

# Appendix C

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## *Borehole Logs*



# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612280 **IWP Location ID:** 16 **Date:** 9/28/2010

**TA- 02 SWMU/AOC:**02-004(b-e), 02-011(d)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** 12

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):**15.25

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	0	1810	RE02-10-21501				QAL	(0.5, 15.3) QAL: Gray brown sandy silt with pebbles and cobbles.	Alluvial groundwater from 12 to 15.25 ft.
10											
15		0	19	1574	RE02-10-21500	Sat.	▼				
20										(15.3, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
25	100	0	3	1670	RE02-10-21495				QBO		
30											
35		0	3	1729	RE02-10-21490						
40											
45											
50	↓	0	0	1581	RE02-10-21485				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612292 **IWP Location ID:** 20

**Date:** 9/21/10 -9/24/10

**TA- 2 SWMU/AOC:** 02-006(e), 02-011(a)(vii,viii)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10

**Depth to saturation (ft):** 13

**LATA Sampler:** Ali Furlall

**Depth to soil/tuff interface (ft):** 15.75

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	0	1086	RE02-10-21521				QAL	(0.5, 15.8) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											Alluvial groundwater from 13 to 15.75 ft.
15		0	0	1175	RE02-10-21522	Sat.	▼				
20											
25	100	0	25	1450	RE02-10-21523				QBO	(15.8, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
30											
35		0	57	1302	RE02-10-21524						
40											
45											
50	↓	0	0	1273	RE02-10-21525				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

**Los Alamos Technical Associates, Inc.  
Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612293 **IWP Location ID:** 17 **Date:** 9/29/10 - 10/05/10

**TA- 2 SWMU/AOC:** 02-004(g)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** 13.5

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 18

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) Asphalt: Asphalt	The HSA borehole was located under asphalt, drilled to TD, and abandoned using hydrated 3/8-inch bentonite chips.
5		0	21	1353	RE02-10-21528				QAL	(0.5, 18.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											Alluvial groundwater from 13.5 to 18 ft.
15		0	5	1191	RE02-10-21529	Sat.	▼				
20										(18.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
25	100	0.1	1	1251	RE02-10-21530				QBO		
30											
35		0	8	1359	RE02-10-21531						
40											
45											
50	↓	0	25	1258	RE02-10-21532				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612325 **IWP Location ID:** 25 **Date:** 8/17/10 - 8/19/10

**TA- 2 SWMU/AOC:** 02-004(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** 13.5

**LATA Sampler:** Jon Marin

**Depth to soil/tuff interface (ft):** 16

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	33	2050	RE02-10-21656				QAL	(0.5, 16.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											Alluvial groundwater from 13.5 to 16 ft.
15		0	22	1937	RE02-10-21657	Sat.	▲				
20											
25	100	0	14	665	RE02-10-21658					(16.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
30											
35		0	14	1183	RE02-10-21659				QBO		
40											
45											
50	↓	0	8	1390	RE02-10-21660				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612326 **IWP Location ID:** 26

**Date:** 9/9/10 - 9/10/10

**TA- 2 SWMU/AOC:** 02-004(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10

**Depth to saturation (ft):** 13

**LATA Sampler:** Jon Marin

**Depth to soil/tuff interface (ft):** 17

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.  Alluvial groundwater from 13 to 17 ft.
5		0	38	1265	RE02-10-21661				QAL	(0.5, 17.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	0	991	RE02-10-21662	Sat.	▼				Alluvial groundwater from 13 to 17 ft.
20											
25	100	0	20	1420	RE02-10-21663						
30											
35		0	25	1805	RE02-10-21664				QBO	(17.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
40											
45											TD = 50 ft.
50	↓	0	0	1331	RE02-10-21665				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 02-612327 **IWP Location ID:** 24 **Date:** 9/10/10 - 9/13/10

**TA- 2 SWMU/AOC:** 02-004(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10

**Depth to saturation (ft):** none

**LATA Sampler:** Jon Marin

**Depth to soil/tuff interface (ft):** 16.9

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	15	1316	RE02-10-21666				QAL	(0.5, 16.9) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											Wet at base of alluvium.
15		0	10	1198	RE02-10-21667	Wet					
20											(16.9, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.
25	100	0	23	1413	RE02-10-21668						
30											
35		0	23	1265	RE02-10-21669				QBO		
40											TD = 50 ft.
45											
50	↓	0	29	1384	RE02-10-21670				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 02-612328 **IWP Location ID:** 23 **Date:** 9/15/10 - 9/16/10

**TA- 2 SWMU/AOC:**02-004(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Jon Marin

**Depth to soil/tuff interface (ft):**16.2

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	0	1084	RE02-10-21671				QAL	(0.5, 16.2) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	0	1240	RE02-10-21672						
20											(16.2, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.
25	100	0	15	1373	RE02-10-21673				QBO		
30											
35		0	0	1107	RE02-10-21674						
40											TD = 50 ft.
45											
50	↓	0	11	1043	RE02-10-21675				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612345 **IWP Location ID:** 22

**Date:** 8/18/10 - 8/19/10

**TA-2 SWMU/AOC:** 02-006(c), 02-011(a)(ix)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10

**Depth to saturation (ft):** 12.5

**LATA Sampler:** Ali Furmall

**Depth to soil/tuff interface (ft):** 16.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0										(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	8	643	RE02-10-21742				QAL	(0.5, 16.5) QAL: Loose medium to coarse grained sand with pebbles and large cobbles.	
10											Alluvial groundwater from 12.5 to 16.5 ft.
15		2.2	19	857	RE02-10-21743	Sat.					
20										(16.5, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
25	100	3.8	25	1136	RE02-10-21744				QBO		
30											
35		32.7	8	1035	RE02-10-21745						
40											
45											
50		0.8	3	872	RE02-10-21746						

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612346 **IWP Location ID:** 19 **Date:** 9/16/10 - 9/20/10

**TA-2 SWMU/AOC:** 02-004(a,f), 02-011(a)(iv)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10

**Depth to saturation (ft):** 12.5

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 18

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.  Alluvial groundwater from 12.5 to 18 ft.
5											
10		0	11	1176	RE02-10-21747				QAL	(0.5, 18.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
15		0	31	996	RE02-10-21748	Sat.	▼				
20											
25	100	0	15	1306	RE02-10-21749					(18.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
30											
35		0	4	1055	RE02-10-21750				QBO		
40											
45											
50	↓	0	25	1159	RE02-10-21751				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

**Los Alamos Technical Associates, Inc.  
Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612347 **IWP Location ID:** 15 **Date:** 9/21/10 - 9/22/10

**TA-2 SWMU/AOC:** 02-004(f), 02-011(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 16.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	4	886	RE02-10-21752				QAL	(0.5, 16.5) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	8	1240	RE02-10-21753						
20									↑	(16.5, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
25	100	0	19	1573	RE02-10-1754				QBO		
30											
35		0	19	1758	RE02-10-21755						
40											
45											
50	↓	0	8	1536	RE02-10-21756				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# Los Alamos Technical Associates, Inc. Borehole Log

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612348 **IWP Location ID:** 27 **Date:** 8/17/2010

**TA- 2 SWMU/AOC:** 02-009(d), 02-003(a), 02-011(a)(x) **Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furlall

**Depth to soil/tuff interface (ft):** 16

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.  Wet from 13 to 16 ft.
5		0	25	605	RE02-10-21768				QAL	(0.5, 16.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	0	598	RE02-10-21769	Wet					
20											
25	100	0	15	701	RE02-10-21770				QBO	(16.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
30											
35		0	0	886	RE02-10-21771						
40											
45											
50	↓	0	9	1000	RE02-10-21772				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612374 **IWP Location ID:** 21 **Date:** 9/27/2010

**TA-2 SWMU/AOC:** 02-006(b), 02-012

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10

**Depth to saturation (ft):** 12

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 16.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.  Alluvial groundwater from 12 to 16.5 ft.
5		0.1	0	1225	RE02-10-21859				QAL	(0.5, 16.5) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	8	833	RE02-10-21860	Sat.	▼				
20											
25	100	0.1	8	1344	RE02-10-21861				QBO	(16.5, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
30											
35		0.1	8	1559	RE02-10-21862						
40											
45											
50	↓	0.1	14	1721	RE02-10-21863				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

**Los Alamos Technical Associates, Inc.  
Borehole Log**

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**Borehole Location ID:** 02-612388 **IWP Location ID:** 30 **Date:** 9/3/10 - 9/7/10

**TA- 2 SWMU/AOC:**02-009(b)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Jon Marin

**Depth to soil/tuff interface (ft):**18

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	15	1423	RE02-10-21895				↑	(0.5, 18.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
10									↑		
15		0	37	1217	RE02-10-1896				↑		
20									↑	(18.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
25	100	0	21	1305	RE02-10-21897				↑		TD = 50 ft.
30									↑		
35		0	4	1291	RE02-10-21898				↑		
40									↑		
45									↑		
50	↓	0	26	1416	RE02-10-21899				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# Los Alamos Technical Associates, Inc. Borehole Log

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**Borehole Location ID:** 02-612389 **IWP Location ID:** 31

**Date:** 10/6/2010 - 10/13/10

**TA- 2 SWMU/AOC:** 02-003(a,e), 02-011(b)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** 15

**LATA Sampler:** Ali Furmall

**Depth to soil/tuff interface (ft):** 20

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.  Alluvial groundwater from 15 to 20 ft.
5		0	20	4800	RE02-10-21904				↑	(0.5, 20.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
10									↑		
15							▼		↑		
20		0	11	1214	RE02-10-21905	Sat.			↑		
25	100	0	8	1628	RE02-10-21906				↑	(20.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
30									↑		
35		0	30	1835	RE02-10-21907				↑		
40									↑		
45									↑		
50	↓	0	25	1391	RE02-10-21908				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 02-612390 **IWP Location ID:** 32 **Date:** 9/8/2010

**TA- 2 SWMU/AOC:** 02-003(b),02-008(c)(i),02-011(b),02-007 **Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):**15.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	26	1765	RE02-10-21911				QAL	(0.5, 15.5) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	26	1543	RE02-10-21912						
20											
25	100										
30		0	53	1225	RE02-10-21913						
35											
40		0	48	1373	RE02-10-21914						
45											
50	↓	0	26	1269	RE02-10-21915				QBO	(15.5, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 02-612391 **IWP Location ID:** 33 **Date:** 9/7/2010

**TA-2 SWMU/AOC:** 02-009(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

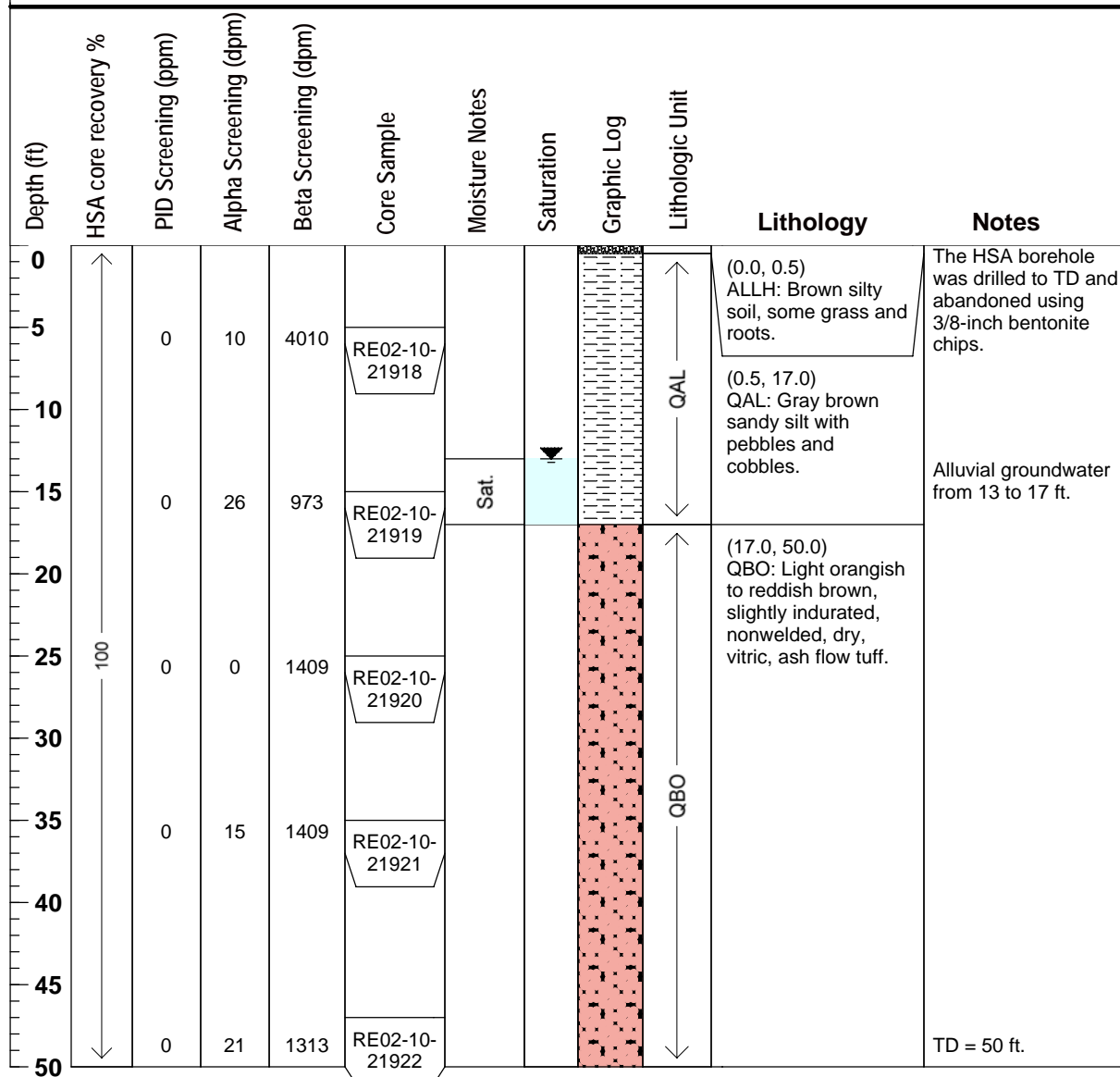
**Depth to saturation (ft):** 13

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 17

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50



ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 02-612392 **IWP Location ID:** 34

**Date:** 9/9/10 - 9/10/10

**TA-2 SWMU/AOC:** 02-009(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

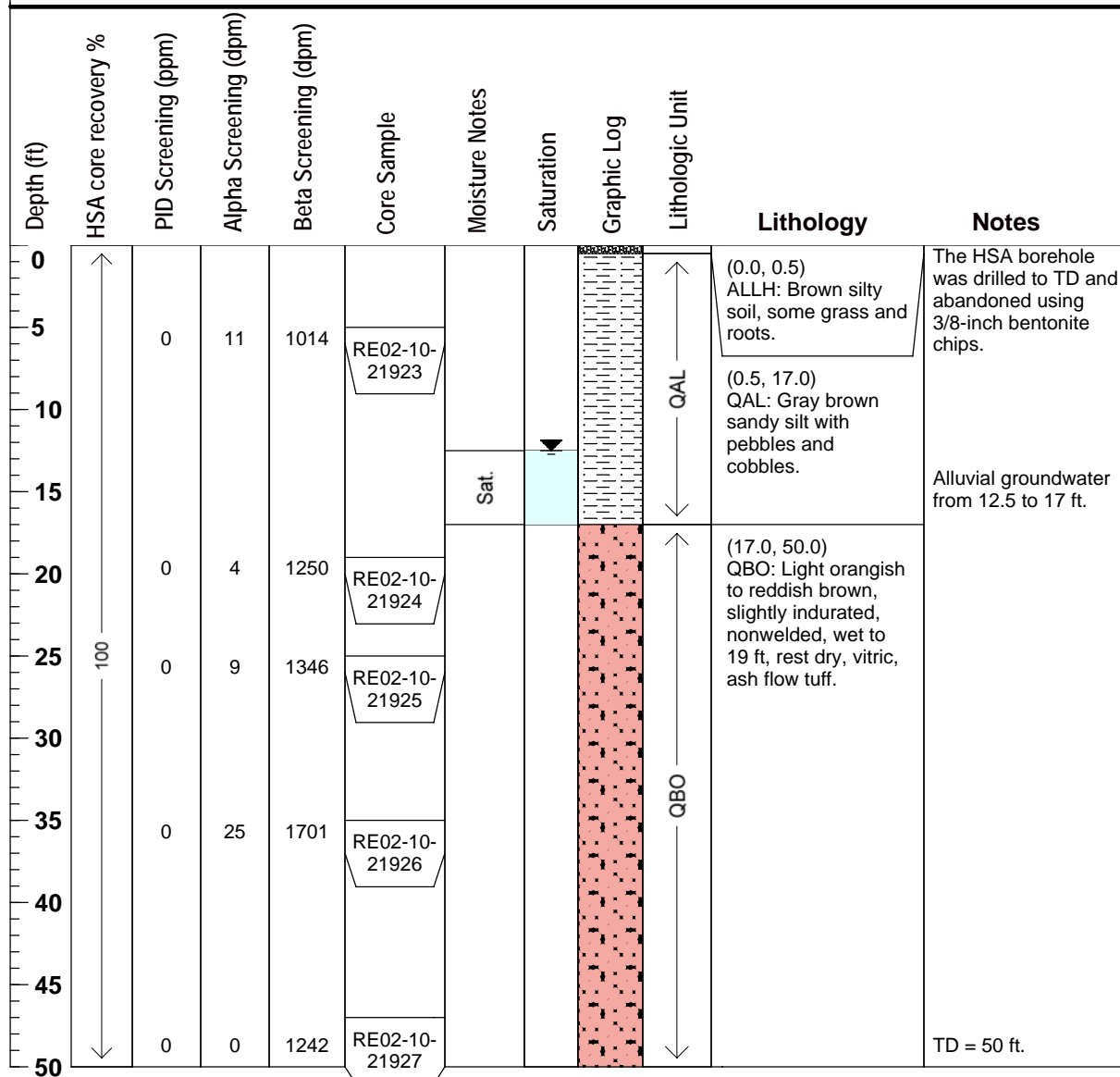
**Depth to saturation (ft):** 12.5

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 17

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50



ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 02-612393 **IWP Location ID:** 35 **Date:** 9/13/10 - 9/14/10

**TA- 2 SWMU/AOC:** 02-009(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** 12

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 16.6

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.  Alluvial groundwater from 12 to 16.6 ft.
5		0	31	1339	RE02-10-21928				QAL	(0.5, 16.6) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	15	1368	RE02-10-21929	Sat.	▼				
20										(16.6, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
25	100	0	0	1080	RE02-10-21930				QBO		
30											
35		0	9	1106	RE02-10-21931						
40											
45											
50	↓	0	9	1219	RE02-10-21932				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 02-612403 **IWP Location ID:** 50 **Date:** 9/27/2010

**TA- 2 SWMU/AOC:** 02 core area

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** 6.5

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** NA

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 10

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	16	2240	RE02-10-21964				↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The 0 to 0.5 ft sample was collected using a hand auger.
5	100	0	0	1239	RE02-10-21965				QAL		
10	↓	0	0	877	RE-02-10-21966	Sat.			↓	(0.5, 10.0) QAL: Gray brown sandy silt with pebbles and cobbles.	TD = 10 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 02-612404 **IWP Location ID:** 49 **Date:** 9/27/2010

**TA- 2** **SWMU/AOC:** 02 core area

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** NA

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 10

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	37	2370	RE02-10-21967				↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The 0 to 0.5 ft sample was collected using a hand auger.
5	100	0	3	1025	RE02-10-21968				QAL		
10	↓	0	8	988	RE02-10-21969				↓	(0.5, 10.0) QAL: Gray brown sandy silt with pebbles and cobbles.	TD = 10 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 02-612415 **IWP Location ID:** 68 **Date:** 10/6/2010

**TA- 2 SWMU/AOC:** 02 core area

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Riley Evans

**Depth to soil/tuff interface (ft):** NA

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 10

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	68	1337	RE02-10-22001				↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The 0 to 0.5 ft and 4 to 5 ft samples were collected using a hand auger.
5	100	0	13	1590	RE02-10-22000				QAL		
10	↓	0.1	46	1179	RE02-10-22002				↓	(0.5, 10.0) QAL: Gray brown sandy silt with pebbles and cobbles.	TD = 10 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 02-612416 **IWP Location ID:** 69 **Date:** 10/6/2010

**TA- 2 SWMU/AOC:** 02 core area

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** NA

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 10

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0.1	67	1492	RE02-10-22003				↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The 0 to 0.5 ft and 4 to 5 ft samples were collected using a hand auger.
5	100	0	55	1213	RE02-10-22004				QAL		
10	↓	0.1	20	1468	RE02-10-22005				↓	(0.5, 10.0) QAL: Gray brown sandy silt with pebbles and cobbles.	TD = 10 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 02-612420 **IWP Location ID:** 36

**Date:** 9/14/10 - 9/15/10

**TA- 2 SWMU/AOC:** 02-003(c), 02-009(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 17.4

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	16	1011	RE02-10-22027				QAL	(0.5, 17.4) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	25	986	RE02-10-22028						
20						Wet					
25	100	0	31	860	RE02-10-22029				QBO	(17.4, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
30											
35		0	20	797	RE02-10-22030						
40											
45											
50	↓	0	9	879	RE02-10-22031				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 02-612421 **IWP Location ID:** 37 **Date:** 9/16/10 - 9/20/10

**TA- 2 SWMU/AOC:**02-009(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** 24

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):**29

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	17	1494	RE02-10-22034						
10										(0.5, 29.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
15		0	11	1279	RE02-10-22035				QAL		
20											Alluvial groundwater from 24 to 29 ft.
25	100					Sat.	▼				
30		0	15	1188	RE02-10-22036					(29.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
35		0	4	966	RE02-10-22037				QBO		
40											TD = 50 ft.
45											
50	↓	0	0	1011	RE02-10-22038				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 02-612422 **IWP Location ID:** 38 **Date:** 9/23/2010

**TA- 2 SWMU/AOC:**02-009(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):**25

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.
5		0	14	1110	RE02-10-22039						
10										(0.5, 25.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
15		0	4	1065	RE02-10-22040						
20											
25	100	0	14	1250	RE02-10-22041				↑	(25.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
30											
35		0	9	1376	RE02-10-22042						
40											
45											
50	↓	0	4	1642	RE02-10-22043				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612463 **IWP Location ID:** 28 **Date:** 8/12/10 - 8/16/10

**TA-2 SWMU/AOC:** 02-010, 02-006(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10

**Depth to saturation (ft):** 13

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 18.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using 3/8-inch bentonite chips.  Alluvial groundwater from 13 to 18.5 ft.
5		0	27	905	RE02-10-22178						
10										(0.5, 18.5) QAL: Gray brown sandy silt with pebbles and cobbles.	
15		0	0	794	RE02-10-22179	Saturated	▼		QAL		
20									↑	(18.5, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
25	100	0	0	880	RE02-10-22180						
30											
35		0	27	1110	RE02-10-22181				QBO		
40											
45											
50	↓	0	0	969	RE02-10-22182				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612640 **IWP Location ID:** 6

**Date:** 11/1/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 0.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	12	1255	RE02-10-23289				↑	(0.0, 0.5) ALLH: Gray brown sandy silt with pebbles, cobbles, and roots.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	12	1255	RE02-10-23290						
10											
15		0	12	1255	RE02-10-23291						
20											
25	100	0	12	1255	RE02-10-23292						
30											
35		0	12	1255	RE02-10-23293						
40											
45											
50	↓	0	12	1255	RE02-10-23294				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612641

**IWP Location ID:** 7

**Date:** 11/1/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 0.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	12	1255	RE02-10-23295				↑	(0.0, 0.5) ALLH: Gray brown sandy silt with pebbles, cobbles, and roots.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	22	2080	RE02-10-23296						
10											
15		0	22	2080	RE02-10-23297					(0.5, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	100	0	22	2080	RE02-10-23298				QBT3		
30											
35		0	22	2080	RE02-10-23299						
40											
45											
50	↓	0	22	2080	RE02-10-23300				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612642 **IWP Location ID:** 9

**Date:** 11/2/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 0.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	22	2080	RE02-10-23301				↑	(0.0, 0.5) ALLH: Gray brown sandy silt with pebbles, cobbles, and roots.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	22	2080	RE02-10-23302						
10											
15		0	22	2080	RE02-10-23303					(0.5, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	100	0	22	2080	RE02-10-23304				QBT3		
30											
35		0	22	2080	RE02-10-23305						
40											
45											
50	↓	0	22	2080	RE02-10-23306				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612643 **IWP Location ID:** 10 **Date:** 11/3/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 0.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	0	198	RE02-10-23307				↑	(0.0, 0.5) ALLH: Gray brown sandy silt with pebbles and cobbles.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	0	198	RE02-10-23308						
10										(0.5, 50.0) QBT3: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
15		0	0	198	RE02-10-23309						
20											
25	100	0	0	198	RE02-10-23310				QBT3		
30											
35		0	0	198	RE02-10-23311						
40											
45											
50	↓	0	0	198	RE02-10-23312				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 02-612644 **IWP Location ID:** 3

**Date:** 11/3/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	0	198	RE02-10-23313				↑	(0.0, 1.0) ALLH: Gray brown sandy silt with pebbles and cobbles.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	0	198	RE02-10-23314						
10											
15		0	0	198	RE02-10-23315					(1.0, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	100	0	0	198	RE02-10-23316				QBT3		
30											
35		0	0	198	RE02-10-23317						
40											
45											
50	↓	0	0	198	RE02-10-23318				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612645 **IWP Location ID:** 11 **Date:** 11/4/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	2	631	RE02-10-23319				↑	(0.0, 1.0) ALLH: Gray brown sandy silt with pebbles and cobbles.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	2	631	RE02-10-23320						
10											
15		0	2	631	RE02-10-23321					(1.0, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	100	0	2	631	RE02-10-23322						
30											
35		0	2	631	RE02-10-23323						
40											
45											
50	↓	0	2	631	RE02-10-23324				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc. Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612646 **IWP Location ID:** 4

**Date:** 11/5/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 0.6

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	20	294	RE02-10-23325				↑	(0.0, 0.6) ALLH: Gray brown sandy silt with pebbles, cobbles, and roots.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	20	294	RE02-10-23326						
10											
15		0	20	294	RE02-10-23327						
20											
25	100	0	20	294	RE02-10-23328						
30											
35		0	20	294	RE02-10-23329						
40											
45											
50	↓	0	20	294	RE02-10-23330				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc. Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612647 **IWP Location ID:** 12 **Date:** 11/5/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 2.2

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	20	294	RE02-10-23331					(0.0, 2.2) ALLH: Gray brown sandy silt with pebbles and cobbles.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	20	294	RE02-10-23332						
10											
15		0	20	294	RE02-10-23333					(2.2, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	100	0	20	294	RE02-10-23334						
30											
35		0	20	294	RE02-10-23335						
40											
45											
50	↓	0	20	294	RE02-10-23336						TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc. Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612648 **IWP Location ID:** 13 **Date:** 11/8/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 0.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	1	430	RE02-10-23337				↑	(0.0, 0.5) ALLH: Gray brown sandy silt with pebbles and cobbles.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	1	430	RE02-10-23338						
10											
15		0	1	430	RE02-10-23339					(0.5, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	100	0	1	430	RE02-10-23340				QBT3		
30											
35		0	1	430	RE02-10-3341						
40											
45											
50	↓	0	1	430	RE02-10-23342				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612649 **IWP Location ID:** 8

**Date:** 11/9/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furlall

**Depth to soil/tuff interface (ft):** 0.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	26	367	RE02-10-23343				↑	(0.0, 0.5) ALLH: Gray brown sandy silt with pebbles, cobbles, and roots.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	26	367	RE02-10-23344						
10											
15		0	26	367	RE02-10-23345					(0.5, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	100	0	26	367	RE02-10-23346				QBT3		
30											
35		0	26	367	RE02-10-23347						
40											
45											
50	↓	0	26	367	RE02-10-23348				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612650 **IWP Location ID:** 5

**Date:** 11/10/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 0.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	39	1583	RE02-10-23349				↑	(0.0, 0.5) ALLH: Gray brown sandy silt with pebbles and cobbles.	The 0 to 0.5 ft sample was collected using a hand auger.
5		0	39	1583	RE02-10-23350						
10											
15		0	39	1583	RE02-10-23351						
20											
25	100	0	39	1583	RE02-10-23352						
30											
35		0	39	1583	RE02-10-23353						
40											
45											
50	↓	0	39	1583	RE02-10-23354				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612651 **IWP Location ID:** 1 **Date:** 11/09/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 0.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Gray brown sandy silt with pebbles and cobbles.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	26	367	RE02-10-23370						
10											
15		0	26	367	RE02-10-23371						
20											
25	100	0	26	367	RE02-10-23372						(0.5, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.
30											
35		0	26	367	RE02-10-23373						
40											
45											
50	↓	0	26	367	RE02-10-23374				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612652 **IWP Location ID:** 2 **Date:** 11/4/2010

**TA- 61 SWMU/AOC:** 02-006(a)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 0.75

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0										(0.0, 0.8) ALLH: Gray brown sandy silt with pebbles and cobbles.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5											
10										(0.8, 50.0) QBT3: Light gray, non-indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	
15											
20											
25	100	0	2	631	RE02-10-23377				QBT3		
30											
35		0	2	631	RE02-10-23378						
40											
45											
50		0	2	631	RE02-10-23379						TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612982 **IWP Location ID:** 71 **Date:** 9/29/10 - 9/30/10

**TA- 2 SWMU/AOC:** 02-011(a)(x), 02-008(c)(ii)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10

**Depth to saturation (ft):** 13

**LATA Sampler:** Ali Furmall

**Depth to soil/tuff interface (ft):** 25

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0.1	28	1695	RE02-10-25659						
10										(0.5, 25.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
15		0.1	0	874	RE02-10-25660		▼		QAL		Alluvial groundwater from 13 to 25 ft.
20						Saturated					
25	100	0	50	1414	RE02-10-25661						
30										(25.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
35		0.1	7	1451	RE02-10-25662				QBO		
40											
45											
50	↓	0.1	7	1481	RE02-10-25663				↓		TD = 50 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 02-612983 **IWP Location ID:** 29 **Date:** 10/6/10 - 10/14/10

**TA- 2 SWMU/AOC:** 02-011(a)(x), 02-008(c)(ii)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** Failing F-10 and CME 750

**Depth to saturation (ft):** 13

**LATA Sampler:** Ali Furlall

**Depth to soil/tuff interface (ft):** 15.7

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.  Alluvial groundwater from 13 to 15.7 ft.
5		0	28	769	RE02-10-25664				QAL	(0.5, 15.7) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	36	1379	RE02-10-25665	Sat.	▼				
20											
25	100	0	9	972	RE02-10-25666				QBO	(15.7, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	TD = 50 ft.
30											
35		0	13	1216	RE02-10-25667						
40											
45											
50	↓	0	34	1793	RE02-10-25668				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 02-613571 **IWP Location ID:** 18 **Date:** 10/28/2010

**TA- 2 SWMU/AOC:** 02-011(a)(i-iii,v)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Craig Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 15

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 50

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 0.5) ALLH: Brown silty soil, some grass and roots.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	28	1485	RE02-11-1525				QAL	(0.5, 15.0) QAL: Gray brown sandy silt with pebbles and cobbles.	
10											
15		0	0	1618	RE02-11-1526				↑	(15.0, 50.0) QBO: Light orangish to reddish brown, slightly indurated, nonwelded, dry, vitric, ash flow tuff.	
20											TD = 50 ft.
25	100	0	12	1492	RE02-11-1527				QBO		
30											
35		0	1	1300	RE02-11-1528						
40											
45											
50	↓	0	0	1655	RE02-11-1529				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

**Los Alamos Technical Associates, Inc.  
Borehole Log**

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**Borehole Location ID:** 21-612318 **IWP Location ID:** 1 **Date:** 7/28/2010

**TA- 21 SWMU/AOC:** 21-006(e)-99

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 4

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 4.0) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	0	414	MD21-10-21629						
10											
15		0	0	401	MD21-10-21630						
20											TD = 25 ft.
25	↓	0	28	217	MD21-10-21631						

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

**Los Alamos Technical Associates, Inc.  
Borehole Log**

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**Borehole Location ID:** 21-612319 **IWP Location ID:** 2 **Date:** 7/27/2010

**TA- 21 SWMU/AOC:** 21-006(e)-99

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 4

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 0.5) Asphalt	The HSA borehole was located under asphalt, drilled to TD, and abandoned using hydrated 3/8-inch bentonite chips and asphalt patch.
5		0	13	257	MD21-10-21632					(0.5, 4.0) FILL: Gray brown sand and gravel.	
10											
15		0	28	488	MD21-10-21633				QBT3	(4.0, 25.0) QBT3: Medium gray/brown/purple, moderately indurated, slightly moist, ash flow tuff.	
20											
25	↓	0	18	457	MD21-10-21634						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 21-612320 **IWP Location ID:** 3

**Date:** 7/26/2010

**TA- 21 SWMU/AOC:** 21-006(e)-99

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 4

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 0.5) Asphalt	The HSA borehole was located under asphalt, drilled to TD, and abandoned using hydrated 3/8-inch bentonite chips and asphalt patch.
5		0	14	528	MD21-10-21637					(0.5, 4.0) FILL: Gray brown sand and gravel.	
10											
15		0	2	543	MD21-10-21638				QBT3	(4.0, 25.0) QBT3: Medium gray/brown/purple, moderately indurated, slightly moist, ash flow tuff.	
20											
25	↓	0	0	295	MD21-10-21639						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 21-612321 **IWP Location ID:** 4

**Date:** 7/27/2010

**TA- 21 SWMU/AOC:** 21-006(e)-99

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 4

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 0.5) Asphalt	The HSA borehole was located under asphalt, drilled to TD, and abandoned using hydrated 3/8-inch bentonite chips and asphalt patch.
5		0	38	241	MD21-10-21640					(0.5, 4.0) FILL: Gray brown sand and gravel.	
10											
15		0	15	205	MD21-10-21641				QBT3	(4.0, 25.0) QBT3: Medium gray/brown/purple, moderately indurated, slightly moist, ash flow tuff.	
20											
25	↓	0	12	626	MD21-10-21642						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



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**Borehole Location ID:** 21-612322 **IWP Location ID:** 5

**Date:** 7/27/2010

**TA- 21 SWMU/AOC:** 21-006(e)-99

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 4

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 0.5) Asphalt	The HSA borehole was located under asphalt, drilled to TD, and abandoned using hydrated 3/8-inch bentonite chips and asphalt patch.
5		0	18	702	MD21-10-21643					(0.5, 4.0) FILL: Gray brown sand and gravel.	
10											
15		0	45	629	MD21-10-21644				QBT3	(4.0, 25.0) QBT3: Medium gray/brown/purple, moderately indurated, slightly moist, ash flow tuff.	
20											
25	↓	0	15	475	MD21-10-21645						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

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**Borehole Location ID:** 21-612323 **IWP Location ID:** 6 **Date:** 7/26/2010

**TA- 21 SWMU/AOC:** 21-006(e)-99

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 4

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑									(0.0, 0.5) Asphalt	The HSA borehole was located under asphalt, drilled to TD, and abandoned using hydrated 3/8-inch bentonite chips and asphalt patch.
5		0	2	460	MD21-10-21646					(0.5, 4.0) FILL: Gray brown sand and gravel.	
10											
15		0	25	543	MD21-10-21647					(4.0, 25.0) QBT3: Medium gray/brown/purple, moderately indurated, slightly moist, ash flow tuff.	
20											TD = 25 ft.
25	↓	0	18	410	MD21-10-21648						

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



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**Borehole Location ID:** 21-612329 **IWP Location ID:** 1 **Date:** 10/19/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 4.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 4.5) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	7	968	MD21-10-21680						
10											
15		0	18	658	MD21-10-21681						
20											TD = 25 ft.
25	↓	0	23	924	MD21-10-21682						

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612330 **IWP Location ID:** 4

**Date:** 10/18/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 4.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 4.5) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	13	820	MD21-10-21685						
10											
15		0	18	1138	MD21-10-21686				QBT3	(4.5, 25.0) QBT3: Gray, slightly indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	
20											
25	↓	0	13	1101	MD21-10-21687						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612331 **IWP Location ID:** 14 **Date:** 10/19/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 4.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 4.5) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	23	806	MD21-10-21688						
10											
15		0	18	946	MD21-10-21689						(4.5, 25.0) QBT3: Gray, slightly indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.
20											
25		0	18	798	MD21-10-21690						

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612332 **IWP Location ID:** 6

**Date:** 10/20/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 5.1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 5.1) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	5	573	MD21-10-21691						
10											
15		0	16	573	MD21-10-21692						
20											TD = 25 ft.
25	↓	0	27	618	MD21-10-21693				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612333 **IWP Location ID:** 10 **Date:** 10/20/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 5.1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 5.1) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	22	344	MD21-10-21694						
10											
15		0	5	625	MD21-10-21695						
20											TD = 25 ft.
25	↓	0	0	507	MD21-10-21696				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



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**Borehole Location ID:** 21-612334 **IWP Location ID:** 7 **Date:** 10/20/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 4.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 4.5) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	0	662	MD21-10-21697						
10											
15		0	0	558	MD21-10-21698						
20											TD = 25 ft.
25	↓	0	10	1078	MD21-10-21699				↓		

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612335 **IWP Location ID:** 9

**Date:** 10/21/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 4.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 4.5) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	32	878	MD21-10-21700						
10											
15		0	10	1078	MD21-10-21701						
20											TD = 25 ft.
25	↓	0	26	893	MD21-10-21702						

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



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**Borehole Location ID:** 21-612337 **IWP Location ID:** 5 **Date:** 10/25/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furlall

**Depth to soil/tuff interface (ft):** 5.1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 5.1) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	12	988	MD21-10-21706						
10											
15		0	6	2430	MD21-10-21707						(5.1, 25.0) QBT3: Gray, slightly indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.
20											
25		0	17	1151	MD21-10-21708						

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612338 **IWP Location ID:** 11 **Date:** 10/25/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 4.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								↑	(0.0, 4.5) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	2	1060	MD21-10-21709				↓	(4.5, 25.0) QBT3: Gray, slightly indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	
10											
15		0	7	1201	MD21-10-21710						
20											
25	↓	0	2	1379	MD21-10-21711				↓		TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612339 **IWP Location ID:** 8

**Date:** 10/26/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Fumall

**Depth to soil/tuff interface (ft):** 5.1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 5.1) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	0	704	MD21-10-21712						
10											
15		0	21	1192	MD21-10-21713						
20											
25	↓	0	16	837	MD21-10-21714						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612340 **IWP Location ID:** 13 **Date:** 10/19/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 5.1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 5.1) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	5	1251	MD21-10-21715						
10											
15		0	21	1081	MD21-10-21716				QBT3	(5.1, 25.0) QBT3: Gray, slightly indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	
20											
25	↓	0	16	955	MD21-10-21717						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 21-612341 **IWP Location ID:** 12 **Date:** 10/26/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 5.1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 5.1) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	21	756	MD21-10-21718						
10											
15		0	21	978	MD21-10-21719				QBT3	(5.1, 25.0) QBT3: Gray, slightly indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	
20											
25	↓	0	16	807	MD21-10-21720						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.



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**Borehole Location ID:** 21-612342 **IWP Location ID:** 3

**Date:** 10/27/2010

**TA- 21 SWMU/AOC:** 21-028(c)

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furrall

**Depth to soil/tuff interface (ft):** 4.5

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑								FILL	(0.0, 4.5) FILL: Gray brown sand and gravel.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5		0	6	870	MD21-10-21721						
10											
15		0	1	1218	MD21-10-21722				QBT3	(4.5, 25.0) QBT3: Gray, slightly indurated, slightly welded, dry, ash flow tuff, with crystals and pumice.	
20											
25	↓	0	0	1003	MD21-10-21723						TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 26-612295 **IWP Location ID:** 6 **Date:** 7/22/2010

**TA- 26 SWMU/AOC:** 26-001

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 10

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	11	1127	RE26-10-21538				↑	(0.0, 1.0) ALLH: Gray brown silty soil, with pebbles, some grass and roots.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
5	100	0	11	1127	RE26-10-21539				QBT3		
10	↓	0	11	1127	RE26-10-21540				↓	(1.0, 10.0) QBT3: Light gray, slightly indurated, slightly welded, dry, ash flow tuff, with pumice.	TD = 10 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 26-612303 **IWP Location ID:** 1 **Date:** 7/20/2010

**TA- 26 SWMU/AOC:** 26-001

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Ali Furlall

**Depth to soil/tuff interface (ft):** 1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	11	1443	RE26-10-21566				↑	(0.0, 1.0) ALLH: Gray brown silty soil, with pebbles, some grass and roots.	The 0 to 0.5 ft sample was collected using spade and scoop.
5		0	11	1443	RE26-10-21567						
10											
15		0	11	1443	RE26-10-21568					(1.0, 25.0) QBT3: Light gray, slightly indurated, slightly welded, dry, ash flow tuff, with pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	↓	0	11	1443	RE26-10-21569				↓		TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

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**Borehole Location ID:** 26-612304 **IWP Location ID:** 2 **Date:** 7/20/2010

**TA- 26 SWMU/AOC:** 26-001

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	11	1443	RE26-10-21570				↑	(0.0, 1.0) ALLH: Gray brown silty soil, with pebbles, some grass and roots.	The 0 to 0.5 ft sample was collected using spade and scoop.
5		0	11	1443	RE26-10-21571						
10											
15		0	11	1443	RE26-10-21572					(1.0, 25.0) QBT3: Light gray, slightly indurated, slightly welded, dry, ash flow tuff, with pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	↓	0	11	1443	RE26-10-21573				↓		TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

# **Los Alamos Technical Associates, Inc.** **Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 26-612305 **IWP Location ID:** 3

**Date:** 7/20/2010

**TA- 26 SWMU/AOC:** 26-001

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	11	1443	RE26-10-21574				↑	(0.0, 1.0) ALLH: Gray brown silty soil, with pebbles, some grass and roots.	The 0 to 0.5 ft sample was collected using spade and scoop.
5		0	13	1677	RE26-10-21575						
10											
15		0	13	1677	RE26-10-21576					(1.0, 25.0) QBT3: Light gray, slightly indurated, slightly welded, dry, ash flow tuff, with pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	↓	0	13	1677	RE26-10-21577				↓		TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.

**Los Alamos Technical Associates, Inc.  
Borehole Log**

**Project:** Middle LA Canyon Aggregate Area Phase II IWP

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**Borehole Location ID:** 26-612306 **IWP Location ID:** 4 **Date:** 7/21/2010

**TA- 26 SWMU/AOC:** 26-001

**Attitude:** Vertical

**Drilling Company:** Stewart Bros. Drilling Co.

**Drill Operator:** Stanley Johnson

**Drilling equipment:** CME 750

**Depth to saturation (ft):** none

**LATA Sampler:** Larry Lopez

**Depth to soil/tuff interface (ft):** 1

**Sampling equipment:** HSA core barrel

**Total Depth (ft):** 25

Depth (ft)	HSA core recovery %	PID Screening (ppm)	Alpha Screening (dpm)	Beta Screening (dpm)	Core Sample	Moisture Notes	Saturation	Graphic Log	Lithologic Unit	Lithology	Notes
0	↑	0	13	1677	RE26-10-21578				↑	(0.0, 1.0) ALLH: Gray brown silty soil, with pebbles, some grass and roots.	The 0 to 0.5 ft sample was collected using spade and scoop.
5		0	13	1677	RE26-10-21579						
10											
15	100	0	13	1677	RE26-10-21580					(1.0, 25.0) QBT3: Light gray, slightly indurated, slightly welded, dry, ash flow tuff, with pumice.	The HSA borehole was drilled to TD and abandoned using hydrated 3/8-inch bentonite chips.
20											
25	↓		13	1677	RE26-10-21581				↓		TD = 25 ft.

ALLH = Soil, all horizons, CME = Central Mine Equipment, dpm = disintegrations per minute, HSA = hollow stem auger, NA = not applicable or not encountered, PID = photo-ionization detector, ppm = parts per million, QAL = Quaternary Alluvium, QBO = Quaternary Bandelier Tuff Otowi Member, QBT = Quaternary Bandelier Tuff Tshirege Member, QBT1v = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 1 devitrified, QBT3 = Quaternary Bandelier Tuff Tshirege Member Cooling Unit 3, Sat. = saturated, TA = Technical Area, TD = Total Depth.