**BOREHOLE LOG**

Field Support Facility

- **Borehole ID:** 110-608284
- **TA/FU:** 164
- **Drill Depth From:** 0' To 35' A
- **Print Name:** NA
- **Start Date/Time:** 2/18/10, 1140
- **End Date/Time:** 2/18/10, 1500
- **Drilling Equipment/Method:** Delta Base Hollowstem Auger Drill Rig with 71/4" OD auger and 5ft long; 3 3/4" ID continuous sampler core barrel
- **Sampling Equipment/Method:** Core barrel samplers

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery (ft per core)</th>
<th>Field Borehole Analytical Sample</th>
<th>Field Screening Results</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphic Log</th>
<th>Lithologic Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0' - 5'</td>
<td>49 / 60</td>
<td>NA</td>
<td>0.0</td>
<td>Snow Anne 1 ft, 0-3 ft tuff, light pinkish grey, fine ash matrix, medium sanding, granite, very abundant lime nodules, 3-5 ft, hard drilling.</td>
<td></td>
<td></td>
<td>2-3 ft @ 1100 - 135</td>
</tr>
<tr>
<td>5' - 10'</td>
<td>50 / 60</td>
<td>NA</td>
<td>0.0</td>
<td>5-10 ft SAA, organic material and calcium carbonate observed at 7 ft, abundant 4 te pumiceyts 6-3 mm, few lherz 9-10 ft.</td>
<td></td>
<td></td>
<td>4-10 ft @ 1100 - 135</td>
</tr>
<tr>
<td>10' - 15'</td>
<td>60 / 60</td>
<td>NA</td>
<td>0.0</td>
<td>10-15 ft 9-14 tuff, fine ash matrix, pinkish gray with 3 ft staining throughout, very white, 1-soft, abundant 4 te pumiceyts.</td>
<td></td>
<td></td>
<td>14-20 ft SAA with large clay-filled pumiceyts up to 2&quot; dia.</td>
</tr>
<tr>
<td>15' - 20'</td>
<td>58 / 60</td>
<td>NA</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:**
Amy L. Howard / Amy J. Howard
2/18/10

**Checked By:**
Elizabeth Bird/Elizabeth Bickel
7/6/10

Los Alamos
Environmental Restoration Project

SOP-12.01
# Borehole Log

**Field Support Facility**

**Borehole ID:** 16-0044  
**TA/FU:** 16 /  
**Drill Depth From:** 0'4" To 30'4"  
**Start Date/Time:** 2/1/10, 1500  
**End Date/Time:** 2/10/10, 1500  
**Print Name:**

**Drilling Equipment/Method:** Delta Base Hollowstem Auger Drill Rig with 7 1/4" OD auger and 5 ft long; 3 3/4" ID continuous sample core barrel

**Sampling Equipment/Method:** Core barrel samplers

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (feet per bucket %)</th>
<th>Field Borehole Analytical Sample #</th>
<th>Field Screen Results</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphite Log</th>
<th>Lithologic Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>60</td>
<td>0.0</td>
<td>0.0</td>
<td>NA</td>
<td></td>
<td></td>
<td>20-25ft Q6+4 full pink clay w/ red Fe staining, fine ash matrix, large 2&quot; dia. clay filled purple, alkaline 9.12 &amp; lithic, friable. 25-30ft SAA</td>
</tr>
<tr>
<td>25'</td>
<td>60</td>
<td>0.0</td>
<td>0.0</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30'</td>
<td>60</td>
<td>0.0</td>
<td>0.0</td>
<td>NA</td>
<td></td>
<td></td>
<td>10 @ 30' + 60'</td>
</tr>
</tbody>
</table>

**Prepared By:**

Amy K. Howard / Amy K. Howard 2/10/10

**Checked By:**

Elizabeth Birkos / Shari Buffa 7/6/10

Los Alamos  
Environmental Restoration Project

SOP-12.01
# Borehole Log

**Field Support Facility**

**Borehole ID:** 110-608685  
**TA/FU:** 110  
**Driller:** Dave Starnes - Drilling  
**Box:** NA  
**Drill Depth From:** 0 ft  
**Start Date/Time:** 2/19/10, 1035  
**End Date/Time:** 2/11/10, 1145

**Drilling Equipment/Method:** Delta Base Hollowstem Auger Drill Rig with 7 1/2" OD auger and 5 ft long; 3 3/4" ID continuous sample core barrels

**Sampling Equipment/Method:** Core barrel samplers

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery (percent)</th>
<th>Field/Borehole Artificial Sample?</th>
<th>Field Screening Results</th>
<th>Lithology - Petrology - Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 - 5</td>
<td>50/50</td>
<td>NA</td>
<td>0.0</td>
<td>Snow covered ~ 6&quot;</td>
</tr>
<tr>
<td>5.1 - 10</td>
<td>50/60</td>
<td>NA</td>
<td>0.0</td>
<td>0.5 ft; Qb+ 4 tuff, pinkish grey; fine ash matrix, mod. welded</td>
</tr>
<tr>
<td>10.1 - 15</td>
<td>60/60</td>
<td>NA</td>
<td>0.0</td>
<td>5-10ft SAA</td>
</tr>
<tr>
<td>15.1 - 20</td>
<td>60/60</td>
<td>NA</td>
<td>0.0</td>
<td>10-15ft Qb+ 4 tuff, pinkish grey w/ ~ 10% Fe staining throughout; felsic fragments throughout; Fe staining and increased in the fragments</td>
</tr>
</tbody>
</table>

**Prepared By:** Amy Huard/Amie Huard  
**Date:** 2/19/10  
**Checked By:** Elizabeth Bickers/Spedl Birtner  
**Date:** 7/6/10

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Environmental Restoration Project

SOP-12.01
**BOREHOLE LOG**

Field Support Facility

Borehole ID: 16-004885  TA/FU: 16  Drill Depth From: 0 ft to 30 ft
Driller: [Name]  Box: NA  Start Date/Time: 2/10/10 10:05
Drilling Equipment/Method: Delta Base Hollowstem Auger Drill Rig with 7 1/2" OD auger and 5 ft long; 3 3/4" ID continuous sampled core barrel
Sampling Equipment/Method: Core barrel samplers

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery (feet per foot %)</th>
<th>Field Boracode</th>
<th>Analytical Sample #</th>
<th>Field Screening Results</th>
<th>Core Bottom Core in Box</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphic Log</th>
<th>Lithologic Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>20' - 25'</td>
<td>60</td>
<td>0.0</td>
<td>NA</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1110 CQH-14</td>
<td>1110 CQH-14</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>RE10-10-1216 + 10 + PH</td>
<td>RE10-10-1237</td>
</tr>
</tbody>
</table>

**Notes**

- 25-30' 5A

TD @ 30 ft

Prepared By:
Amy Howard  2/10/10

Checked By:
Elizabeth Birkos  7/6/10

Print Name/Signature  Date  Print Name/Signature  Date

Los Alamos
Environmental Restoration Project

SOP-12.01
## Borehole Log

**Field Support Facility**

**Borehole ID:** 16-008687  **TA/FU:** Na  
**Drill Depth From:** 0 ft To 30 ft  
**Driller:** Dave Stapp - Jackson  
**Box:** NA  
**Start Date/Time:** 2/11/10, 18:10  
**End Date/Time:** 2/11/10, 11:10

**Drilling Equipment/Method:** Orita Base Hollowstem Auger Drill Rig with 7/8" OD auger and 5'1" long; 3 3/4" ID continuous sampler core barrels

**Sampling Equipment/Method:** Core barrel samplers

### Lithology - Petrology - Soil

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (feet per foot %)</th>
<th>Field Borehole Analytical Sample #</th>
<th>Field Screening Results</th>
<th>Top/Bottom of Core in Box</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphite Log</th>
<th>Lithologic Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0'</td>
<td>24</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>0-1.5 ft Approx pavement</td>
<td>1-2 ft Glaicifluvial sand, 1.5-2 ft Glaicifluvial sand, 1.5-2 ft Glacial drift, admixture of fine, clayey sand, silt, gravel, and sandstone, few fragments, and sand.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5'</td>
<td>60</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>2-5' No recovery</td>
<td>5-10' Tuff, reddish brown sand, silt, sandstone, admixture of fine, clayey sand, silt, gravel, and sandstone, few fragments, and sand.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10'</td>
<td>60</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>5-10' Tuff, reddish brown sand, silt, sandstone, admixture of fine, clayey sand, silt, gravel, and sandstone, few fragments, and sand.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15'</td>
<td>60</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>10-15' Tuff SAA</td>
<td>10-15' Tuff SAA, horizontal fractures gone at 13-13.5 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20'</td>
<td>60</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>15-20' Tuff, Glaicifluvial sand, admixture of fine, clayey sand, silt, gravel, and sandstone, few fragments, and sand.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:**

Amy Howard  2/11/10

**Checked By:**

Elizabeth Birkes/Blitthe Birds  7/6/10

---

**Los Alamos**

Environmental Restoration Project
## BOREHOLE LOG

**Field Support Facility**

- **Borehole ID:** 16-007687
- **TA/FU:** H4
- **Drill Depth:** From 04' to 30.4'
- **Start Date/Time:** 2/11/10 10:10
- **End Date/Time:** 2/11/10 11:30
- **Driller:** Dave Stamps - Jacksonville
- **Box:** NA
- **Sampling Equipment/Method:** Core barrel samplers
- **Drilling Equipment/Method:** Delta Ross Hollowstem Auger Drill Rig with 7 1/4" OD augers and 5 ft long; 3 3/4" ID continues sample core barrelly

### Lithology - Petrology - Soil

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (best per-foot %)</th>
<th>Field Borehole Analytical Samples</th>
<th>Field Screening Results</th>
<th>Top/Bottom of Core in Feet</th>
<th>Lithological Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>50</td>
<td>0.0</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25'</td>
<td>60</td>
<td>0.0</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25'</td>
<td>50</td>
<td>0.0</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30'</td>
<td>60</td>
<td>0.0</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-25ft Out of 4 ft of light pinkish gray, moder. weak clay, lime chunks, and 2.5&quot; cinder. Clay filled punkie (approx. 10&quot; large pieces).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25-30ft clay, filled matrix at 285.29.0 ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Prepared By:
- **Amy Howard**
- **Date:** 2/11/10

### Checked By:
- **Elizabeth Birkett/Flatte Bull**
- **Date:** 7/20/10

**Los Alamos Environmental Restoration Project**

**SOP-12.01**
# Borehole Log

**Field Support Facility**

**Borehole ID:** NW-0004(b)  
**TA/FU:** 16  
**Drill Depth From:** 0 ft to 30 ft  
**Start Date/Time:** 2/14/10, 1:40 PM  
**End Date/Time:** 2/14/10, 10:45 AM  
**Print Name:**  
**Drilling Equipment/Method:** Delta Base Hollowstem Auger Drill Rig with 7 1/4" OD auger and 5 ft long; 3 3/16" T0 continuous sampler core barrel  
**Sampling Equipment/Method:** Core barrel samplers

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery (best per foot %)</th>
<th>Field Borehole Analytical Sample #</th>
<th>Field Screening Results</th>
<th>Lithology – Petrology – Soil</th>
<th>Graphic Log</th>
<th>Lithologic Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0' - 5'</td>
<td>24/60</td>
<td>NA</td>
<td>0.0</td>
<td>0.8 ft Oft 4 tuff intermixed with large cobble, clay, loose.</td>
<td>Q6t 4</td>
<td>Q6t 4</td>
<td>Pothole to 3 ft</td>
</tr>
<tr>
<td>5' - 10'</td>
<td>36/60</td>
<td>NA</td>
<td>0.0</td>
<td>5-10 ft sand with abundant black thin fragments and up to 5% glass phenocrysts, clay, friable</td>
<td>Q6t 4</td>
<td>Q6t 4</td>
<td></td>
</tr>
<tr>
<td>10' - 15'</td>
<td>48/60</td>
<td>NA</td>
<td>0.0</td>
<td>10-15 ft Oft 4 tuff, matrix gray with Fe staining, fragments &gt; 2&quot; dia., clay-friable, abundant glass phenocrysts &lt; 3 mm, abundant lithic fragments &amp; dacite chunks up to 3&quot; dia., mod. weathered, clay, friable.</td>
<td>Q6t 4</td>
<td>Q6t 4</td>
<td></td>
</tr>
<tr>
<td>15' - 20'</td>
<td>60/60</td>
<td>NA</td>
<td>0.0</td>
<td>15-20 ft sand</td>
<td>Q6t 4</td>
<td>Q6t 4</td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:**  
*Amy Howard / Amy K. Howard*  2/14/10

**Checked By:**  
*Elizabeth Birkos / Math Birkos*  7/6/15

**Print Name/Signature**  
**Date**

**Los Alamos**  
**Environmental Restoration Project**

**SOP-12.01**
# Borehole Log

**Field Support Facility**

**Borehole ID:** N10-004/B  
**TA/FU:** 14  
**Drill Depth From:** 0' to 30'  
**Start Date/Time:** 1/10/14 14:00  
**End Date/Time:** 1/10/15 15:45

**Print Name:**

**Driller:** Dave Starnes - Throckmorton  
**Box:** NA  
**Drilling Equipment/Method:** Delta Rose Hollowstem Auger Drill Rig with 7 1/2" OD augers and 5' ft long; 3 3/4" ID continuous sample core barrels

**Sampling Equipment/Method:** Core barrel samplers

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery (% of Asst)</th>
<th>Field Borehole Sample</th>
<th>Field Core Sample</th>
<th>Lithology - Petrology - Soil</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>Qlt 4 tuff, light gray grading to pinkish gray, fine ash matrix, mechanically welded, large clay-filled fracture, abundant lichens, gray and gray phenocysts</td>
<td>1520 Sample Collected</td>
</tr>
<tr>
<td>25'</td>
<td>60</td>
<td>60/10</td>
<td>60/12</td>
<td>25-30 ft SAA</td>
<td>1535 Sample Collected</td>
</tr>
<tr>
<td>30'</td>
<td>60/10</td>
<td>60/30</td>
<td>60/30</td>
<td>T/0 @ 30.0 ft</td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:**

Amy Toward  
Amy K. Koester  
2/19/10

**Checked By:**

Elizabeth Parker  
Clint Hall  
7/6/10

Los Alamos  
Environmental Restoration Project

SOP-12.01