### Borehole Log

**Field Support Facility**

**BOREHOLE LOG**

**Shale #3: 0528**

**Borehole ID:** 16-608676  **TA/FU:** 12A  
**Drill Depth From:** 0' to 30'  
**Start Date/Time:**  
**End Date/Time:**  
**Print Name:** Dave Stumpf - Kronig  
**Box:** NA  
**Drilling Equipment/Method:** Delta Base Hollowstem Auger Drill Rig with 7 1/4" OD auger and 5' long; 3 3/4" in continuous sample core lance  
**Sampling Equipment/Method:** Core barrel samplers

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**Depth (Feet) | Recovery (foot per foot %) | Field/Borehole Analytical Sample # | Field Screening Results | Lithology - Petrology - Soil**
---|---|---|---|---
0' | NA | 3' | 0.0 | 0 - 3.5' fill and roadbase; 3.5 - 8.5' fill and red clay. 
5' | 24 | NA | 0.0 | Gray, medium brown, moist. 
10' | 60 | NA | 0.0 | 5 - 8.5' fill, sand, silt, gravel, medium brown clay. 
15' | 60 | NA | 0.0 | 8 - 10.5' fill, sand, silt, fine gravel, rounded, tuff, chunks, wide, mod. moist. 
20' | 60 | NA | 0.0 | 10 - 15.5' fill consisting of sand, silt, clay, and fine gravel, rounded, tuff, chunks, wide, mod. moist. 
15.5 - 20' | 60 | NA | 0.0 | 16.5 - 20' tuff, pinch, gray, moderate weathering; pieces less than 1" dia., survery white, abundant white + qte. phenocrysts. 
20' | 60 | NA | 0.0 | 16.5 - 20' tuff, pinch, gray, moderate weathering; pieces less than 1" dia., survery white, abundant white + qte. phenocrysts. 

**Prepared By:** Amy K. Howard  
**Date:** 2/1/10  
**Checked By:** Elizabeth Bickis  
**Date:** 7/16/10

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SOP-12.01
# Borehole Log

**Field Support Facility**

**Borehole ID:** 16-608670  **TA/FU:** 16a  **Drill Depth From:** 0 ft  **To:** 30 ft  **Page 3 of 6**

**Driller:** Dave Spanos - Hickson  **Box:** NA  **Start Date/Time:** 2/10/2006 1500-1600  **End Date/Time:** 2/11/2006 1100

**Print Name**

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

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

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (percent per foot)</th>
<th>Core/Borehole Sample #</th>
<th>Field Screaming Results</th>
<th>Top/Bottom of Core in Box</th>
<th>Lithology/ Petrology - Soil</th>
<th>Graphic Log</th>
<th>Lithological Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 ft</td>
<td>60</td>
<td>16-10-150</td>
<td>0.0</td>
<td>NA</td>
<td>20-25 ft 60+4 sandstone with 1/8&quot; and 1/4&quot; dolomite, light pink, grey, lined with quartz fragments to 1&quot; diameter, quartz filled pumice 1&quot;-2&quot;, 23.5-25.0 ft.</td>
<td>Q6-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 ft</td>
<td>60</td>
<td>16-10-150</td>
<td>0.0</td>
<td>NA</td>
<td>25-30 ft 54a, moderate welding, large clay-filled pumice 1&quot;-2&quot; with abundant quartz phenocrysts &lt;5 mm, dry</td>
<td>Q6-4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:**

Amy Houser, Amy Houser  **Date:** 2/13/10

**Checked By:**

Elizabeth Bitko, Elizabeth Bitko  **Date:** 7/6/10

Los Alamos Environmental Restoration Project

SOP-12.01
# Borehole Log

**Field Support Facility**

<table>
<thead>
<tr>
<th>Borehole ID:</th>
<th>16-628673</th>
<th>TA/PU:</th>
<th>HP</th>
<th>Drill Depth From:</th>
<th>0' To 30'</th>
<th>Page 1 of 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driller:</td>
<td>Dave Starnes</td>
<td>Precision</td>
<td>Box: NA</td>
<td>Start Date/Time:</td>
<td>1420</td>
<td>11/15/07</td>
</tr>
<tr>
<td>Print Name</td>
<td>'De Haan Base'</td>
<td></td>
<td></td>
<td>End Date/Time:</td>
<td>1445</td>
<td>11/18/07</td>
</tr>
</tbody>
</table>

**Sampling Equipment/Method:** Holloway Auger, 3.5/40 continuous sample core barrels, 11/07-11/15, auger, 5 ft long core barrel

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (Percent of Core)</th>
<th>Field Borehole Analytical Sample #</th>
<th>Field Screening Results</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphic Log</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0' - 5'</td>
<td>30%</td>
<td>NA</td>
<td>0.5'</td>
<td>0-2.5' Backfill - sand, silt, ground, chunks of weathered till; 2.5-5.0' Aft 4' tulip, reddish brown, red, reddish, ash matrix, moist, few lithics, deformed pumice (elasted)</td>
<td>Quakertown</td>
<td>1/2' of core</td>
</tr>
<tr>
<td>5' - 10'</td>
<td>60%</td>
<td>NA</td>
<td>1'</td>
<td>5-10' Aft 4' tulip, reddish brown ash, matrix, lapilli size pumice (1/2'), lithics, 5-10% phenocrysts, pumice and ash field</td>
<td>Oat Quakertown</td>
<td></td>
</tr>
<tr>
<td>10' - 15'</td>
<td>60%</td>
<td>NA</td>
<td>0.5'</td>
<td>10-20' Aft 4' pumice, moderately indurated, increase in grainy phenocrysts, abundant lithics up to 1&quot; diameter</td>
<td>Oat Quakertown</td>
<td></td>
</tr>
<tr>
<td>15' - 20'</td>
<td>60%</td>
<td>NA</td>
<td>0.5'</td>
<td>15'-20' holigrolt, pumice, 17.7-18.3 45' clay filled pumice, pumice and ash field</td>
<td>Oat Quakertown</td>
<td></td>
</tr>
<tr>
<td>20' - 25'</td>
<td>60%</td>
<td>NA</td>
<td>1'</td>
<td>20'-25' Oat Quakertown</td>
<td>Oat Quakertown</td>
<td></td>
</tr>
</tbody>
</table>

Prepared By: Amy Howard, Amy Howard, 2/11/07

Checked By: Elizabeth Birkos, Edith Bildo, 7/6/10

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SOP-12.01
**BOREHOLE LOG**

**Field Support Facility**

Borehole ID: 16-6086673  TA/FU: 16 1  Drill Depth From: 0'4" To 30'4"

Driller: Mark Stewart  Box: NA  Start Date/Time: 2/11/10 13:45

Print Name:  NEHA Base

End Date/Time: 2/11/10 14:15

Drilling Equipment/Method: Hollowstem Augers 3 1/4" ID Continuous Cou Barrel

Sampling Equipment/Method: S14" OD - Auger (5 ft long)

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (foot per foot/%)</th>
<th>Field Borhole #</th>
<th>Amenityal 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' - 25'</td>
<td>60</td>
<td>KE16-10-1160</td>
<td>1.000</td>
<td>NA</td>
<td></td>
<td>20-25' ST 60% 4.5&quot; till, pinkish grey, pumice fines = 1 inch thick. litchies ≤ 1/2&quot; dia. 10% gravel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25' - 30'</td>
<td>60</td>
<td>KE16-10-1151</td>
<td>0.600</td>
<td>NA</td>
<td></td>
<td>25-30' SAA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:**
Amy Howard 2/11/10

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

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SOP-12.01
# BOREHOLE LOG

**Field Support Facility**

**Borehole ID:** 16-60081.74  **TA/FU:** K3  **Drill Depth From:** 0' To 30'  **Page 1 of 2**

**Driller:** Dave Spence  **Box:** NA  **Start Date/Time:** 3/45  **End Date/Time:** 2/21/10, 1:300

**Print Name**

**Drilling Equipment/Method:** 0814 Base Hollowstem Auger Drill Rig with 7 1/4" OD auger and 5' long; 3 3/4" ID continuous sampler core barrel

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

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Recovery (foot/foot %)</th>
<th>Field Forehand Sample</th>
<th>Field Screen %</th>
<th>Lithology - Petrology - Soil</th>
<th>Graphic Log</th>
<th>Lithologic Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0' - 5'</td>
<td>36/30</td>
<td>NA</td>
<td>0.0</td>
<td>0 - 3' Khorl, sand, silt, silt, silt, medium brown, upper 1 foot rhyolite, some gray horizons 3 - 5' NE recovery 2' 2/21/10 8' - 10' NE recovery 2' 2/21/10 10' - 15' SAA Medium pinkish gray 17.6 - 17.9 1450 fracture, large dacite fragments up to 2' and range rhyolite up to 2', no 5 - 10% 15' - 20' SAA, porphyry dacite, 7 - 8&quot; increase in size, 80% phenocrysts increase in size with depth, pinkite grains have upper cristobalite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5' - 10'</td>
<td>60/60</td>
<td>NA</td>
<td>0.2</td>
<td>10 - 15' SAA, Medium pinkish gray 17.6 - 17.9 1450 fracture, large dacite fragments up to 2' and range rhyolite up to 2', no 5 - 10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10' - 15'</td>
<td>60/60</td>
<td>NA</td>
<td>0.2</td>
<td>10 - 15' SAA, Medium pinkish gray 17.6 - 17.9 1450 fracture, large dacite fragments up to 2' and range rhyolite up to 2', no 5 - 10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15' - 20'</td>
<td>60/60</td>
<td>NA</td>
<td>0.0</td>
<td>15' - 20' SAA, Medium pinkish gray 17.6 - 17.9 1450 fracture, large dacite fragments up to 2' and range rhyolite up to 2', no 5 - 10%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:** K. Leavel  **Checked By:** Elizabeth Buck  **Print Name/Signature:** K. Leavel  **Date:** 2/21/10  **Print Name/Signature:** Elizabeth Buck  **Date:** 7/6/11

**SOP-12.01**

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Environmental Restoration Project
## Borehole Log

**Field Support Facility**

**Borehole ID:** N6-108/174  
**TA/FU:** N6  
**Drill Depth From:** 0 ft to 30 ft  
**Drill Depth To:** 30 ft  
**Start Date/Time:** 2/1/10, 9:45  
**End Date/Time:** 2/1/10, 13:00  
**Print Name:**  
**Driller:** Dave Starnes - Jackson  
**Box:** NA  
**Drilling Equipment/Method:** ORI HA 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

### Lithology - Petrology - Soil

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Recovery (feet per非常的 %)</th>
<th>Field Screening Results</th>
<th>Lithology - Petrology - Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 25'</td>
<td>KEU-10-113</td>
<td>0.0</td>
<td>20-25' Q + 4 tuff, pinkish gray, moist, wetting, 11/4''-11/2'' thin, pinkish gray; dry texture. 6 x 100 mm box end cap 23.0 ft, color wetting slightly with depth</td>
</tr>
<tr>
<td>25 - 30'</td>
<td>KEU-10-1153</td>
<td>0.5</td>
<td>25-30' Q + 4 tuff, pinkish gray, 11/4&quot;, wood fragments 27.5 - 28.0'</td>
</tr>
</tbody>
</table>

---

**Prepared By:**  
Amyk Howard / Amyk Howard  
**Date:** 2/1/10  

**Checked By:**  
Elizabeth Birkos / Elizabeth Birkos  
**Date:** 7/6/10

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**SOP-12.01**
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Recovery (feet per foot %)</th>
<th>Field Borehole Analytical Sample #</th>
<th>Lithology - Petrology - Soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>0' - 5'</td>
<td>24/24</td>
<td>NA</td>
<td>Snow cover 6&quot;</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>5' - 10'</td>
<td>60/60</td>
<td>NA</td>
<td>0-1.5 ft backfill consisting of sand and pebbles, wet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.5-2.5 ft backfill consisting of cobble, wet-water filled BHT.</td>
</tr>
<tr>
<td>10' - 15'</td>
<td>50/50</td>
<td>NA</td>
<td>2.5-10 ft Qt 7 tuff, pinkish grey, fine ash matrix, moderately welded, abundant quartz phenocrysts some (~5%) black 1&quot;-2&quot; fragments, ~1% K feldspar.</td>
</tr>
<tr>
<td>15' - 20'</td>
<td>58/60</td>
<td>NA</td>
<td>10-15 ft S/AH with Fe staining throughout and 1/2&quot; to 1&quot; quartz filled ameise. 13-15 ft multiple horizontal clay-filled fractures, wet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
<td>15-20 ft Qt 7 tuff, fine ash matrix, moderately welded, pinkish grey, 10% quartz phenocrysts &amp; dark fragments.</td>
</tr>
</tbody>
</table>

Prepared By:  
Amy L. Howard  2/1/10

Checked By:  
Elizabeth Birlos  7/6/10

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SOP-12.01
### BOREHOLE LOG

**Field Support Facility**

**Borehole ID:** 16-008/75  **TA/FU:** 16  **Drill Depth From:** 0 ft To 30 ft  **Page 2 of 3**  
**Driller:** Dave Sparrow - Jackson  **Box:** NA  **Start Date/Time:** 2/10/10, 14:45  **End Date/Time:** 2/10/10, 16:20  
**Print Name**

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

**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>Graphic Log</th>
<th>Lithologic Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>20'</td>
<td>60</td>
<td>-</td>
<td>0.0</td>
<td>NA</td>
<td>20-25 ft ABT 4 tuff, light pinkish gray, fine ash matrix, moderately weathered, 1-2&quot; diameter, filled pink with abundant quartz, plagioclase and black lithic fragments, 25-30 ft SAA, grading to light gray.</td>
<td>Collected RE16-10-1154 + FO RE16-10-1174 @ 16:05</td>
<td></td>
<td>Collected RE16-10-1155 @ 16:15</td>
</tr>
<tr>
<td>25'</td>
<td>50</td>
<td>LE16-10-155</td>
<td>0.0</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30'</td>
<td>60</td>
<td>LE16-10-1154</td>
<td>0.0</td>
<td></td>
<td>TO @ 30 ft bgs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prepared By:** Amy Howard  **Checked By:** Elizabeth Bickes  
**Print Name/Signature:** Amy Howard  **Date:** 2/10/10  **Print Name/Signature:** Elizabeth Bickes  **Date:** 7/6/10

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