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<td>- brown, weathered and friable</td>
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</table>

**Completion Depth:** 106.6 feet  
**Date Boring Started:** 12/13/00  
**Date Boring Completed:** 12/13/00  
**Engineer/Geologist:** JEN/JTS  
**Project No.:** C00553

**Remarks:** Water was noted at a depth of 83.9 ft. upon drilling completion.
**LOG OF BORING NO. DHX-2**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1055.5 feet

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<th>Symbol / USCS</th>
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<th>Sand %</th>
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<th>Plastic Limit</th>
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<td>Rock Core</td>
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</tbody>
</table>

**MATERIAL DESCRIPTION**

- Gray SANDSTONE, medium hard to hard, medium grained  
  Recovery %: 100  
  RQD: 100
- Weathered, iron stained, with occasional clayey shale lenses, soft  
  Recovery %: 99  
  RQD: 71
- Iron stained (69.5 - 70.1 ft.)  
  Recovery %: 100  
  RQD: 89
- Iron stained vertical fracture (69.8 - 70.1 ft.)

**Completion Depth:** 106.6 feet  
Date Boring Started: 12/12/00  
Date Boring Completed: 12/13/00  
Engineer/Geologist: JEN/JTS  
Project No.: C00553

**Remarks:** Water was noted at a depth of 83.9 ft. upon drilling completion.

---

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

Figure 124
**LOG OF BORING NO. DHX-2**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

| Location: See Drawing No. C00553-1 |
| Surface El.: 1055.5 feet |

<table>
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<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
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<td>Rock Core</td>
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</tbody>
</table>

**MATERIAL DESCRIPTION**

**VOID**

- void sample - coal slurry with sand and gravel
  - 3.2% gravel
  - 26.7% sand
  - 70.1% silt and clay

**Gray SHALE**, soft to medium hard
- clayey, soft (98.5 - 101.7 ft.)
  - 89 60

- silty, medium (101.7 - 104.3 ft.)

**Gray SANDSTONE** with occasional shale laminations, medium hard, fine grained

**Bottom of Test Boring @ 106.6 ft.**

**Completion Depth:** 106.6 feet
**Remarks:** Water was noted at a depth of 83.9 ft. upon drilling completion.

**In situations, the transition may be gradual.**
**LOG OF BORING NO. DHX- 3**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

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<th>Sample Type</th>
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<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
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<tr>
<td>10.0</td>
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<tr>
<td>15.0</td>
<td>Rock Core</td>
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</tbody>
</table>

**MATERIAL DESCRIPTION**

Coarse **COAL REFUSE**

Brown **CLAYEY SAND** with sandstone fragments, damp, medium dense to very dense

- SPOIL/FILL -

**Completion Depth:** 105.4 feet  
**Date Boring Started:** 12/11/00  
**Date Boring Completed:** 12/11/00  
**Engineer/Geologist:** JEN/CEM  
**Project No.:** C00553

**Remarks:** Groundwater was first noted at a depth of 50.0 ft. during drilling operations.

**Continued Next Page**

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-3**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface El.:** 1052.3 feet

- **Symbol / USCS:**
  - Split Spoon
  - Shelby Tube
  - Rock Core

### MATERIAL DESCRIPTION

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
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**Completion Depth:** 105.4 feet

**Remarks:** Groundwater was first noted at a depth of 50.0 ft. during drilling operations.

**Date Boring Started:** 12/11/00

**Date Boring Completed:** 12/11/00

**Engineer/Geologist:** JEN/CEM

**Project No.:** C00553

---

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

*Continued Next Page*
**LOG OF BORING NO. DHX-3**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

<table>
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<th>Depth, feet</th>
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<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</thead>
<tbody>
<tr>
<td>65</td>
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<td>Brown SANDY CLAY to CLAYEY SAND with some sandstone fragments, damp, medium dense to very dense</td>
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<tr>
<td>70.0</td>
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<td>Brown SANDSTONE, medium hard, medium to coarse grained, moderately weathered, friable</td>
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Completion Date: 12/11/00
Date Boring Completed: 12/11/00
Engineer/Geologist: JEN/CEM
Project No.: C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
<table>
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<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
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<th>Penetration Blows / 6 inches</th>
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</tbody>
</table>

**Material Description**

- **COAL**
  - unconfined compressive strength (93.5' - 93.8') - 3,270 psi

- **Gray CLAY SHALE**, very soft to soft

- **Gray SANDSTONE** with shale laminations, medium hard, fine grained

**Completion Depth:** 105.4 feet

**Remarks:** Groundwater was first noted at a depth of 50.0 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DHX-4

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

<table>
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<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
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</table>

MATERIAL DESCRIPTION

Coarse COAL REFUSE

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

Completion Depth: 104.8 feet
Date Boring Started: 12/14/00
Date Boring Completed: 12/15/00
Engineer/Geologist: JEN/CEM
Project No.: C00553

Remarks: Groundwater was first noted at a depth of 67 ft. during drilling operations.

Continued Next Page

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
# LOG OF BORING NO. DHX- 4

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. c00553-1  
**Surface El.:** 1051.8 feet

## MATERIAL DESCRIPTION

- **Brown CLAYEY SAND** with sandstone fragments, damp, medium dense to very dense

### Depth, feet  | Sample Type  | Symbol / USCS  | Recovery % | RQD | Penetration Blows / 6 inches | Gravel % | Sand % | Silt and Clay % | Water Content % | Liquid Limit | Plastic Limit  
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---  
35 |  |  |  |  |  |  |  |  |  |  |  
36 |  |  |  |  |  |  |  |  |  |  |  
37 |  |  |  |  |  |  |  |  |  |  |  
38 |  |  |  |  |  |  |  |  |  |  |  
39 |  |  |  |  |  |  |  |  |  |  |  
40 |  |  |  |  |  |  |  |  |  |  |  
41 |  |  |  |  |  |  |  |  |  |  |  
42 |  |  |  |  |  |  |  |  |  |  |  
43 |  |  |  |  |  |  |  |  |  |  |  
44 |  |  |  |  |  |  |  |  |  |  |  
45 |  |  |  |  |  |  |  |  |  |  |  
46 |  |  |  |  |  |  |  |  |  |  |  
47 |  |  |  |  |  |  |  |  |  |  |  
48 |  |  |  |  |  |  |  |  |  |  |  
49 |  |  |  |  |  |  |  |  |  |  |  
50 |  |  |  |  |  |  |  |  |  |  |  
51 |  |  |  |  |  |  |  |  |  |  |  
52 |  |  |  |  |  |  |  |  |  |  |  
53 |  |  |  |  |  |  |  |  |  |  |  
54 |  |  |  |  |  |  |  |  |  |  |  
55 |  |  |  |  |  |  |  |  |  |  |  
56 |  |  |  |  |  |  |  |  |  |  |  
57 |  |  |  |  |  |  |  |  |  |  |  
58 |  |  |  |  |  |  |  |  |  |  |  
59 |  |  |  |  |  |  |  |  |  |  |  
60 |  |  |  |  |  |  |  |  |  |  |  

**Completion Depth:** 104.8 feet  
**Remarks:** Groundwater was first noted at a depth of 67 ft. during drilling operations.

---

**TRIAD Engineering, Inc.**  
The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

*Continued Next Page*
**LOG OF BORING NO. DHX-4**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCIS</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>Split Spoon</td>
<td></td>
<td>Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- with some plant roots at 69.0 ft.</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td>- less sand with trace of coal slurry (69.0 - 71.0 ft.)</td>
</tr>
<tr>
<td>75</td>
<td>Shelby Tube</td>
<td></td>
<td>WOT/24&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- with coal slurry and sandstone fragments (73.0 - 75.0 ft.)</td>
</tr>
<tr>
<td>77</td>
<td>Rock Core</td>
<td></td>
<td>WOT/12&quot;-4-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- with numerous sandstone fragments (77.0 - 79.0 ft.)</td>
</tr>
<tr>
<td>85</td>
<td></td>
<td></td>
<td>11-12-10-16</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>15-10-6-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WOT/24&quot;</td>
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<tr>
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<td>40-20-14-10</td>
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<td></td>
<td></td>
<td>3-8-6-9</td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td>WOT/12&quot;-5-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- SPOIL/FILL -</td>
</tr>
</tbody>
</table>

**Completion Depth:** 104.8 feet  
**Remarks:** Groundwater was first noted at a depth of 67 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX- 4**

**Project Description:** Big Branch Slurry Impoundment Investigation

Martin County, Kentucky

**Location:** See Drawing No. c00553-1

**Surface El.:** 1051.8 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.0</td>
<td>Brown CLAYEY SAND with sandstone fragments, damp to wet, medium dense to very dense</td>
<td>50/2&quot;</td>
<td>91.0</td>
<td>WOT/19'-7</td>
<td>92</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>93.0</td>
<td>COAL</td>
<td>98</td>
<td>94</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>103.9</td>
<td>Gray SANDSTONE with shale laminations, medium hard, fine to medium grained</td>
<td>103.9</td>
<td>104.8</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Bottom of Test Boring @ 104.8 ft.**

**Completion Depth:** 104.8 feet

**Date Boring Started:** 12/14/00

**Date Boring Completed:** 12/15/00

**Engineer/Geologist:** JEN/CEM

**Project No.:** C00553

**Remarks:** Groundwater was first noted at a depth of 67 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

**Figure 133**
**LOG OF BORING NO. DHX-5**

**Location:** See Drawing No. C00553-1

**Surface El.:** 1051.2 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol/USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Split Spoon</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td>Shelby Tube</td>
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<tr>
<td></td>
<td>Rock Core</td>
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</tbody>
</table>

**Coarse COAL REFUSE**

20.0

**Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense**

25.0

- SPOIL/FILL -

**Completion Depth:** 104.8 feet

**Remarks:** Groundwater was first noted at a depth of 65 ft. during drilling operations.

**Continued Next Page**

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DHX-5

Location: See Drawing No. C00553-1
Surface El.: 1051.2 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</tbody>
</table>

- SPOIL/FILL -

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

Remarks: Groundwater was first noted at a depth of 65 ft. during drilling operations.

Completion Depth: 104.8 feet
Date Boring Started: 12/15/00
Date Boring Completed: 12/18/00
Engineer/Geologist: JEN/CEM
Project No.: C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DHX-5

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1051.2 feet

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<thead>
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<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tbody>
<tr>
<td>65</td>
<td>Split Spoon</td>
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<td></td>
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<td>27-50/5&quot;</td>
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<tr>
<td>70.5</td>
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<td>17-28-35-50/5&quot;</td>
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<tr>
<td>77.1</td>
<td>Rock Core</td>
<td></td>
<td></td>
<td></td>
<td>50/3&quot;</td>
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</tbody>
</table>

MATERIAL DESCRIPTION

- SPOIL/FILL -

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

Brown SANDY CLAY to CLAYEY SAND with some sandstone fragments, damp, very dense

Brown SANDSTONE, medium hard, medium to coarse grained, moderately weathered, friable

VOID

- void sample (79.7'-82.7') brown silty sand

0.1% gravel
93.9% sand
6.0% silt and clay

Completion Depth: 104.8 feet
Date Boring Started: 12/15/00
Date Boring Completed: 12/18/00
Engineer/Geologist: JEN/CEM
Project No.: C00553

Remarks: Groundwater was first noted at a depth of 65 ft. during drilling operations.

Continued Next Page

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX- 5**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
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<th>Sample Type</th>
<th>Recovery %</th>
<th>ROD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gray CLAY SHALE, very soft to soft, becoming sandier and medium hard with depth</td>
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<td></td>
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<td>98</td>
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<tr>
<td>104.8</td>
<td>Gray SANDSTONE with shale laminations, medium hard, fine to medium grained</td>
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**Remarks:** Groundwater was first noted at a depth of 65 ft. during drilling operations.

**Completion Depth:** 104.8 feet  
**Date Boring Started:** 12/15/00  
**Date Boring Completed:** 12/18/00  
**Engineer/Geologist:** JEN/CEM  
**Project No.:** C00553  

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-6**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.5</td>
<td>Shelby Tube</td>
<td>X</td>
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<td>5.0</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12.5</td>
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<td>I</td>
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<td></td>
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</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

- Coarse COAL REFUSE
- Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

**Completion Depth:** 105.8 feet

**Remarks:** Groundwater was first noted at a depth of 65 ft. during drilling operations.

**Continued Next Page**

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX- 6**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1
Surface El.: 1051.8 feet

- **Split Spoon**
- **Shelby Tube**
- **Rock Core**

**MATERIAL DESCRIPTION**

- Brown **CLAYEY SAND** with sandstone fragments, damp, medium dense to very dense

**Depth, feet** | **Sample Type** | **Symbol / USCS** | **Recovery %** | **RQD** | **Penetration Blows / 6 inches** | **Gravel %** | **Sand %** | **Silt and Clay %** | **Wider Content %** | **Liquid Limit** | **Plastic Limit**
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---

**Completion Depth:** 105.8 feet
**Remarks:** Groundwater was first noted at a depth of 65 ft. during drilling operations.

TRIAD Engineering, Inc.
The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

Figure 139
LOG OF BORING NO. DHX-6

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1051.8 feet

MATERIAL DESCRIPTION

Depth, feet | Sample Type
---|---
65 | Split Spoon
65.0 | Recovery %
69.3 | Rock Core
69 | Penetration Blows / 6 inches
97 | RQD
99 | Gravel %
59 | Sand %
12 | Silt and Clay %
0 | Water Content %
- | Liquid Limit
- | Plastic Limit

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

Brown CLAYEY SAND to SANDY CLAY with some sandstone fragments, damp, very dense
- boulder at 67.9 ft.

Brown SANDSTONE, medium hard, medium to coarse grained, moderately weathered, friable
- weathered, clayey, very soft (81.1 - 81.9 ft.)

Gray SHALE, soft

COAL

Completion Depth: 105.8 feet
Remarks: Groundwater was first noted at a depth of 65 ft. during drilling operations.

Continued Next Page
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tbody>
<tr>
<td>93.5</td>
<td>Split Spoon</td>
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<td></td>
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<tr>
<td>95</td>
<td>Shelby Tube</td>
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<td></td>
<td>95</td>
<td>60</td>
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<tr>
<td>95 - 105</td>
<td>Rock Core</td>
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<td>105.8</td>
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</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

- **COAL**

Gray **CLAYFY SHALE**, very soft to soft, becoming sandier and medium hard with depth

- core loss (100.8' - 105.8') due to core barrel malfunction

- sandstone @ 105.8 ft.

**Bottom of Test Boring @ 105.8 ft.**

**Completion Depth:** 105.8 feet

**Date Boring Started:** 12/18/00

**Date Boring Completed:** 12/19/00

**Engineer/Geologist:** JEN/CEM

**Project No.:** C00553

**Remarks:** Groundwater was first noted at a depth of 65 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-7**

**Location:** See Drawing No. C00553-1

**Surface El.:** 1052.4 feet

- Split Spoon
- Shelby Tube
- Rock Core

**MATERIAL DESCRIPTION**

- Coarse COAL REFUSE

18.0

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

**Completion Depth:** 101.4 feet

**Date Boring Started:** 12/19/00

**Date Boring Completed:** JEN/JTS

**Remarks:** Groundwater was first noted at a depth of 77 ft. during drilling operations.
Location: See Drawing No. C00553-1
Surface El.: 1052.4 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
</tr>
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<tbody>
<tr>
<td>35</td>
<td>Split Spoon</td>
<td></td>
</tr>
<tr>
<td>40</td>
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<td></td>
</tr>
<tr>
<td>45</td>
<td>Rock Core</td>
<td></td>
</tr>
</tbody>
</table>

MATERIAL DESCRIPTION

Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense

Completion Depth: 101.4 feet
Remarks: Groundwater was first noted at a depth of 77 ft. during drilling operations.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-7**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface El.:** 1052.4 feet

**Recovery %**

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCIS</th>
<th>MATERIAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>Split Spoon</td>
<td></td>
<td>Brown CLAYEY SAND with sandstone fragments, damp, medium dense to very dense</td>
</tr>
<tr>
<td>70</td>
<td>Shelby Tube</td>
<td></td>
<td>Brown CLAYEY SAND to SANDY CLAY with some sandstone fragments, damp, dense to very dense</td>
</tr>
<tr>
<td>75</td>
<td></td>
<td></td>
<td>- with some coal fragments and organics (69.0 - 71.5 ft.)</td>
</tr>
<tr>
<td>77.0</td>
<td></td>
<td></td>
<td>- boulder at 71.5 ft.</td>
</tr>
<tr>
<td>79.5</td>
<td></td>
<td></td>
<td>- with some gray mottling (73.0 - 75.0 ft.)</td>
</tr>
<tr>
<td>80.5</td>
<td></td>
<td></td>
<td>- wet (77.0 - 79.0 ft.)</td>
</tr>
<tr>
<td>82.5</td>
<td></td>
<td></td>
<td>Brown SANDSTONE, medium hard, medium to coarse grained, moderately weathered, friable</td>
</tr>
<tr>
<td>85</td>
<td></td>
<td></td>
<td>COAL</td>
</tr>
<tr>
<td>88.7</td>
<td></td>
<td></td>
<td>- clayey shale lens (88.7 - 89.3 ft.)</td>
</tr>
</tbody>
</table>

**Penetration Blows / 6 inches**

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Recovery %</th>
<th>RQD</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>65.0</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>19-32-24-27</td>
</tr>
<tr>
<td>75</td>
<td></td>
<td>14-27-30-31</td>
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<td>77.0</td>
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<td>10-24-25-30</td>
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<tr>
<td>79.5</td>
<td></td>
<td>30-50/2&quot;</td>
</tr>
<tr>
<td>80.5</td>
<td></td>
<td>19-28-28-19</td>
</tr>
<tr>
<td>82.5</td>
<td></td>
<td>24-21-22-23</td>
</tr>
<tr>
<td>85</td>
<td></td>
<td>15-16-15-15</td>
</tr>
<tr>
<td>88.7</td>
<td></td>
<td>2-33-48-38</td>
</tr>
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</table>

**Remarks:** Groundwater was first noted at a depth of 77 ft. during drilling operations.

**Completion Depth:** 101.4 feet
**Date Boring Started:** 12/19/00
**Date Boring Completed:** 12/19/00
**Engineer/Geologist:** JEN/JTS
**Project No.:** C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-7**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
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<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tbody>
<tr>
<td>95</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Shelby Tube</td>
<td>91.6</td>
<td></td>
<td></td>
<td>100</td>
<td>87</td>
<td></td>
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<td></td>
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<tr>
<td>101.4</td>
<td>Rock Core</td>
<td>95.5</td>
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<td></td>
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</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

- **COAL**
  - Gray SHALE, soft to medium hard
    - clayey, soft (91.6 - 94.3 ft.)
    - silly medium hard (94.3 - 95.5 ft.)

- **Gray SANDSTONE** with shale laminations, medium hard, fine to medium grained

**Remarks:** Groundwater was first noted at a depth of 77 ft. during drilling operations.

**Completion Depth:** 101.4 feet

**Date Boring Started:** 12/19/00
**Date Boring Completed:** 12/19/00
**Engineer/Geologist:** JEN/JTS
**Project No.:** C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
## LOG OF BORING NO. DHX- 8

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

### Location:
See Drawing No. C00553-1

**Surface El.:** 1051.4 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Split Spoon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shelby Tube</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rock Core</td>
<td></td>
</tr>
</tbody>
</table>

### MATERIAL DESCRIPTION

- Coarse COAL REFUSE

- Brown CLAYEY SAND with sandstone fragments, damp to wet, very loose to medium dense

- SPOIL/FILL -

**Completion Depth:** 100.0 feet  
**Date Boring Started:** 12/19/00   
**Date Boring Completed:** 12/19/00   
**Engineer/Geologist:** JEN/CEM   
**Project No.:** C00553

**Remarks:** Groundwater was first noted at a depth of 65 ft. during drilling operations.

Continued Next Page

**The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.**

Figure 146
**LOG OF BORING NO. DHX- 8**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1
Surface El.: 1051.4 feet

**Sample Type**
- Split Spoon
- Shelby Tube
- Rock Core

**MATERIAL DESCRIPTION**

Brown CLAYEY SAND with sandstone fragments, damp to wet, very soft to medium dense

- FILL/SPOIL -

**Completion Depth:** 100.0 feet
**Remarks:** Groundwater was first noted at a depth of 65 ft. during drilling operations.

**Date Boring Started:** 12/19/00
**Date Boring Completed:** 12/19/00
**Engineer/Geologist:** JEN/CEM
**Project No.:** C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-8**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1051.4 feet

<table>
<thead>
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<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<td></td>
<td>wot/12&quot;-4-4</td>
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<tr>
<td>70</td>
<td>Shelby Tube</td>
<td></td>
<td></td>
<td>wot/12&quot;-4-6</td>
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<tr>
<td>75</td>
<td></td>
<td>2-3-2-2</td>
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<tr>
<td>80</td>
<td>Rock Core</td>
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<td>5-5-5-7</td>
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<td>27-50/2&quot;</td>
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<td>4-6-7-6</td>
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</tbody>
</table>

- with trace coal fragments (67.0 - 69.0 ft.)
- with trace root fragments (69.0 - 71.0 ft.)
- with some slurry and weathered coal fragments (81.0 - 83.0 ft.)
- with numerous sandstone fragments (85.0 - 87.0 ft.)
- with some weathered coal and shale fragments at 88.5 ft.

**Remarks:** Groundwater was first noted at a depth of 65 ft. during drilling operations.

**Completion Depth:** 100.0 feet

**Date Boring Started:** 12/19/00
**Date Boring Completed:** 12/19/00
**Engineer/Geologist:** JEN/CEM
**Project No.:** C00553

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*

*Continued Next Page*
LOG OF BORING NO. DHX-8

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

<table>
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<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>ROD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.0</td>
<td>COAL</td>
<td></td>
<td></td>
<td></td>
<td>50/3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>93.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gray CLAYEY SHALE. very soft to soft, becoming sandier with depth</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- very sandy (99.0 - 100.0 ft.)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>Bottom of Test Boring @ 100.0 ft.</td>
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</table>

Completion Depth: 100.0 feet
Remarks: Groundwater was first noted at a depth of 65 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DHX-9

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1052.0 feet

Material Description
- Coarse COAL REFUSE
- Brown and gray CLAYEY SAND with sandstone fragments, damp

Completion Depth: 105.0 feet
Remarks: Groundwater was first noted at a depth of 60 ft. during drilling operations.

Date Boring Started: 12/20/00
Date Boring Completed: 12/20/00
Engineer/Geologist: JEN/CEM
Project No.: C00553
<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Location</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tbody>
<tr>
<td>0</td>
<td></td>
<td>See Drawing No. C00553-1 SurfacEl.: 1052.0 feet</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Split Spoon</td>
<td>Split Spoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Shelby Tube</td>
<td>Shelby Tube</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>30</td>
<td>Rock Core</td>
<td>Rock Core</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

Brown CLAYEY SAND with sandstone fragments, damp

- wet @ 60 ft.

- SPOIL/FILL -

60.0 feet

Completion Depth: 105.0 feet

Date Boring Started: 12/20/00

Date Boring Completed: 12/20/00

Engineer/Geologist: JEM/CEM

Project No.: C00553

Remarks: Groundwater was first noted at a depth of 60 ft. during drilling operations.

Continued Next Page

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
LOG OF BORING NO. DHX-9

Location: See Drawing No. C00553-1
Surface El.: 1052.0 feet

MATERIAL DESCRIPTION

- SPOIL/FILL -

Brown and gray CLAYEY SAND with some sandstone fragments, damp,

- Brown CLAYEY SAND to SANDY CLAY with little sandstone fragments, damp, very dense
  - boulders @ 67 ft. and 69 ft.

- Brown SANDSTONE, medium hard, medium grained, weathered and friable
  - diagonal fracture (71.3' - 71.7')
  - vertical fracture (73.7' - 74.0') and 79.2' - 79.5')
  - shale band (81.8' - 83.0')

COAL

Completion Depth: 105.0 feet
Remarks: Groundwater was first noted at a depth of 60 ft. during drilling operations.

Date Boring Started: 12/20/00
Date Boring Completed: 12/20/00
Engineer/Geologist: JEN/CEM
Project No.: C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

Figure 152
LOG OF BORING NO. DHX-9

Location: See Drawing No. C00553-1
Surface El.: 1052.0 feet

MATERIAL DESCRIPTION

COAL

Gray CLAY SHALE, very soft to soft, becoming sandier and medium hard with increasing depth

Gray SANDSTONE with shale laminations, medium hard, fine to medium grained

Bottom of Test Boring @ 105.0 ft.

Completion Depth: 105.0 feet
Date Boring Started: 12/20/00
Date Boring Completed: 12/20/00
Engineer/Geologist: JEN/CEM
Project No.: C00553

Remarks: Groundwater was first noted at a depth of 60 ft. during drilling operations.
**LOG OF BORING NO. DHX-10**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Location: See Drawing No. C00553-1</th>
<th>Surface El.: 1055.3 feet</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>Split Spoon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shelby Tube</td>
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<td></td>
<td>Rock Core</td>
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</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

- Coarse COAL REFUSE

- Brown CLAYEY SAND, with sandstone fragments, damp

Completion Depth: 106.7 feet  
Date Boring Started: 12/20/00  
Date Boring Completed: 12/20/00  
Engineer/Geologist: JEN/JTS  
Project No.: C00553

Remarks:

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td></td>
<td></td>
<td>Brown CLAYEY SAND with sandstone fragments, damp</td>
</tr>
<tr>
<td>45.0</td>
<td></td>
<td></td>
<td>- SPOIL/FILL -</td>
</tr>
<tr>
<td>45</td>
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<td></td>
<td>Brown SANDY CLAY to CLAYEY SAND with some sandstone fragments, damp, medium dense to very dense</td>
</tr>
<tr>
<td>50.9</td>
<td></td>
<td></td>
<td>Brown SANDSTONE, medium hard, medium grained, weathered and friable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- medium hard (54.4 - 57.8 ft.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- gray, medium hard to hard from approximately 56 ft.</td>
</tr>
<tr>
<td>60</td>
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</table>

Completion Depth: 106.7 feet
Date Boring Started: 12/20/00
Date Boring Completed: 12/20/00
Engineer/Geologist: JEN/JTS
Project No.: C00553

Remarks:

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-10**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface El.:** 1055.3 feet

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<td>70</td>
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<tr>
<td>75</td>
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<td>81</td>
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</tr>
</tbody>
</table>

**Material Description**

- Gray SANDSTONE, medium hard to hard, medium grained
  - with occasional carbonaceous laminations (61.1 - 62.2 ft.)
  - iron stained, weathered, medium hard (62.2 - 62.4 ft.)
  - iron stained (62.9 - 65.5 ft.)
  - weathered, medium hard (66.7 - 67.5 ft.)
  - with occasional coal spars (76.2 - 77.3 ft.)
  - fractured (76.4 - 76.7 ft.)
  - iron stained (80.3 - 84.7 ft.)

**Remarks:**

- (Partially Filled)

**Completion Depth:** 106.7 feet

**Date Boring Started:** 12/20/00

**Date Boring Completed:** 12/20/00

**Engineer/Geologist:** JEN/ITS

**Project No.:** C00553

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*
<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
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<tr>
<td>100</td>
<td>Shelby Tube</td>
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<td>102.4</td>
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<td>106.7</td>
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</tbody>
</table>

**MATERIAL DESCRIPTION**

- **VOID** (Partially Filled)
- Gray SHALE, soft to medium hard
  - clayey, soft (95.1 - 97.6 ft.)
  - silty, medium hard (97.6 - 98.1 ft.)
  - sandstone lens, medium hard (98.1 - 98.7 ft.)
  - silty, medium hard (98.7 - 102.4 ft.)
- Gray SANDSTONE, medium hard to hard, fine grained

**Bottom of Test Boring @ 106.7 ft.**

**Completion Depth:** 106.7 feet

**Date Boring Started:** 12/20/00

**Date Boring Completed:** 12/20/00

**Engineer/Geologist:** JEN/JTS

**Project No.:** C00553

**Remarks:**
**LOG OF BORING NO. DHX-11**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Material Description</th>
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<tbody>
<tr>
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<td>Split Spoon</td>
<td>Brown CLAYEY SAND TO SANDY CLAY with sandstone fragments, damp</td>
</tr>
<tr>
<td>5</td>
<td>Shelby Tube</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Rock Core</td>
<td></td>
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<tr>
<td>15</td>
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<tr>
<td>30</td>
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</tr>
</tbody>
</table>

**Location:** See Drawing No. C00553-1  
**Surface El.:** 1054.5 feet

**Completion Depth:** 106.3 feet

**Remarks:**

---

*Note: The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*

**Figure 158**
LOG OF BORING NO. DHX-11

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface EL.: 1054.5 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tbody>
<tr>
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<td>50-55</td>
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<td>55-60</td>
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</tr>
</tbody>
</table>

Brown CLAYEY SAND TO SANDY CLAY with sandstone fragments, damp

Brown SANDSTONE, medium hard, medium grained, weathered and friable
- soft to medium hard (52.0 - 56.5 ft.)
- with occasional clay lenses, soft (56.7 - 57.2 ft.)
- fractured (57.5 - 57.7 ft.)

Completion Depth: 106.3 feet
Date Boring Started: 12/20/00
Date Boring Completed: 12/21/00
Engineer/Geologist: JEN/JTS
Project No.: C00553

Remarks:

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

Continued Next Page

Figure 159
**LOG OF BORING NO. DHX-11**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1054.5 feet

<table>
<thead>
<tr>
<th>Depth, ft.</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</thead>
<tbody>
<tr>
<td>65</td>
<td>Split Spoon</td>
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<td></td>
<td></td>
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<tr>
<td>70</td>
<td>Shelby Tube</td>
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<tr>
<td>75</td>
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<tr>
<td>80</td>
<td></td>
<td>Brown SANDSTONE, medium hard, medium grained, weathered and friable</td>
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<tr>
<td>90</td>
<td></td>
<td>- gray (66.3 - 66.9 ft.)</td>
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<td></td>
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<tr>
<td>90</td>
<td></td>
<td>- gray shale lens (66.1 - 66.3 ft.)</td>
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<tr>
<td>90</td>
<td></td>
<td>- gray, medium hard to hard from 69 ft.</td>
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<td></td>
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<tr>
<td>90</td>
<td></td>
<td>- with occasional coal spars (72.9 - 78.8 ft.)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>85.7</td>
<td></td>
<td>Gray SHALE, soft to medium hard</td>
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<td></td>
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<td>87.1</td>
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</table>

**Completion Depth:** 106.3 feet  
Date Boring Started: 12/20/00  
Date Boring Completed: 12/21/00  
Engineer/Geologist: JEN/JTS  
Project No.: C00553

Remarks:

---

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

Figure 160: Continued Next Page
**LOG OF BORING NO. DHX-11**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Plastic Limit</th>
<th>Liquid Limit</th>
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<td>90-100</td>
<td>Split Spoon</td>
<td>100</td>
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<tr>
<td>95</td>
<td>Shelby Tube</td>
<td>32</td>
<td>0</td>
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<tr>
<td>96.3</td>
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</tbody>
</table>

**Material Description:**
- **COAL**  
  - poor recovery due to inner barrel malfunction  
  (91.3 - 97.0 ft.)

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Material</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Plastic Limit</th>
<th>Liquid Limit</th>
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</thead>
<tbody>
<tr>
<td>96.3</td>
<td>Gray SHALE, soft to medium hard</td>
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<td>105.5</td>
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</tbody>
</table>

**Gray SANDSTONE** with shale laminations, medium hard, fine to medium grained

Bottom of Test Boring @ 106.3 ft.

**Completion Depth:** 106.3 feet  
**Remarks:**
The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-12**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1051.5 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
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</tr>
<tr>
<td>15</td>
<td>Shelby Tube</td>
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</table>

**MATERIAL DESCRIPTION**

Coarse COAL REFUSE

**Completion Depth:** 100.0 feet

**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.

**Continued Next Page**

---

**TRIAD Engineering, Inc.**

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-12**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1051.5 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
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**Material Description:**  
- Coarse COAL REFUSE
- Brown CLAYEY SAND with sandstone fragments, damp, very dense

**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
# LOG OF BORING NO. DHX-12

**Project Description:**
Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:**
See Drawing No. C00553-1

**Surface EL.:** 1051.5 feet

<table>
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<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
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</table>

**Material Description:**
- Brown CLAYEY SAND with sandstone fragments, damp, very dense
  - SPOIL/FILL -
  - Shelby tube (66.0' - 67.0') - interface between fill material and natural ground
- Brown CLAYEY SAND TO SANDY CLAY with some sandstone fragments, damp, very dense
  - Shelby tube (68.0' - 69.0') brown clayey sand to sandy clay with some sandstone fragments
  - Shelby tube (72.0' - 72.8') brown clayey sand to sandy clay with sandstone fragments
  - Gray at 74.0 ft.
  - Brown at 78.0 ft.
  - Shelby tube (80.0' - 80.5')
  - Weathered shale at 82.0 ft.

**Coal**

**Remarks:**
Groundwater was first noted at a depth of 60 ft. during drilling operations.

---

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-12**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

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**MATERIAL DESCRIPTION**

- **COAL**
  - Gray CLAY SHALE, very soft to soft
  - Becomes sandier and medium hard with depth

- Bottom of Test Boring @ 100.0 ft.

**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.

**The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.**
**LOG OF BORING NO. DHX-13**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

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**Location:** See Drawing No. C00553-1  
**Surface El.:** 1051.1 feet

**Symbol / USCS:**
- Split Spoon  
- Shelby Tube  
- Rock Core

**MATERIAL DESCRIPTION**

Coarse COAL REFUSE

**Completion Depth:** 105.5 feet

**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.

**Date Boring Started:** 12/21/00  
**Date Boring Completed:** 1/3/01  
**Engineer/Geologist:** JEN/CEM  
**Project No.:** C00553
**LOG OF BORING NO. DHX-13**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface El.:** 1051.1 feet

- Split Spoon
- Shelby Tube
- Rock Core

**Material Description:**

Coarse COAL REFUSE

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**Completion Depth:** 105.5 feet

**Date Boring Started:** 12/21/00
**Date Boring Completed:** 1/3/01

**Engineer/Geologist:** JEN/CEM

**Project No.:** C00553

**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*

*Continued Next Page*
**LOG OF BORING NO. DHX-13**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface Elevation:** 1051.1 feet

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<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
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**MATERIAL DESCRIPTION**

- Brown CLAYEY SAND with sandstone fragments, wet, medium dense to dense
- with less clay and numerous sandstone fragments (64.0 - 66.0 ft.)
- very wet at 70.0 ft.
- SPOIL/FILL

- Brown CLAYEY SAND TO SANDY CLAY with some sandstone fragments, damp, very dense
- Shelby tube (74.0' - 75.0') and (76.0' - 77.3')
- Shelby tube (84.0' - 86.0') gray clayey sand with sandstone fragments
- sandstone boulder at 89.0 ft.

**Completion Depth:** 105.5 feet

**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.
<table>
<thead>
<tr>
<th>Depth, feet</th>
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<th>ROD</th>
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**MATERIAL DESCRIPTION**

Brown **CLAYEY SAND TO SANDY CLAY** with some sandstone fragments, damp, very dense
- sandstone boulder at 89.0 ft.

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Gray **CLAY SHALE**, very soft to soft, becoming sandier and medium hard with depth

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Gray **SANDSTONE** with shale laminations, medium hard, fine to medium grained

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Bottom of Test Boring @ 105.5 ft.

Remarks: Groundwater was first noted at a depth of 60 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
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<td>Coarse COAL REFUSE</td>
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<tr>
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<td>Brown CLAYEY SAND with sandstone fragments, damp</td>
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**Location:** See Drawing No. C00553-1

**Surface El.:** 1054.4 feet

**Completion Depth:** 102.4 feet

**Date Boring Started:** 1/14/01

**Date Boring Completed:** 1/14/01

**Engineer/Geologist:** JEN/JTS

**Project No.:** C00553

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The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
<table>
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<th>Sample Type</th>
<th>Material Description</th>
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<td>Brown CLAYEY SAND with sandstone fragments, damp</td>
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**Location:** See Drawing No. C00553-1  
**Surface El.:** 1054.4 feet  

**56.0 feet**  
**Brown SANDSTONE, medium hard, medium grained, weathered and friable**

**Completion Depth:** 102.4 feet  
**Date Boring Started:** 1/14/01  
**Date Boring Completed:** 1/14/01  
**Engineer/Geologist:** JEN/JTS  
**Project No.:** C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-14**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

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**Date Boring Started:** 1/14/01
**Date Boring Completed:** 1/14/01
**Engineer/Geologist:** JEN/JTS
**Project No.:** C00553

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*

*Continued Next Page*
### MATERIAL DESCRIPTION

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<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>94.3</td>
<td>COAL</td>
<td>100</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>94.3 - 98.1 ft.</td>
<td>Gray SHALE, soft to medium hard</td>
<td>98</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>98.1 - 101.1 ft.</td>
<td>Gray SANDSTONE, medium hard to hard, fine grained</td>
<td>101.1</td>
<td>102.4</td>
<td></td>
<td></td>
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</tbody>
</table>

Bottom of Test Boring @ 102.4 ft.
LOG OF BORING NO. DHX-15

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1053.1 feet

- Split Spoon
- Shelby Tube
- Rock Core

MATERIAL DESCRIPTION

AUGER W/O SAMPLING

Completion Depth: 100.2 feet
Remarks: Water was noted at a depth of 85 ft. upon drilling completion.

Date Boring Started: 1/9/01
Date Boring Completed: 1/9/01
Engineer/Geologist: JEN/CEM
Project No.: C00553

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
### LOG OF BORING NO. DHX-15

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Split Spoon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shelby Tube</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rock Core</td>
<td></td>
</tr>
</tbody>
</table>

**Location:** See Drawing No. C00553-1  
Surface El.: 1053.1 feet

### MATERIAL DESCRIPTION

**AUGER W/Om SAMPLING**

<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
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</tbody>
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### Remarks

Water was noted at a depth of 85 ft. upon drilling completion.

---

**TRIAD Engineering, Inc.**

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

---

**Figure 175**

**Completion Depth:** 100.2 feet

**Date Boring Started:** 1/9/01

**Date Boring Completed:** 1/9/01

**Engineer/Geologist:** JEN/CEM  
**Project No.:** C00553

---

**Continued Next Page**
**LOG OF BORING NO. DHX-15**  
**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1053.1 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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</thead>
<tbody>
<tr>
<td>65</td>
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</tr>
<tr>
<td>75</td>
<td>Split Spoon</td>
<td>X</td>
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<td></td>
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<td></td>
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<tr>
<td>80</td>
<td>Shelby Tube</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>85</td>
<td>Rock Core</td>
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<tr>
<td>90</td>
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</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

AUGER W/OPT SAMPLING

75.0

Gray SANDSTONE, hard, medium grained

87.1

VOID

46  44

Remarks: Water was noted at a depth of 85 ft. upon drilling completion.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

---

**Completion Depth:** 100.2 feet  
**Date Boring Started:** 1/9/01  
**Date Boring Completed:** 1/9/01  
**Engineer/Geologist:** JEN/CEM  
**Project No.:** C00553
## LOG OF BORING NO. DHX-15

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95 - 97.1</td>
<td>Shelby Tube</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Rock Core</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>100 - 102</td>
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</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

**VOID**

- coal and mine rubble (96.1 - 97.1 ft.)

Gray CLAY SHALE, very soft to soft

Bottom of Test Boring @ 100.2 ft.

**Remarks:** Water was noted at a depth of 85 ft. upon drilling completion.
LOG OF BORING NO. DHX-16

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1052.9 feet

[Diagram of borehole with depths and sampling points]

MATERIAL DESCRIPTION

AUGER W/O SAMPLING

Completion Depth: 95.1 feet
Date Boring Started: 1/10/01
Date Boring Completed: 1/10/01
Engineer/Geologist: JEN/CEM
Project No.: C00553

Remarks: Groundwater was first noted at a depth of 60 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-16**

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1
Surface El.: 1052.9 feet

MATERIAL DESCRIPTION

- Auger w/out sampling

**Completion Depth:** 95.1 feet

**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.

**Continued Next Page**

*The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.*
# LOG OF BORING NO. DHX-16

**Project Description:** Big Branch Slurry Impoundment Investigation  
**Location:** See Drawing No. C00553-1  
**Surface El.:** 1052.9 feet  
**Sample Type:**  
- Split Spoon  
- Shelby Tube  
- Rock Core

### MATERIAL DESCRIPTION

<table>
<thead>
<tr>
<th>Depth</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>65.0</td>
<td>65.0</td>
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<tr>
<td>65.0' - 69.9'</td>
<td>98</td>
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<td>83.2</td>
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<tr>
<td>84.9</td>
<td>84.9</td>
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</tr>
</tbody>
</table>

**AUGER W/OUT SAMPLING**  
Gray SANDSTONE, medium hard to hard, medium grained  
brown, weathered and friable

**Completion Depth:** 95.1 feet  
**Date Boring Started:** 1/10/01  
**Date Boring Completed:** 1/10/01  
**Engineer/Geologist:** JEN/CEM  
**Project No.:** C00553  
**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-16**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1052.9 feet

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>95-95.1</td>
<td>COAL</td>
<td>100</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95.1</td>
<td>Gray CLAY SHALE, very soft</td>
<td>94.1</td>
<td>95.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bottom of Test Boring @ 95.1 ft.

**Remarks:** Groundwater was first noted at a depth of 60 ft. during drilling operations.

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

**TRIAD Engineering, Inc.**  
Figure 181
LOG OF BORING NO. DHX-17

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. C00553-1
Surface El.: 1056.7 feet

Depth, feet | Sample Type | Symbol / USGS |
--- | --- | --- |
0 | Split Spoon | ☑ |
5 | Shelby Tube | ☒ |
10 | Rock Core | ☐ |
15 | | |
20 | | |
25 | | |
30 | | |
35 | | |
40 | | |
45 | | |
50 | | |
55 | | |
60 | | |
65 | | |
70 | | |
75 | | |
80 | | |
85 | | |
90 | | |
95 | | |
100 | | |
101.1 feet | Completion Depth: | |

Remarks:

Coarse COAL REFUSE

Brown CLAYEY SAND TO SANDY CLAY with little sandstone fragments, damp, very dense

AUGER W/O SAMPLING

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

Continued Next Page
LOG OF BORING NO. DHX-17

Project Description: Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

Location: See Drawing No. CO0553-1
Surface El.: 1056.7 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>Split Spoon</td>
<td>X</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Shelby Tube</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>45</td>
<td>Rock Core</td>
<td>I</td>
<td></td>
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<td></td>
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<td>60</td>
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</tr>
</tbody>
</table>

MATERIAL DESCRIPTION

Brown CLAYEY SAND TO SANDY CLAY with little sandstone fragments, damp, very dense

AUGER W/OUT SAMPLING

Gray SANDSTONE, hard, fine to medium grained

- with numerous carbonaceous laminations
  (50.4 - 51.3 ft.)

- iron stained, medium hard to hard
  (51.5 - 52.0 ft.)

Completion Depth: 101.1 feet
Date Boring Started: 1/22/01
Date Boring Completed: 1/22/01
Engineer/Geologist: JEN/JTS
Project No.: CO0553

Remarks:

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-17**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
**Surface El.:** 1056.7 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol/USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Plastic Limit</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>65</td>
<td>Split Spoon</td>
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<td></td>
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<tr>
<td>70</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Gray SANDSTONE, hard, fine to medium grained</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>- iron-stained, medium hard to hard</td>
<td>100</td>
<td>56</td>
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<tr>
<td>61.4 - 66.4 ft.</td>
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<td></td>
</tr>
<tr>
<td>- clayey shale lens, soft (62.6 - 62.7 ft.)</td>
<td>100</td>
<td>100</td>
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<td></td>
</tr>
<tr>
<td>- diagonal fracture (62.7 - 62.9 ft.)</td>
<td>100</td>
<td>100</td>
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<td></td>
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<tr>
<td>- diagonal fracture (63.1 - 63.6 ft.)</td>
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<td>100</td>
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<tr>
<td>- clayey shale lens, soft (63.3 - 63.5 ft.)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>- clayey shale lens, soft (65.3 - 66.1 ft.)</td>
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</tr>
</tbody>
</table>

**Completion Depth:** 101.1 feet  
**Remarks:** The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
# LOG OF BORING NO. DHX-17

**Project Description:** Big Branch Slurry Impoundment Investigation  
**Location:** See Drawing No. C00553-1  
**Surface El.:** 1056.7 feet  
**Sample Type:**  
- Split Spoon  
- Shelby Tube  
- Rock Core

## MATERIAL DESCRIPTION

**Depth, feet**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RCD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.1</td>
<td>Gray SANDSTONE, hard, fine to medium grained</td>
<td>86</td>
<td>57</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **VOID**  
  - void sample (91.6' - 99.0') coal slurry with sand
  - 0.7% gravel
  - 22.2% sand
  - 77.1% silt and clay

**Bottom of Test Boring @ 101.1 ft.**

**Completion Depth:** 101.1 feet

**Date Boring Started:** 1/22/01  
**Date Boring Completed:** 1/22/01  
**Engineer/Geologist:** JEN/JTS  
**Project No.:** C00553  

*Remarks:* The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-18**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1056.8 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Symbol</th>
<th>Recovery %</th>
<th>ROQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>Coarse COAL REFUSE</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brown CLAYEY SAND with sandstone fragments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>29.2</td>
<td>Gray SANDSTONE, medium hard to hard</td>
<td></td>
<td></td>
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</table>

**Completion Depth:** 97.6 feet  
Remarks: Water was noted at a depth of 85.2 ft. upon drilling completion.

**Date Boring Started:** 1/22/01  
**Date Boring Completed:** 1/23/01  
**Engineer/Geologist:** JEN/JTS  
**Project No.:** C00553  

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.
**LOG OF BORING NO. DHX-18**

**Location:** See Drawing No. C00553-1

**Surface El.:** 1056.8 feet

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
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<tr>
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</table>

**MATERIAL DESCRIPTION**

Gray SANDSTONE, medium hard to hard, medium grained

**CASING ADVANCE W/OUT SAMPLING**

**Completion Depth:** 97.6 feet

**Remarks:** Water was noted at a depth of 85.2 ft. upon drilling completion.
**LOG OF BORING NO. DHX-18**

**Project Description:** Big Branch Slurry Impoundment Investigation  
Martin County, Kentucky

**Location:** See Drawing No. C00553-1  
Surface El.: 1056.8 feet

<table>
<thead>
<tr>
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<th>Sample Type</th>
<th>Symbol / USCS</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
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<th>Liquid Limit</th>
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</tbody>
</table>

**Remarks:** Water was noted at a depth of 85.2 ft. upon drilling completion.

---

*Continued Next Page*  

**TRIAD Engineering, Inc.**  
The stratification lines represent approximate strata boundaries.  
In situations, the transition may be gradual.
## LOG OF BORING NO. DHX-18

**Project Description:** Big Branch Slurry Impoundment Investigation
Martin County, Kentucky

**Location:** See Drawing No. C00553-1

**Surface El.:** 1056.8 feet

### MATERIAL DESCRIPTION

<table>
<thead>
<tr>
<th>Depth, feet</th>
<th>Sample Type</th>
<th>Recovery %</th>
<th>RQD</th>
<th>Penetration Blows / 6 inches</th>
<th>Gravel %</th>
<th>Sand %</th>
<th>Silt and Clay %</th>
<th>Water Content %</th>
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<th>Plastic Limit</th>
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<td></td>
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<tr>
<td></td>
<td>- no recovery (96.3' - 90.3')</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- silty sand and gravel (90.3' - 92.3')</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>- silty sand w/trace gravel (92.3' - 94.3')</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>- silty sand w/trace gravel (94.3' - 96.3')</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- gravel (96.3' - 97.6')</td>
<td>97.6</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</table>

Bottom of Test Boring @ 97.6 ft.

### Completed by:

**Description:**

- Water was noted at a depth of 85.2 ft. upon drilling completion.

**Remarks:**

The stratification lines represent approximate strata boundaries. In situations, the transition may be gradual.

**Figure:** 189
APPENDIX A

LABORATORY TESTING

GRAIN SIZE DISTRIBUTION

TRIAXIAL SHEAR STRENGTH

PERMEABILITY

UNIAXIAL COMPRESSIVE STRENGTH

MODULUS OF RUPTURE
GRAIN SIZE DISTRIBUTION
GRAN SIZE DISTRIBUTION TEST REPORT

<table>
<thead>
<tr>
<th>%+75 mm</th>
<th>% GRAVEL</th>
<th>% SAND</th>
<th>% SILT</th>
<th>% CLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.3</td>
<td>23.5</td>
<td>37.1</td>
<td>6.9</td>
<td>11.2</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>LL</th>
<th>PI</th>
<th>D85</th>
<th>D60</th>
<th>D50</th>
<th>D30</th>
<th>D15</th>
<th>D10</th>
<th>Cc</th>
<th>Cu</th>
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<tbody>
<tr>
<td>NP</td>
<td>NP</td>
<td>96.61</td>
<td>13.34</td>
<td>0.60</td>
<td>0.191</td>
<td>0.0162</td>
<td>0.0039</td>
<td>0.69</td>
<td>3388.4</td>
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MATERIAL DESCRIPTION
- LT. BROWN SILTY SAND WITH ROCK FRAGMENTS

Project No.: C00553
Project: BIG BRANCH SLURRY IMPOUNDMENT
- Location: TP-1, S-1

Date: 03/01/01

Remarks:
Specific Gravity = 2.7

GRAN SIZE DISTRIBUTION TEST REPORT
TRIAD ENGINEERING, INC.
GRAIN SIZE DISTRIBUTION TEST REPORT

GRAIN SIZE - mm

%+75 mm | % GRAVEL | % SAND | % SILT | % CLAY
---|---|---|---|---
21.3 | 23.5 | 37.2 | 6.3 | 11.7

LL | PI | D₉₅ | D₆₀ | D₅₀ | D₃₀ | D₁₅ | D₁₀ | Cₑ | Cᵤ
---|---|---|---|---|---|---|---|---|---
NP | NP | 96.61 | 13.34 | 0.58 | 0.184 | 0.0144 | 0.0034 | 0.75 | 3944.6

MATERIAL DESCRIPTION
- LT. BROWN SILTY SAND WITH ROCK FRAGMENTS

USCS | AASHTO
---|---
GM | A-1-b

Remarks:
Specific Gravity = 2.7

Project No.: C00553
Project: BIG BRANCH SLURRY IMPOUNDMENT
Location: TP-1, S-2

Date: 03/01/01

GRAIN SIZE DISTRIBUTION TEST REPORT
TRIAD ENGINEERING, INC.
**GRAIN SIZE DISTRIBUTION TEST REPORT**

### Grain Size Distribution

<table>
<thead>
<tr>
<th>%+75 mm</th>
<th>% Gravel</th>
<th>% Sand</th>
<th>% Silty</th>
<th>% Clay</th>
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</thead>
<tbody>
<tr>
<td>0.0</td>
<td>17.3</td>
<td>45.6</td>
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<td>37.1</td>
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</table>

<table>
<thead>
<tr>
<th>LL</th>
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<th>D85</th>
<th>D60</th>
<th>D50</th>
<th>D30</th>
<th>D15</th>
<th>D10</th>
<th>Cc</th>
<th>Cu</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5.89</td>
<td>0.32</td>
<td>0.21</td>
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### Material Description
- LT. BROWN SANDY SILT WITH ROCK FRAGMENTS

### Project Information
- **Project No.:** C00553
- **Project:** BIG BRANCH SLURRY IMPOUNDMENT
- **Location:** DH1-6, DEPTH: 40.0' - 42.0'

**Date:** 03/01/01

**Remarks:**

**Figure No.**

TRIAD ENGINEERING, INC.
GRAIN SIZE DISTRIBUTION TEST REPORT

PERCENT FINER

GRAIN SIZE - mm

%+75\text{mm} & % GRAVEL & % SAND & % SILT & % CLAY \\
0.0 & 0.3 & 18.7 & 23.5 & 57.5 \\

LL & PI & D_{85} & D_{60} & D_{50} & D_{30} & D_{15} & D_{10} & C_c & C_u \\
0.12 & 0.00 & \\

MATERIAL DESCRIPTION

BLACK SANDY CLAY (SLURRY)

USCS & AASHTO

ML & A-4(0.0)

Project No.: C00553
Project: BIG BRANCH SLURRY IMPOUNDMENT
Location: DH1-6 (88.3' - 90.2')

Date: 02/23/2001

Specific Gravity = 2.15

Remarks:

Figure No. ___
# Grain Size Distribution Test Report

## Graph

![Grain Size Distribution Graph](image-url)

## Table

<table>
<thead>
<tr>
<th>%+75 mm</th>
<th>% Gravel</th>
<th>% Sand</th>
<th>% Silt</th>
<th>% Clay</th>
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<tbody>
<tr>
<td>0.0</td>
<td>7.2</td>
<td>82.6</td>
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</tbody>
</table>

## LL, PI, D85, D60, D50, D30, D15, D10, Cc, Cu

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<thead>
<tr>
<th></th>
<th>LL</th>
<th>PI</th>
<th>D85</th>
<th>D60</th>
<th>D50</th>
<th>D30</th>
<th>D15</th>
<th>D10</th>
<th>Cc</th>
<th>Cu</th>
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<td>1.41</td>
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<td>0.223</td>
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## Material Description

- **Brown Silty Sand with Rock Fragments**

## USCS, AASHTO

<table>
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<th>AASHTO</th>
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<tbody>
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<td>SP-SM</td>
<td>A-3</td>
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## Project Information

- **Project No.:** C00553
- **Project:** Big Branch Slurry Impoundment
- **Location:** DH1-10, Depth: 80.6' - 85.7'

## Date

- **Date:** 02/19/2001

## Remarks

- **Remarks:**

---

**Grain Size Distribution Test Report**

**Triad Engineering, Inc.**

**Figure No.** [blank]
GRAIN SIZE DISTRIBUTION TEST REPORT

<table>
<thead>
<tr>
<th>%+75mm</th>
<th>% GRAVEL</th>
<th>% SAND</th>
<th>% SILT</th>
<th>% CLAY</th>
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<tbody>
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<td>0.0</td>
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<td>5.4</td>
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<th>PI</th>
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<th>D₆₀</th>
<th>D₅₀</th>
<th>D₃₀</th>
<th>D₁₅</th>
<th>D₁₀</th>
<th>Cc</th>
<th>Cu</th>
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<td>0.1627</td>
<td>1.16</td>
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MATERIAL DESCRIPTION

- BROWN SILTY SAND WITH ROCK FRAGMENTS

Project No.: C00553
Project: BIG BRANCH SLURRY IMPOUNDMENT
- Location: DH1-11, DEPTH: 92.6' - 96.2'

Date: 02/19/2001

Figure No.
%+75 mm  % GRAVEL  % SAND  % SILT  % CLAY
0.0  15.8  55.0  29.2

LL  PI  D85  D60  D50  D30  D15  D10  Cc  Cu
5.01  0.38  0.28  0.083

MATERIAL DESCRIPTION
- GRAY SILTY SAND WITH ROCK FRAGMENTS

USCS  AASHTO
SM  A-2-4(0.0)

Project No.: C00553
Project: BIG BRANCH SLURRY IMPOUNDMENT
- Location: DH1-11, DEPTH: 96.1' - 97.1'

Date: 02/19/2001

GRAIN SIZE DISTRIBUTION TEST REPORT

TRIAD ENGINEERING, INC.
GOLDEN SIZE DISTRIBUTION TEST REPORT

<table>
<thead>
<tr>
<th>%+{75}_{mm}</th>
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<th>% SAND</th>
<th>% SILT</th>
<th>% CLAY</th>
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<tr>
<td>0.0</td>
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<td>24.9</td>
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<table>
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MATERIAL DESCRIPTION
- BROWN SILTY SAND WITH ROCK FRAGMENTS

USCS    AASHTO
GM      A-1-b

Project No.: C00553
Project: BIG BRANCH SLURRY IMPOUNDMENT
- Location: DH1-12, DEPTH: 89.4' - 99.4'

Date: 02/19/2001

GOLDEN SIZE DISTRIBUTION TEST REPORT
TRIAD ENGINEERING, INC.