# Borehole Log

## Field Support Facility

**Borehole ID:** 16-60971  
**TA/FU:** 1101  
**Drill Depth From:** 0.0  
**To:** 30.0  
**Start Date/Time:** 3/11/10 1540Hrs  
**End Date/Time:** 3/11/10 1650Hrs

**Driller:** Dave Starnes  
**Drilling Equipment/Method:** Delta Base Hollowstem Auger Drill Rig with 5 ft long 7 1/4” OD Auger and 3 3/4” ID Continuous Core Barrels  
**Sampling Equipment/Method:** Continuous Core

## Lithology – Petrology – Spill

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery (per cent)</th>
<th>Field Borehole Analysis Sample</th>
<th>Field Screening Results</th>
<th>Top/Bottom of Core in Box</th>
<th>Lithology – Petrology – Spill</th>
<th>Graphite Log</th>
<th>Lithology Data</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 - 6.0”</td>
<td>NA</td>
<td>0.0 %</td>
<td>NA</td>
<td></td>
<td>0-2.0 Crushed Tuff and river fill material. Dark reddish brown fill tuff.</td>
<td></td>
<td></td>
<td>Start 1540Hrs</td>
</tr>
<tr>
<td>6.0 - 12”</td>
<td>NA</td>
<td>6.0 %</td>
<td>NA</td>
<td></td>
<td>15% crystals in an ash matrix flattened Pumice to 3mm are dark brownish red. Welded and well indurated.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 - 15”</td>
<td>NA</td>
<td>0.0 %</td>
<td>NA</td>
<td></td>
<td>10.0 – 15 Pinkish gray fill tuff, moderately welded. 30% crystals in an ash matrix. Becomes very moist at 13’, matrix becomes more altered in moist zone. Rare Pumice to 3mm are altered and only slightly flattened. Moderate welding w/3% lithics p 15’.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:** John C. Beckner  
**Checked By:** Elizabeth Birkos/Philip Bulow  
**Print Name/Signature:** John C. Beckner  
**Date:** 3/11/10  
**Print Name/Signature:** Elizabeth Birkos/Philip Bulow  
**Date:** 7/9/10

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Environmental Restoration Project

SOP-12.01
### BOREHOLE LOG

**Field Support Facility**

**Borehole ID:** TA/FU-16/1  
**Driller:** Dave Stansel - Decision Drilling  
**Print Name:**  
**Drilling Equipment/Method:** Delta Base Hollowstem Auger Drill Rig with 5 ft long 7 1/4" OD augers and 3 3/4" ID Continuous Coring Barrels  
**Sampling Equipment/Method:** Continuous core

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery (best per 100 %)</th>
<th>Field Borehole Analytical Sample #</th>
<th>Field Screened Results</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphic Log</th>
<th>Lithologic Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>60&quot; RE-16-10-1445</td>
<td>0.0 ppm</td>
<td>NA</td>
<td>15-26 Same as above, with inns in lithies, crystals to 30&quot;, in ash matrix, welding is moderate, moderately indurated. Roughly 1070 lithies to 1 cm.</td>
<td>NA</td>
<td></td>
<td>Vert frnt 15-11.5' in fill.</td>
</tr>
<tr>
<td>25</td>
<td>60&quot; RE-16-10-1445</td>
<td>0.0 ppm</td>
<td>NA</td>
<td>25-30 Same as above.</td>
<td>NA</td>
<td></td>
<td>TDB 1650 hrs</td>
</tr>
</tbody>
</table>

**Prepared By:** John C. Cracker  
**Date:** 3/11/10  
**Checked By:** Elizabeth Birkos/Elizabeth Birkos  
**Date:** 7/9/10

---

**SOP-12.01**

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BOREHOLE LOG
Field Support Facility

Borehole ID: 16-009714 TA/FU: No / 
Driller: Dave Stansell - Jackson Box: NA 
Stake ID: 3528 
Drilling Equipment/Method: Delta Base Hollowstem Auger Drill Rig with 7½" OD auger and 5ft long; 3 3/4" ID continuous sample core barrels
Sampling Equipment/Method: Core barrel samplers

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (Feet per test %)</th>
<th>Field/Bohring Sample #</th>
<th>Field Screening Results</th>
<th>Top Bottom of Core in Box</th>
<th>Lithology - Petrology - Soil</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0’-5’</td>
<td>36</td>
<td>NA</td>
<td>NA</td>
<td>0-3ft fill material, medium brown sand, gravel, and tuff, clay, loose. 3.5ft SAA, trash including steel and aluminum observed @ 50ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5’-10’</td>
<td>24</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>5-7ft SAA</td>
<td>7-10ft No Recovery</td>
</tr>
<tr>
<td>10’-15’</td>
<td>24</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>10-11ft fill material consisting of sand, gravel, and cobbles, under observed in borehole at 14.0ft 11-15ft No Recovery</td>
<td></td>
</tr>
<tr>
<td>15’-20’</td>
<td>24</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>15.0-19.0ft No Recovery. Augers seized up due to detecting off of cobbles-sized fill material, unable to continue drilling T&amp;D @ 19.0ft</td>
<td></td>
</tr>
</tbody>
</table>

Prepared By: 
Print Name/Signature: Amy K. Howard 
Date: 3/9/10

Checked By: 
Print Name/Signature: Elizabeth Binkis 
Date: 7/6/10

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Environmental Restoration Project

SOP-12.01
# BOREHOLE LOG

**Field Support Facility**

Borehole ID: 110-6009-74  
TA/FU: NA  
Drill Depth From: 0' To 22.5'  
Driller: Dave Stokes - Driller  
Box: NA  
Start Date/Time: 3/10/10 0930 to 1445  
End Date/Time:  
Print Name:  
Drilling Equipment/Method: Delta Base Hollowstem Auger Drill Rig with 7'9"OD auger and 5'ft long; 3 3/4" ID continuous sample core sampler  
Sampling Equipment/Method: Core barrel samplers

---

<table>
<thead>
<tr>
<th>Depth (Ft)</th>
<th>Recovery (foot per hour)</th>
<th>Field Borehole Sample #</th>
<th>Field Screening Results</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphical Log</th>
<th>Lithological Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0'</td>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>Surface - 4&quot; concrete cap</td>
<td></td>
<td></td>
<td>2nd attempt - 2 ft east of 1st attempt located within well footprint.</td>
</tr>
<tr>
<td>5'</td>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>0-5'ft No Recovery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' - 10'</td>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>5-10'ft No Recovery, augers start deflecting off cobble at 6 ft and seize up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10' - 15'</td>
<td>12</td>
<td>NA</td>
<td>NA</td>
<td>10-11'ft Fill material consisting of sand, gravel, and cobbles, dry</td>
<td></td>
<td>Fill</td>
<td></td>
</tr>
<tr>
<td>15' - 20'</td>
<td>12</td>
<td>0.0</td>
<td>NA</td>
<td>15-16'ft Fill material consisting of cobble, wet</td>
<td></td>
<td>Fill</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16-20'ft No Recovery</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prepared By: Amy Howard  
Print Name/Signature: Amy Howard  3/10/10  
Checked By: Elizabeth Birkos  
Print Name/Signature: Elizabeth Birkos  7/6/10

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SOP-12.01
# Borehole Log

**Field Support Facility**

**Borehole ID:** 16-609174  
**TA/FU:** HA 1  
**Driller:** David Stones - Inklin  
**Box:** NA

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

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

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<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (feet per hour)</th>
<th>Field Borehole Sample #</th>
<th>Field Screening Results</th>
<th>Top/Bottom of Core in Box</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphic Log</th>
<th>Lithologic Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>0/30</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>20-22.5 ft No recovery, auger refused at 22.5 ft.</td>
<td>NR</td>
<td></td>
<td><em>2nd attempt</em></td>
</tr>
<tr>
<td>25'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Prepared By:**  
Amy Howard/Mark Howard  
3/10/10  
**Print Name/Signature**

**Checked By:**  
Elizabeth Birks/Christine Birks  
7/6/10  
**Print Name/Signature**

Los Alamos  
Environmental Restoration Project  
SOP-12.01
# BOREHOLE LOG

**Field Support Facility**

**Borehole ID:** 11-6009173  **Sample:** SWMU 11-001 (e)  **Site ID:** 3S29  **Drill Depth From:** 0' To 22.5'  **Start Date/Time:** 3/10/10, 13:15  **End Date/Time:** 3/10/10, 14:45

**Driller:** Dave Stamey  **Drilling Equipment/Method:** Delta Barge Hollowstem Auger Drill Rig with 5 ft long 7 1/4” OD augers and 3 3/4” in continuou Core Barrels  **Sampling Equipment/Method:** Core Barrel Sampler

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (Cert for each log)</th>
<th>Field Borehole Sample #</th>
<th>Field Securing Details</th>
<th>Top/Bottom of Core in Box</th>
<th>Lithology - Petrology - Soil</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0' - 5'</td>
<td>36/36</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0-5 ft No Recovery</td>
<td></td>
</tr>
<tr>
<td>5' - 10'</td>
<td>55</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>5-10 ft Soft Material, sand, silt, clay, gravel, dark brown, wet, 8-10 ft gds + red, slightly weathered, dark gray, fine ash matrix, few gds phyllosilicates, 10-15 ft SAA, wet, added Fe staining throughout ~50%, weathered.</td>
<td>Fill</td>
</tr>
<tr>
<td>10' - 15'</td>
<td>57</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>15-20 ft coarse-grained sand + large till chunks = fill material</td>
<td></td>
</tr>
<tr>
<td>15' - 20'</td>
<td>24/60</td>
<td>RE10-10-279</td>
<td>0.0</td>
<td>NA</td>
<td>1430 Collected</td>
<td>Fill Sample RE10-10-279</td>
</tr>
</tbody>
</table>

**Prepared By:** Amy L. Howard  **Date:** 3/10/10  **Checked By:** Elizabeth Barkos  **Date:** 7/6/10

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

**Environmental Restoration Project**

SOP-12.01
**BOREHOLE LOG**

Field Support Facility

Borehole ID: 16-09173  TA/FU: N/A  Drill Depth From: 0 ft to 22.5 ft  Page 2 of 2
Driller: Dave Stanes - Theatin  Box: NA  Start Date/Time: 3/10/10  End Date/Time: 13:15 to 14:45

Print Name

Drilling Equipment/Method: OHA Bore Hollowstem Auger Drill Rig with 7½" OD auger and 5 ft avg; 3 3/4" TH Continuous sample core barrels

Sampling Equipment/Method: Core barrel samplers

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Recovery (ft)</th>
<th>Field Borehole Sample #</th>
<th>Field Screening Results</th>
<th>Lithology - Petrology - Soil</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>10/30</td>
<td>NA 0.0 NA</td>
<td></td>
<td></td>
<td>FMI</td>
</tr>
<tr>
<td>251</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NR</td>
</tr>
</tbody>
</table>

20-20.8 ft Fill material, large river cobbles, and coarse gravel sand, moist. 20.8-22.5 ft No recovery to 22.5 ft due to auger refusal.

Prepared By: Amy Howard
Print Name/Signature 3/10/10

Checked By: Elizabeth Bickos/Christopher Bicke
Print Name/Signature 7/6/10

Los Alamos
Environmental Restoration Project

SOP-12.01
BOREHOLE LOG

Field Support Facility

Borehole ID: 16-0001 (1)

Driller: Dave Stamey - Precision Drilling

Drilling Equipment/Method: Delta Base Hollowstem Auger Drill Rig with 5 ft long 7 1/4" OD augers and 3 3/4" ID Continuous Core Barrels

Sampling Equipment/Method: Continuous Core Sampling

<table>
<thead>
<tr>
<th>Depth (Ft)</th>
<th>Recovery (best per cent)</th>
<th>Field Borehole Analytical Sample #</th>
<th>Field Screen Results</th>
<th>Top Soils of Core in Box</th>
<th>Lithology - Petrology - Soil</th>
<th>Lithology Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>24</td>
<td>NA</td>
<td>NA</td>
<td>3.5 ft sand, silt, gravel; backfill, saturated.</td>
<td>0-3 ft previously washed on 1/5/10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>60</td>
<td>NA</td>
<td>NA</td>
<td>5-8 ft slightly welded tuff mixed with coarse-grained sand; area of exposed material 2-1.8 ft thick.</td>
<td>0-14 ft red and gray with reddish orange staining, 13-14 ft, some 1 ft phenoconers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prepared By: Amy K. Howard 3/10/10

Checked By: John L. Lack 3/11/10

SOP-12.01

Los Alamos
Environmental Restoration Project
# BOREHOLE LOG

## Field Support Facility

**Borehole ID:** 16-00912

**TA/FU:** 161

**Driller:** Dave Starnes - Precision Drilling

**Print Name:**

**Drilling Equipment/Method:** Delta Base Hollowstem Auger Drill Rig with 5 ft long 7 1/4" OD augers and 3 3/4" ID Continuous Core Barrels

**Sampling Equipment/Method:** Continuous Core

## Lithology – Petrology – Soil

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (best per test?)</th>
<th>Field Borehole Analytical Sample #</th>
<th>Field Screening Results</th>
<th>Top/Bottom of Core in Box</th>
<th>Lithological Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0%</td>
<td>NA</td>
<td>NA</td>
<td>0.0-10'</td>
<td>Silt, sand, and crushed reddish brown welded tuff fill to 2.0'</td>
<td>Second attempt, relocate 2 ft towards road (NW)</td>
</tr>
<tr>
<td>10.0</td>
<td>0%</td>
<td>NA</td>
<td>NA</td>
<td>10-13'</td>
<td>Clayey tuff, fine lapilli tuff, pumice, moderately welded, pumice to 300 cm reddish brown but become gray with depth, 300° crystals, 3% pumice, 3% crystals</td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:** Jerome Cepeck

**Print Name/Signature:** 3/11/10

**Checked By:** Elizabeth Burris/Chad Burren

**Print Name/Signature:** 7/9/10

**Los Alamos Environmental Restoration Project**

**SOP-12.01**
# Borehole Log

**Field Support Facility**

<table>
<thead>
<tr>
<th>Borehole ID: 16-609172</th>
<th>TA/FU: 16/1</th>
<th>Drill Depth From: 0.0 To: 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driller: Dave Starnes</td>
<td>Box:</td>
<td>Start Date/Time: 3/11/10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End Date/Time: 3/11/10</td>
</tr>
</tbody>
</table>

**Drilling Equipment/Method:** Hollow Stem Auger w/ continuous core.  
**Sampling Equipment/Method:** continuous core

<table>
<thead>
<tr>
<th>Depth (Ft)</th>
<th>Recovery (total per foot)</th>
<th>Field Borehole Analytical Sample</th>
<th>Field Screening Results</th>
<th>Top/Bottom of Core Box</th>
<th>Lithology – Petrology – Soil</th>
<th>Graphic Log</th>
<th>Lithologic Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>34&quot;/60&quot;</td>
<td>0.0 ppm</td>
<td></td>
<td></td>
<td>18-22 ft Reddish-brown moderately welded tuff (as above), Pumice very strongly altered to brick reddish-orange, moist. Moderately indurated, Pumice size decreases from 3 cm to 0.25 cm with depth.</td>
<td>Q B T 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>36&quot;/60&quot;</td>
<td>RE6-10-14142</td>
<td></td>
<td></td>
<td>22-30 ft Reddish-brown moderately welded lapilli tuff, 10% pumice in an ash matrix, 15% crystals, 15% mafics</td>
<td>Q B T 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 25         | 36"/60"                   | RE6-10-14143                     |                         |                        | TD 30.0' B65

**Prepared By:** John C. Crockel  
**Checked By:** Elizabeth Birkos / Judith Birkos

**Print Name/Signature:** John C. Crockel  
**Date:** 3/11/10  
**Print Name/Signature:** Elizabeth Birkos / Judith Birkos  
**Date:** 7/9/10

**Los Alamos Environmental Restoration Project**

**SOP-12.01**