

**Appendix D**  
**Soil Boring Logs**

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PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AU Sheet 1 of 7

## SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: Bernbeck Residence

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40 START: 4/27/2001 END: 4/1/2701 LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY			SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	TYPE-#	SS-Spill Spoon ST-ShelbyTube			
0	0.0-28.0		6-6-6 (in) (N)	Overburden.	
1					
2					
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7					
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25					



PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AU Sheet 2 of 7

## SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: Bernbeck Residence

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40 START: 4/27/2001 END: 4/1/2701 LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-#	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
					SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.

TYPE-#

SS-Spill Spoon  
ST-ShelbyTube

6-6-6 (in)  
(N)

26						
27						
28	28.0-45.0				Weathered slate.	
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45	45.0-160.0				Slate.	
46						
47						
48						
49						
50						



PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AU

Sheet 3 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Bernbeck Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 4/27/2001

END: 4/1/2701

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
51			6-6-6 (in) (N)		
52					
53					
54					
55					
56					
57					
58					
59					
60					
61					
62					
63					
64					
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67					
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73					
74					
75					
76					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.03

BORING ID:

11AU

Sheet 4 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Bernbeck Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 4/27/2001

END: 4/1/2701

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)		
77					
78					
79					
80					
81					
82					
83					
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85					
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89					
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92					
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98					
99					
100					
101					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.03

BORING ID:

11AU

Sheet 5 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Bernbeck Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 4/27/2001

END: 4/1/2701

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
102			6-6-6 (in) (N)		
103					
104					
105					
106					
107					
108					
109					
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111					
112					
113					
114					
115					
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122					
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124					
125					
126					
127					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AU Sheet 6 of 7

## SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: Bernbeck Residence

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40 START: 4/27/2001 END: 4/1/2701 LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
		TYPE-# <small>SS-Spill Spoon ST-ShelbyTube</small>	6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.

128					
129					
130					
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138					
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144					
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150					
151					
152					



PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AU

Sheet 7 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: Bernbeck Residence

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40 START: 4/27/2001 END: 4/1/2701 LOGGER: Meier

DEPTH BGS (ft)	STANDARD PENETRATION TEST RESULTS		CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	INTERVAL (ft)	RECOVERY		
	TYPE-# SS-Spill Spoon ST-ShelbyTube	6-6-6 (in) (N)		
153				
154				
155				
156				
157				
158				
159				
160			Total depth=160 ft. bgs.	
161				





PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 1 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
0	0.0-7.0		6-6-6 (in) (N)	Red clay.	
1					
2					
3					
4					
5					
6					
7	7.0-55.0			Overburden.	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
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19					
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21					
22					
23					
24					
25					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 2 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
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PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AV  
Sheet 3 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: Lofton Residence

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40 START: 7/23/1998 END: 7/24/1998 LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
51			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
52					
53					
54					
55	55.0-67.0			Fractured Weathered rock (slate).	
56					
57					
58					
59					
60					
61					
62					
63					
64					
65					
66					
67	67.0-215.0			Blue slate.	
68					
69					
70					
71					
72					
73					
74					
75					
76					



PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AV

Sheet 4 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
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100					
101					



PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 5 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
102			6-6-6 (in) (N)		
103					
104					
105					
106					
107					
108					
109					
110					
111					
112					
113					
114					
115					
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123					
124					
125					
126					
127					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AV

Sheet 6 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
128					
129					
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PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 7 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
153			6-6-6 (in) (N)		
154					
155					
156					
157					
158					
159					
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178					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AV Sheet 8 of 14

## SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: Lofton Residence

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40 START: 7/23/1998 END: 7/24/1998 LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
		TYPE-# <small>SS-Spill Spoon ST-ShelbyTube</small>	6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.

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203					





PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 9 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR:

Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED:

Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
204					
205					
206					
207					
208					
209					
210					
211					
212					
213					
214					
215	215.0-340.			Greenstone.	
216					
217					
218					
219					
220					
221					
222					
223					
224					
225					
226					
227					
228					
229					



PROJECT NUMBER  
151319.FI.03

BORING ID:  
11AV

Sheet 10 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)		
230					
231					
232					
233					
234					
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254					



PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 11 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
255			6-6-6 (in) (N)		
256					
257					
258					
259					
260					
261					
262					
263					
264					
265					
266					
267					
268					
269					
270					
271					
272					
273					
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275					
276					
277					
278					
279					
280					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 12 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
281					
282					
283					
284					
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287					
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293					
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296					
297					
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299					
300					
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302					
303					
304					
305					



PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 13 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
306-			6-6-6 (in) (N)		
307-					
308-					
309-					
310-					
311-					
312-					
313-					
314-					
315-					
316-					
317-					
318-					
319-					
320-					
321-					
322-					
323-					
324-					
325-					
326-					
327-					
328-					
329-					
330-					
331-					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.03

BORING ID:

11AV

Sheet 14 of 14

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lofton Residence

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Peters Drilling and Pump Service, Inc.

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS: 40

START: 7/23/1998

END: 7/24/1998

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
332-					
333-					
334-					
335-					
336-					
337-					
338-					
339-					
340-				Total depth=340 ft. bgs.	
341-					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

11DAM1

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lost Lake Dam

ELEVATION: 2468'

NORTHING:

EASTING:

DRILLING CONTRACTOR: Taber Consultants

DRILLING METHOD AND EQUIPMENT USED: CME 55 Hi Torque, Air Rotary, 4" Casing, Ring Bit

WATER LEVELS:

START: 9/18/2001 9:30:00 AM

END: 9/18/2007 11:30:00 AM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	TYPE-# <small>SS-Spill Spoon ST-ShelbyTube</small>	STANDARD PENETRATION TEST RESULTS  6-6-6 (in) (N)	CORE DESCRIPTION:  SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS:  DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-							
1-							
2-	2.5-4.0	1.3	SS-1		25-34-35 (69)	SILTY GRAVEL (GM). Brown, slightly moist, very dense, angular gravel.	Rock in shoe.
3-							
4-							
5-	5.0-6.5	1.0	MC-2		20-32-42 (74)	Same as above.	Jar sample 0950.
6-							
7-							
8-	7.5-9.0	0.6	SS-3		18-50/5"	SILTY GRAVEL (GM). Red-brown, slightly moist, very dense.	Driller notes sampler bouncing on rock.
9-							
10-	10.0-11.5	0	MC-4		50/0	Boulders.	Sampler on rock. No recovery.
11-							
12-							
13-	12.5-14.0	0	SS-5		29-50/1"		Driller notes boulder ~2'. Blue-gray cuttings. No recovery.
14-						Bedrock.	Blue-gray to white cuttings. Lost air circ temporarily. Continue blue-gray and white cuttings. Rock.
15-							
16-							
17-							
18-							
19-							
20-							
21-							
						Total depth=20 ft. bgs. Grout to surface.	



PROJECT NUMBER

151319.FI.09

BORING ID:

11DAM2

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lost Lake Dam ~75' East of Spillway

ELEVATION: 2470'

NORTHING:

EASTING:

DRILLING CONTRACTOR: Taber Consultants

DRILLING METHOD AND EQUIPMENT USED: CME 55 Hi Torque, Air Rotary, 4" Casing, Ring Bit

WATER LEVELS:

START: 9/18/2001 11:30:00 AM

END: 9/18/2001 3:30:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
			6-6-6 (in) (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-					
1-					
2-	2.5-4.0	0.6	SS-1	13-26-22 (48)	SILTY GRAVEL (GM). Brown, dry, dense, angular gravel.
3-					
4-					
5-	5.0-6.5	0.3	MC-2	9-8-8 (16)	Similar. Poor recovery. Gravels.
6-					
7-	7.5-9.0	0	SS-3	50/3"	Sampler on rock. No recovery.
8-					
9-					Driller notes drilling through boulder. Blue-gray cuttings.
10-					
11-					Driller notes small zone (6") dirt, then boulders again.
12-					
13-					
14-					Continue nesting of boulders with soil between.
15-					
16-					
17-	17.5-19.0	0.2	SS-4	11-50/2"	SILTY GRAVEL (GM). Gray-brown, moist, dense, angular gravel (gray).
18-					
19-					
20-	20.0-21.5	0.1	SS-5	21-10-7 (17)	Similar. 1320. Poor recovery. Gravels in shoe.
21-					
22-	22.5-24.0	0.8	MC-6	25-16-25 (41)	Similar. Brown, moist, dense. Jar sample. 1415.
23-					
24-					Continue nested boulders (2- 5' with soil layers up to 1' thick).
25-	25.0-25.5	0	MC-7	50/0	





PROJECT NUMBER

151319.FI.09

BORING ID:

11DAM2

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lost Lake Dam ~75' East of Spillway

ELEVATION: 2470'

NORTHING:

EASTING:

DRILLING CONTRACTOR: Taber Consultants

DRILLING METHOD AND EQUIPMENT USED: CME 55 Hi Torque, Air Rotary, 4" Casing, Ring Bit

WATER LEVELS:

START: 9/18/2001 11:30:00 AM

END: 9/18/2001 3:30:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
26 -			6-6-6 (in) (N)		
27 -					
28 -	0	MC-9	50/3"		No recovery. Rock in shoe.
29 -					
30 -	30.0-30.5	0	50/0	Total depth=30 ft. bgs. Grout to surface.	
31 -					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

11DAM3

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lost Lake Dam ~115' East of Spillway

ELEVATION: 2471' NORTHING:

EASTING:

DRILLING CONTRACTOR: Taber Consultants

DRILLING METHOD AND EQUIPMENT USED: CME 55 Hi Torque, Air Rotary, 4" Casing, Ring Bit

WATER LEVELS:

START: 9/19/2001 8:30:00 AM

END: 9/19/2001 11:00:00 AM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	TYPE-#	6-6-6 (in) (N)					SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-								
1-								
2-								
3-								
4-								
5-	5.0-6.5	1.0	MC-1	47-46-34 (80)	SILTY GRAVEL (GM). Brown, slightly moist, very dense, angular gravel.	Jar sample. 0840.		
6-								
7-	7.5-9.0	0	SS-2	50/4"		No recovery. Gravels.		
8-								
9-								
10-	10.0-11.5	1.0	MC-3	33-37-34 (71)	SILTY GRAVEL (GM). Brown, moist, very dense, friable, some clay.			
11-								
12-	12.5-14.0	1.3	MC-4	16-20-25 (45)	Same as above.	Jar sample=0920.		
13-								
14-								
15-	15.0-16.5	1.0	SS-5	14-14-23 (37)	Same as above.			
16-								
17-	17.5-19.0	0	MC-6	50/4"		No recovery, rocky cuttings, probably gravels/cobbles.		
18-								
19-								
20-	20.0-21.5	0	MC-7	50/3"				
21-								
22-	22.5-24.0	1.3	MC-8	27-20-14 (34)	SILTY GRAVEL (GM). Brown, very moist, dense, some clay.	Jar sample 1010.		
23-								
24-								
25-	25.0-26.5	SS-9	1.5	3-7-5 (12)	SILTY SAND (SM). Brown, wet, medium, some gravel, some clay.			



PROJECT NUMBER

151319.FI.09

BORING ID:

11DAM3

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lost Lake Dam ~115' East of Spillway

ELEVATION: 2471'

NORTHING:

EASTING:

DRILLING CONTRACTOR: Taber Consultants

DRILLING METHOD AND EQUIPMENT USED: CME 55 Hi Torque, Air Rotary, 4" Casing, Ring Bit

WATER LEVELS:

START: 9/19/2001 8:30:00 AM

END: 9/19/2001 11:00:00 AM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
26 -			6-6-6 (in) (N)		
27 -	27.5-29.0	1.5	SS-10	2-1-3 (4)	SILTY SAND (SM). Brown, wet, loose, some gravel, some clay.
28 -					
29 -					
30 -	30.0-31.5	1.0	MC-11	9-10-13 (23)	SILTY GRAVEL (GM). Brown, wet, medium, angular gravel (gray), some clay. Total depth=30 ft. bgs. Grout to surface.
31 -					Rock in shoe.
32 -					



PROJECT NUMBER

151319.FI.03

BORING ID:

13Q

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lower Deposition

ELEVATION: NORTHING: EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 85

WATER LEVELS:

START: 5/11/2000 1:30:00 PM

END: 5/11/2000 3:00:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-1	0.0-4.0			SILTY SAND (SM). Brown (10YR 4/3), dry, 70% fine to very fine sand, subrounded, 30% silt.	Sunny, 70 degrees F.		
1-4	4.0-5.5	1.5	1-2-3	SILTY SAND (SM). Dark grayish brown (10YR 4/2), moist, soft, 50% fine to very fine sand, subrounded, 50% silt. FAT CLAY (CL). Bluish gray (Gley 2 5/1), wet, very soft, 100% fat clay SILTY SAND (SM). Dark grayish brown (10YR 4/2). Same as above.	8" layer of tailings.		
9-10	9.0-10.5	1.5	3-3-2	SILTY SAND (SM). Dark gray (Gley 1 4/ ), wet, very soft, 85% fine to very fine sand, well rounded, 15% silt.	1425: Collected sample 13Q1-1, 9 to 10 ft. bgs.		
14-15	14.0-15.5		3-4-4	FAT CLAY (CH). Bluish gray (Gley 2 5/1), wet, very soft, 80% fat clay, 20% silt. SILTY SAND (SM). Dark gray (Gley 1 4/ ), wet, very soft, 85% fine to very fine sand, well rounded, 15% silt.			
19-20	19.5-20.5		3-4-3	SILTY SAND (SM). Same as above.	Augers sinking into hole, very soft material. Roots in sample. 1445: Collected sample 13Q1-2, 13Q1-2 ?, 13Q1-2 ?.		
24-25	24.0-25.5	5-5-16		WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM). Dark gray (10YR 4/1), wet, soft, 75% well graded sand, well rounded, 10% subangular gravel (0.25 to 0.5 cm diameter), 15% silt.			



PROJECT NUMBER

151319.FI.03

BORING ID:

13Q

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lower Deposition

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 85

WATER LEVELS:

START: 5/11/2000 1:30:00 PM

END: 5/11/2000 3:00:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
25	25.0-25.0		6-6-6 (in) (N)	WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM). Very dark grayish brown (10YR 3/2), 50% gravel, angular, 0.5 to 3 cm diameter, 30% well graded sand, well rounded, 20% silt, wet, loose.	Auger refusal, no sample possible.
26					
27					
28				Total depth=28 ft. bgs.	
29					

TYPE-#  
SS-Spill Spoon  
ST-ShebyTube



PROJECT NUMBER

151319.FI.03

BORING ID:

13R

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Lower Deposition Area

ELEVATION: NORTHING: EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 85

WATER LEVELS:

START: 5/11/2000 5:30:00 PM

END: 5/11/2000 6:40:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Sunny, 70 degrees F, intermittent showers all week.		
1							
2							
3							
4	4.0-5.5	0.5	1-2-1	SILTY SAND (SM). Dark grayish brown (10YR 4/2), 85% fine to very fine sand, well rounded, wet, 15% silt, very soft.			
5							
6							
7							
8							
9	9.0-10.5	1.5	4-7-17	Same as above (9 to 9.5 ft. bgs).	1800: Collected samp 13R1-1, 9 to 10 ft. bgs.		
10				SILTY SAND (SM). Dark gray (Gley 1 4/ ), 85% fine to very fine sand, well rounded, wet, soft, 15% silt.			
11							
12							
13							
14							
15	15.0-15.0			FAT SILTY CLAY (CH). Bluish gray (Gley 2).	Tailings slurry coming up inside augers. Impossible to sample and to install a well. Driller pulled augers, redrilled with wooden plug, no sampling possible. Collected sample from augers 13R1-2, x-15 ft. bgs.		
16							
17							
18							
19							
20							



PROJECT NUMBER

151319.FI.09

BORING ID:

13S

Sheet 1 of 3

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Deposition Area

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Taber Consultants

DRILLING METHOD AND EQUIPMENT USED: CME 55 Hi Torque, Air Rotary, 4" Casing, Ring Bit

WATER LEVELS: 10

START: 9/19/2001 3:00:00 PM

END: 9/21/2001

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.0				Begin using 8" HSA. Tailings.		
1							
2							
3							
4							
5	5.0-6.5	1.5	SS-1	2-3-2 (5) SILTY SAND (SM). Gray, moist, loose, fine sand, few organics.			
6							
7							
8							
9							
10	10.0-11.5	1.5	SS-2	1-1-1 (2) SILTY SAND (SM). Gray, wet, very loose, fine sand.			
11							
12							
13							
14							
15	15.0-16.5	1.5	SS-3	1-2-2 (4) Same as above with ~2" zone of SILTY CLAY (CL). Gray, soft.			
16							
17							
18							
19							
20	20.0-21.5	1.0	SS-4	1-2-2 (4) SILTY SAND (SM). Gray, wet, very loose, fine sand.	Driller notes heaving sands.		
21							
22							
23							
24							
25				Heaving sands.	End day 4:40 pm. Resume drilling 9/20/01 7:30 am.		



PROJECT NUMBER

151319.FI.09

BORING ID:

13S

Sheet 2 of 3

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Desposition Area

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Taber Consultants

DRILLING METHOD AND EQUIPMENT USED: CME 55 Hi Torque, Air Rotary, 4" Casing, Ring Bit

WATER LEVELS: 10

START: 9/19/2001 3:00:00 PM

END: 9/21/2001

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26					No sample at 25', heaved sands.		
27					Grinding, harder drilling.		
28							
29							
30	30.0-31.5	1.0	SS-5	9-26-40 (66)	CLAYEY SAND (SC). Blue-gray and olive, wet, firm, trace brown organics, becoming hard (thin rock zone).  Weathered rock.		
31							
32					Smooth, hard drilling.		
33							
34							
35	35.0-36.5	0.2	SS-6	50/3"	Bedrock. Blue-gray with brown-orange staining, highly fractured.  Switch over to air, 4" bit, no casing.		
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							





PROJECT NUMBER

151319.FI.09

BORING ID:

13S

Sheet 3 of 3

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Deposition Area

ELEVATION:                   NORTHING:

EASTING:

DRILLING CONTRACTOR: Taber Consultants

DRILLING METHOD AND EQUIPMENT USED: CME 55 Hi Torque, Air Rotary, 4" Casing, Ring Bit

WATER LEVELS: 10

START: 9/19/2001 3:00:00 PM

END: 9/21/2001

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
51					
52					
53					
54					
55					Discharge water clearing up.
56					
57					
58					
59					
60					
61	61.0-61.0				Rock becoming harder. Gray in color.
62					
63					
64					
65					
66					
67					
68					
69					
70					
71					
72					11:30. End drilling. Trip out for well installation.
73					



PROJECT NUMBER

BORING ID:

13T

Sheet 1 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH/Star 30 KDH rig

WATER LEVELS:

START: 2/7/2007 9:00:00 AM

END:

LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#		SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-					
1-					
2-					
3-					
4-					
5-	5.0-10.0			VERY FINE SAND WITH SILT (SM). Mine tailings, recognizable as, damp, very loose sand, ~30% silt, subangular, well sorted, Gley 2 4/10B.	0908
6-					
7-					
8-					
9-					
10-	10.0-18.0			Same as above.	0915
11-					
12-					
13-					
14-					
15-					15 ft. bgs. driller reports hitting water.
16-					
17-					
18-	18.0-21.0			Same as above. Wet.	0920
19-					
20-					
21-	21.0-25.0			Very dark blue-gray siltstone (dolomite?) appears to be previously fractured, staining and weathering apparent in orange oxidation lineations. Some clasts up to 2" diameter subrounded and appear not to have been cut by rig. Gley 2 3/5PB. Average clast size 1 to 1.5 inch diameter.	21 ft. bgs. Driller reports hitting bedrock. 0945.
22-					
23-					0950. Driller pumping water off of 3 yd. collection bin. 1000 Resume drilling.



PROJECT NUMBER

BORING ID:

13T

Sheet 2 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH/Star 30 KDH rig

WATER LEVELS:

START: 2/7/2007 9:00:00 AM

END:

LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
24 -					
25 -	25.0-30.0			Same lithology as at 21 ft. bgs., but ground up into very coarse angular sand. No clasts over 1/4" diameter, ~20% fine gravel with diameters between 0.19 and 0.25".	1005
26 -					
27 -					
28 -					
29 -					
30 -	30.0-31.0			Same lithology. Evidence of orange oxidation and staining, angular coarse sand and fine gravel.	1015
31 -	31.0-33.0			Change in lithology. Siltstone with clasts quartz and black mineral (or may be very dark blue gray seen above). Matrix is Gley1 5/N. Coarse sand of some 3 mineralogies 20 to 30% of sample. Coarse sand and fine gravel is subrounded. Orange oxidation/staining, evidence of weathering. ~10 to 15% quartz, ~10% dark black/blue mineral.	Driller is going to stop advancing casing at 40 ft. bgs. to expedite drilling. He is confident formation will not cave, is competent. 31 ft. bgs at 1017.
32 -					
33 -	33.0-34.0			SILTSTONE. ~20% Gley 1 5/N seen above. ~10% quartz. 70% Gley 2 2.5/5PB, similar 50% fine gravel, 50% coarse sand. All angular, poorly sorted.	1023
34 -	34.0-37.0			Same as above. Lots of weathering indication, orange staining. Mineralogy is more consistent than at 33 ft. bgs. Few medium rounded gravels with diameter 1 to 2" exhibit oxidation/weathering staining. No light gray material observed above present.	Driller reports water coming out of hole changed color to rust colored. Thinks we hit fracture. 1028. 35 ft. bgs. Water color changed back to normal.
35 -					
36 -					
37 -	37.0-40.0			Same as above.	1052. Driller reports water smells sulfurous. CH2M HILL field staff doesn't smell it.
38 -					
39 -					
40 -	40.0-45.0			Same as above.	1058. Stop drilling, readjust rig jacks, surface has settled, causing feet to drop. Driller switching from 9 5/8" bit to 7 7/8" to expedite drilling and stop casing the hole.
41 -					
42 -					
43 -					
44 -					
45 -	45.0-50.0			Same mineralogy as above. Appears to be competent bedrock, no evidence of weathering upon 2nd inspection, I think bedrock may be the same as meta sediments (slate) seen 5K-S	1200. Driller says water smells sulfurous. Again, CH2M HILL does not smell it but maybe his nose is more well trained than ours?
46 -					



PROJECT NUMBER

BORING ID:

13T

Sheet 3 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH/Star 30 KDH rig

WATER LEVELS:

START: 2/7/2007 9:00:00 AM

END:

LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
			6-6-6 (in) (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
47				and 5k-D instead of siltstone.	
48					
49					
50	50.0-60.0			Same as above.	1230
51					
52					
53					1240 at 53 ft. bgs: Cease. 1415 at 53 ft. bgs: Continue.
54					
55					
56					
57					
58					
59					
60	60.0-65.0			Same as above. Black (Gley 1 2.5/N), metasedimentary rock (slate).	1440. Cuttings consistent, probable competent bedrock.
61					
62					
63					
64					
65	65.0-70.0			Same as above.	1510
66	66.0-66.0				1515 at 66 ft. bgs: Cease. 1520 at 66 ft. bgs: Drilling resumes.
67					
68					
69					
70	70.0-75.0			Same as above. Slightly more angular and slightly larger fragments (0.5 to 3 mm) as above.	1545
71					



PROJECT NUMBER

BORING ID:

13T

Sheet 4 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH/Star 30 KDH rig

WATER LEVELS:

START: 2/7/2007 9:00:00 AM

END:

LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY			SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	TYPE-#	6-6-6 (in) (N)			
72 -					
73 -					
74 -					
75 -	75.0-80.0			Same as above. Angularity returns as seen above at 70 ft. bgs.	1610
76 -	76.0-76.0			Total depth=76 ft. bgs.	
77 -					
78 -					
79 -					
80 -					
81 -					



PROJECT NUMBER

BORING ID:

1R

Sheet 1 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: Approx 100 ft. south of main gate

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS:

START: 11/28/2001

END: 11/28/2001

LOGGER: T. Lae

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-20.0			LEAN CLAY (CL). Strong brown (7.5YR 5/4), moist, soft, plastic, no dilatancy.	
1					
2					
3					
4					
5					
6					
7					
8				Drier at 8 ft. bgs.	
9					
10					
11					
12				Cobbles and gravel 12 to 14 ft. bgs.	
13					
14					
15					
16					
17					
18					Easy, rapid drilling.
19					
20	20.0-46.0			LEAN CLAY (CL). Brown (7.5YR 4/2), damp, soft, little sand and gravel to 1 inch. Color change to pale yellow (5Y 7/3) at 23 ft. bgs. Some black mottling. Gravel is dark gray matrix with high quartz content.	
21					
22					
23					
24					
25					



PROJECT NUMBER

BORING ID:

1R

Sheet 2 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: Approx 100 ft. south of main gate

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS:

START: 11/28/2001

END: 11/28/2001

LOGGER: T. Lae

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26					
27					
28					
29					
30					Slow drilling.
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					Injecting foam to circulate clay, not successful.
41					
42					
43					
44					
45					
46	46.0-70.0				
47					
48					
49					
50					



PROJECT NUMBER

BORING ID:

1R

Sheet 3 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: Approx 100 ft. south of main gate

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS:

START: 11/28/2001

END: 11/28/2001

LOGGER: T. Lae

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
51					
52					
53					
54				WEATHERED BEDROCK. Greenish gray (10G 5/1), dry, loose, fine grained, angular, breaks to smaller pieces easily.	
55				Grades to BEDROCK. Greenish gray (10G 5/1).	
56					
57					
58					
59					
60				Metasedimentary CLAYSTONE. Dry, very dusty, massive, fine grained, trace FeOx staining.	
61					
62					
63					
64					
65					
66					
67					
68					
69					
70	70.0-98.0				
71					
72					
73					
74					
75					
76					





PROJECT NUMBER

BORING ID:

1R

Sheet 4 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: Approx 100 ft. south of main gate

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS:

START: 11/28/2001

END: 11/28/2001

LOGGER: T. Lae

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
77					
78					
79					
80					
81					
82				Color change to dark bluish gray (5B 4/1) at 82 ft. bgs.	
83					
84					
85					
86					
87					
88					
89					
90					
91					
92					
93					
94					
95					
96					
97					
98	98.0-141.0			Cutting damp to moist at 98 feet bgs. Crumbles with thumb/finger pressure.	
99					
100					
101					



PROJECT NUMBER

BORING ID:

1R

Sheet 5 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: Approx 100 ft. south of main gate

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS:

START: 11/28/2001

END: 11/28/2001

LOGGER: T. Lae

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
102					
103					
104					
105					
106					
107					
108					
109					
110					
111					
112					
113					
114					
115					
116					
117					
118					
119					
120					
121				Making water from 121 ft. bgs.	Stop for the day 11/28/01 due to hydraulic hose breaking. Resume 11/29/01. Driller reports 20 to 25 ft. of water in hole.
122					
123					
124					
125					
126					
127					



PROJECT NUMBER

BORING ID:

1R

Sheet 6 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: Approx 100 ft. south of main gate

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Air Rotary

WATER LEVELS:

START: 11/28/2001

END: 11/28/2001

LOGGER: T. Lae

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
128					
129					
130					
131					
132					
133					
134					
135					
136					
137					
138					
139					
140					
141				Total depth=141 ft. bgs. Install a 6 inch PVC clay 1120 liner. Hand perforated from 115 to 135 ft. bgs. See well completion diagram.	
142					



PROJECT NUMBER

151319.FI.09

BORING ID:

5 PZ 1

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: 5 PZ 1-Waste Rock Area

ELEVATION: 2784.9'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque

WATER LEVELS:

START: 8/17/2001

END: 8/17/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#	6-6-6 (in) (N)				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-								
1-	1.5-3.0	7"	SS-1	24-25-15 (40)	SANDY GRAVEL (SP) (3/4") and sand. Blue-gray angular gravel, gray-brown sand, dry, dense.	Waste Rock (8").		
2-								
3-								
4-								
5-	5.0-6.5	12"	SS-2	15-21-25 (46)	Same as above.			
6-								
7-	7.5-9.0	1"	SS-3	50/2"	SANDY GRAVEL. Broken rock particles, orange-gray, dry, sampled particles soft broken rock plate-like structure.	Hard drilling.		
8-								
9-								
10-								
11-								
12-	12.5-14.0	NR	SS-4	8-13-25 (38)	SANDY GRAVEL (SP) (3/4"). Some blue gray gravel/gray brown sand, dry, dense.			
13-								
14-								
15-	15.0-16.5	3"	SS-5	22-21-33 (54)	SANDY GRAVEL (GP) (3/4"). Orange, moist, dense, angular shapes.			
16-								
17-	17.5-19.0	4"	SS-6	11-15-18 (33)	GRAVEL-BROKEN ROCK (GP) (3/4"). Gravel: small broken rock particles, gray-black, moist, dense.			
18-								
19-								
20-	20.0-21.5	2"	SS-7	12-12-15 (27)	Same as above.			
21-								
22-	22.5-24.0	2"	SS-8	12-15-19 (34)	Same as above.			
23-								
24-								
25-	25.0-26.5	2"	SS-9	7-9-9 (18)	CLAY (CL). Orange, moist, stiff, plastic.	Clay lense, native?		



PROJECT NUMBER

151319.FI.09

BORING ID:

5 PZ 1

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: 5 PZ 1-Waste Rock Area

ELEVATION: 2784.9'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque

WATER LEVELS:

START: 8/17/2001

END: 8/17/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
26 -			6-6-6 (in) (N)		
27 -	27.5-29.0	7"	SS-10	24-30-33 (63)	ROCK AND SANDY GRAVEL (GP) (3/4"). Gravel broken rock, gray black, moist, very dense.
28 -					
29 -					
30 -					
					Total depth=27.5 ft. bgs. Grout backfill.

TYPE-#  
SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

5 PZ 2

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine (Data Gaps)

LOCATION: 5 PZ 2-Tailings Area

ELEVATION: 2756.3'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque

WATER LEVELS:

START: 8/17/2001

END: 8/17/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:	
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.
0-					Waste rock, 3' thick.	
1-						
2-	2.5-4.0	0	SS-1	50/4"	SANDY GRAVEL (GP) (3/4"). Blue-gray gravel, dry, dense, sand.	Tailings.
3-						
4-						
5-	5.0-6.5	13"	SS-2	11-12-15 (27)	SILTY SAND (SM). Gray, moist, dense.	
6-						
7-						
8-	7.5-9.0	10"	MC-3	13-14-19 (33)	Same as above.	
9-						
10-	10.0-12.5	0	SH-4		Same as above.	No recovery.
11-						
12-	12.5-14.5	15"	SS-5	3-2-2 (4)	CLAY-SILTY SAND (CL-SM). Orange-gray, moist, stiff, clay-dense sand.	Top 1/2 of sample: clay. Bottom 1/2: Sand.
13-						
14-						
15-	15.0-17.5	2' 3"	SH-6		SILTY SAND (SM). Gray, moist, medium density.	
16-						
17-						
18-	17.5-20.0	14"	SS-7	6-4-8 (12)	Same as above.	
19-						
20-	20.0-21.5	12"	MC-8	11-15-21 (36)	Same as above.	
21-						
22-	22.5-24.0	18"	SS-9	7-9-15 (24)	Same as above.	
23-						
24-						
25-	25.0-26.5	6"	MC-10	14-12-19 (31)	Same as above.	



PROJECT NUMBER

151319.FI.09

BORING ID:

5 PZ 2

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine (Data Gaps)

LOCATION: 5 PZ 2-Tailings Area

ELEVATION: 2756.3'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque

WATER LEVELS:

START: 8/17/2001

END: 8/17/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
26 -			6-6-6 (in) (N)		
27 -	27.5-29.0	16"	SS-11	29-50/3"	Same as above.
28 -					Clay at bottom of sample, native.
29 -				Bedrock. Total depth=29 ft. bgs. Grout backfill.	
30 -					

TYPE-#  
SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

5 PZ 3

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine (Data Gaps)

LOCATION: 5 PZ 3-Tailings Area

ELEVATION: 2751.3'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque

WATER LEVELS: 10

START: 8/17/2001

END: 8/17/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	TYPE-#	6-6-6 (in) (N)					SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-						Waste rock to 8". Tailings.		
1-								
2-	2.5-4.0	9"	SS-1	4-4-6 (10)	SILTY SAND (SM). Gray, moist, dense.			
3-								
4-								
5-	5.0-6.5	6"	MC-2	6-4-6 (10)	GRAVELLY SILTY SAND (GP-SP). Blue gray-gray, moist, loose, medium dense.	Top 1/2 gravel.		
6-								
7-								
8-	7.5-9.0	18"	SS-3	1-1-4 (5)	SILTY SAND (SM). Gray, moist, medium dense.			
9-								
10-	10.0-12.5	20"	SH-4		Same as above.	10' approximate water level.		
11-								
12-								
13-	12.5-14.0	16"	SS-5	2-3-6 (9)	SANDY SILT (ML). Gray, wet, firm.			
14-								
15-	15.0-16.5	6"	MC-6	5-4-5 (9)	Same as above.			
16-								
17-								
18-	17.5-19.0	12"	SS-7	3-3-6 (9)	Similar to above. Less sand.			
19-								
20-	20.0-21.5	6"	MC-8	NR	SANDY SILT (ML). Gray, very moist, loose.			
21-								
22-								
23-	22.5-24.0	12"	SS-9	6-16-25 (41)	Same as above.			
24-								
25-								





PROJECT NUMBER

151319.FI.09

BORING ID:

5 PZ 3

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine (Data Gaps)

LOCATION: 5 PZ 3-Tailings Area

ELEVATION: 2751.3'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque

WATER LEVELS: 10

START: 8/17/2001

END: 8/17/2001

LOGGER: A. Evans

DEPTH BGS (ft)	STANDARD PENETRATION TEST RESULTS		CORE DESCRIPTION:	COMMENTS:
	INTERVAL (ft)	6-6-6 (in) (N)		
	RECOVERY			
26 -			Rock. Total depth=25.5 ft. bgs. Grout backfill.	

SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.

DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.

TYPE-#  
SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

5 PZ 3

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine (Data Gaps)

LOCATION: 5 PZ 3-Tailings Area

ELEVATION: 2751.3'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque

WATER LEVELS: 10

START: 8/17/2001

END: 8/17/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	TYPE-#	6-6-6 (in) (N)					SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-						Waste rock to 8". Tailings.		
1-								
2-	2.5-4.0	9"	SS-1	4-4-6 (10)	SILTY SAND (SM). Gray, moist, dense.			
3-								
4-								
5-	5.0-6.5	6"	MC-2	6-4-6 (10)	GRAVELLY SILTY SAND (GP-SP). Blue gray-gray, moist, loose, medium dense.	Top 1/2 gravel.		
6-								
7-								
8-	7.5-9.0	18"	SS-3	1-1-4 (5)	SILTY SAND (SM). Gray, moist, medium dense.			
9-								
10-	10.0-12.5	20"	SH-4		Same as above.	10' approximate water level.		
11-								
12-								
13-	12.5-14.0	16"	SS-5	2-3-6 (9)	SANDY SILT (ML). Gray, wet, firm.			
14-								
15-	15.0-16.5	6"	MC-6	5-4-5 (9)	Same as above.			
16-								
17-								
18-	17.5-19.0	12"	SS-7	3-3-6 (9)	Similar to above. Less sand.			
19-								
20-	20.0-21.5	6"	MC-8	NR	SANDY SILT (ML). Gray, very moist, loose.			
21-								
22-								
23-	22.5-24.0	12"	SS-9	6-16-25 (41)	Same as above.			
24-								
25-								



PROJECT NUMBER

151319.FI.09

BORING ID:

5 PZ 3

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine (Data Gaps)

LOCATION: 5 PZ 3-Tailings Area

ELEVATION: 2751.3'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque

WATER LEVELS: 10

START: 8/17/2001

END: 8/17/2001

LOGGER: A. Evans

DEPTH BGS (ft)	STANDARD PENETRATION TEST RESULTS		CORE DESCRIPTION:	COMMENTS:
	INTERVAL (ft)	6-6-6 (in) (N)		
	RECOVERY			
26 -			Rock. Total depth=25.5 ft. bgs. Grout backfill.	

SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.

DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.

TYPE-#  
SS-Spill Spoon  
ST-Shelby Tube



PROJECT NUMBER

151319.FI.09

BORING ID:

5ABUT1

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5ABUT 1 (Left)

ELEVATION: 2746.8 ft.

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 13

START: 8/14/2001 12:00:00 PM

END: 8/14/2001 1:45:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-					Waste rock <1 ft.		
1-							
2-	2.5-4.0	1	SS-1	3-3-3 (6)	SANDY SILT (ML). Gray, moist, stiff.	Tailings.	
3-							
4-							
5-	5.0-6.5	1.5	MC-2	7-9-13 (22)	Similar. Mottled gray-tan, more moist.		
6-							
7-							
8-	7.5-8.5	1	SS-3	4-4-6 (10)	SILTY SAND (SM). Gray, slightly moist, loose, finer sand.		
9-							
10-	10.0-12.5	2.5	4-SH		SILTY SAND (SM). Gray, slightly moist, medium.	Shelby-full recovery.	
11-							
12-							
13-	12.5-14.0	1.5	SS-5	6-9-7 (16)	SANDY SILT (ML). Gray, moist, very stiff.	Sampler, wet.	
14-							
15-	15.0-16.5	1	MC-6	5-7-8 (15)	Zones of: SILTY SAND (SM), same as above and SILT (ML).		
16-							
17-							
18-	17.5-19.0	1.5	SS-7	4-5-8 (13)	Similar.		
19-							
20-	20.0-22.5	2	SH-8			Shelby.	
21-							
22-							
23-	22.5-24.0	1.5	SS-9	3-3-3 (6)	Similar.		
24-							
25-	25.0-26.5	1	MC-10	8-12-13 (25)	SANDY SILT (ML). Gray, wet, stiff, rocky.		



PROJECT NUMBER

151319.FI.09

BORING ID:

5ABUT1

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5ABUT 1 (Left)

ELEVATION: 2746.8 ft.

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 13

START: 8/14/2001 12:00:00 PM

END: 8/14/2001 1:45:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:	
	RECOVERY	TYPE-#				
						SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.
26 -			6-6-6 (in) (N)			
27 -	27.5-29.0	1	SS-11	8-50/6"	BEDROCK. Yellowish.	Native? Rock fragments.
28 -						
29 -						
30 -	30.0-30.5	.5		50/6"	BEDROCK. Total depth=30 ft. bgs. Grout backfill.	
31 -						

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

5ABUT2

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5ABUT 2 (Right)

ELEVATION: 2746.5

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS:

START: 8/14/2001 2:00:00 PM

END: 8/14/2001 4:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0				SILTY SAND/GRAVEL (GM). Brown-gray, dry to moist, medium, angular gravel.	Waste rock (8"). PDM=0.0		
1							
2	2.5-4.0	0	SS-1	50/3"	No recovery.		
3							
4							
5	5.0-6.5	1.5	MC-2	23-14-9 (23)	SILT (ML). Tan-gray, slightly moist, stiff. Tailings.		
6							
7							
8	7.5-8.5	1.5	SS-3	8-10-8 (18)	Similar. More gray.		
9							
10	10.0-12.5	1.5	SH-4		Easy push, soft.		
11							
12							
13	12.5-14.0	1.5	SS-5	3-3-5 (8)	SILT (ML). Dark brown, moist, firm, trace sand. Native?		
14							
15	15.0-16.5	1.5	SS-6	9-19-23 (42)	Similar. Stiff, few finer gravels.		
16							
17							
18	17.5-19.0	1.5	MC-7	10-6-15 (21)	Similar. Very moist, increasing sand.		
19							
20	20.0-22.5	1.0	SH-8		Poor recovery.		
21							
22							
23	22.5-24.0	0.2	SS-9	31-50/3"	CLAYEY SAND with gravel. Brown, wet, very dense, angular gravels. Harder pushing last 6". Bedrock.		
24							
25	25.0-26.5	0.3	SS-10	50/5"	CLAYEY SAND with gravels. Red-brown, wet. Total depth=25		



PROJECT NUMBER

151319.FI.09

BORING ID:

5ABUT2

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5ABUT 2 (Right)

ELEVATION: 2746.5

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS:

START: 8/14/2001 2:00:00 PM

END: 8/14/2001 4:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26 -				ft. bgs. Grout backfill.	
27 -					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE01

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE01

ELEVATION: 2785.5'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 32

START: 8/15/2001 2:20:00 PM

END: 8/15/2001 4:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	TYPE-# <small>SS-Spill Spoon ST-ShelbyTube</small>	STANDARD PENETRATION TEST RESULTS  6-6-6 (in) (N)	CORE DESCRIPTION:  SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS:  DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-							
1-	1.0-1.0					SILTY SAND/GRAVEL (GM). Brown-gray, dry, medium, angular.	Waste rock (8").
2-	2.5-4.0	0	SS-1	50/1"		SILTY SAND/GRAVEL (GM). Brown-gray, dry, medium, angular gravel.	Waste rock (8").
3-							
4-							Driller notes softer zones at 4'.
5-	5.0-6.5	0.6	SS-2	15-10-16 (26)		SILTY SAND/GRAVEL (GM). Brown, gray, slightly moist, medium, angular gravel.	
6-							
7-	7.5-9.0	0.5	SS-3	26-13-24 (37)		Same as above.	
8-							
9-							
10-	10.0-11.5	0.7	SS-4	14-24-15 (39)		Same as above.	
11-							
12-	12.5-14.0	0.5	SS-5	7-9-15 (24)		Same as above.	
13-							
14-							
15-	15.0-16.5	1.0	SS-6	20-10-13 (23)		Same as above. Moist.	
16-							
17-	17.5-19.0	0.8	SS-7	10-19-15 (34)		Same as above.	
18-							
19-							
20-	20.0-21.5	0	SS-8	33-38-50/3"			
21-							
22-	22.5-24.0	0	SS-9	23-17-12 (29)			
23-							
24-							
25-	25.0-26.5	0.7	SS-10	18-24-37 (61)			





PROJECT NUMBER  
151319.FI.09

BORING ID:  
5GE01

Sheet 2 of 2

## SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: 5GE01

ELEVATION: 2785.5' NORTHING: EASTING: DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 32 START: 8/15/2001 2:20:00 PM END: 8/15/2001 4:00:00 PM LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	TYPE-# <small>SS-Spill Spoon ST-Shelby Tube</small>	STANDARD PENETRATION TEST RESULTS  6-6-6 (in) (N)	CORE DESCRIPTION:	COMMENTS:	
							SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26								
27	27.5-29.0	0.6		SS-11	42-50	More brown silty sand.		
28								
29								
30	30.0-31.5	0.5		SS-12	50/5"			
31								
32	32.5-34.0	0.5		SS-13	50-12-28 (40)	Similar. SILTY SAND WITH GRAVEL (GM). Brown, wet, dense, angular gravel.	Woody debris in sample.	
33								
34								
35	35.0-36.5	1.2		SS-14	14-15-27 (42)	SILTY SAND (SM). Gray-brown, wet, dense, finer sand. Total depth=35 ft. bgs. Grout backfill.		
36								
37								



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE02

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE01

ELEVATION: 2756.9'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 10'

START: 8/15/2001 1:00:00 PM

END: 8/15/2001

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	TYPE-# <small>SS-Spill Spoon ST-ShelbyTube</small>	STANDARD PENETRATION TEST RESULTS  6-6-6 (in) (N)	CORE DESCRIPTION:  SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS:  DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	2.5-4.0	0.3					
0-1							Waste rock (8").
1-2	2.5-4.0	0.3	SS-1		50/5"	SILTY SAND/GRAVEL. Brown, slightly moist, dense, angular.	
2-3							
3-4							
4-5	5.0-6.5	0	SS-2		50/1"	Same as above.	Sampler "bouncing" on rock.
5-6							
6-7							
7-8	7.5-9.0	0	SS-3		50/5"	Same as above.	
8-9							
9-10							
10-11	10.0-11.5	0	SS-4		50/5"		Tailings.
11-12							
12-13	12.5-14.0	1.5	MC-5		16-43-10 (53)	SILTY SAND (SM). Gray, wet, dense, fine sand.	Organics-wood debris in sample TCLP/STLC Sample 1:30 pm.
13-14							
14-15	15.0-16.5	1.5	SS-6		11-13-9 (22)	Same.	
15-16							
16-17							
17-18	17.5-19.0	1.0	MC-7		20-50/3"	SANDY SILT (ML). Gray, wet, stiff.	Native, debris.
18-19							
19-20							
20-21	20.0-21.5	0.3	SS-8		50/3"	CLAYEY SAND/GRAVEL (GC). Brown, wet, very dense. Total depth=20 ft. bgs. Grout backfill.	
21-22							



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE03

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE03

ELEVATION: 2748.3'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 7.5'

START: 8/15/2001 9:00:00 AM

END: 8/15/2001 10:00:00 AM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
0-			6-6-6 (in) (N)		
1-					
2-	2.5-4.0	1.5	SS-1	7-10-15 (25)	SILTY SAND (SM). Brown, moist, dense.
3-					
4-					
5-	5.0-6.5	1.2	MC-2	18-19-22 (41)	SILTY SAND (SM) and SANDY SILT ML). Similar as above.
6-					
7-					
8-	7.5-9.0	1.5	SS-3	4-4-3 (7)	SILTY SAND (SM). Gray, wet, medium, fine sand.  CLAY (CL). Gray, wet, firm.
9-					
10-	10.0-12.5	0	SH-4		No recovery.
11-					
12-					
13-	12.5-14.0	1.5	SS-5	4-4-5 (9)	SILTY SAND (SM). Gray, wet, loose, becoming CLAYEY SAND (SC). Brown, wet, loose.
14-					
15-	15.0-16.5	1.3	MC-6	8-10-11 (21)	SANDY CLAY (CL). Brown, wet, stiff.
16-					
17-					
18-	17.5-19.0	1.5	SS-7	17-24-18 (42)	CLAYEY SAND WITH GRAVEL (GC). Brown, wet, dense, angular gravel.
19-					
20-	20.0-21.5	1.0	MC-8	21-24-29 (53)	Same as above.
21-					
22-					
23-	22.5-24.0	0.4	SS-9	50/4"	Weathered bedrock, orange-brown, very dense. Total depth=22.5 ft. bgs. Grout backfill.
24-					
25-					



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE04

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE04

ELEVATION: 2750.7'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 10

START: 8/15/2001 10:00:00 AM

END: 8/15/2001 12:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#	6-6-6 (in) (N)				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-								
1-						Waste rock (8").		
2-	2.5-4.0	1.5	SS-1	14-11-10 (21)	SILTY SAND (SM) with gravel. Brown, slightly moist, medium, angular gravel.			
3-								
4-								
5-	5.0-6.5	0.6	MC-2	24-10-10 (20)	Similar. Becoming more silty.	Tailings?		
6-								
7-	7.5-10.0	0	SH-3		No recovery.			
8-								
9-								
10-	10.0-11.5	1.5	SS-4	11-7-9 (16)	SILTY SAND (SM). Gray, wet, medium, fine sand.	TCLP/STLC Sample.		
11-								
12-	12.5-14.0	1.0	MC-5	11-12-9 (21)	Similar. More silty.			
13-								
14-								
15-	15.0-16.5	2.5	SH-6					
16-								
17-	17.5-19.0	1.5	SS-7	2-2-2 (4)	SILTY SAND (SM). Gray, wet, loose, fine sand, trace clay.			
18-								
19-								
20-	20.0-21.5	0.5	MC-8	7-5-5 (10)	Same as above.			
21-								
22-	22.5-24.0	1.5	SS-9	4-3-8 (11)	Same as above.			
23-								
24-								
25-	25.0-26.5	1.5	MC-10	7-16-18 (34)	SANDY SILT (ML). Gray, wet, very stiff.			



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE04

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE04

ELEVATION: 2750.7'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 10

START: 8/15/2001 10:00:00 AM

END: 8/15/2001 12:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
26 -	26.5-26.5		6-6-6 (in) (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
27 -	27.5-29.0	0	SS-11	50/2"	CLAYEY SAND AND GRAVEL (GC). Brown, wet, medium.
28 -					Native.
29 -					Total depth=27.5 ft. bgs. Grout backfill.
30 -					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE04

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE04

ELEVATION: 2750.7'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 10

START: 8/15/2001 10:00:00 AM

END: 8/15/2001 12:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#	6-6-6 (in) (N)				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-								
1-						Waste rock (8").		
2-	2.5-4.0	1.5	SS-1	14-11-10 (21)	SILTY SAND (SM) with gravel. Brown, slightly moist, medium, angular gravel.			
3-								
4-								
5-	5.0-6.5	0.6	MC-2	24-10-10 (20)	Similar. Becoming more silty.	Tailings?		
6-								
7-	7.5-10.0	0	SH-3		No recovery.			
8-								
9-								
10-	10.0-11.5	1.5	SS-4	11-7-9 (16)	SILTY SAND (SM). Gray, wet, medium, fine sand.	TCLP/STLC Sample.		
11-								
12-	12.5-14.0	1.0	MC-5	11-12-9 (21)	Similar. More silty.			
13-								
14-								
15-	15.0-16.5	2.5	SH-6					
16-								
17-	17.5-19.0	1.5	SS-7	2-2-2 (4)	SILTY SAND (SM). Gray, wet, loose, fine sand, trace clay.			
18-								
19-								
20-	20.0-21.5	0.5	MC-8	7-5-5 (10)	Same as above.			
21-								
22-	22.5-24.0	1.5	SS-9	4-3-8 (11)	Same as above.			
23-								
24-								
25-	25.0-26.5	1.5	MC-10	7-16-18 (34)	SANDY SILT (ML). Gray, wet, very stiff.			



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE04

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE04

ELEVATION: 2750.7'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 10

START: 8/15/2001 10:00:00 AM

END: 8/15/2001 12:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
26 -			6-6-6 (in) (N)		
26.5-26.5				CLAYEY SAND AND GRAVEL (GC). Brown, wet, medium.	Native.
27 -					
27.5-29.0	0	SS-11	50/2"	Total depth=27.5 ft. bgs. Grout backfill.	
28 -					
29 -					
30 -					



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE05

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE05

ELEVATION: 2754.6'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 12.5

START: 8/15/2001 12:00:00 PM

END: 8/15/2001 1:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-					Waste rock (8").		
1-							
2-	2.5-4.0	1.5	SS-1	18-20-25 (45)	SILTY SAND (SM). Brown, slightly moist, dense.		
3-							
4-							
5-	5.0-6.5	1.0	MC-2	23-27-24 (51)	Same as above.		
6-							
7-							
8-	7.5-9.0	1.5	SS-3	5-5-7 (12)	SILTY SAND (SM). Gray-brown, moist, medium.		
9-					Tailings.		
10-	10.0-12.5	2.5	SH-4		Similar.		
11-							
12-							
13-	12.5-14.0	1.5	SS-5	2-2-11 (13)	Similar. Wet, grading to gray.		
14-							
15-	15.0-16.5	1.5	MC-6	3-3-5 (8)	SANDY SILT (ML). Gray, wet, firm.		
16-							
17-							
18-	17.5-19.0	1.5	SS-7	6-6-8 (14)	Same as above.		
19-					TCLP/STLC Sample 12:30 pm.		
20-	20.0-22.5	0	SH-8		No recovery.		
21-							
22-							
23-	22.5-24.0	1.5	SS-9	6-7-9 (16)	Same as above.		
24-							
25-	25.0-26.5	1.5	SS-10	19-23-20 (43)	CLAYEY SAND/GRAVEL (GC). Brown, wet, dense.		





PROJECT NUMBER

151319.FI.09

BORING ID:

5GE05

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE05

ELEVATION: 2754.6'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 12.5

START: 8/15/2001 12:00:00 PM

END: 8/15/2001 1:00:00 PM

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
26 -					
27 -					
28 -	27.5-29.0	0.5	SS-11	50/5*	Native.
29 -					
30 -					
				Weathered bedrock. Total depth=27.5 ft. bgs. Grout backfill.	

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.09

BORING ID:

5GE06

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 5GE06

ELEVATION: 2744.5'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 75 High Torque using 8" HSA

WATER LEVELS: 7.5

START: 8/14/2001 4:00:00 PM

END: 8/14/2001

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	TYPE-# <small>SS-Spill Spoon ST-ShelbyTube</small>	STANDARD PENETRATION TEST RESULTS  6-6-6 (in) (N)	CORE DESCRIPTION:  SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS:
	DEPTH BGS (ft)	INTERVAL (ft)					
0							
1	0.8-0.8						Waste rock (8").
2	2.5-4.0	0.2	SS-1	13-21-17 (38)	SILTY SAND AND GRAVEL. Brown, moist, dense, angular gravel.		Poor recovery.
3							
4							
5	5.0-6.5	0.6	MC-2	20-23-15 (38)	Similar.		
6							
7	7.5-8.5	1.5	SS-3	2-2-3 (5)	SILT (ML). Gray, wet, firm, few thin zones of fine gray sand.		Tailings.
8							
9							
10	10.0-11.5	1.5	MC-4	21-18-15 (33)	Same as above.		
11							
12	12.5-15.0	2.4	SH-5		Same as above.		Soft.
13							
14							
15	15.0-16.5	0.5	SS-6	11-15-15 (30)	Similar. With few gravels.		
16							
17	17.5-19.0	0.4	MC-7	19-19-25 (44)	Becoming brown, gravelly.		Poor recovery, sluff. Native?
18							
19							
20	20.0-21.5	0.3	SS-8	50/5"	Same as above.		
21							
22							Total depth=22 ft. bgs. Refusal. Grout backfill.
23							



PROJECT NUMBER

BORING ID:

5I

Sheet 1 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION:

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 85

WATER LEVELS:

START: 5/8/2000 2:00:00 PM

END:

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-					Partly cloudy. 75 degrees. Rain this morning.		
1-							
2-							
3-	3.0-3.5						
4-	4.0-6.0	2	1-18"	WELL GRADED GRAVEL AND SAND (GW). Very dark grayish brown (2.5Y 3/2), 60% angular gravel (1 to 3 cm), 40% angular, medium to very coarse sand, wet. FAT CLAY (CH). Gray (Gley 1 5/N), 70% fat clay, 30% silt, wet, very soft.			
5-							
6-							
7-							
8-					No sample collected while still drilling through tailings.		
9-							
10-							
11-							
12-							
13-							
14-							
15-							
16-							
17-							
18-							
19-							
20-					Still in tailings.		
21-							
22-							
23-							
24-	24.0-26.0	1.5	7-9-11	SILTY SAND (SM). Very dark gray (Gley1 3/N), 60% fine to			



PROJECT NUMBER

BORING ID:

5I

Sheet 2 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION:

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR:

Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 85

WATER LEVELS:

START: 5/8/2000 2:00:00 PM

END:

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
			6-6-6 (in) (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
25				very fine sand, subrounded, 40% silt, very moist, soft.	
26				SILTY SAND WITH CLAY AND GRAVEL (SW-SC). Dark grayish brown (10YR 4/2), 40% fine to coarse sand, 30% clay, 30% gravel (1 to 3 cm), subrounded to subangular, very moist, medium soft.	
27					
28					
29	29.0-31.0		10-17-78	Same as above.	
30	30.0-30.0			WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Dark...can't read.	
31					Drilling through much harder material.
32					
33					
34	34.0-35.5		2-37-42	POORLY GRADED GRAVEL WITH CLAYEY SAND (GP-GC). Dark grayish brown (10YR 4/2), 70% gravel (1 to 5 cm), angular gravel, 20% clay, 10% fine to coarse sand, angular, stiff, wet.	Broken up rock, bedrock? Definitely igneous, high quartz content, very hard, light gray colored granite?
35					
36					
37					
38					
39	39.0-40.0		52-6"	WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Light olive brown (2.5Y 5/4), 50% gravel, 30% clay, 20% fine to coarse sand, angular, very moist, very soft.	Rock=granite rock. Black argillitic vein.
40					
41					
42					
43					Drilled with augers to 45 ft. bgs. very hard matrix, no sample collected, will switch to air in the morning.
44					
45					
46	46.0-46.5			Same as above.	
47					Drilling with air 5/9/00. Rig chatter.
48					



PROJECT NUMBER

BORING ID:

51

Sheet 3 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION:

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR:

Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED:

Hollow Stem Auger CME 85

WATER LEVELS:

START: 5/8/2000 2:00:00 PM

END:

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#	6-6-6 (in) (N)			
49					
50	50.0-50.5			POORLY GRADED GRAVEL (GP). Dark gray (Gley 4/N), 100% gravel, angular, wet, very hard.	Bedrock=Gray igneous rock with quartz and feldspar and sulfide minerals (pyrite).
51	51.0-51.5			Same as above.	Occasional fractures.
52					
53					
54					
55					
56					
57	57.0-58.0			Same as above.	
58					
59				Same as above.	
60					
61	61.0-62.0			Same as above.	
62					
63					
64					
65	65.0-66.0			Same as above.	Occasional iron oxide staining along fractures.
66					
67					
68					
69					
70	70.0-70.5			Same as above.	
71					
72					
73	73.0-73.5			Same as above.	



PROJECT NUMBER

BORING ID:

5I

Sheet 4 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION:

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 85

WATER LEVELS:

START: 5/8/2000 2:00:00 PM

END:

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
74					
75	75.0-75.5			Same as above.	
76					
77					
78					
79	79.0-79.5			Same as above.	
80					
81					
82					
83	83.0-83.5			POORLY GRADED GRAVEL (GP). Some gray gravel containing pyrite (occasional) with trace quartz gravel.	Evidence of pyrite veins.
84					
85					
86				Increased quartz content.	Collected sample 5I-3.
87					
88					
89					
90				Total depth=90 ft. bgs.	
91					



PROJECT NUMBER

151319.FI.09

BORING ID:

5J

Sheet 1 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: 5J-Tailings Area Monitoring Well

ELEVATION: 2751.1

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque; HSA & Air Hammer

WATER LEVELS:

START: 8/20/2001

END: 8/25/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:	
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.
0-			6-6-6 (in) (N)		Waste rock to 20". Hollow stem auger.	
1-						
2-						
3-						
4-						
5-	5.0-6.5	12"	SS-1	7-7-8 (15) SILTY SAND (SM). Gray, some moisture, medium.		
6-						
7-						
8-						
9-						
10-	10.0-11.5	18"	SS-2	8-5-8 (13) SILTY SAND-CLAY (SM-CL). Gray, moist to very moist, medium to soft.	Top 1/2 silty sand.	
11-						
12-						
13-						
14-						
15-	15.0-16.5	12"	SS-3	9-11-15 (26) CLAY (CL). Gray, very moist, stiff.		
16-						
17-						
18-						
19-						
20-	20.0-21.5	15"	SS-4	9-11-11 (22) SILTY SAND (SM). Gray, medium.		
21-						
22-						
23-						
24-						
25-	25.0-26.5	10"	SS-5	50/5" Same as above.		



PROJECT NUMBER

151319.FI.09

BORING ID:

5J

Sheet 2 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: 5J-Tailings Area Monitoring Well

ELEVATION: 2751.1

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque; HSA & Air Hammer

WATER LEVELS:

START: 8/20/2001

END: 8/25/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26					
27				NATIVE ROCK. Brown-orange cuttings.	Changed to 6" Air Hammer uncased.
28					
29					
30					
31					
32				ROCK. Blue gray.	Hole reamed out to 8"+ with hammer bit.
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					





PROJECT NUMBER

151319.FI.09

BORING ID:

5J

Sheet 3 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: 5J-Tailings Area Monitoring Well

ELEVATION: 2751.1

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque; HSA & Air Hammer

WATER LEVELS:

START: 8/20/2001

END: 8/25/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61					
62					
63					
64				ROCK. Blue gray.	Increase in water in hole.
65					
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					
76					



PROJECT NUMBER  
151319.FI.09

BORING ID:  
5J Sheet 4 of 6

## SOIL BORING LOG

PROJECT: Lava Cap Mine Road LOCATION: 5J-Tailings Area Monitoring Well  
 ELEVATION: 2751.1 NORTHING: EASTING: DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR  
 DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque; HSA & Air Hammer  
 WATER LEVELS: START: 8/20/2001 END: 8/25/2001 LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY			SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	TYPE-#				
			6-6-6 (in) (N)		
77					
78					
79					
80					
81					
82					
83					
84					
85					
86					
87					
88					
89					
90					
91					
92				SAND. Black, 90 to 100 ft. bgs.	
93					
94					
95					
96					
97					
98					
99					
100					
101					



PROJECT NUMBER

151319.FI.09

BORING ID:

5J

Sheet 5 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: 5J-Tailings Area Monitoring Well

ELEVATION: 2751.1

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque; HSA & Air Hammer

WATER LEVELS:

START: 8/20/2001

END: 8/25/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
102					
103					
104					
105					
106					
107					
108					
109					
110					
111					
112				ROCK. Blue gray.	
113					
114					
115					
116					
117					
118					
119					
120					
121				ROCK. Blue gray, heavily fractured, larger rock particles at surface.	Hole collapsed at ~120 to 132 feet behind 8' hammer
122					
123					
124					
125					
126					
127					



PROJECT NUMBER

151319.FI.09

BORING ID:

5J

Sheet 6 of 6

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: 5J-Tailings Area Monitoring Well

ELEVATION: 2751.1

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: CME 7500 High Torque; HSA & Air Hammer

WATER LEVELS:

START: 8/20/2001

END: 8/25/2001

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
128					
129					
130					
131					
132					
133					
134					
135					
136					
137					
138					
139					
140					
141					
142					
143					
144					
145					
146				End of hole=146 ft. bgs.	
147					
148					
149					
150					
151				Well bottom=151 ft. bgs. Construction Monitoring Well.	
152					



PROJECT NUMBER  
184646.FI.02

BORING ID:  
5K-D  
Sheet 1 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation      LOCATION: Grass Valley, CA

ELEVATION: TBD      NORTHING:      EASTING:      DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:      START: 5/27/2005 2:00:00 PM      END:      LOGGER: H. Perry

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
0-			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
1-					
2-					
3-					
4-					
5-5.0-10.0				SILT (ML), dark reddish brown (5YR 2.5/2), dry, loose, plant debris	
6-					
7-					
8-					
9-					
10-10.0-15.0				CLAY (CL), strong brown (7.5YR 5/6), damp, moderate plasticity, soft	
11-					
12-					
13-					
14-					
15-15.0-20.0				SANDY CLAY (CL), strong brown (7.5YR 4/6), damp, moderate plasticity, loose, ~5% sand	
16-					
17-					
18-					
19-					
20-20.0-25.0				Same as above	14:26
21-					
22-					
23-					
24-					
25-25.0-30.0				CLAY with GRAVEL (CL), strong brown (7.5YR 4/6), moist,	Cuttings coming up in "balls"



PROJECT NUMBER

184646.FI.02

BORING ID:

5K-D

Sheet 2 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:

START: 5/27/2005 2:00:00 PM

END:

LOGGER: H. Pery

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#	6-6-6 (in) (N)			
26				moderate plasticity, soft, trace (-5%) fine gravel, subrounded up to 0.25" diameter	
27					
28					
29					
30	30.0-35.0			CLAY with SAND and GRAVEL (CL), brown (7.5YR 4/4), moist, moderate plasticity, soft, trace (5-10%) fine gravel (subrounded) up to 0.25" diameter	Cuttings coming out of hole in "balls"
31					
32					
33					
34					
35	35.0-40.0			GRAVELLY CLAY (CL), brown (7.5YR 5/4), wet, non-plastic, non-cohesive, large 2" diameter nodules of cohesive, highly plastic clay, greenish gray (Gley 6/1), 20% gravel, subrounded, up to 1" diameter, grayish crystalline rock	Difficult drilling conc: 0.015 mg/m3, TWA: 0.000 mg/m3, water encountered, Dust meter conc: 0.015 mg/m3
36					
37					
38					
39					
40	40.0-45.0			CLAY (CL), dark yellowish brown (10YR 4/4), wet, moderate plasticity, cohesive, trace (<5%) coarse sand	
41					
42					
43					
44					
45	45.0-50.0			GRAVELLY CLAY (CL), dark yellowish brown (10YR 4/4), wet, low to moderate plasticity, slightly cohesive, ~10% gravel up to 0.25" diameter, subrounded	
46					
47					
48					
49					
50	50.0-55.0			GRAVELLY CLAY (CL), dark yellowish brown (10YR 4/4), wet, low plasticity, slightly cohesive, ~25% gravel up to 1"	15:30



PROJECT NUMBER

184646.FI.02

BORING ID:

5K-D

Sheet 3 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:

START: 5/27/2005 2:00:00 PM

END:

LOGGER: H. Perry

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#		SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
51				diameter, subrounded	
52					
53					
54					
55	55.0-60.0			GRAVELLY CLAY (CL), dark yellowish brown (10YR 4/4), wet, low plasticity, slightly cohesive, ~15% gravel, subrounded up to 1" diameter (mostly <0.25")	
56					
57					
58					
59					
60	60.0-65.0			GRAVELLY CLAY with SAND (CL), dark yellowish brown (10YR 4/4), wet, low plasticity, non-cohesive, 15% coarse sand, 10% gravel up to 0.5" diameter	Conc: 0.018 mg/m3, TWA: 0.002 mg/m3
61					
62					
63					
64					
65	65.0-70.0			CLAYEY SAND with GRAVEL (SP), dark yellowish brown (10YR 4/4), wet, 70% coarse sand, subrounded, 15% clay, 15% gravel, subangular up to 1.5" diameter, dark gray crystalline clasts (look igneous)	
66					
67					
68					
69					
70	70.0-75.0			Same as above	
71					
72					
73					
74					
75	75.0-80.0			SANDY CLAY (CL), olive brown (2.5Y 4/4), wet, non-plastic, non-cohesive, ~25% coarse sand, trace gravel up to 0.5" diameter, subrounded	
76					



PROJECT NUMBER

184646.FI.02

BORING ID:

5K-D

Sheet 4 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:

START: 5/27/2005 2:00:00 PM

END:

LOGGER: H. Perry

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
77			6-6-6 (in) (N)		
78					
79					
80	80.0-85.0			Same as above, dark grayish brown (2.5Y 4/2)	15:53
81					
82					
83					
84					
85	85.0-90.0			SANDY CLAY (CL) with GRAVEL, olive brown (2.5Y 4/3), wet, non-plastic, non-cohesive, 20% coarse sand, trace gravel, subrounded up to 1" diameter, "clumps" of cohesive, moderate plasticity clay	
86					
87					
88					
89					
90	90.0-95.0			SANDY CLAY with GRAVEL (CL), olive brown (2.5YR 4/3), wet, non-plastic, non-cohesive, 20% coarse sand, ~10% gravel, subrounded up to 1" diameter, igneous clasts	
91					
92					
93					
94					
95	95.0-100.0			Same as above	
96					
97					
98					
99					
100	100.0-105.			Same as above, more sand ~30%	
101					





PROJECT NUMBER

184646.FI.02

BORING ID:

5K-D

Sheet 5 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:

START: 5/27/2005 2:00:00 PM

END:

LOGGER: H. Perry

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
102 -			6-6-6 (in) (N)		
103 -					
104 -					
105 -	105.0-110.			CLAYEY SAND with GRAVEL (SP), olive brown (2.5YR 4/3), wet, loose, 65% coarse sand, 25% clay, ~10% gravel up to 1" diameter, subround to subangular, igneous	
106 -					
107 -					
108 -					
109 -					
110 -	110.0-115.			CLAYEY SAND with GRAVEL (SP), black (Gley 2.5/N), wet, loose, 75% very coarse grained sand, angular, 15% clay (olive brown), 10% gravel, subrounded, up to 0.5" diameter, igneous	Sand could be ground up meta sediment rock (slate)
111 -					
112 -					
113 -					
114 -					
115 -	115.0-120.			CLAYEY SAND (SP), black (Gley 2.5/N), wet, loose, 85% very coarse sand, angular (ground up slate), 15% clay, olive brown	Not competent bedrock
116 -					
117 -					
118 -					
119 -					
120 -	120.0-125.			Same as above	Jim indicates that we are not in competent bedrock, drilling difficulty fluctuates between hard and easy - not "steady", pressure fluctuates
121 -					
122 -					
123 -					
124 -					
125 -	125.0-130.			SAND (SW), black (Gley1 2.5/N), wet, loose, very coarse grained, angular [meta sed rock (slate) ground up by drill bit]	Jim indicates that we probably hit competent bedrock - 123 ft bgs - drilling and cuttings consistent
126 -					
127 -					



PROJECT NUMBER

184646.FI.02

BORING ID:

5K-D

Sheet 6 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:

START: 5/27/2005 2:00:00 PM

END:

LOGGER: H. Perry

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
128			6-6-6 (in) (N)		
129					
130	130.0-135.			Same as above	
131					
132					
133					
134					
135	135.0-140.			Same as above	
136					
137					
138					
139					
140	140.0-145.			Same as above	End 5/27/05 @ 17:00. Start 5/31/05 @ 11:30. Difficult drilling - rig chatter
141					
142					
143					
144					
145	145.0-150.			SAND (SW), black (Gley1 2.5/N), wet, loose, very coarse grained, subangular to angular, trace gravel, subrounded, up to 0.5" diameter, ~10% of sand is reddish brown in color, gravel clasts are igneous	Difficult drilling - rig chatter
146					
147					
148					
149					
150	150.0-155.			Same as above, more gravel (~10%)	Difficult drilling (difficult to tell whether igneous clasts are inclusions in meta sed. bedrock or from a shallower depth interval)
151					
152					



PROJECT NUMBER

184646.FI.02

BORING ID:

5K-D

Sheet 7 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:

START: 5/27/2005 2:00:00 PM

END:

LOGGER: H. Perry

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#		SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
153					
154					
155	155.0-160.			SAND (SW), very dark gray (Gley1 2.5/3) to black (Gley1 2.5/N), wet, loose, very coarse grained, angular (ground up slate), 10-15% reddish brown sand, coarse, subrounded, trace gravel up to 0.5" diameter, subrounded, igneous	
156					
157					
158					
159					
160	160.0-165.			Same as above, finer sand (being ground up more by bit), ~20% reddish brown subrounded sand, less gravel	12:00
161					
162					
163					
164					
165	165.0-170.			Same as above, coarse, not ground up by bit as much	12:10
166					
167					
168					
169					
170	170.0-175.			Same as above, slate with igneous inclusions ground up to very coarse sand by drill bit	12:15
171					
172					
173					
174					
175					
176					
177					
178	178.0-200.			170-200 ft bgs: Same as above	Difficulty logging due to foam



PROJECT NUMBER

184646.FI.02

BORING ID:

5K-D

Sheet 8 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:

START: 5/27/2005 2:00:00 PM

END:

LOGGER: H. Perry

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
179					
180					
181					
182					
183					
184					
185					
186					
187					
188					
189					
190					
191					
192					
193					
194					
195					
196					
197					
198					
199					
200					
201					
202					
203					



PROJECT NUMBER  
184646.FI.02

BORING ID:  
5K-D

Sheet 9 of 9

## SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation      LOCATION: Grass Valley, CA

ELEVATION: TBD      NORTHING:      EASTING:      DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS:      START: 5/27/2005 2:00:00 PM      END:      LOGGER: H. Perry

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY			SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	TYPE-#				
			6-6-6 (in) (N)		
204					
205					
206					
207					
208					
209					
210	210.0-215.			Very dark gray (Gley1 2.5/3) to black (Gley1 2.5/N), slate, very few inclusions <5% ground up to very coarse sand by drill bit	
211					
212					
213					
214					
215					
216					



PROJECT NUMBER  
184646.FI.02

BORING ID:  
5K-S  
Sheet 1 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation LOCATION: Grass Valley, CA

ELEVATION: TBD NORTHING: EASTING: DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS: 61 ft bgs START: END: LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#	6-6-6 (in) (N)			
0					
1					
2					
3					
4					
5	5.0-10.0			SILT with SAND (ML), dark reddish brown, dry, loose, cuttings have popcorn texture	14:06
6					
7					
8					
9					
10	10.0-15.0			Brown sand clay with fine rounded gravel, medium moisture, unsorted, loose, moderate plasticity	Rig chatter. Probably hitting gravel or boulders as we observe at surface. 14:11
11					
12					
13					
14					
15	15.0-20.0			Brown sandy clay with medium - coarse rounded gravel clasts, moderate moisture and plasticity	So much chatter, bit temporarily halted
16					
17					
18					
19					
20	20.0-25.0			Brown sandy clay with ~20% heterogeneous, very fine angular gravel, sand ~30%, very dry	Still significant chatter, probably indicative of gravel and boulders in unit. 14:27
21					
22					
23					
24					
25	25.0-30.0			Brown sandy clay with rounded and angular clasts, very fine	14:40



PROJECT NUMBER  
184646.FI.02

BORING ID:  
5K-S  
Sheet 2 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation LOCATION: Grass Valley, CA

ELEVATION: TBD NORTHING: EASTING: DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS: 61 ft bgs START: END: LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
			6-6-6 (in) (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26				to fine, moderate moisture and plasticity	
27					
28					
29					
30	30.0-35.0			Very moist brown sandy clay with ~30% rounded fine to medium gravel clasts, moderate plasticity	14:50
31					
32					
33					
34					
35	35.0-40.0			Brown sandy clay with very fine angular gravel clasts and rounded fine to medium clasts, unsorted	Very slow drilling between 35 and 40 ft - still intermittent chatter from rig
36					
37					
38					
39					
40	40.0-45.0			GRAVELLY CLAY, brown, heterogeneous rounded fine clasts, low moisture, also very fine angular clasts	15:44
41					
42					
43					
44					
45	45.0-50.0			Brown gravelly clay with large, coarse rounded ~20% clasts, moderate moisture and plasticity, gravel is unordered and heterogeneous	15:53
46					
47					16:30 Switch to button bit
48					
49					
50	50.0-55.0			Very moist reddish brown clay with gravel, gravel is rounded and very fine to medium, also very fine angular	



PROJECT NUMBER

184646.FI.02

BORING ID:

5K-S

Sheet 3 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS: 61 ft bgs

START:

END:

LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
51				gravel ~10% gravel, also contains sand ~10%, cohesive	
52					
53					
54					
55					
56					
57					
58					
59					
60	60.0-65.0			Reddish brown wet clay with gravel, gravel is very fine to fine and angular ~20% gravel, also ~10% coarse sand, low plasticity	
61					
62					
63					
64					
65	65.0-70.0				Driller reports a large void from 65/67 to 70 ft bgs
66					
67					
68					
69					
70					
71					
72					
73					
74					
75	75.0-80.0			Wet reddish brown clay, ~15% angular gravel, very fine to medium, ~10% coarse sand, low plasticity, cohesive	
76					





PROJECT NUMBER  
184646.FI.02

BORING ID:  
5K-S  
Sheet 4 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation LOCATION: Grass Valley, CA

ELEVATION: TBD NORTHING: EASTING: DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS: 61 ft bgs START: END: LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
			6-6-6 (in) (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
77					
78					
79					
80	80.0-85.0			Brown wet clay with gravel, ~30% heterogeneous (angular and rounded, very fine to coarse) gravel, also contains medium to coarse sand ~10%	17:05
81					
82					
83					
84					
85	85.0-90.0			Yellowish brown wet clay with sand, ~40% medium to coarse sand, also rounded gravels up to medium, non-plastic, low cohesive	
86					
87					
88					
89					
90	90.0-95.0			Yellow brown sand clay with gravel, ~50% sand, ~20% gravel, wet, non-plastic/noncohesive, coarse angular sand and very fine to fine angular gravel	
91					
92					
93					
94					
95	95.0-100.0			CLAYEY GRAVEL and SAND, clay is yellow brown, sand and gravel are dark blue gray and heterogeneous white/brown rounded clasts, wet, loose, no plasticity/cohesion, gravel ~80%, sand ~15%, clay 5%	Jim indicates that he thinks we've hit bedrock
96					
97					
98					
99					
100	100.0-105.			Same as above, but with bigger angular clasts, also less heterogeneous white/brown rounded gravels, evidence of fractured/conglomerated dark blue gray slate	
101					



PROJECT NUMBER

184646.FI.02

BORING ID:

5K-S

Sheet 5 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine Monitoring Well Installation

LOCATION: Grass Valley, CA

ELEVATION: TBD

NORTHING:

EASTING:

DRILLING CONTRACTOR: Diamond Well Drilling

DRILLING METHOD AND EQUIPMENT USED: Rotodrill Schramm T450 WS

WATER LEVELS: 61 ft bgs

START:

END:

LOGGER: L. Elliott

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
102					
103					
104					
105	105.0-110.			Same as above, more evidence of slatey fracture zone, coarse angular gravel and trace yellow brown clay, coarse sand, few rounded heterogeneous gravel clasts (fine)	
106					
107					
108					
109					
110	110.0-115.			Dark blue gray gravel, very fine to medium angular, few (<10%) rounded heterogeneous gravel clasts, also fine to coarse sand of same lithology blue gray	
111					
112					
113					
114					
115					
116					
117					
118					
119					
120	120.0-120.			Dark blue gray sandy gravel, angular very fine to fine gravel, fine to coarse sand, angular dark blue gray.	18:10
121				Few (<10%) rounded heterogeneous, fine gravel clasts, sample almost identical to 110 ft bgs; except average grain sizes are smaller at 120 ft	
122					



PROJECT NUMBER

BORING ID:

5L-D

Sheet 1 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:

START: 2/14/2007 2:00:00 PM

END:

LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	TYPE-#					
	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.					
0-				6-6-6 (in) (N)		Begin at 730 with 9 3/8 inch bit and 11 3/4 inch casing.
1-						
2-						
3-						
4-						
5-	5.0-10.0	NA			SANDY CLAY (CL). Yellowish red (5YR 5/6), semi moist, medium to low plasticity, <5% sand.	735
6-						
7-						
8-						
9-						
10-	10.0-15.0	NA			SILTY CLAY (CL). Yellowish brown (10YR 5/8), <5% sand, low plasticity.	740
11-						
12-						
13-						
14-						
15-	15.0-17.0	NA			Same as above.	745.
16-						
17-	17.0-20.0				GRAVELLY SAND (SP). Light olive brown (2.5Y 5/4), loose, <2% gravels (<2 mm), dry, subrounded.	747. Harder material, could be weathered rock.
18-						
19-						
20-	20.0-25.0				Same as above.	750.
21-						Rig chatter.
22-						
23-						
24-						
25-	25.0-30.0				Same as above.	810



PROJECT NUMBER

BORING ID:

5L-D

Sheet 2 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:

START: 2/14/2007 2:00:00 PM

END:

LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
			6-6-6 (in) (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26					
27					
28					
29					
30	30.0-35.0			Same as above.	820.
31					
32					
33					
34					
35	35.0-40.0			BEDROCK. Light olive brown (2.5Y 5/4), semi angular, pieces <5 mm.	830. Drilling chatter.
36					
37					
38					Cease advancement of 11 3/4 casing. Proceed with 9 5/8 open hole only.
39					
40	40.0-45.0			Same as above. Subangular pieces, <1 cm, dark bluish gray (Gley 2 4/10B).	900. Rig chatter, little progress.
41					
42					915. Switch to 7 7/8 bit in open hole.
43					
44					
45	45.0-50.0			Same as above. Semiangular pieces (<2 mm), dark grayish brown (10YR 4/2).	1020.
46					
47					
48					
49					
50	50.0-55.0			Same as above.	1030.



PROJECT NUMBER

BORING ID:

5L-D

Sheet 3 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:

START: 2/14/2007 2:00:00 PM

END:

LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
51			6-6-6 (in) (N)	Same as above. Greenish gray (Gley 2 5/5BG).	1040
52					
53					
54					
55	55.0-60.0				
56			6-6-6 (in) (N)	Same as above.	1100
57					
58					
59					
60	60.0-65.0				
61			6-6-6 (in) (N)	Same as above.	1135
62					
63					
64					
65	65.0-70.0				
66			6-6-6 (in) (N)	Same as above.	1140
67					
68					
69					
70	70.0-75.0				
71			6-6-6 (in) (N)	Same as above.	1200
72					
73					
74					
75	75.0-80.0				
76					



PROJECT NUMBER

BORING ID:

5L-D

Sheet 4 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:

START: 2/14/2007 2:00:00 PM

END:

LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
77					
78					
79					
80	80.0-85.0			Same as above. Semiangular (<3 mm).	1215. Slightly larger, more angular fragments.
81					
82	82.5-82.5				1225. Driller estimates water production 1 gpm.
83					
84					
85	85.0-90.0			Same as above. Very angular, thin pieces.	1300.
86					
87					
88					
89					
90	90.0-95.0			Same as above.	1325
91					
92					
93					
94					
95	95.0-100.0			Same as above.	1335
96					
97					
98					
99					
100	100.0-105.			Same as above.	1350
101					



PROJECT NUMBER

BORING ID:

5L-D

Sheet 5 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:                      START: 2/14/2007 2:00:00 PM                      END:                      LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
102					Downtime to refuel.		
103							
104							
105	105.0-110.			Same as above.	1505. Driller estimates water production ~7-8 gpm.		
106							
107							
108							
109							
110	110.0-115.			Same as above. Slightly smaller granules (<1 mm).	1530		
111							
112							
113							
114							
115	115.0-120.			Same as above.	1550		
116							
117							
118							
119							
120	120.0-125.			Same as above.	1610		
121							
122							
123							
124							
125	125.0-130.			Same as above.	1640. Cease drilling on 2/14/07.		
126							
127							



PROJECT NUMBER

BORING ID:

5L-D

Sheet 6 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:                      START: 2/14/2007 2:00:00 PM                      END:                      LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#	6-6-6 (in) (N)			
128					
129					
130	130.0-135.			Same as above in appearance. Elliott's description: meta sedimentary bedrock seen elsewhere on site. No evidence of weathering. Angular, well sorted clasts are pancake-like (preferred fracture surface?). Gley 2 5/5BG, no fines, largest clast size <3/4" diameter, wet.	
131					
132					
133					
134					
135	135.0-140.			Same as above.	1235
136					
137					
138					
139					
140	140.0-145.			Same as above. With ~15% fine rounded brown (10YR 6/8) gravel.	The gravel may not be from this section? Doesn't make sense. Gravel is same as gravel found on ground. I suspect driller's helper laid sieve on ground before bringing sample to me.
141					
142					
143					
144					
145	145.0-150.				Begin drilling 2/27/07 at 1400.
146					
147					
148					
149					
150	150.0-155.			Same as above.	1430.
151					





PROJECT NUMBER

BORING ID:

5L-D

Sheet 7 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:

START: 2/14/2007 2:00:00 PM

END:

LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
152-					
153-					
154-					
155-					
156-					
157-					
158-					
159-					
160-	160.0-165.			Same as above. Bedrock with no evidence of weathering.	1630 12/20/07 cont.
161-					
162-					
163-					
164-					
165-	165.0-170.			Same as above.	1645
166-					2/21/2007 0720 Begin drilling.
167-					
168-					
169-					
170-	170.0-175.			Same as above.	
171-					
172-					
173-					
174-					
175-	175.0-180.			Same as above.	0840
176-					



PROJECT NUMBER

BORING ID:

5L-D

Sheet 8 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:

START: 2/14/2007 2:00:00 PM

END:

LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY			SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	TYPE-#	6-6-6 (in) (N)			
177					
178					
179					
180	180.0-185.			Same as above.	0900
181					
182					
183					
184					
185	185.0-190.			Same as above.	0925
186					
187					
188					
189					
190	190.0-195.			Same as above.	0950
191					
192					
193					
194					
195					
196					
197					
198					
199					
200	200.0-205.			Wet, loose bedrock. Ground by bit to ~80% coarse sand, ~20% fine gravel. No fines, no evidence of weathering, homogenous, Gley 2 6/10B when dry	1015
201					
202					



PROJECT NUMBER

BORING ID:

5L-D

Sheet 9 of 9

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Grass Valley, CA

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: ARCH with 11 3/4 inch casing

WATER LEVELS:

START: 2/14/2007 2:00:00 PM

END:

LOGGER: D. Hodson

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
203					
204					
205	205.0-210.			Same as above.	1130
206					
207					
208					
209					
210	210.0-215.			Same as above.	1050
211					
212					
213					
214					
215	215.0-220.			Same as above.	1110
216					
217					
218					
219					
220	220.0-225.			Same as above.	1200. End drilling 2/21/2007.
221					
222					
223					
224					
225					
226					



PROJECT NUMBER

151319.FI.09

BORING ID:

5L-S

Sheet 1 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION:

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR:

DRILLING METHOD AND EQUIPMENT USED:

WATER LEVELS:

START: 2/22/2007

END:

LOGGER:

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-					
1-					
2-					
3-					
4-					
5-	5.0-10.0			SILT. 10R 4/8, moist, loose, no gravel or sand.	
6-					
7-					
8-					
9-					
10-	10.0-15.0			CLAYEY SILT. 5YR 5/8, wet, loose, no gravel or sand, cohesive, high plasticity.	1012.
11-					
12-					
13-					
14-					
15-	15.0-20.0			GRAVELLY SILT. ~30% gravel, silt is 5YR 5/8, gravel is rounded, heterogeneous in lithology up to 1" diameter. Also, ~10% medium sand, wet, loose.	1033.
16-					
17-					
18-					
19-					
20-	20.0-25.0			SILTY GRAVEL with 10% sand. ~20% silt. Gravel is rounded and up to 2.5" diameter, heterogeneous lithology.	1041.
21-					
22-					
23-					
24-					
25-	25.0-30.0			SANDY SILT. ~30% fine to medium sand, dry, loose, not	1120.



PROJECT NUMBER

151319.FI.09

BORING ID:

5L-S

Sheet 2 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION:

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR:

DRILLING METHOD AND EQUIPMENT USED:

WATER LEVELS:

START: 2/22/2007

END:

LOGGER:

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26				cohesive or plastic. 10YR 4/6.	
27					
28					
29					
30	30.0-35.0			Same as above.	1125.
31					
32					
33					
34					
35	35.0-40.0			Same as above.	1130.
36					
37					
38					
39					
40	40.0-45.0			Same as above. With few chips of bedrock.	1135.
41					
42					
43					
44					
45	45.0-50.0			SILTY SAND. ~30% silt, fine to medium sand, dry, loose, 2.5Y 5/6.	1220. Strange color compacted to other samples.
46					
47					
48					
49					
50	50.0-55.0			Bedrock. Dry.	1230.



PROJECT NUMBER  
151319.FI.09

BORING ID:  
5L-S  
Sheet 3 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION:

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR:

DRILLING METHOD AND EQUIPMENT USED:

WATER LEVELS: START: 2/22/2007 END: LOGGER:

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
51			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
52					
53					
54					
55	55.0-60.0			Same as above. Dry.	1235.
56					
57					
58					
59					
60	60.0-65.0			Same as above. Dry, moist.	1245. Stop drilling. 2/22/07 1530: Resume drilling.
61					
62					
63					
64					
65	65.0-70.0			BEDROCK. Weathered medium sand, medium gravel.	1540.
66					
67					
68					
69					
70	70.0-75.0			BEDROCK. (Maybe not weathered), homogeneous sand.	1600.
71					
72					
73					
74					
75					



PROJECT NUMBER

151319.FI.09

BORING ID:

5L-S

Sheet 4 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION:

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR:

DRILLING METHOD AND EQUIPMENT USED:

WATER LEVELS:

START: 2/22/2007

END:

LOGGER:

DEPTH BGS (ft)	STANDARD PENETRATION TEST RESULTS		CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	INTERVAL (ft)	RECOVERY		
	TYPE-# SS-Spill Spoon ST-ShelbyTube	6-6-6 (in) (N)		
76-				



PROJECT NUMBER

151319.FI.09

BORING ID:

5TP1

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Waste Rock Area

ELEVATION: 2785'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: Case 580 Super L with 18" Bucket

WATER LEVELS:

START: 8/17/2001

END:

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)		
0-					Waste rock.
1-					
2-					Stable-sides holding.
3-					
4-					60% fines.
5-				SILTY SANDY GRAVEL (GW). Brown, slightly moist, angular, cobbles (8").	
6-					
7-					Sides caving below 6'. Increased moisture with depth.
8-					
9-					
10-					
11-					
12-					Backfill with excavated material.
13-					
14-					
15-					
16-					
17-					
18-					
19-					
20-					





PROJECT NUMBER

151319.FI.09

BORING ID:

5TP10

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Right Abutment of Log Dam

ELEVATION: 2741'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: Case 580 Super L with 18" Bucket

WATER LEVELS:

START: 8/17/2001

END:

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:	
	RECOVERY					SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.
	TYPE-#	6-6-6 (in) (N)				
0-						
1-						
2-						
3-						
4-						
5-						
6-						
7-						
8-	8.0-8.0			SILTY SAND AND GRAVEL (GW). Dark brownish gray, moist, angular gravel/cobbles.	Waste rock (8").	
9-						
10-						
11-						
12-				SILTY CLAY (CL). Gray, very moist, very soft.	Tailings at 8 ft. bgs.	
13-						
14-						
15-						
16-						
17-						
18-						
19-						
20-						

SS-Spill Spoon  
ST-Shelby Tube

Backfilled excavated material.



PROJECT NUMBER

151319.FI.09

BORING ID:

5TP2

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Waste Rock Area

ELEVATION: 2785'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: Case 580 Super L with 18" Bucket

WATER LEVELS:

START: 8/17/2001

END:

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.0				Waste rock (8").
1					
2					Walls relatively stable.
3					
4					
5				SILTY SAND WITH GRAVEL (GW). Cobbles, angular, dry to moist, gray-brown becoming dark brown with depth.	
6					
7					
8					
9					
10					
11					
12					Backfill with excavated material.
13					
14					
15					
16					
17					
18					
19					
20					





PROJECT NUMBER  
151319.FI.09

BORING ID:  
5TP4

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: Waste Rock Area

ELEVATION: 2772' NORTHING: EASTING: DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: Case 580 Super L with 18" Bucket

WATER LEVELS: START: 8/17/2001 END: LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:	
	RECOVERY					SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.
	TYPE-#	6-6-6 (in) (N)				
0-					Waste rock (8").	
1-						
2-					Walls stable.	
3-						
4-					Less cobbles below -4'.	
5-5.0-5.0				SILT SAND WITH GRAVEL (GW) and cobbles. Dark gray-brown, moist, dense, angular.	Increase cobbles, less stable.	
6-						
7-						
8-						
9-						
10-						
11-						
12-					Backfill with excavated material.	
13-						
14-						
15-						
16-						
17-						
18-						
19-						
20-						



PROJECT NUMBER

151319.FI.09

BORING ID:

5TP5

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Waste Rock Area

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: Case 580 Super L with 18" Bucket

WATER LEVELS:

START: 8/17/2001

END:

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-				SILTY SAND WITH GRAVEL AND COBBLES (GW). Brown to gray, moist, dense, angular.	Waste rock (8").
1-					
2-					Organic debris, roots, slight change in color.
3-					
4-					
5-					
6-				SILTY SAND (SM). Brown, moist, medium, fine sand.	Tailings. Fine roots.
7-					
8-				Becoming gray, very moist.	Less stable, slight caving.
9-					
10-					
11-				Wet.	Water at 10.5 ft.-hole unstable, caving. Backfill with excavated material.
12-					
13-					
14-					
15-					
16-					
17-					
18-					
19-					
20-					

SS-Spill Spoon  
ST-ShelbyTube





PROJECT NUMBER

151319.FI.09

BORING ID:

5TP7

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Waste Rock Area

ELEVATION: 2750'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: Case 580 Super L with 18" Bucket

WATER LEVELS:

START: 8/17/2001

END:

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-				SILTY SAND/GRAVEL (GW), cobbles. Brown-gray, moist, dense, angular.	Waste rock.
1-					
2-2.0-2.0				SILTY SAND WITH CLAY. Brown grading to gray, moist, loose to medium.	Some organic (wood) debris.
3-					Tailings. Roots.
4-					No roots beyond 4 ft. bgs.
5-					
6-					
7-					
8-				Becoming wet.	Grab sample: bucket and bag, wet.
9-					Walls becoming unstable, some caving.
10-					Grab sample: bucket.
11-					
12-					Backfill with excavated material.
13-					
14-					
15-					
16-					
17-					
18-					
19-					
20-					



PROJECT NUMBER

151319.FI.09

BORING ID:

5TP8

Sheet 1 of 1

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Tailings Area

ELEVATION: 2755'

NORTHING:

EASTING:

DRILLING CONTRACTOR: CASCADE DRILLING, INC., RANCHO COR

DRILLING METHOD AND EQUIPMENT USED: Case 580 Super L with 18" Bucket

WATER LEVELS: 8

START: 8/17/2001

END:

LOGGER: K. Porter

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-				SILTY SAND/GRAVEL (GW). Gray-brown, moist, dense, angular.	Waste rock.
1-				SILTY SAND (SM). Tan, dry, loose, fine sand.	Tailings.
2-				Becoming moist.	
3-					
4-					
5-					Bucket sample.
6-					
7-					
8-				Becoming clayey, gray, wet.	
9-					
10-					Bucket sample, wet. Bag sample.
11-					
12-					Backfilled with excavated material.
13-					
14-					
15-					
16-					
17-					
18-					
19-					
20-					







PROJECT NUMBER

BORING ID:

LCM 1A

Sheet 1 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: ~150' S of electric gate

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS:

START: 11/2/1999 3:00:00 PM

END: 11/3/1999 1:30:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.0			ORGANIC SOIL WITH SAND (OL/OH). Reddish brown (5YR 4/4), 75% silt, 25% fine to coarse sand, well rounded, soft.	MiniRam reading: 0.14. Surface soil sample 1450 0 to 0.25		
1							
2	2.0-3.5	1.5	6-8-7	SANDY LEAN CLAY (CL). Strong brown (7.5YR 5/6), 70% clay, 25% fine to medium sand, 5% gravel, well rounded, dry, very stiff, crumbly.	Roots present. Gravel: yellowish weathered sandstone and gray siliceous rock. Some white clay material present in areas: caliche?		
3							
4	3.5-5.0	1.5	6-7-9	Same as above.			
5							
6	5.0-6.5	1.5	6-9-9	Same as above.	6 to 6.5 ft. bgs. collected soil sample 1A1-2.		
7							
8	6.5-8.5	2	6-8-10-10	Same as above.	MiniRam=0.0		
9							
10	8.5-10.0	1.5	6-9-10	Same as above.	Black spots: organic rich material. White spots: mineralization? Still some roots present.		
11							
12	10.0-11.5	1.5	6-11-11	Same as above. With increasing content on white mineralized material, very soft, chalky, fine-grained material.			
13							
14	11.5-13.5	2	6-8-10-11	Same as above. Pockets of white mineralization up to 1" diameter. Hardness =1.	Augers grinding on rocky material.		
15							
16	13.5-15.0	1.5	6-9-10	Same as above. White mineralized material in 2" diameter rock firm.	MiniRam=0.0		
17							
18	15.0-15.5			No recovery.			
19	15.5-16.5	1	7-10-18	Same as above.			
20							
21	16.5-18.5	2	8-10-12-12	SANDY LEAN CLAY (CL). Strong brown (7.5YR 4/6), 65% clay, 20% fine to medium sand, 15% gravel (2 to 600 mm), well rounded, moist, very stiff.	Increasing content with metasediments. Increasing moisture.		
22							
23	18.5-20.0	1.5	15-12-8	LEAN CLAY WITH SAND (CL). Strong brown (7.5YR 4/6), 80% clay, 15% fine to medium sand, 5% gravel, well rounded, moist, very stiff, medium plasticity.			
24							
25	20.0-21.5	1.5	5-5-6	LEAN CLAY WITH SAND (CL). Strong brown (7.5YR 4/6), 85% clay, 15% fine to very fine sand, well rounded, moist, soft, high plasticity.	Decreasing mineralization, increasing moisture, softness and plasticity.		
26							
27	21.5-23.5	2	4-6-7-7	Same as above. Very stiff.			
28							
29	23.5-24.5			No recovery.			
30							
31	24.5-25.0		7-9-13	Same as above with large argillaceous/siliceous rock, dark gray matrix with high quartz content.	Sample IA1-3 24.5 to 25 ft. bgs.		



PROJECT NUMBER

BORING ID:

LCM 1A

Sheet 2 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: ~150' S of electric gate

ELEVATION: NORTHING: EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS: START: 11/2/1999 3:00:00 PM END: 11/3/1999 1:30:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	TYPE-#	6-6-6 (in) (N)					SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
25	25.0-26.5			7-10-11	LEAN CLAY WITH GRAVEL (CL). Strong brown (7.5YR 4/6), 75% clay, 15% gravel, 10% fine to medium sand, subrounded to subangular, moist, medium stiff.	MiniRam: 0.0		
26	26.5-27.0			25-5"	Same as above. Increasing gravel/rock content. Color change: Brown (7.5YR 4/4).			
27	27.0-28.5				No recovery.	28 ft. augers grinding, no progress, drilled through rocky zone.		
28	28.5-30.0	1.5	No blow counts, hammer problem		Same as above. Color change: Dark yellowish brown (10YR 4/4).			
29								
30	30.0-31.5	1.5		12-22-27	LEAN CLAY WITH SAND (CL). Brownish yellow (10YR 6/8), 85% clay, 15% fine to medium sand, well rounded, moist, very stiff, high plasticity.	MiniRam: 0.0		
31	31.5-32.5	1		7-13-20-1"	SANDY LEAN CLAY WITH GRAVEL (CL). Pale olive (5Y 6/4), 65% clay, 20% fine to medium sand, 15% gravel, subrounded, moist, very stiff, medium plasticity.	Lenses of dark gray metasedimentary, argillaceous/siliceous rock.		
32	32.5-35.0				No recovery.			
33								
34								
35	35.0-35.5				No recovery.			
36	35.5-36.5	1		12-18-22	LEAN CLAY WITH SAND (CL). Pale olive (5Y 6/4), 85% clay, 15% sand, subrounded, stiff, moist, high plasticity.			
37	36.5-38.5	2		10-10-16-35	LEAN CLAY WITH SAND AND GRAVEL (CL). Strong brown (7.5YR 5/6), 70% clay, 20% fine to coarse sand, 10% gravel (2 -600 mm), subrounded, very moist, stiff, medium to high plasticity.	Gravel metasedimentary.		
38	38.5-40.0	1.5		8-10-12	LEAN CLAY WITH SAND (CL). Light brown (7.5YR 6/2), 75% clay, 20% fine to medium sand, 5% gravel, subrounded, very moist, medium stiff, high plasticity.			
39								
40	40.0-41.5	1.5		6-6-7	GRAVELLY LEAN CLAY WITH SAND (CL). Pale olive (5Y 6/4), 65% clay, 20% gravel, (2 to 400 mm), 15% fine to coarse sand, subrounded, moist, very stiff.	Zones with iron oxide staining gravel=black metasedimentary rock. MiniRam:0.0.		
41	41.5-43.5	2		6-12-18-7	Same as above.	Gravel=Black, massive argillaceous rock, gray claystone. Red (2.5YR 4/4), claystone.		
42								
43								
44	43.5-44.0				No recovery.			
44	44.0-45.0			7-7-7	Same as above. Light olive brown (2.5Y 5/3).			
44	44.5-45.0	1.5			WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Light olive brown (2.5Y 5/3), 65% gravel, (2 to 600 mm), 25% fine to coarse sand, 10% clay, subrounded, moist, stiff, crumbly.	Weathered sandstone/claystone, breaks easily.		
45	45.0-46.5	1.5		7-13-15	SANDY LEAN CLAY WITH GRAVEL (CL). Dark grayish brown (10YR 4/2), 70% clay, 15% fine to coarse sand, 15% gravel, (2 to 400 mm), subrounded, wet, medium soft, high plasticity.	Oxidized and reduced zones.		



PROJECT NUMBER

BORING ID:

LCM 1A

Sheet 3 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: ~150' S of electric gate

ELEVATION: NORTHING: EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS: START: 11/2/1999 3:00:00 PM END: 11/3/1999 1:30:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
46-47	46.5-47.5	1	9-50-5"	GRAVELLY LEAN CLAY WITH SAND. Light gray (Gley 1 7/N), to light greenish gray (10Y 7/1), 60% clay, 25% gravel, 15% fine to coarse sand, subangular, moist, crumbly. No recovery.	
47-48	47.5-48.5		10-11-16	WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC). Yellowish brown (10YR 5/6) and pale olive (5Y 6/4), 70% fine to coarse sand, 25% gravel (2 - 500 mm), 15% clay, angular, moist, crumbly to soft.	
48-50	48.5-50.0		50-6"	WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Pale olive (5Y 6/3), 70% gravel (2-700 mm), 20% fine to coarse sand, 10% clay, subrounded sand, angular, gravel, dry, loose.	Gravel=broken rock. Gray argillaceous metased rock.
50-51	50.0-51.5	1.5	25-40-50-3"	LEAN CLAY WITH SAND (CL). Greenish gray (5G 5/1), 90% clay, 10% very fine sand, well rounded, dry, very stiff, crumbly.	
51-52	51.5-53.5	2	60-6"	LEAN CLAY WITH GRAVEL (CL). Greenish gray (5G 5/1), 80% clay, 15% gravel (2-400 mm), 5% fine to medium sand, angular gravel, dry, very stiff, crumbly. No recovery.	Gravel=same as above.
52-53	53.5-54.0	0.5	28-50-4"	POORLY GRADED GRAVEL WITH CLAY (GP-GC). Greenish gray (5G 5/1), 85% gravel (2-500 mm), 10% clay, 5% fine sand, angular, dry, loose. No recovery.	Gravel=broken dark gray argillaceous metasedimentary rock.
53-54	54.0-55.0		60-6"	No recovery.	
54-55	55.0-56.0	1	38-50-5"	Same as above.	
55-56	56.0-57.0		35-50-3"	POORLY GRADED GRAVEL WITH CLAY (GP-GC). Greenish gray (5G 5/1), 85% gravel, 10% clay, 5% fine sand, angular, dry, loose. No recovery.	MiniRam: 0.0
56-57	57.0-58.5	1.5	60-6"	Same as above.	
57-58	58.5-60.0	1.5		No recovery.	
58-59	61.0-61.5			Same as above.	
59-60	61.5-62.5	1		No recovery.	
60-61	62.5-63.5			Same as above.	
61-62	63.5-65.0			No recovery.	63.5 ft. bgs. Drilling too hard with auger, switch to air rotary.
62-63	65.0-66.0			Same as above.	Very dry, clay dust.
63-64	67.0-68.0			Same as above.	Bedrock=Dark gray argillaceous metasedimentary rock, very fine grained, massive, dries to light greenish gray color, similar to the dust color.
64-65					
65-66					
66-67					
67-68					



PROJECT NUMBER

BORING ID:

LCM 1A

Sheet 4 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: ~150' S of electric gate

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS:

START: 11/2/1999 3:00:00 PM

END: 11/3/1999 1:30:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#		SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
69-70	69.0-70.0			Same as above.	
70-71					
71-72					
72-73	72.0-73.0			Same as above.	
73-74					
74-75					
75-76	75.0-76.0			Same as above.	
76-77					
77-78					
78-79					
79-80	79.0-80.0			Same as above.	
80-81					
81-82					
82-83	82.0-83.0			Same as above.	
83-84					
84-85					
85-86	85.0-86.0			Same as above.	Discussed the possibility of water in bedrock fractures. May enter borehole slowly.
86-87					
87-88					
88-89					
89-90	89.0-90.0			Same as above.	Allowed 20 minutes and checked for water. Sample hardly even damp. Very small fracture.
90-91	90.0-90.5			Same as above. Slightly moist.	
91-92					
92-93	92.0-92.5				
93-94					



PROJECT NUMBER

BORING ID:

LCM 1A

Sheet 5 of 5

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: ~150' S of electric gate

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS:

START: 11/2/1999 3:00:00 PM

END: 11/3/1999 1:30:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
94 -					
95 -					
96 -	96.0-96.5			Same as above. Moist, no dust.	
97 -					
98 -					
99 -	99.0-99.5			Same as above. Moist, no dust.	99 ft. bgs. Stopped drilling, waited 5 minutes.
100 -					
101 -					
102 -	102.0-103.			Same as above. Wet.	Soil sample 1AA-4 1310.
103 -					
104 -	104.0-105.			Same as above. Drier than previous. Damp only.	
105 -					
106 -					
107 -	107.0-108.			LEAN CLAY (CL). Greenish gray (5G 5/1), 100% clay, moist, soft, medium plasticity.	
108 -					
109 -	109.0-110.			POORLY GRADED GRAVEL WITH CLAY (CL). Greenish gray (5G 5/1), 85% gravel, 10% clay, 5% fine to coarse sand, angular, moist, loose. Total depth=109 ft. bgs.	Stopped, pulled hammer. Souder: Water at 103 ft. bgs rising slowly. Gravel=greenish gray argillaceous metasedimentary rock. High quartz, high iron.
110 -					
111 -					



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 1B

Sheet 1 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine	LOCATION: At Y with Lava Cap Mine Road and Gravel Drive to the m
ELEVATION:                      NORTHING:                      EASTING:	DRILLING CONTRACTOR: Water Development Corp., Woodland, CA
DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger	
WATER LEVELS:	START: 11/4/1999 10:15:00 AM      END: 11/4/1999 5:00:00 PM      LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	TYPE-#	6-6-6 (in) (N)					SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.0					MiniRam=0.0		
	0.5-1.0	.5			ORGANICE SOIL WITH SAND (OL/OH). Dark brown (10YR 3/3), 80% organic soil, 20% fine to very fine sand, well rounded, dry, stiff.	Gravel=dark gray igneous rock, hornblende olivine		
1	1.0-4.0	3			GRAVELLY ORGANIC SOIL WITH SAND (OL/OH). Brown (10YR 4/3), 50% organic soil, 35% gravel, 15% fine to very fine sand, subrounded, dry, very stiff.	and quartz crystals. Diorite?? Doesn't look like  a breccias.		
2								
3								
4						At 4 ft. bgs. switching from augers to air rotary driller.		
5	5.0-5.5	0.5			WELL GRADED GRAVEL WITH SAND (GW). Grayish brown (10YR 5/2), 60% gravel (2 to 10 mm), 40% fine to coarse sand, angular, dry, very stiff.	Hammer broken, need to weld.		
6	6.0-6.5	0.5			SANDY LEAN CLAY WITH GRAVEL (CL). Grayish brown (10YR 5/2), 60% clay, 25% fine to medium sand, 15% gravel, subrounded, dry, loose.	Lots of dusts generated, drilling breaks rock  into dust.		
7	7.0-7.5	0.5						
8	8.0-8.5	0.5			WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Dark grayish brown (10YR 4/2), 60% gravel, 20% clay, 20% fine to coarse sand, subangular, dry, loose.	Gravel=Same igneous rock as above. MiniRam=0.8		
9								
10	10.0-10.5	0.5			Same as above.			
11								
12								
13	13.0-13.5				SANDY LEAN CLAY WITH GRAVEL (CL). Same as above.			
14								
15	15.0-15.5				Same as above.	MiniRam=0.97		
16								
17								
18	18.0-18.5				WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Dark grayish brown (10YR 4/2), 60% gravel, 20% fine to coarse sand, 20% clay, subrounded, dry, loose.			
19								
20								
21	21.0-21.5	0.5			Same as above.			
22								



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 1B

Sheet 2 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: At Y with Lava Cap Mine Road and Gravel Drive to the m

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS: START: 11/4/1999 10:15:00 AM END: 11/4/1999 5:00:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		RECOVERY	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	TYPE-#					
	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.					
23	23.0-23.5	0.5		6-6-6 (in) (N)	Same as above.	
24						
25	25.0-25.5	0.5			SANDY LEAN CLAY (CL). Dark grayish brown (10YR 4/2), 60% clay, 25% fine to coarse sand, 15% gravel, subrounded, dry, loose.	
26						
27	27.0-27.5	0.5				Hammer broken again. MiniRam=0.35
28						
29						
30						
31	31.0-31.5				WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Dark grayish brown (10YR 4/2), 50% gravel, 30% fine to coarse sand, 20% clay, subrounded, dry, loose.	Gravel=some dark gray igneous rock.
32						
33						
34	34.0-34.5				Same as above.	
35						
36						
37						
38	38.0-38.5				Same as above.	
39						
40						
41	41.0-41.5				Same as above.	
42	42.0-42.5				Same as above. Larger gravel (2 to 250 mm).	
43						
44	44.0-44.5				WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Dark grayish brown (10YR 4/2), 50% gravel, 30% fine to medium sand, 20% clay, subrounded, dry, loose.	Gravel (2 to 300 mm diameter).
45						
46						





PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 1B

Sheet 3 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: At Y with Lava Cap Mine Road and Gravel Drive to the m

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS: START: 11/4/1999 10:15:00 AM END: 11/4/1999 5:00:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
47			6-6-6 (in) (N)		
48	48.5-49.0			Same as above. With color change: Very dark grayish brown (10YR 3/2), moist.	
49					
50					
51	51.0-51.5			Same as above.	
52					
53					
54	54.0-54.5			Same as above.	
55					
56	56.0-56.5			Same as above.	
57					
58					
59	59.0-59.5			Same as above. Moist.	Seal around augers blow out.
60					
61	61.0-61.5			WELL GRADED GRAVEL WITH SAND (GW). Dark gray (10YR 4/1), 80% gravel (2 to 300 mm), 20% medium to coarse sand, subangular, wet, loose.	Driller added water to hydrate bentonite and form seal around augers. Sample 1B1-4 61 to 63 ft. bgs.
62	62.0-62.5			Same as above.	Very hard drilling.
63					
64	64.0-64.5			Same as above.	Gravel=Dark gray, massive volcanic rock with some breccia present.
65					
66	66.0-66.5			Same as above.	
67					
68	68.0-68.5			Same as above.	Breccia content increasing. Dark gray igneous rock content decreasing. Sample 1B1-5 68 to 71 ft. bgs.
69					
70	70.0-70.5			WELL GRADED SAND WITH GRAVEL (SW). Dark grayish brown (10YR 4/2), 80% fine to very fine coarse sand, 20% gravel (2 to 10 mm), subangular, wet, loose.	Sand and gravel=broken up breccia.
71					





PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 1B

Sheet 5 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: At Y with Lava Cap Mine Road and Gravel Drive to the m

ELEVATION: NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS:

START: 11/4/1999 10:15:00 AM

END: 11/4/1999 5:00:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
96					
97					
98					
99					
100	100.0-101.			WELL GRADED GRAVEL WITH SAND. Dark grayish brown (10YR 4/2), 75% gravel (2 to 20 mm), 25% medium to coarse sand, subrounded to subangular, moist.	
101					
102					
103					
104					
105	105.0-106.			WELL GRADED SAND WITH CLAY AND GRAVEL. Grayish brown (10YR 5/2), 60% sand, 30% gravel, 10% clay, moist, subrounded to subangular.	Gravel pieces mixture of volcanic and metamorphic rocks. Collected sample 1B-6.
106					
107					
108					
109					
110				Increasing clay, transition zone from "Lava Cap" to underlying conglomerate.	
111					
112					
113					
114					
115	115.0-116.			Same as 105 ft. bgs. 70% sand, 20% gravel.	1015 11/18/1999
116					
117					
118					
119					
120					



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 1B

Sheet 6 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: At Y with Lava Cap Mine Road and Gravel Drive to the m

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS: START: 11/4/1999 10:15:00 AM END: 11/4/1999 5:00:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
121 -					
122 -					
123 -					
124 -					
125 -					
126 -					
127 -					
128 -					
129 -	129.0-130.			WELL GRADED SAND WITH GRAVEL AND WOOD (consistency of railroad ties). Maybe fines present but washed by added water. Dark gray (10YR 4/1), 80% sand, 20% gravel, subangular to subrounded, wet.	
130 -					
131 -					
132 -					
133 -					
134 -	134.0-135.			WELL GRADED SAND. With some cobbles to 1/2" fine to coarse sand, wet, subangular, very dark gray (7.5YR N/3). Non volcanic.	1215
135 -					
136 -					
137 -					Transitions at 137 ft. bgs. to solid claystone/slaty rock.
138 -					
139 -					
140 -				Massive, dark gray claystone (broken into 1/8 to 1/4" pieces), metasedimentary bedrock, does not appear to contain much quartz.	Argillite, slightly metamorphosed. Dries to a light olive gray.
141 -					
142 -					
143 -					
144 -					
145 -					
146 -					



PROJECT NUMBER  
151319.FI.03

BORING ID:  
LCM 1B

Sheet 7 of 7

# SOIL BORING LOG

PROJECT: Lava Cap Mine LOCATION: At Y with Lava Cap Mine Road and Gravel Drive to the m

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS: START: 11/4/1999 10:15:00 AM END: 11/4/1999 5:00:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
147					
148					
149					
150	150.0-152.			Same as 140 ft. bgs.	Collected sample 1B-8
151					
152	152.0-152.			Total depth=152 ft. bgs.	1515 11/18/1999
153					



PROJECT NUMBER

BORING ID:

LCM 5A

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: Caved in Adit

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 1050

WATER LEVELS: 10 ft. bgs.

START: 10/25/1999 4:30:00 PM

END: 10/26/1999 4:00:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
0-1	0.0-1.0			POORLY GRADED GRAVEL WITH CLAY (GP-GC). Gray (5Y 5/1), dry, loose, 60% gravel, 40% clay.	Mini Ram Aerosol Monitor Model PDM-3 Nazco 3564 Rdg=0.18. Continuous core.
3-4	3.0-4.0			Same as above. Olive brown (2.5YR 4/3), slightly moist.	
6-7	6.0-8.0			POORLY GRADED GARVEL WITH SILT AND CLAY (GP-GC). Light brownish gray (2.5Y 6/2), dry, loose, 50% gravel, 20% silt, 30% clay.	Gravel=1 to 8 cm diameter. Semilithified sandstone and siltstone, light gray and white.
8-9	8.0-9.0			Same as above. Dark yellowish brown (10YR 4/6), very moist, soft clay, 50% gravel, 40% clay, 10% silt.	Water may be semi-perched layer from pond at adit.
9-10	9.0-10.0			Same as above. Dark brown (10YR 3/3), wet.	
12-13	12.0-13.0			POORLY GRADED GRAVEL WITH CLAY (GP-GC). Dark yellowish brown (10YR 2/6) to black (10YR 2/1), wet, loose, 85% gravel, 15% clay, subangular.	Gravel (2 mm to 10 cm), semilithified to lithified sandstone/siltstone.
13-14	13.5-14.0			SILTSTONE. Very dark gray (10YR 3/1), wet, 85% rock/gravel, 15% clay, angular.	Switch to drive sampling.
15-16	15.0-15.5				15.5 ft. bgs: Auger-max power, no progress, water, fine sand and clay comes up on augers.
16-17	16.0-17.0			Bedrock. Dark gray (5Y 4/1), 100% gravel (2 mm to 3 cm).	
20-21	20.0-21.0			Same as above.	Miniram (1.6). Water color varies from gray to grayish brown (2.5Y 5/2).
22-23	22.0-23.0			Same as above.	Miniram (1.0).
24-25	24.0-24.5			WELL GRADED GRAVEL WITH SAND (GW). Wet, finer grained gravel (2 mm to 4 mm), 65% gravel, 35% fine to coarse grained sand, angular.	May be more competent (less fractured) bedrock.



PROJECT NUMBER

BORING ID:

LCM 5A

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: Caved in Adit

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 1050

WATER LEVELS: 10 ft. bgs.

START: 10/25/1999 4:30:00 PM

END: 10/26/1999 4:00:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
26	26.0-26.5				Miniram (0.4).
27					
28	28.0-29.0			Same as above.	
29					
30				Same as above. Total depth=30 ft. bgs.	
31					



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 5B

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: ~500 ft. NW of Log Dam

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 1050

WATER LEVELS: START: 10/29/2007 10:45:00 AM END: 10/29/2007 12:15:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
0-					Mini Ram reading=0.06. Soil sample SB1-1 0 to 0.25.
1-	1.5-3.5		10-14-11-8	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM). Dark grayish brown (2.5Y 4/2), dry, soft, 50% fine to very fine sand, 30% gravel (2 to 250 mm), 20% silt. SILTY SAND (SM). Dark grayish brown (2.5Y 4/2), slightly moist, soft, 60% fine to very fine sand, subrounded.	
2-					
3-	3.5-5.0		3-4-5	FAT CLAY (CH). Gray (Gley 1 5/N), moist, medium stiff, high plasticity, 100% clay.	
4-					
5-	5.0-6.5		3-3-4	SILTY SAND (SM). Dark grayish brown (2.5Y 4/2). Same as above. FAT CLAY (CH). Same as above.	
6-	6.5-8.5		2-2-1-2	SILTY SAND (SM). Same as above. Very moist. FAT CLAY (CH). Gray (Gley 1 5/N), wet, very soft, high plasticity, 100% clay.	Clay saturated, holds water in pores.
7-					
8-					
9-	9.0-10.0		2-1-2	SILTY SAND (SM). Dark gray (2.5Y 4/1), very moist, soft, 75% fine to very fine sand, 25% silt, subrounded.	
10-	10.0-12.0		2-1-1-2	CLAYEY SAND (SC). Gray (Gley 1 5/N), wet, soft, 60% fine to very fine sand, 40% clay, subrounded, high plasticity clay.	Tailings mixed with silt. Mini Ram reading=0.0.
11-					
12-	12.0-13.0			No recovery.	
13-	13.0-14.5		2-2-3	Same as above.	
14-					
15-	14.5-16.0		1-2-3	Same as above.	Water level indicator inside augers: WT ~14.5 ft. bgs. Mini Ram reading=0.0.
16-					
17-			1-2-2-3	Same as above.	
18-			3-3-3	Same as above.	Sample 5B1-2 10/29 12:00 pm.
19-	19.5-21.0		1-1-2	FAT CLAY (CH). Gray (Gley 1 5/N), wet, soft, high plasticity, 100% clay.	
20-					
21-	21.0-22.5		2-2-1	CLAY WITH SILT (CH). Gray (Gley 1 5/N), wet, soft, high plasticity clay, 60% clay, 40% silt.	
22-	22.5-23.5		1-1	SANDY LEAN CLAY WITH GRAVEL (CL). Very dark brown (10YR 2/2), wet, soft, 50% clay, 25% fine to medium sand, 25% gravel (2 to 50 mm), subrounded.	22 ft. bgs. interface with native material, roots present. Sample 5B1-3.
23-	23.5-25.0		1-1-2	Same as above. With color change to dark brown (10YR 3/3).	





PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 5B

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine Road

LOCATION: ~500 ft. NW of Log Dam

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: Hollow Stem Auger CME 1050

WATER LEVELS:

START: 10/29/2007 10:45:00 AM

END: 10/29/2007 12:15:00 PM

LOGGER: Meier

DEPTH BGS (ft)	STANDARD PENETRATION TEST RESULTS		CORE DESCRIPTION:	COMMENTS:
	INTERVAL (ft)	6-6-6 (in) (N)		
	RECOVERY			
24 -			Same as above. With color change to very dark brown (10YR 2/2). Total depth=25 ft. bgs.	Sample 5B1-4.
25 -				
26 -				

TYPE-#

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 5C

Sheet 1 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Between tailings piles

ELEVATION: NORTHING: EASTING: DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS: START: 10/27/1999 10:15:00 AM END: 10/27/2007 5:00:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
0-			6-6-6 (in) (N)		MiniRam reading=0.0
1-	1.5-3.0		8-11-9	WELL GRADED SAND WITH GRAVEL (SW). Very dark gray (10YR 3/1), 60% fine to coarse grained sand, 40% gravel (2 mm to 5 cm), subangular, dry, loose.	Drilling through rock. Auger breaking rock into smaller pieces (gravel). Mini Ram reading=0.1.
2-	3.0-5.0		3-5-5-5	Same as above. Very dark grayish brown (10YR 3/2).	Mini Ram reading=0.2.
3-					
4-					
5-	5.5-6.5		3-4-5	Same as above. Very dark grayish brown (10YR 3/2).	Waste rock-metasedimentary, appears to be argillite containing pyrite crystal slate, iron oxide staining, chert and quartz.
6-	6.5-8.5		5-4-4-4	Same as above.	
7-					
8-					
9-	8.5-10.0		3-4-5	Same as above.	Some metamorphosed volcanics, hornblende crystals visible.
10-	10.0-11.5		3-4-4	Same as above. Black (10YR 2/1).	
11-					
12-	11.5-13.5		4-4-5-6	Same as above. Black (Gley 1 2.5/N), Some dark yellowish brown sand (10YR 3/6), slightly moist.	
13-					
14-	14.5-15.0		7-7-8	Same as above. Very dark grayish brown (10YR 3/2).	Drilling sounds like bit hit bedrock Mini Ram reading=0.10.
15-	15.0-16.5		4-6-6	Same as above.	
16-					
17-	16.5-18.5		5-4-4-5	Same as above. Slightly moist.	Mini Ram reading=0.12.
18-					
19-	18.5-20.0		2-3-3	Same as above.	
20-					
21-	21.0-21.5		4-8-8	Same as above.	Mini Ram reading=0.18.
22-	22.0-23.5		4-5-5-5	Color change to brown (10YR 4/3).	More iron oxidation visible.
23-					
24-	23.5-25.0		5-4-3	Back to very dark grayish brown (10YR 3/2).	Mini Ram reading=0.10.
25-	25.0-26.5		5-4-4	Same as above.	Waste rock: massive sulfides, argillite quartz.



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 5C

Sheet 2 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Between tailings piles

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS:                      START: 10/27/1999 10:15:00 AM                      END: 10/27/2007 5:00:00 PM                      LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
26					
27	27.5-28.5		4-5-6-6	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM). Dark gray (2.5Y 3/1), 60% fine to medium sand, 40% gravel, 10% clay, subangular, moist.	Mini Ram reading=0.95.
28	28.5-30.0		9-8-9	WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM). Brown (10YR 4/3), 50% gravel (2 mm to 500 mm), 30% fine to very fine sand, 20% silt, subangular, slightly moist.	Mini Ram reading=0.51.
29					
30	30.0-31.5		9-12-14	WELL GRADED GRAVEL WITH SILT (GW-GM). Brown (10YR 4/3), 50% gravel, (2 mm to 500 mm), 30% fine to very fine sand, 20% silt.	Gravel, chert and argillite. More felsic material.
31	31.5-33.5		9-7-9-10	WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC). Dark grayish brown (10YR 4/2), 60% gravel, 30% fine to coarse sand, 10% clay, subangular, wet.	Water. Sample and sampler wet at 32 ft. bgs.
32					
33	33.5-35.0			Metasedimentary rock (Gley 1 6/N).	
34					
35	35.0-36.5		12-14-15	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM). Olive brown (2.5Y 4/4), 50% gravel (100 to 500 mm), 30% fine to very fine sand, 20% silt, subangular, wet.	Black waste rock, massive sulfides.
36	36.5-38.5		8-7-6	Same as above.	Driller says hardly any pressure necessary to drill.
37					
38	38.5-40.0		5-6-9-10	Same as above. Gray (Gley 1 5/N), 50% gravel, 30% silt, 20% very fine sand, subangular, wet.	May be tailings, washed downward to bedrock
39			4-2-2	Same as above. 50% gravel, 40% silt, 10% very fine sand.	interface. Color not natural.
40	40.0-41.5		7-6-6	Same as above. Dark gray (Gley 1 4/N).	Mini Ram reading=0.10.
41	41.5-43.5		4-10-12-14	SILTY SAND (SM). Very dark gray (Gley 1 3/N), 60% fine to very fine sand, 40% silt, wet, loose. Same as above.	
42					
43	43.5-45.0		8-8-10	WELL GRADED SAND WITH GRAVEL AND SILT (SW-SM). Very dark gray (Gley 1 3/N), 60% fine to coarse sand, 30% gravel (2 to 100 mm), 10% silt, subangular, wet.	
44					
45	45.0-46.0		7-30-6"	SILTY SAND (SM). Very dark grayish brown (10YR 3/2).	May be bedrock.
46					
47	47.0-70.0			No recovery.	Drilling very difficult, could not drive sampler, no sample possible.



PROJECT NUMBER  
151319.FI.03

BORING ID:  
LCM 5C

Sheet 3 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Between tailings piles

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS:                      START: 10/27/1999 10:15:00 AM                      END: 10/27/2007 5:00:00 PM                      LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	RECOVERY				
	TYPE-# SS-Spill Spoon ST-ShelbyTube	6-6-6 (in) (N)			
48					
49					No sense in switching to air rotary drilling if bedrock within a few feet. Raining hard. Mini
50					Ram reading=0.08.
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61					
62					10 feet of sluff in borehole. Mini Ram reading=0.0.
63					
64					
65					More clay and silt. Evidence of woody material in sluff.
66					
67					Mini Ram reading=0.0.
68					
69					
70					
71					
72	72.0-72.5		70-6"	SANDY LEAN CLAY WITH GRAVEL (CL). Gray (Gley 1 5/N), 40%	Used sampler to remove sluff. Very hard material.



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 5C

Sheet 4 of 4

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: Between tailings piles

ELEVATION:

NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME1050 Hollow Stem Auger

WATER LEVELS:

START: 10/27/1999 10:15:00 AM

END: 10/27/2007 5:00:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY				
	TYPE-#				
			6-6-6 (in) (N)	SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
73				clay, 30% very fine to medium sand, 20% gravel, 10% silt, subangular, very moist.	
74					Very hard material.
75					
76	76.0-76.5		60-6"	WELL GRADED GRAVEL IN CLAY (GW-GC). Gray (Gley 1 5/N), 50% gravel (2 to 200 mm), 30% clay, 20% very fine sand, subangular, wet, dense. Total depth=76.5 ft. bgs.	Refusal at max power. Weathered bedrock.
	76.5-76.5				Borehole abandoned.
77					

SS-Spill Spoon  
ST-ShelbyTube



PROJECT NUMBER

BORING ID:

LCM 5D

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 175' NW of Log Dam

ELEVATION: NORTHING: EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS: START: 10/28/1999 11:00:00 AM END: 10/28/1999 3:00:00 PM LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
0	0.0-0.0			Waste rock.	MiniRam=0.0. Sample 5D-1 0.0 to 0.25 ft. bgs.
1	1.5-3.0		4-3-4	SILTY SAND (SM). Dark grayish brown (2.5Y 4/2), 80% fine to very fine sand, 20% silt, subrounded, moist, loose.	High quartz content.
2					
3	3.0-4.5		2-2-2	Same as above. Gray (2.5Y 5/1).	
4					
5	4.5-6.5		2-1-2-2	SILT WITH CLAY (ML). Dark gray (Gley 1 4/1), 60% silt, 40% clay, wet, loose.	Tailings, saturated.
6					
7	6.5-8.0		1-1-1	FAT CLAY (CH). Gray (Gley1 5/1), 100% clay, wet, very soft, high plasticity.	Glue-like consistency.
8	8.0-9.5		1-1-1	CLAY WITH SILT (CH). Gray (Gley1 5/1), 75% clay, 25% silt, wet, very soft, high plasticity.	MiniRam=0.0.
9					
10	9.5-11.5		1-1-1-2	FAT CLAY (CH). Gray (Gley1 5/1), 95% clay, 5% silt, wet, very soft, high plasticity.	
11					
12	11.5-13.0		1-3-2	SILT WITH CLAY (CL). Dark gray (Gley1 4/1), 70% silt, 30% clay, wet, loose.	
13	13.0-14.5		2-1-1	FAT CLAY (CH). Same as above.	
14					
15	14.5-16.5		1-1-1	SILT WITH CLAY (ML). Same as above.	3 blows-24".
16					
17	16.5-18.0		1-1	FAT CLAY (CH). Same as above.	MiniRam=0.0.
18	18.0-19.5		3-3-3		2 blows-18".
19					
20	19.5-21.0			No recovery.	19.5 ft. bgs. driller added water. Tailings sticking to augers.
21	21.0-21.5			SILT WITH CLAY (ML). Same as above.	
22	21.5-23.0		2-2-2-1	FAT CLAY (CH). Same as above.	
23	23.0-24.5		3-3-4	SILTY SAND (SM). Very dark gray (Gley1 3/N), 60% fine to very fine sand, 40% silt, wet, loose.	
24			2-2-1	FAT CLAY (CH). Same as above.	
25	25.0-26.5		2-2-3-5	SILT WITH CLAY (ML). Very dark gray (Gley 1 3/N), 80% silt,	



PROJECT NUMBER

BORING ID:

LCM 5D

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 175' NW of Log Dam

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS:

START: 10/28/1999 11:00:00 AM

END: 10/28/1999 3:00:00 PM

LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
			6-6-6 (in) (N)		
26				20% clay, wet, loose.	
27	27.0-28.0		2-4-7	WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC). Dark grayish brown (10YR 4/2), 60% fine to coarse sand, 20% gravel (2 to 100 mm), 20% clay, subrounded, wet, soft.	Sample 5D1-3. Interface with underlying native material, roots present.
28					
29					
30	30.0-31.5		7-18-25	Same as above. With weathered sandstone.	MiniRam=0.0
31					
32					
33	32.5-33.0 33.0-34.5		3-10-15 7-25-38	Same as above. WELL GRADED SAND WITH GRAVEL AND SAND (SW-SC). Dark yellowish brown (10YR 4/4), 50% fine to coarse sand, 35% gravel, 15% clay, wet, medium stiff.	Sample 5D-4.
34	34.5-36.0		20-44-53	WELL GRADED GRAVEL WITH SAND AND CLAY (GW-GC). Yellowish brown (10YR 5/6).	
35					
36	36.5-37.5		15-50-5"	POORLY GRADED GRAVEL WITH SAND AND CLAY (GP-GC). Yellowish brown (10YR 5/6) with black rock (10YR 2/1), 70% gravel (2 to 600 mm), 20% sand, fine to coarse, 10% clay, wet, very dense.	
37					
38	38.0-38.5		50-3"	No recovery.	
39					
40	39.5-41.0		28-20-18	No recovery.	
41					
42				Total depth=42 ft. bgs.	
43					



PROJECT NUMBER

BORING ID:

LCM 5E

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 150' N to NE of Log Dam

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS:                      START: 11/1/1999 9:00:00 AM                      END: 11/1/1999 12:00:00 PM                      LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:	
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.
0	0.25-0.25					
1				WELL GRADED GRAVEL WITH SAND (GW). Very dark grayish brown (2.5Y 3/2), 60% gravel, 35% fine to coarse sand, 5% clay, subrounded, wet.	MiniRam reading=0.0. Sample: 5E1-1 0.25 ft. bgs.	
2	2.0-3.5	1.5	1-1-1	FAT CLAY (CH). Gray (Gley 1 5/N), 100% clay, wet, very soft, high plasticity.		
3						
4	3.5-5.0	0	1-1	No recovery.		
5						
5	5.0-6.5	1.5	1-1	Same as above.		
6						
6	6.5-8.5	2	1-1-3-2	SILTY SAND (SM). Dark gray (Gley 1 4/N), very moist, soft, 60% fine to very fine sand, 40% silt, subrounded.		
7						
8						
8	8.5-10.0	1.5	1-1-2	Same as above.		
9						
10	10.0-11.5	1.5	1-2-2	Same as above.	10 ft. bgs. Driller added water, tailings too sticky.	
11						
11	11.5-12.0	0		No recovery.		
12	12.0-13.5	1.5	1-1-1-1	Same as above.		
13						
13	13.5-15.0	1.5	1-1-1	CLAY WITH SILT (CH). Gray (Gley 1 5/N) 85% clay, 15% silt, wet, high plasticity, soft.		
14						
15	15.0-16.5	1.5	1-1-1	FAT CLAY (CH). Gray (Gley 1 6/N), 100% clay, wet, very soft, high plasticity.	MiniRam reading 0.00. 15 to 16 ft. bgs: Sample 5E1-2, 5E1-5.	
16						
16	16.5-18.5	2	1-1-1-2	Same as above.		
17						
18						
18	18.5-20.0	1.5	1-1-2	Same as above.		
19						
20	20.0-21.5	1.5	1-2-3	CLAY WITH SILT (CH). Gray (Gley 1 5/N), 85% clay, 15% silt, wet, medium stiff, high plasticity.	Driller added more water.	
21						
21	21.5-23.5	2	2-3-3-3	FAT CLAY (CH). Gray (Gley 6/N), 100% clay, wet, increasingly stiff with depth, high plasticity.		
22						
23						
23	23.5-25.0	1.5		CLAY WITH SILT (CH). Same as above.		
24						





PROJECT NUMBER

BORING ID:

LCM 5E

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 150' N to NE of Log Dam

ELEVATION:                      NORTHING:                      EASTING:                      DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS:                      START: 11/1/1999 9:00:00 AM                      END: 11/1/1999 12:00:00 PM                      LOGGER: Meier

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:
	RECOVERY	TYPE-#			
25	25.0-25.5		2-3-4	LEAN CLAY WITH SAND (CH). Dark yellowish brown (10YR 4/6), 70% clay, 30% fine to medium sand, subrounded, wet, medium stiff.	Sample: 5E1-3, 25.5 to 26.5 ft. bgs.
	25.5-26.0			FAT CLAY (CH). Same as above.	
26	26.5-28.5	2	3-5-6	WELL GRADED GRAVEL WITH SAND AND CLAY (GW-GC). Very dark grayish brown (2.5Y 2/2), 50% gravel (2 to 100 mm), 40% very fine to medium sand, 10% clay, subangular, wet, soft.	MiniRam reading=0.0.
27				Same as above. Color change to dark grayish brown (10YR 4/2).	
28			9-9-6-6	Same as above.	
29	29.0-30.0		13-23-25	Same as above.	
30					
	30.5-31.5	0.5	25-35-40	WELL GRADED GRAVEL WITH SAND AND CLAY (GW-GC). Dark grayish brown (2.5Y 4/2), 60% gravel, (2m to 500 mm), 30% fine to coarse sand, 10% clay, subangular, wet.	Some large pieces (2" diameter), medasedimentary rock.
31				Same as above.	
32	32.0-32.5	0.7	11-32-2"	Same as above.	
	32.5-33.5	1			
33	33.5-34.0			No recovery.	
34	34.0-35.0	1	3-3-6	Same as above. With 45% gravel, 45% fine to coarse sand, 10% clay, subrounded, wet, soft.	
35	35.0-36.0	1	38-50-5"	Same as above. With increasing content black igneous rock.	
36	36.0-37.0			No recovery.	
37	37.0-38.5		5-25-50	SANDY LEAN CLAY (CL). Dark yellowish brown (10YR 4/6), 65% clay, 35% fine to very fine sand, subrounded, moist, soft.	MiniRam=0.0. Sample: 5E1-4, 37.5 to 38.5 ft. bgs.
38					
	38.5-40.0	1			
39					
40	40.0-41.5		5-7-8	Same as above.	
41					
42				Total depth=42.0 ft. bgs.	
43					



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 5H

Sheet 1 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 150 ft. W of Cyanide Bldg.

ELEVATION: NORTHING: EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS:

START: 11/2/1999 11:45:00 AM

END: 11/2/1999 1:10:00 PM

LOGGER: A. Evans

DEPTH BGS (ft)	INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
	RECOVERY	TYPE-#				SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0-					MiniRam reading=0.0. Sample 5H-1 collected.		
1-							
2-	2.0-3.5	1.5	15-12-10	WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GM). Very dark brown (10YR 2/2), dry, loose/soft, 40% gravel, (2 to 500 mm), 40% fine to coarse sand, 10% clay, subrounded.	Gravel=Waste rock. Massive argillaceous rock with sulfide minerals, mostly pyrite.		
3-							
4-	4.0-5.0		5-9-10	Same as above.			
5-							
6-	6.0-6.5	1	4-3-2	Same as above. Damp.	Some quartz, some slatelike rock.		
7-							
8-	7.5-8.5	0.5	1-3-4-3	Same as above. Damp.			
9-	9.0-10.0	1	3-3-4	Same as above. Moist.			
10-							
11-	10.5-11.5	1	3-3-3	Same as above. Moist.	MiniRam=0.06		
12-							
13-	12.5-13.5	1	3-3-3-3	Same as above. Moist.	Waste rock, softer more fissile slate-y material, very dark brown to black.		
14-							
15-	14.5-15.0	0.3	3-4-4	Same as above. Moist.			
16-							
17-		0.2	2-2-1	Same as above. Moist.			
18-	17.5-18.5	1	3-3-4-4	Same as above. Moist.	Waste rock: massive, argillaceous, sulfide bearing rock with iron oxide staining occasionally and some quartz veins. MiniRam=0.0.		
19-	19.0-20.0	1	6-6-5	Same as above. Moist.			
20-							
21-	20.5-21.5	1	4-8-6	Same as above. Moist.	21 ft. bgs. Sample 5H-2 1245. Waste rock softer, more fissils slaty material, black and dark brown.		
22-		1.5	4-6-6-3	FAT CLAY WITH SAND (CH). Dark brown (10YR 3/3), wet, soft, high plasticity, 75% clay, 25% fine to coarse sand, subangular.	Native material interface at 22.5 ft. bgs. Sample 5H-3 1255.		
23-							
24-	23.5-25.0	1.5	3-2-2	LEAN CLAY WITH SAND (CL). Strong brown (7.5YR 5/6), moist, medium stiff, medium to high plasticity, 75% clay, 25% fine to coarse sand, rounded.	Root zone, weathered sandstone, high iron content.		



PROJECT NUMBER

151319.FI.03

BORING ID:

LCM 5H

Sheet 2 of 2

# SOIL BORING LOG

PROJECT: Lava Cap Mine

LOCATION: 150 ft. W of Cyanide Bldg.

ELEVATION:                      NORTHING:

EASTING:

DRILLING CONTRACTOR: Water Development Corp., Woodland, CA

DRILLING METHOD AND EQUIPMENT USED: CME 1050 Hollow Stem Auger

WATER LEVELS:

START: 11/2/1999 11:45:00 AM

END: 11/2/1999 1:10:00 PM

LOGGER: A. Evans

DEPTH BGS (ft)		INTERVAL (ft)	RECOVERY	TYPE-# <small>SS-Spill Spoon ST-ShelbyTube</small>	STANDARD PENETRATION TEST RESULTS	CORE DESCRIPTION:	COMMENTS:		
								SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
25	25.0-26.0	1.5			6-6-6 (in) (N)		26 ft. bgs. Sample 5H-4 1310.		
26						Total depth=26.5 ft. bgs.			
27									