

NYE COUNTY

**EARLY
WARNING
DRILLING
PROGRAM**



PHASE I - FY 1999

DATA PACKAGE

MARCH 1999

PREPARED BY:

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

**1210 EAST BASIN ROAD
SUITE 6
PAHRUMP, NEVADA 89048**

9906100166 990608
PDR WASTE PDR
WM-11

NYE COUNTY

NUCLEAR WASTE REPOSITORY PROJECT OFFICE

EARLY WARNING DRILLING PROGRAM



Phase I - Fiscal Year 1999

DATA PACKAGE

This package contains preliminary data collected during Nye County's Early Warning Drilling Program. The package contains the following information:

1. A one-page site summary that provides summary location and access information, the objectives, and a brief summary of the activities that were conducted.
2. A well completion diagram or "as-built".
3. Summary and field lithologic logs.
4. Copy of geophysical logs and diskette containing digital data.
5. Summary data table and graph and diskette containing digital data.
6. Water level data measurements collected by Nye County during and after well drilling and construction.

Data Package Contents Matrix

MONITORING WELL	SITE SUMMARY	WELL COMPLETION DIAGRAM	SUMMARY LITHOLOGIC LOG	FIELD LITHOLOGIC LOG	GEOPHYSICAL LOGS	AQUIFER TEST DATA	WATER LEVEL DATA
NC-EWDP-1D	X	na	X	X	X	na	X
NC-EWDP-1S	X	X	X	X	X	X	X
NC-EWDP-2D	X	na	X	X	X	na	X
NC-EWDP-3D	X	na	X	X	X	X	X
NC-EWDP-3S	X	X	X	X	X	na	X
NC-EWDP-5S	X	na	X	X	X	na	X
NC-EWDP-9S	X	X	X	X	X	X	X
NC-Washburn-1X	X	X	X	X	X	na	X

na = not available

Notes:

1. Location and elevation data presented in this data package are based upon a Global Positioning System (GPS) survey conducted by the M&O contractor organization.
2. Digital data is in ASCII format for geophysical logs and in .xls format for aquifer test data.
3. Data not available at this time will be distributed in subsequent data packages and/or well completion reports.

Well No. NC-EWDP-1D

Status:

Completed

Latitude\Longitude:

36° 42' 33.526" 116° 35' 18.003"

Legal Description:

Township 14S Range 48E

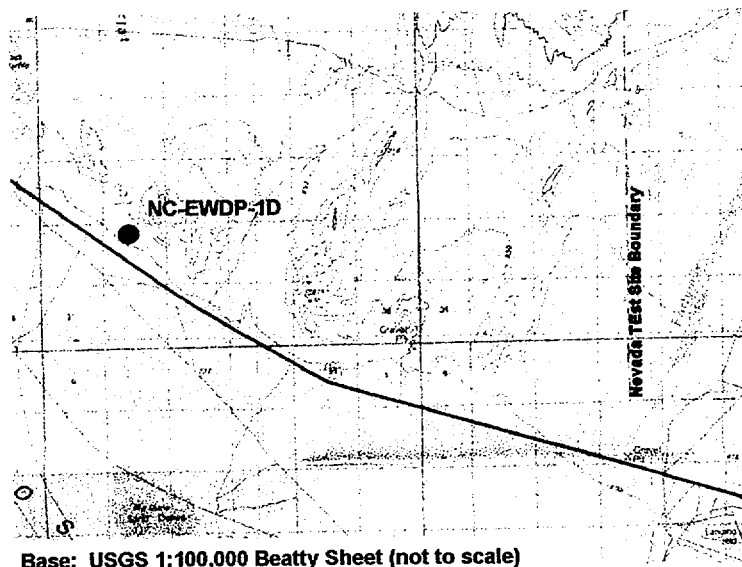
Section 29 NW 1/4 NE 1/4 1/4

Elevation:

803.23 m AMSL (2635.24 ft) GPS

Access:

Highway 95 west from Lathrop Wells Jct 11.0 miles to gate on north side of Highway. Take gravel road 0.2 miles to turnaround in white spring deposits.



Purpose: 1) provide lithologic samples of spring deposits; 2) define valley-fill stratigraphic sequence and groundwater flow paths down gradient of proposed repository; 3) provide aquifer test data; and 4) provide water level and water chemistry data.



Base: Thematic Mapper Image of the Big Dune 7.5° Quadrangle

NC-EWDP-1D is located on paleospring deposits near the boundary between the Crater Flat and Amargosa Desert hydrographic basins. The site is located down gradient of fractured volcanic rocks that provide a pathway for groundwater flow from the Yucca Mountain area. The paleospring deposits are of note as these types of deposits are associated with past climates. Two zones, one in the upper Tertiary volcanics, and one in the underlying Tertiary sedimentary rocks were selected for long-term monitoring. A satellite well (NC-EWDP-1S) was completed in shallower horizons. Water samples were collected for chemical analysis.

**NC-EWDP- 1D
SITE SUMMARY**

Land surface

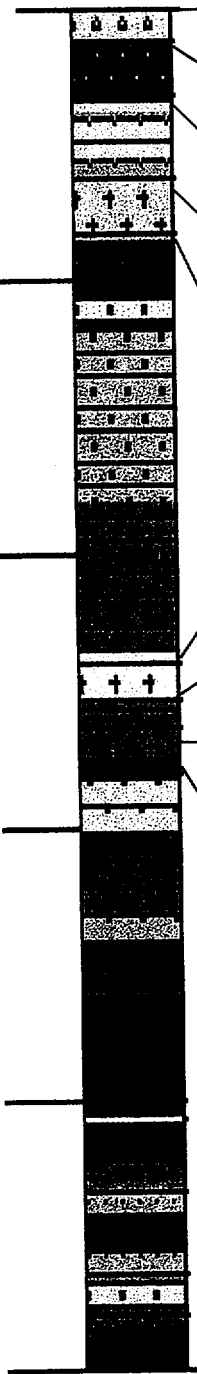
500 ft

1000 ft

1500 ft

2000 ft

2500 ft (TD)



0-65' Valley-fill Spring Deposits - 0-65' sand & silt, light yellowish gray (5Y 8/1), w/ang. gravel, clay rich below 35', unit coarsens with depth and grades into alluvial gravels by 65'

65-161' Valley-fill Alluvium - 65-161' gravel, brownish gray (5R 4/1), poorly sorted cobbly gravel,

161-311' Tertiary Volcanics - 161-311' welded crystal tuff, 161-180' light brown (5YR 6/4), densely welded, 180-205' pale yellowish brown (10YR 6/2), 205-278' light brown (5YR 6/4), 278-311' pale purple gray (5RP 6/2 to 5R 6/2)

311-410' Tertiary Volcanics - 311-410' ash fall tuff, grayish green (5GY 7/2) to dusky yellow green (5GY 5/2), wet soft green clay w/localized fine chips of reddish brown tuff, unit grades into more competent rock below 360' suggesting increased welding; mostly pumice from 399 to 407', 407-410' welded tuff, dark yellowish orange (10 YR 6/6) , moderately welded

410-1197' Tertiary Sedimentary rocks - 410-1197' siltstone, medium dark gray (N4) and light olive gray (5Y 4/1), w/minor (1-10%) ash flow tuff, clay rich, very soft, numerous color changes between 540-600'; 600-840' light bluish gray (5G 7/1) and slightly harder with reworked white ash fall (mostly vitric pumice) from 710-720', w/clay 750-755', 860-865', 920-930', 945-960', and

1197-1259' Tertiary Volcanics - 1197-1259' ashflow tuff, possibly ash fall or reworked ash fall , pale reddish brown (FYR 8/2) 1197-1210' with pumice, 1200-1201' pale yellowish orange (10YR 8/6)

1259-1314' Tertiary Sedimentary rocks - 1259-1314' siltstone medium bluish gray (5B 5/1) to greenish black (5G 2/1), w/ash flow fragments @ 1271, softer & w/ laminae evident in some chips below 1280

1314-1395' Tertiary Volcanics - 1314-1395' tuff, ashflows or reworked, mottled light bluish gray (5B 7/1) to medium bluish gray (5B 5/1), 20% lighter colored pumic and local fine sandine phenocrysts, 1363-1390' vitrophyric tuff, brownish gray (5R 4/1), 1% fine brassy pyrite as druze on fractures, localized 1-2% pyrite as cement in microbreccia w/ grainy texture (silicous silt-stone?),

1395-2500' Tertiary Sedimentary rocks - 1395-2500' sandstone, very light gray (N8) to medium light gray (N6) , interbedded w/ siltstone to clay, greenish gray (5G 7/1), clay rich 1508-1510', 1525-1528', and 1595-1600', localized white tuff fragments 1620-1630', pale yellowish brown (10YR 6/2) 1655-1710', sandstone 1710-1790' w/ 4-10% siltstone to 1740' w/ increase in siltstone to 10-40% below 1740'; sandstone 1790-1795', volcanic source, 50% siltstone 1795-1822', increased siltstone (to 90%) from 1822- 1862', sandstone, 1862-1880', fg w/ 40% quartz, 50% feldspar, and 10% dark minerals, sandstone interbedded w/ siltstone 1880-2030', poorly sorted 2028-2030', 2030-2040' siltstone, brownish gray (5YR 4/1), w/ fine laminae (<1 mm) and some sandstone, no sample 2040-2047', grayish black (N2) 2047-2119' w/ traces of gypsum, interbedded siltstone and sandstones, (N5 & N6) 2119-2161'; sandstone, medium light gray (N6), homogeneous, w/ localized beds of dark gray (N3); siltstone and clay 2161-2313'; silt-stone, light brownish gray (5YR 6/1), finely (<1mm) laminated with unlaminated sections to 1 cm, clay rich 2335-2340' & 2345-2350', more homogeneous below 2363'; sandstone 2391-2500' w/ interbedded clay and siltstone

NC-EWDP-1D

SUMMARY LITHOLOGIC LOG

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NLC-EWDR 1DX Drill Depth From 0.0 To 60 Page 1 of 42

Driller Gene Smith/Neil Hale Start Date/Time 12-10-98 11:00 End Date/Time _____
 (0-32') (32'+)

Drilling Equip./Method 0-32' 6.0' x 1.8' Auger Sampling Equip./Method 0-32' Auger / 32-105 RC IA-hole hammer
32' + Schramm T685 DHH 105+ RC Tricone

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes			
0	BCS00000 951	Fine sand to silt. Light yellowish grey (54 %); some places are rain crusted on surface; poorly consolidated.		Qsd				
5	BCS00000 952							
10	BCS00000 954							
15	BCS00000 955							
20	BCS00000 956	Some gravel mixed with fine silt/spring deposit material. Gravel is angular.						
25	BCS00000 957							
30	BCS00000 958	Drill encountered hard surface - unable to auger drill. Moved on Schramm T685 DHH - started drilling 03:00 on 12-11-98			Logging by Jamie Walker MOVED ON SCHRAMM T685 DHH STARTED DRILLING 0300HRS ON 12-11-98			
35	BCS00000 959	Spring deposits, clay-rich, yellowish grey (54 %). Unit coarsens with depth and grades into alluvial gravels by 65'. Unit contains 2 to 10 mm pebbles in a matrix of silty clay						
40	BCS00000 960							
45	BCS00000 961							
50	BCS00000 962	-- Static Water Level - 56.62'						
55	BCS00000 963							
60								

Prepared By Michael Cline Date 12-10-98 Checked By BENT ANGLIST Date 1-4-99
Jamie Walker 12-11-98

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID AK-EWDP-1DX Drill Depth From 60 To 120 Page 2 of 42

Driller Neil Hale Start Date/Time _____ End Date/Time _____

Drilling Equip./Method Schramm T685DHH Sampling Equip./Method Wet/Buckets/Olefin bags/chip tray

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes	
65	BES 00000 964	<p>Hit water; water in return cuttings at Alluvial gravels; brownish grey (54R 4/1), poorly sorted cobbly gravels with a coarse sand matrix. Mostly reddish-grey volcanic clasts. Clay coating (similar to spring deposits) to ~80'.</p>		Qsd	<p>Stopped drilling at 63.25' due to water. Static water level at 56.25' 12-11-98 05:20</p>	
65	BES 00000 965					Qg
70	BES 00000 966					
75	BES 00000 967					
80	BES 00000 968					
85	BES 00000 969					
90	BES 00000 970					
95	BES 00000 971					
100	BES 00000 972					
105	BES 00000 973					
110	BES 00000 974			<p>-- hard ground - slow drilling Obvious caliche</p>		
115	BES 00000 975					
120	BES 00000 975					

Prepared By JAMIE WALKER Date 12-11-98 Checked By ARTHUR J. MENDENHALL 12/11/98

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 120 To 180 Page 3 of 42

Driller EARL MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAM T685 DTH Sampling Equip./Method _____

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
125	PCS 00000 976	--- Lost return, tripped out; cleaned bit/exchange sand and gravel as above.		Q3	resumed drilling @ 23:40 on 12-11-98
130	PCS 00000 977				
135	PCS 00000 978				
140	PCS 00000 979	becomes sandy;			
145	PCS 00000 980	COARSE GRAVEL AND SAND			plugged bit (air) on pipe #8 add 140' DRILLED 12-12-98 DAYSHIFT LOGGED BY BENT AARQUIST
150	PCS 00000 981				
155	PCS 00000 982				
160	PCS 00000 983	GRAVEL - ABOUT 90% WELDED CRYSTAL TUFF AND 10% DARK GRAY DOLOMITE FRAGMENTS			
165	PCS 00000 984	BEDROCK AT 161' WELDED CRYSTAL TUFF, LIGHT BROWN (5YR 6/4) 3-5% QUARTZ PHENOCRYSTS 1mm OR LESS, BIOTITE < 170, ABOUT 1mm FELDSPAR PHENOCRYSTS 5-10%, 1mm LOCAL MAFIC PHENOCRYSTS < 1mm, < 1% DENSELY WELDED		Q5 Tuff	
170	PCS 00000 985				
175	PCS 00000 986				
180	PCS 00000 987				

Prepared By JAMIE WALLER Date 12-11-98 (NIGHT) Checked By BENT AARQUIST Date 1-4-99
BENT AARQUIST 12-12-98 (DAY)

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP Drill Depth From 180 To 240 Page 4 of 42
-1DX

Driller EARL MANUM / NIEL HALE Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 Sampling Equip./Method WET/BUCKETS/OLEFIN BAGS/CHIPTRAYS

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
185	BCS 00000 988	WELDED CRYSTAL TUFF AS ABOVE BUT PALE YELLOWISH BROWN (10 YR G/2)	W W W W W W W W W W W W W W W W W W W W	TWT	
190	BCS 00000 989				
195	BCS 00000 990				
200	BCS 00000 991				
205	BCS 00000 992				
210	BCS 00000 993				
215	BCS 00000 994				
220	BCS 00000 995				
225	BCS 00000 996				
230	BCS 00000 997				
235	BCS 00000 998	harder, less fractured	W W W W		BROKEN GROUND AT 217' WITH WATER PUMPED > 100 GAL/MIN FROM 1115 TO 1135 HRS. Air pumped well commensurate with surface. Water sample taken by Don Schell from sample splitter-240'
240	BCS 00000 999				

Prepared By BENT AQUIST (DAY) Date 12-12-98
JAMIE WALKER (NIGHT)

Checked By BENT AQUIST Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 240 To 300 Page 5 of 42

Driller NIEL HALE Start Date/Time 12-12-98 1800 End Date/Time 12-13-98 0600

Drilling Equip./Method SCHRAMM T68SDHM Sampling Equip./Method CYCLONE, SAMPLE SPLITTER

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes	
240	BCS 0000 1000	Welded Tuff, as above	W W W	Twt		
245	BCS 0000 1001		W W W			
250	BCS 0000 1002		W W W			
255	BCS 0000 1003		W W W			
260	BCS 0000 1004		W W W			
265	BCS 0000 1005		W W W			
270	BCS 0000 1006		W W W			
275	BCS 0000 1007		W W W			
280	BCS 0000 1008		Unit changes color to pale purple-grey (SRP 6/2 to SR 6/2)		W W W	
285	BCS 0000 1009		W W W			
290	BCS 0000 1010		W W W			
295	BCS 0000 1011		W W W			
300					W W W	

Prepared By JAMIE WALKER Date 12-12-98 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NL-EWDP-12X Drill Depth From 300 To 360 Page 6 of 42

Driller NEIL HALE Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
300	BCS 0000 1012	Welded Tuff, as above	W W W W W	Tuf	
305	BCS 0000 1013				
310	BCS 0000 1014	Tuff, ash fall, green, clay-altered. Very soft, strongly clay altered aphyric aphanitic ash unit. Color varies from greyish yellow green (5G4 7/2) to dusky yellow green (5G4 5/2). Unit consists mostly of wet soft green clay but locally has fine chips of reddish-brown tuff (as above) generally less than 5% (possibly contamination). Unit grades into more competent rock beyond ~360', where the color become greyish yellowgreen (5G4 7/2) to pale greenish yellow (104 8/2)	+ +	Taf	
315	BCS 0000 1015				
320	BCS 0000 1016				
325	BCS 0000 1017				
330	BCS 0000 1018				
335	BCS 0000 1019				
340	BCS 0000 1020				
345	BCS 0000 1021				
350	BCS 0000 1022				
355	BCS 0000 1023				

Prepared By SAMIE WALKER Date 12-12-98 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID AK-EWDR-1DX Drill Depth From 360 To 420 Page 7 of 42
 Driller NIEL HALE Start Date/Time 12-12-98/1800 End Date/Time 12-13-98/0600
 Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method CYCLONE/SPLITTER

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
360		Green clay-altered ash, as above	+ +		
BCS			+ +		
0000			W + W		
1024		gradational contact	+ +		
365			+ +		
BCS		Tuff, ash fall, as described above, less altered section. Soft, yellowish green, aphyric, aphanitic tuffaceous volcanic (weakly welded). Unit becomes harder with depth, suggesting increasing welding.	+ +		
0000			W W		
1025			+ +		
370			W W		
BCS			+ +		
0000			+ W +		
1026			+ + +		
375			W + W		
BCS			+ + +		
0000			+ + +		
1027			W + W		
380			+ + +		
BCS			+ + +		
0000			+ + +		
1028			+ + +		
385			+ + +		
BCS			+ + +		
0000			+ + +		
1029			W + W		
390			+ + +		
BCS			+ + +		
0000			+ + +		
1030			W + W		
395			+ + +		
BCS			W W		
0000					
1031					
400					
BCS		TUFF, ASHFALL, PALE YELLOWISH BROWN, MOSTLY PUMICE, DEVITRIFIED	+ +		
0000			+ + +		
1032			+ + +		
405			+ + +		
BCS			+ + +		
0000			W + W		
1033			+ + +		
410			W + W		
BCS		TUFF, ASHFLOW, DARK YELLOWISH ORANGE 10YR 6/6, MODERATELY WELDED, PHENOCRYSTS ~10% QUARTZ, 5% SANDINE, 1% BIOTITE	+ + +		
0000			+ + +		
1034			+ + +		
415			+ + +		
BCS		SILTSTONE, MED. DARK GRAY (50% LIGHT OLIVE GRAY 40-420) MINOR (1-10%) TUFF, ASHFLOW, GRAYISH BROWN SYR 3/2 FRAGMENTATION THROUGHOUT (LACUSTRINE/PLAYA)	- - -		
0000			- - -		
1034			- - -		
415			- - -		
BCS			- - -		
0000			- - -		
1035			- - -		
420			- - -		

Prepared By JAMIE WALKER/ARTHUR Date 12-12-98 (NIGHT) Checked By _____ Date _____
J. MENDENHALL

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID AL-EWDP-1DX Drill Depth From 420 To 480 Page 8 of 42
 Driller NIEL HALE Start Date/Time 12/12/98/1800 End Date/Time 12-13-98/0600
 Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method CYCLONE/SPLINTER

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes				
420 BCS 0000 1036		SILTSTONE, AS ABOVE	-						
425									
BCS 0000 1037 430									
BCS 0000 1038 435									
BCS 0000 1039 440									
BCS 0000 1040 445									
BCS 0000 1041 450									
BCS 0000 1042 455									
BCS 0000 1043 460									
BCS 0000 1044 465									
BCS 0000 1045 470									
BCS 0000 1046 475									
BCS 0000 1047 480						1% LIGHT GRAY SILTSTONE IN ROCK	-		

Prepared By JAMIE WALKER / ARTHUR Date 12-12-98 (NIGHT) Checked By _____ Date _____
J. MENDENHALL

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NCEWDP-1Dx Drill Depth From 480 To 540 Page 9 of 42

Driller NIEL HALE Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAAM T685 DHH Sampling Equip./Method CYCLONE/SAMPLE SPLITTER

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
480 BCS 0000 1048		SILTSTONE, AS ABOVE			
485 BCS 0000 1049					
490 BCS 0000 1050					
495 BCS 0000 1051					
500 BCS 0000 1052					
505 BCS 0000 1053					
510 BCS 0000 1054					
515 BCS 0000 1055					
520 BCS 0000 1056					
525 BCS 0000 1057					
530 BCS 0000 1058					
535 BCS 0000 1059					
540					

Prepared By ARTHUR J. MENDENHALL Date 12-13-98 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DNC-EWDP-10X Drill Depth From 540 To 600 Page 10 of 42

Driller EARL MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method CYCLONE/SAMPLE SPLITTED

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes	
	BCS 0000 1060	SILTSTONE AS ABOVE YELLOWISH GRAY (SY 7/2)				
545	BCS 0000 1061	545' TO 555' OLIVE GRAY (SY 3/2)				
550	BCS 0000 1062					
555	BCS 0000 1063	555' TO 560' YELLOWISH GRAY (SY 7/2)				
560	BCS 0000 1064	SILTSTONE WITH SAND, MIXED LITHOLOGY WITH MINOR WELDED TUFF MIX OF COLORS				
565	BCS 0000 1065	CLAY VERY MINOR SAND FRAGMENTS PALE OLIVE (10Y 6/2)				VERY SLOW DRILLING BINDING DRILL RODS
570	BCS 0000 1066					
575	BCS 0000 1067					
580	BCS 0000 1068	SILTSTONE FRAGMENTS WITH MUCH CLAY MOST CLAY WASHED OUT WITH DRILL WATER SILTSTONE GRAYISH OLIVE (10Y 4/2)				
585	BCS 0000 1069					
590	BCS 0000 1070					
595	BCS 0000 1071					
600						

Prepared By BENT ARQUIST Date 12-13-96 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-IDX Drill Depth From 600' To 660' Page 11 of 42

Driller EARL HANCOCK Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method CYCLONE/SAMPLE SPLITTER

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
605	BCS 0000 1072	SILTSTONE, as above, clay-rich, very soft, light greenish grey (5G 8/1) to light blueish grey (5B 7/1). Local sections with darker tuffaceous? beds.			
610	BCS 0000 1073				
615	BCS 0000 1074				
620	BCS 0000 1075				
625	BCS 0000 1076				
630	BCS 0000 1077				
635	BCS 0000 1078				
640	BCS 0000 1079				
645	BCS 0000 1080				
650	BCS 0000 1081				
655	BCS 0000 1082				
660	BCS 0000 1083				

-648' END OF DAY SHIFT
12-13-98

slow drilling - bit is "mudding up", very soft clay-rich rock.

Prepared By JAMIE WALKER Date 12-12-98 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-LDX Drill Depth From 660' To 720' Page 12 of 42

Driller Neil Hale Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method WET/CYCLONE/SPLITTER/BUCKETS/OLTFW BAGS

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
660	BCS 0000 1084	SILTSTONE, as above, becoming slightly harder, more competent, generally light blueish grey (SB F/1)			
665	BCS 0000 1085				
670	BCS 0000 1086				
675	BCS 0000 1087				
680	BCS 0000 1088				
685	BCS 0000 1089				
690	BCS 0000 1090				
695	BCS 0000 1091				
700	BCS 0000 1092				
705	BCS 0000 1093				
710	BCS 0000 1094				
715	BCS 0000 1095				
720					
		10% TUFF, AS ABOVE			Drilling speed increasing but still slow.

Prepared By JAMIE WALKER Date 12-12-98 (NIGHT) Checked By _____ Date _____
ARTHUR J. MENDENHALL

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC-EWwp-10X
 Borehole ID _____ Drill Depth From 720 To 780 Page 13 of 42
 Driller _____ Start Date/Time _____ End Date/Time _____
 Drilling Equip./Method SCARAB T685 DH Sampling Equip./Method CYCLONE - SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
730	BCS 0000 1096	SILTSTONE, AS ABOVE, MEDIUM BLuish GRAY S/S VALUES FROM POORLY TO MODERATELY CONSOLIDATED			
725	BCS 0000 1097				
720	BCS 0000 1098				
735	BCS 0000 1100				
740	BCS 0000 1101				
745	BCS 0000 1102				
750	BCS 0000 1103				
760	BCS 0000 1104				
765	BCS 0000 1105				
770	BCS 0000 1106				
775	BCS 0000 1107				

750' - 755' SILTSTONE WITH CLAY, YELLOWISH GRAY S/S
 SILTSTONE AS ABOVE 750', BLuish GRAY S/S

DRILLING RATE
IN CASES

Prepared By Arthur J. Mendenhall Date 12/13/98 (NIEH) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC-EWDP-1DX
 Borehole ID _____ Drill Depth From 780 To 840 Page 14 of 42
 Driller NIEL HALE Start Date/Time _____ End Date/Time _____
 Drilling Equip./Method SCHAUMT 695 DHH Sampling Equip./Method CYCLONE + SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
780	BCS 0000 1108	SILTSTONE, LACUSTINE/PLAYA, MEDIUM BLuish GRAY 5B 5A, AS ABOVE WHEN DRY - LIGHT GRAY N7			
785	BCS 0000 1109				
790	BCS 0000 1110				
795	BCS 0000 1111				
800	BCS 0000 1112				
805	BCS 0000 1113				
810	BCS 0000 1114				
815	BCS 0000 1115				
820	BCS 0000 1116				
825	BCS 0000 1117				
830	BCS 0000 1118				
835	BCS 0000 1119				

Prepared By ARTHUR J. MENDENHALL Date 12/13/98 (NIG-NT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID: DC-EW-PR-107 Drill Depth From 840' To 900' Page 15 of 42

Driller EARL HANBURT Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHWABER T-885 D/H Sampling Equip./Method CYCLONE SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
845'	BCS 0000 1120	<p>SILTSTONE AS ABOVE RE CORES LIGHT GRAY N7 WHEN DRY</p> <p>CLAY RICH SILTSTONE. COARSE FRAGMENTS ARE LIGHT GRAY N7 TO YELLOWISH GRAY S7 B/1</p> <p>SILTSTONE AS ABOVE 860'</p> <p>CLAY RICH ZONE - RODS BROWN. ONLY MINOR COARSE RETURN</p>			
845'	BCS 0000 1121				
845'	BCS 0000 1122				
845'	BCS 0000 1123				
845'	BCS 0000 1124				
845'	BCS 0000 1125				
845'	BCS 0000 1126				
845'	BCS 0000 1127				
845'	BCS 0000 1128				
845'	BCS 0000 1129				
845'	BCS 0000 1130				
845'	BCS 0000 1131				
845'	BCS 0000 1131				
845'	BCS 0000 1131				
845'	BCS 0000 1131				

MINOR FRAGMENTS OF WEDED TUFF WITH SILTSTONE

Prepared By DANIE WALKER Date 12/14/98 (MCH) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID MC-EWDP-10X Drill Depth From 900 To 960 Page 16 of 42

Driller EARL MANFUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method CYCLONE/SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
905'	BCS 0000 1132	SILTSTONE, as above, bluish-grey (5B5/1).			905'-908' DRILL WATER WAS RUSTY BROWN AT 908' IT BECAME GRAY AGAIN
910'	BCS 0000 1133				
915'	BCS 0000 1134				
920'	BCS 0000 1135				
925'	BCS 0000 1136				
930'	BCS 0000 1137				
935'	BCS 0000 1138				
940'	BCS 0000 1139				
945'	BCS 0000 1140				
950'	BCS 0000 1141				
955'	BCS 0000 1142				
960'	BCS 0000 1143				

Prepared By JAMIE WALKER Date 12/14/98 (MCHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDF10X Drill Depth From 960 To 1020 Page 17 of 42

Driller NIEL HALE Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method CYCLONE/SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
965'	BCS 0000 1144	SILTSTONE, as above, bluish-grey (SB 571)			Start of night shift 12-14-98 - 960'
970'	BCS 0000 1145				consistent drilling speed.
975'	BCS 0000 1146				
980'	BCS 0000 1147				
985'	BCS 0000 1148				
990'	BCS 0000 1149				
995'	BCS 0000 1150				
1000'	BCS 0000 1151				
1005'	BCS 0000 1152				
1010'	BCS 0000 1153				
1015'	BCS 0000 1154				
1020'	BCS 0000 1155				

Prepared By JAMIE WALKER Date 12/17/98 (NIGHT) Checked By _____ Date _____
ARTHUR J. MENDENHALL 12/14/98 (NIGHT)

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDR-10X Drill Depth From 1020 To 1080 Page 18 of 42

Driller MEL HALE Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method CYCLONE / SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1025'	BCS 0000 1156	SILTSTONE, AS ABOVE, MEDIUM BLuish GRAY 5B 5/1 10% SILTSTONE, LACUSTRINE/PALYA, DUSKY YELLOW GREEN 56Y 5/2			
1030'	BCS 0000 1157				
1035'	BCS 0000 1158				
1040'	BCS 0000 1159				
1045'	BCS 0000 1160				
1050'	BCS 0000 1161				
1055'	BCS 0000 1162				
1060'	BCS 0000 1163				
1065'	BCS 0000 1164				
1070'	BCS 0000 1165				
1075'	BCS 0000 1166	90% SILTSTONE, AS ABOVE, MEDIUM BLuish GRAY 5B 5/1 10% SILTSTONE, LACUSTRINE/PALYA, DUSKY YELLOW GREEN 56Y 5/2			
1080'	BCS 0000 1167				

Prepared By ARTHUR J. MENDEL Date 12/14/90 (MCHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DNC-EWDP-10A Drill Depth From 1080 To 1140 Page 19 of 42

Driller NIEL HALE / EARL MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAAM T685 DHH/REVERS CIRCULATION Sampling Equip./Method CYCLONE/SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1085	BCS 0000 1168	SILTSTONE, AS ABOVE, MEDIUM BLuish GRAY 5B 5/1 10% SILTSTONE, LACUSTRINE/PALYA, DUSKY YELLOW GREEN 56Y 5/2			
1090	BCS 0000 1169				
1095	BCS 0000 1170	SILTSTONE, AS ABOVE, MEDIUM DARK GRAY N4			
1100	BCS 0000 1171				
1105	BCS 0000 1172	FROM 1100-1165 1 TO 30% SILTSTONE, AS ABOVE, DUSKY YELLOW GREEN 56Y 5/2 TO MODERATE YELLOW GREEN 56Y 7/4.			
1110	BCS 0000 1173				
1115	BCS 0000 1174				
1120	BCS 0000 1175				
1125	BCS 0000 1176				
1130	BCS 0000 1177				
1135	BCS 0000 1178				
1140	BCS 0000 1179				

Prepared By ARTHUR J. MENDENHALL Date 12/14/90 (MHT) Checked By _____ Date _____
12/15/90 (UWHT)

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-10X Drill Depth From 1140 To 1200 Page 20 of 42

Driller EARL MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method CYCLONE/SPLITTER
REVERSE CIRCULATION

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
1140	BCS 0000 1180	SILTSTONE, AS ABOVE, MEDIUM GRAY NS TO MEDIUM BLuish GRAY SB S/1.				
1145	BCS 0000 1181					
1150	BCS 0000 1182					
1155	BCS 0000 1183					
1160	BCS 0000 1184	clay rich area				
1165	BCS 0000 1185					1165 TO 1180 SAMPLES VERY MUCH CLAY
1170	BCS 0000 1186					
1175	BCS 0000 1187					
1180	BCS 0000 1188					
1185	BCS 0000 1189					
1190	BCS 0000 1190					
1195	BCS 0000 1191					
1200	1191	TUFF, ASH FLOWS OR ASH FLOW SANDS, ASH FALL, OR RE-WORKED ASH FALL, FRAYISH BROWN 5YR 3/2, VERY PALE ORANGE 10YR 8/2, DARK YELLOWISH ORANGE 10YR, PALE REDDISH BROWN 10R 5H	+ + + + +		1197 TO 1200 VERY LIKELY REWORKED ASH FLOWS AND ASH FALLS.	

Prepared By ARTHUR J. MENDENHALL Date 12/15/98 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1D Drill Depth From 1200 To 1260 Page 21 of 42

Driller EARL MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCARAB T695 DHH/RELEASE CIRCULATION Sampling Equip./Method CYCLONE/SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1205	BCS 0000 1192	TUFF, AS ABOVE, CONTINUED; PUMICE, WHITE; PENCOCYSTS, 1% SANDINE, 1% BIOTITE. VERY PALE ORANGE 10YA 8/2 TO PALE YELLOWISH ORANGE 10YA 8/6	+ +		FROM 1200' TO 1260' DRILL WATER VARIED FROM YELLOW TO BROWN TO RUSKY RED
	BCS 0000 1193				
1210	BCS 0000 1194				
1215	BCS 0000 1195				
1220	BCS 0000 1196				
1225	BCS 0000 1197				
1230	BCS 0000 1198				
1235	BCS 0000 1199				
1240	BCS 0000 1200				
1245	BCS 0000 1951				
1250	BCS 0000 1952				@ 1253' DRILL RATE SLOWED
1255	BCS 0000 1953				
1260					DRILL WATER DARK GRAY

Prepared By ARTHUR J. MENDENHALL Date 12/15/98 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID ~~NC-EWDP-177~~ Drill Depth From 1260 To 1320 Page 22 of 42

Driller EAL MANGUM / MIKE BOYD Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAMM T685 DTH / REVERSE CIRCULATION Sampling Equip./Method CYCLONE / SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1265	BCS 0000 1954	SILTSTONE, LACUSTRINE/PLAYA, MEDIUM BLuish GRAY 5B 5/1 TO GREENISH BLACK 5G 2/1.			SILTSTONE TENDS TO BE HARDER THAN SILTSTONES ABOVE VOLCANIC INTERVAL 1197 TO 1259 FT.
	BCS 0000 1955				
1270	BCS 0000 1956				
1275	BCS 0000 2050				
1280	BCS 0000 1957	SILTSTONE, LACUSTRINE/PLAYA, MEDIUM BLuish GRAY 5B 5/1, OLIVE GRAY 5Y 3/2, DARK GREENISH GRAY 5G 4/1 LAMINAE EVIDENT IN SOME CHIPS			SOFTER SILTSTONE ASH FLOW FRAGMENTS
1285	BCS 0000 1958				
1290	BCS 0000 1959				
1295	BCS 0000 1960				
1300	BCS 0000 1961				
1305	BCS 0001 1962				
1310	BCS 0000 1963				
1315	BCS 0000 1964	Tuff, ashflows or reworked, mottled light bluish grey (5B 7/1) to medium bluish grey. 20% lighter colored pumice and local fine (<1mm) sanidine phenocrysts to 2%.			

Prepared By ARTHUR J. MENDENHALL Date 12/15/98 (MCKENT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1320 To 1380 Page 23 of 42

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAUM TGS DHT / REVEALS Sampling Equip./Method CYCLONE / SPLITTER
CIRCULATION

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1325	BCS 0000 1965	Tuff, as above, bluish grey. 58G 8/6	+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
1330	BCS 0000 1966	Trace py.	+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
1335	BCS 0000 1967	Vitrophyric Tuff, brownish grey (54R 4/1), homogeneous. <1% fine brassy pyrite as drusy linings on fractures. LOCALLY 1-2% PY AS A CEMENT IN MICRO BRECCIAS. LOCAL v.f.g. GRAINY TEXTURE - MAY BE A SILICEOUS SILTSTONE	+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
			+ +		
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			+ +		
1340	BCS 0000 1968		+ +		
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1345	BCS 0000 1969		+ +		
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1350	BCS 0000 1970		+ +		
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1355	BCS 0000 1971		+ +		
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1360	BCS 0000 1979		+ +		
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1365	BCS 0000 1980		+ +		
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1370	BCS 0000 1981		+ +		
			+ +		
			+ +		
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1375	BCS 0000 1982		+ +		
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1380	BCS 0000 1983		+ +		
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			+ +		
			+ +		
			+ +		

Prepared By JAMIE WALKER Date 12-15-98 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DN-EWDP-1DX Drill Depth From 1380 To 1440 Page 24 of 42

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAMM T685 DAH REVERSE CIRC. Sampling Equip./Method CYLINDR/SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1380	BCS 0000 1984	Vitrophyric Tuff, as above.	V + V		
			+ V +		
1385	BCS 0000 1985		V + V		
			+ V +		
1390	BCS 0000 1986	Tuff, reworked ash fall, very light grey (NB) to white N9.	V + V		
			+ V +		
1395	BCS 0000 1987	INTERBEDDED FINE SANDSTONE VERY LIGHT GRAY (NB) TO MED. LIGHT GRAY (NG), WITH GREENISH GRAY (SG 7/1) SILTSTONE TO CLAY. SANDSTONE GRAINS ARE ANGULAR COMPOSED OF FELDSPAR, QUARTZ & MAFICS, SIMILAR COMPOSITION AS OVERLYING TUFFS.	+ + +		
			+ + +		
1400	BCS 0000 1988				
1405	BCS 0000 1989				
1410	BCS 0000 1990				
1415	BCS 0000 1991				
1420	BCS 0000 1992				
1425	BCS 0000 1993				
1430	BCS 0000 1994				
1435	BCS 0000 1995				
1440					

Prepared By JAMIE WICKER/BENT ARQUIST Date 12-16-98 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-IDY Drill Depth From 1440 To 1500 Page 25 of 42

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAAMM T685 DHH Sampling Equip./Method CYCLONE/SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1445	BCS 0000 1996	<p>SANDSTONE, SILTSTONE & CLAY AS ABOVE</p> <p>Clay is usually Dark greenish Gray (SGY)</p> <p>siltstone is usually Dark Grey (N3)</p> <p>Sandstone is usually Medium light Grey (N6)</p>			
1450	BCS 0000 1997				
1455	BCS 0000 1998				
1460	BCS 0000 1999				
1465	BCS 0000 2000				
1470	BCS 0000 2001				
1475	BCS 0000 2002				
1480	BCS 0000 2003				
1485	BCS 0000 2004				
1490	BCS 0000 2005				
1495	BCS 0000 2006				
1500	BCS 0000 2007				

Prepared By PENT AQUIST Date 12-16-98 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EDDP-IDX Drill Depth From 1500' To 1560' Page 26 of 42

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
1500	BCS 0000 2008	SANDSTONE, SILTSTONE & CLAY Dark Greenish Gray (56 4/1)	[Hand-drawn lithologic column with various patterns representing different rock types]		RETURN WATER 33.2°C	
1505	BCS 0000 2009	--- 1508' - 1510' CLAY RICH ZONE				
1510	BCS 0000 2010					
1515	BCS 0000 2011					
1520	BCS 0000 2012	--- 1525' - 1528' CLAY RICH ZONE				
1525	BCS 0000 2013					
1530	BCS 0000 2014					
1535	BCS 0000 2015					
1540	BCS 0000 2016					RETURN WATER 28.0°C
1545	BCS 0000 2017					
1550	BCS 0000 2018					
1555	BCS 0000 2019					
1560						

Prepared By _____ Date 12-16-98 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-10X Drill Depth From 1560 To 1620 Page 27 of 42

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1565'	BCS 0000 2020	SANDSTONE, SILTSTONE & CLAY AS ABOVE			RETURN WATER 39.5°C
1570'	BCS 0000 2021				
1575'	BCS 0000 2022				
1580'	BCS 0000 2023				
1585'	BCS 0000 2024				
1590'	BCS 0000 2025				
1595'	BCS 0000 2026				
1600'	BCS 0000 2027				
1605'	BCS 0000 2028				
1610'	BCS 0000 2029				
1615'	BCS 0000 2030	Medium Grey (NS) ----- 1595'-1600' MOSTLY CLAY			
1620'	BCS 0000 2031				

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-10X Drill Depth From 1620' To 1680' Page 28 of 42

Driller MIKE BOYD / EARL MANEUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAAM T685 DHH / REVERSE CIRCULATION Sampling Equip./Method CYCLONE / SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes				
1625	BCS 0000 2032	SANDSTONE, SILTSTONE & CLAY AS ABOVE LOCAL WHITE TUFF FRAGMENTS 1620'-1630'							
1630	BCS 0000 2033								
1635	BCS 0000 2034								
1640	BCS 0000 2035								
1645	BCS 0000 2036								
1650	BCS 0000 2037								
1655	BCS 0000 2038								
1660	BCS 0000 2039					SANDSTONE, VOLCANIC SOURCE, PALE YELLOWISH BROWN 10YA G/2 (1665 TO 1710), 1-10% SILTSTONE, LACUSTRINE/ PLAYA, MEDIUM DARK GRAY N4			
1665	BCS 0000 2040								
1670	BCS 0000 2041								
1675	BCS 0000 2042								
1680	BCS 0000 2043								

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DNC-EWDR-10X Drill Depth From 1680' To 1740' Page 29 of 342

Driller EARL MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAMM T685 DHH, REVERSE Sampling Equip./Method CYCLONE/SAMPLE SPLITTER
CIRCULATION

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1685	BCS 0000 2044	SANDSTONE, YELLOWISH BROWN TO GR 6/2, 1-10% SILTSTONE MEDIUM DARK GRAY N4 AS ABOVE. 1710-1790 SANDSTONE, VOLCANIC SOURCE, MEDIUM GRAY N5 TO DARK GRAY N3, POORLY SORTED, 10-4% SILTSTONE, LACUSTRINE/PLAYA, MEDIUM DARK GRAY N4.	.		
	BCS 0000 2045				
1690	BCS 0000 2046				
1695	BCS 0000 2047				
1700	BCS 0000 2051				
1705	BCS 0000 2052				
1710	BCS 0000 2053				
1715	BCS 0000 2054				
1720	BCS 0000 2055				
1725	BCS 0000 2056				
1730	BCS 0000 2057				
1735	BCS 0000 2058				
1740					

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDR-1DX Drill Depth From 1740' To 1800' Page 30 of 42

Driller FAR MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 Sampling Equip./Method CYCLONE AND SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1745	BCS 0000 2059	SANDSTONE, MEDIUM GRAY NS TO DARK GRAY N3, 10-40% SILTSTONE MEDIUM DARK GRAY NA AS ABOVE			
1750	BCS 0000 2060				
1755	BCS 0000 2061				
1760	BCS 0000 2062				
1765	BCS 0000 2063				
1770	BCS 0000 2064				
1775	BCS 0000 2065				
1780	BCS 0000 2066				
1785	BCS 0000 2067				
1790	BCS 0000 2068				
1795	BCS 0000 2069	SANDSTONE, VOLCANIC SOURCE, MEDIUM GRAY NS, POORLY SORTED BIOTITE, SANGIINE, AND QUARTZ.			
1800	BCS 0000 2070	50% SILTSTONE, LACUSTRINE/PALYA, DARK GRAY N3, 50% SANDSTONE, MEDIUM GRAY NS AS ABOVE			

SOMEWHAT CLAYISH

MODERATELY CLAYISH

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1800 To 1860 Page 31 of 42

Driller M. Boyd Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 - RC Tricone Sampling Equip./Method Wet Splitter/Buckets/Olefin bags

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1800	BCS 0000 2071	Sandstone, as above 1800-1805 50% siltstone, dark grey (N3)			
1805	BCS 0000 2072				
1810	BCS 0000 2073				
1815	BCS 0000 2074				
1820	BCS 0000 2075				
1825	BCS 0000 2076				
1830	BCS 0000 2077				
1835	BCS 0000 2078				
1840	BCS 0000 2079				
1845	BCS 0000 2080				
1850	BCS 0000 2081	Siltstone, lesser fine sandstone, lacustrine, dark grey (N3). Obvious interbedded sandstone, as above, less than 10%. Clay beds evident during drilling but poorly represented in chip trays (only as clay balls)			clay beds are washed into fines in return water.
1855	BCS 0000 2082				

Prepared By JAMIE WALKER Date 12-18-98 Checked By Mike Chin Date 1-23-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1860 To 1920 Page 32 of 42

Driller M. Boyd Start Date/Time _____ End Date/Time _____

Drilling Equip./Method Schramm T685 - RC Tricone Sampling Equip./Method Wet Splitter/Buckets/0.1m bags

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
1860	BCS 0000	Siltstone, as above	[Dotted pattern]			
	2083	Sandstone, lacustrine, volcanoclastic, med. to dark grey (N3-N4). Generally fine grained mottled textures. Approx. 40% quartz, 50% feldspar and 10% dark minerals ? biotite.				
1865	BCS 0000					
	2084					
1870	BCS 0000					
	2085					
1875	BCS 0000					
	2086					
1880	BCS 0000					Sandstone, yellowish-grey (S4 7/2)
	2087					Sandstone/Siltstone, interbedded, as described above. Clay evident in upper 5'. Approximately 30% siltstone. Med to dark grey (N3-N4)
1885	BCS 0000					
	2088					
1890	BCS 0000					
	2089					
1895	BCS 0000					
	2090					
1900	BCS 0000					
	2091					
1905	BCS 0000					
	2092					
1910	BCS 0000	mainly sandstone 70% - 5 - 1mm grains				
	2093					
1915	BCS 0000					
1920	2094					

Prepared By JAMIE WALKER Date 12-18-98 Checked By Mike Chin Date 1-23-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDR10X Drill Depth From 1920 To 1980 Page 33 of 42

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1925'	BCS 0000 2095	Dark grey to grayish black (wet) (N3-N2) SILTSTONE, LACUSTRINE			>50% siltstone 1925-1930
1930'	BCS 0000 2096				
1935'	BCS 0000 2097				
1940'	BCS 0000 2098				>80% sandstone
1945'	BCS 0000 2099				
1950'	BCS 0000 2100				
1955'	BCS 0000 2101				10% LACUSTRINE SANDSTONE BEDS.
1960'	BCS 0000 2102				
1965'	BCS 0000 2103				
1970'	BCS 0000 2104				
1975'	BCS 0000 2105				
1980'	BCS 0000 2106				

Prepared By Michael Cline Date 1.12.99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1980 To 2040 Page 34 of 42

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1985	BCS 0000 2107				50% CLAY
1990	BCS 0000 2108				
1995	BCS 0000 2109				
2000	BCS 0000 2110	SANDSTONE, LACUSTRINE			silty Sandstone
2005	BCS 0000 2111				
2010	BCS 0000 2112	Sandstone LACUSTRINE Light Gray to Med light gray (N7-N6)			<20% siltstone
2015	BCS 0000 2113				>95% sandstone med Gray NS
2020	BCS 0000 2114				
2025	BCS 0000 2115				
2030	BCS 0000 2116	Poorly Sorted Sandstone, siltstone, clay			ABUNDANT CLAY
2035	BCS 0000 2117				
2040	BCS 0000 2118	Siltstone LACUSTRINE with Fine <1m laminae Brownish Gray 5YR 4/1 Some Sandstone			

Prepared By Michael Clinc Date 1-13-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWRP-10X Drill Depth From 2040 To 2100 Page 35 of 42

Driller MIKE BOYD Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHAMM T685 DHH Sampling Equip./Method CYCLONE/SAMPLE SPLITTER

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
2045	BCS 0000 2119	NO SAMPLE			No return after extended break. 12-19-98 → 1-7-99
2050	BCS 0000 2120	SANDY SILTSTONE, GRAYISH BLACK N2, AND SILTY SANDSTONE, MEDIUM GRAY N5, LACUSTRINE/PLAYA			TRACE GYPSUM
2055	BCS 0000 2121				
2060	BCS 0000 2122				
2065	BCS 0000 2123				
2070	BCS 0000 2124				
2075	BCS 0000 2125				
2080	BCS 0000 2126				
2085	BCS 0000 2127				
2090	BCS 0000 2128				
2095	BCS 0000 2129				
2100	BCS 0000 2130	SILTY SANDSTONE BECOMING DARKER (GRAYISH BLACK N2) WITH DEPTH			TRACE PYRITE

Prepared By ARTHUR J. MENDENHALL Date 1-13-99

Checked By Mike Chue Date 1-23-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 2100 To 2160 Page 36 of 42
 Driller LAUNE - BOND Start Date/Time _____ End Date/Time _____
 Drilling Equip./Method SCHRAMM T685 PPH Sampling Equip./Method 1145 CYCLONE / 0.55 IN BAG

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2105	RCS 0000 2121	Sandy siltstone, greyish black (N2) and silty sandstone, med. dark grey (N4), lacustrine. Dark sandy siltstone predominates with beds of lighter silty sandstone. (As above)			
2110	RCS 0000 2131				
2115	RCS 0000 2133	Fine silty bed, medium grey (N5)			
2120	RCS 0000 2124				
2125	RCS 0000 2125	as above			
2130	RCS 0000 2126				
2135	RCS 0000 2137	Silty sandstone, greenish grey (SG4 611)			
2140	RCS 0000 2138				
2145	RCS 0000 2139	as above			
2150	RCS 0000 2140				
2155	RCS 0000 2141				
2160	RCS 0000 2142				

Prepared By JAMIE WALKER Date 1-19-99 Checked By Mike Clive Date 1-23-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDD-1DX Drill Depth From 2160 To 2220 Page 37 of 42

Driller LAYNE - BOYD Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 D4H Sampling Equip./Method WET / CYCLONE / OLEFIN BAGS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	RCS 0000 2143	As above Sandstone, fine, med. light grey (N6) homogeneous, lacustrine. Possible fine reworked top to unit below.			
	BCS 0000 2144				
	BCS 0000 2145	Sandstone, fine feldspathic (arkose), light grey (N7), homogeneous. Local ? beds of dark grey siltstone. Unit appears to coarsen down-hole. Lacustrine. Volcaniclastic, predominantly fine white and grey feldspar with pos. calc cement. Compositionally immature terrigenous nature noted.			
	BCS 0000 2146				
	RCS 0000 2147				
	BCS 0000 2148				
	BCS 0000 2149				
	BCS 0000 2150				
	BCS 0000 2151	10% dark grey siltstone			
	BCS 0000 2152				
	BCS 0000 2153				
	BCS 0000 2154				

Prepared By JAMIE WALKER Date 1-19-99 Checked By Mike Dine Date 1-23-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP Drill Depth From 2220 To 2280 Page 38 of 42
-1DX

Driller LAUNE - BOYD/MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2225	BCS 0000 2155	Sandstone, as above, arkosic	[Dotted pattern]		
2230	BCS 0000 2156				
2235	BCS 0000 2157				
2240	BCS 0000 2158				
2245	BCS 0000 2159				
2250	BCS 0000 2160				
2255	BCS 0000 2161				
2260	BCS 0000 2162				
2265	BCS 0000 2163				
2270	BCS 0000 2164				
2275	BCS 0000 2165				
2280	BCS 0000 2166				

Prepared By JAMIE WALKER Date 1-19-99 Checked By Mike Chen Date 1-23-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 2280 To 2340 Page 39 of 42

Driller LAYNE - MANGUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2285	2167	Siltstone, greenish-black (N2), cherty. Unit marks contact			
2290	2168	Sandstone, as 2172-2283, fine feldspathic, light grey (N7) to medium grey (N5). Local sections with clay beds, light grey (N7)			
2295	2169				
2300	2170	Clay in returns			
2305	2171				
2310	2172				
2315	2173	Clay-rich zone, difficult drilling			
2320	2174				Gypsum in cutting
2325	2174	Siltstone, finely laminated (0.5-2mm) to unlaminated local < 1' thick sandstone beds as above. Generally light brownish grey (54R 6/1) to brownish grey			Finished drilling 1125 on 1-14-99 started drilling 2320 on 1-19-99
2330	2250				- drill shift change 2328
2335	2175				
2340	2176	Clay rich zone			

Prepared By JAMIE WALKER Date 1-19-99 Checked By Michael Chive Date 1-23-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-FWDP Drill Depth From 2280 To 2340 Page 40 of 42
IDx

Driller Maugum Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2275	BCS 0000 2177	Siltstone varies in color from pale yellowish orange (10% R %) to Moderate greenish yellow (10% G %)			
2275	BCS 0000 2178	Clay rich zone			
2275	BCS 0000 2179				
2275	BCS 0000 2180				
2275	BCS 0000 2181	more Homogeneous color. Dark gray (N5)			
2275	BCS 0000 2182				
2275	BCS 0000 2183	20% Dusky yellow (5% G) siltstone fragments in dark gray (N5) siltstone			
2275	BCS 0000 2184				
2275	BCS 0000 2185				
2275	BCS 0000 2186				
2275	BCS 0000 2187	Sandstone, buffaceous. Med. gray (N5) to med. dark gray (N4). Similar to 2285-2320; indurated in Miocene (not in core).			
2275	BCS 0000 2188				

Prepared By Mike Cline Date 1-20-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 2400 To 2460 Page 41 of 42

Driller LAYNE-MANGLUM Start Date/Time _____ End Date/Time _____

Drilling Equip./Method ECHRAMM T685 DAH-#450 Sampling Equip./Method WET/CYCLONE

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2405	BCS 0000 2189	10% siltstone, brownish grey, as above	[Hand-drawn lithologic column with dots and dashes representing different rock types]		
2410	BCS 0000 2190	Unit becomes clay-rich - > 30-50% with light grey (N7) clay "balls" in sample.			
2415	BCS 0000 2191				
2420	BCS 0000 2192				
2425	BCS 0000 2193	Siltstone, weakly laminated, similar to section 2220-2391.			
2430	BCS 0000 2194				
2435	BCS 0000 2195	Sandstone, feldspathic with interbedded fine sandstone and lesser siltstone. Sandstone as 2285-2320, light (N7) to med. light grey (N6). Interbeds of dark grey (N3) siltstone			
2440	BCS 0000 2196				
2445	BCS 0000 2197	5% dark grey siltstone (N3)			
2450	BCS 0000 2198				
2455	BCS 0000 2199				
2460	BCS 0000 2200				

Prepared By JAMIE WALKER Date 1-20-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

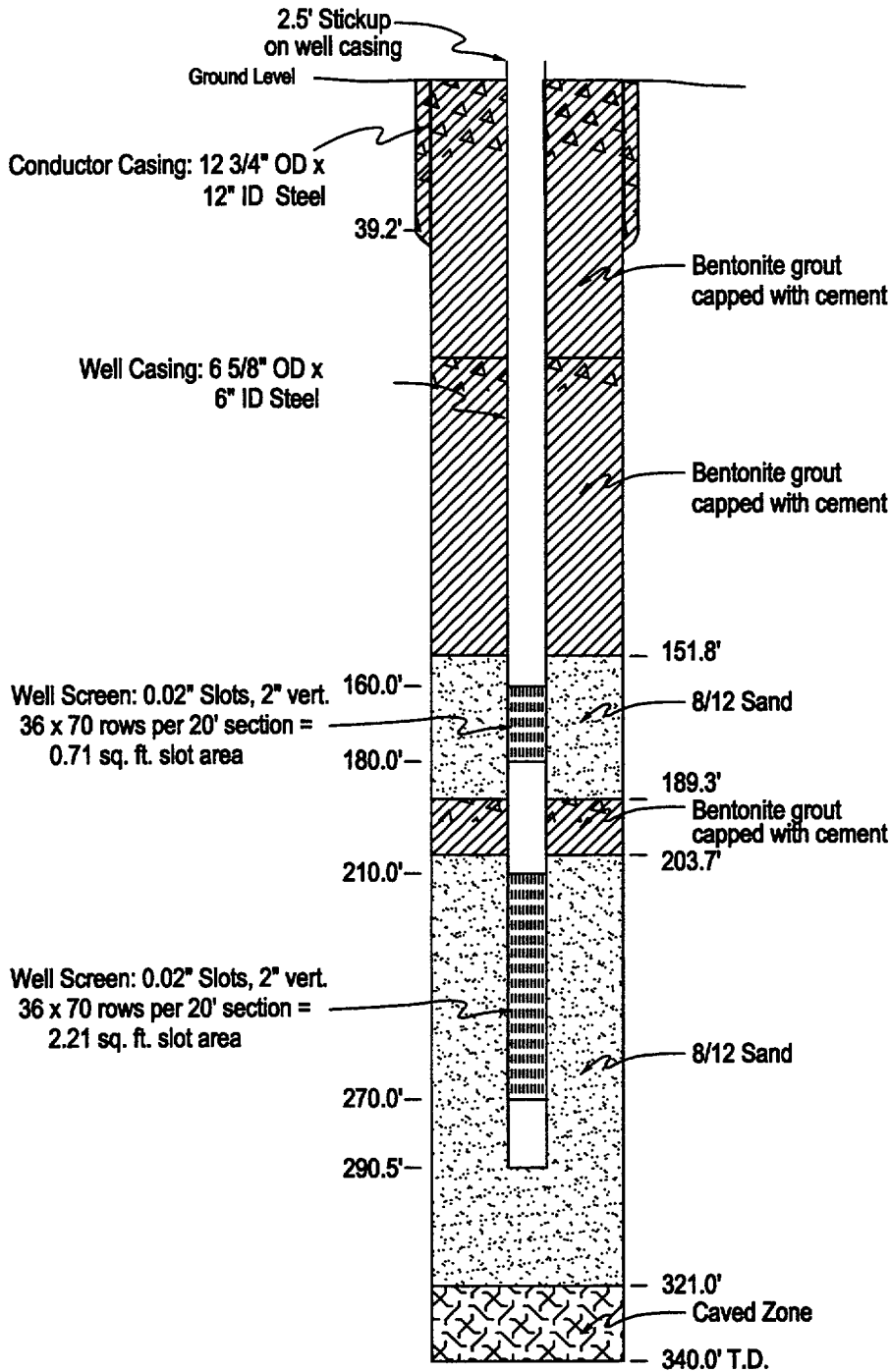
Borehole ID NC-EWDP-1DX Drill Depth From 2460' To 2500' (T.D.) Page 42 of 42

Driller LAUNE-MANGUM/BOYD Start Date/Time _____ End Date/Time _____

Drilling Equip./Method RC-SHEARMI T685 BHH-#450 Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2465	BCS 0000 2201				
2470	BCS 0000 2202				
2475	BCS 0000 2203				
2480	BCS 0000 2204	95% coarse grained Sandstone			
2485	BCS 0000 2205				
2490	BCS 0000 2206				
2495	BCS 0000 2207	30% siltstone			
2500	BCS 0000 2208				
		T.D. at 2500.00			

Prepared By Michael Clive Date 1-23-99 Checked By _____ Date _____



NOTES

1. Horizontal scale exaggerated 50X.
2. All depths referenced to ground level.
3. All casing and screen is flush threaded.
4. Well casings not to horizontal scale.

Nye County, Nevada
 Nuclear Waste Repository Project Office

Early Warning Drilling Program

NC - EWDP - 1S

Well Completion Diagram

Date: 03/99

Geologist: KDD

Scale: 1" = 50'

Drawn by: JSW

**THIS PAGE IS AN
OVERSIZED DRAWING
THAT CAN BE VIEWED AT
THE RECORD TITLED:**

NONE:

BOREHOLE: NC-1D

**LOGS: DENSITY NEUTRON
E-LOGS GAMMA DEVIATION**

**WITHIN THIS PACKAGE...OR,
BY SEARCHING USING THE
DRAWING NUMBER:**

NONE

NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-1

9906100166-01

Well No. NC-EWDP-1S

Status:

Completed

Latitude\Longitude:

36° 42' 33.385" 116° 35' 17.880"

Legal Description:

Township 14S Range 48E

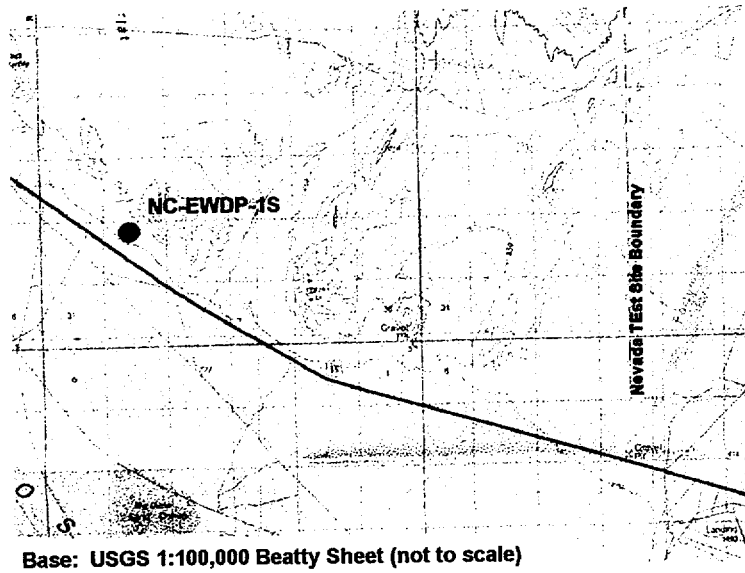
Section 29 NW 1/4 NE 1/4 1/4

Elevation:

803.26 m AMSL (2635.4 ft ±) GPS

Access:

Highway 95 west from Lathrop Wells
Jct 11.0 miles to gate on north side of
Highway. Take gravel road 0.2 miles
to turnaround in white spring deposits.



Purpose: 1) provide lithologic samples of spring deposits; 2) define valley-fill stratigraphic sequence and groundwater flow paths down gradient of proposed repository; 3) provide aquifer test data; and 4) provide water level and water chemistry data.

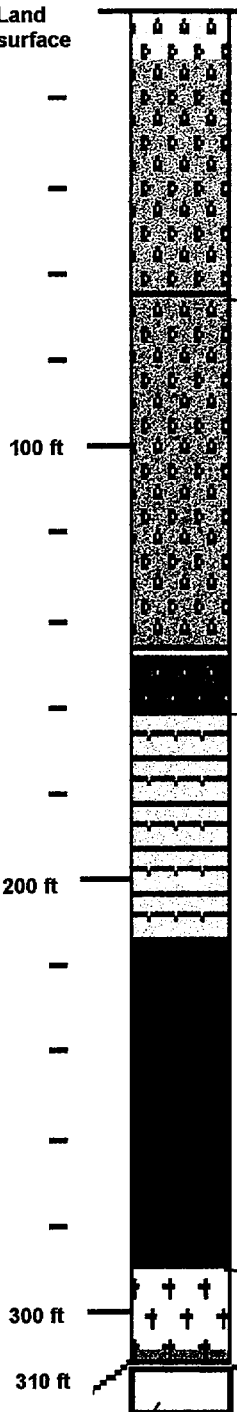


Base: Thematic Mapper Image of the Big Dune 7.5° Quadrangle

NC-EWDP-1S is located on paleospring deposits near the boundary between the Crater Flat and Amargosa Desert hydrographic basins. The site is located down gradient of fractured volcanic rocks that provide a pathway for groundwater flow from the Yucca Mountain area. The paleospring deposits are of note as these types of deposits are associated with past climates. Two zones, one in the valley-fill deposits, and one in the upper Tertiary volcanics were selected for long-term monitoring. Deeper zones are monitored in NC-EWDP-1D. Prior to completion, a 48 hour constant discharge test was completed. Water samples were collected for analysis.

**NC-EWDP- 1S
SITE SUMMARY**

Land surface



0-65' Valley-fill Spring Deposits - 0-10' sandy silt, very pale orange (10YR 8/2), vfg sand and clay; 10-30' silty sand, pale yellow brown (10YR 6/2), vfg, fine gravel; 30-65' gravelly silty sand, pale yellow brown (10YR 6/2) to mod. brown (5YR 3/4), clayey layers, cemented, frag of volcanics/gravel

65-160' Valley-fill -Alluvium - 70-85' clayey gravel, fg-mg ang. sand, fg-cg subang. gravel, pale yellow brown (10YR 6/2); 85-95' clayey sand, pale yellow brown (10YR6/2), cg sand, low plasticity; 95-115' gravelly sand, pale yellow brown (10YR 6/2), fg gravel, cg sand, tr. clay and cobbles, inc. clay downhole; 115-130' sandy clay, pale yellow brown (10YR 6/2), cg ang. sand, fg ang gravel, plastic, becomes gravelly down-hole; 130-150' sandy gravel, pale yellow brown (10YR 6/2), tr. clay, no recovery 145-150'; 150-160' gravelley clay, dark yellow brown (10YR 5/2), cg sand, fg ang. gravel

160- 289' Tertiary Volcanics - 160-289' welded tuff, densely welded, hard, grey orange-pink (5YR6/2) biotite, sanidine; dry when drilled; changes to light brownish gray (5YR 6/1) past 190', dark reddish brown (10R 3/4) 215-280', calcite 235-245', 280-290' pale brown (5YR 5/2)

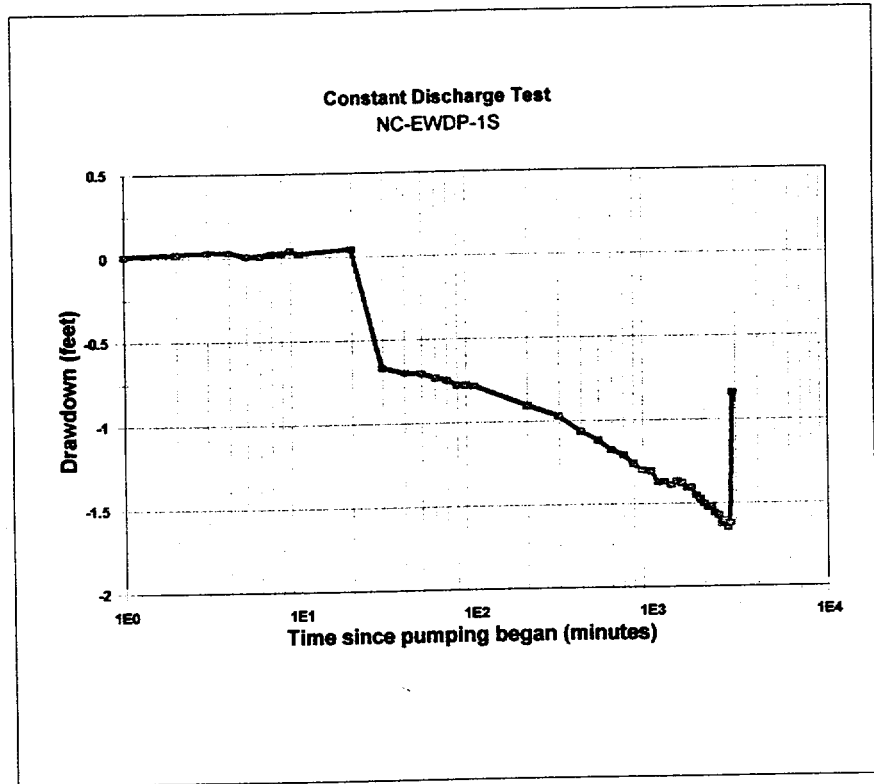
289-320' Tertiary Volcanics - 289-310' ashfall tuff, pale greenish yellow (10Y 8/2) to grayish yellow green (5GY 7/2), clayey, very soft, thin layers or frag's of gray-brn (5YR 4/2), 305-310' greenish-gray (5GY 6/1), very silty, soft

Note: A 30 ft. "rat tail" was extended to a TD of 340'; no samples were collected between 310-340'.

NC-EWDP-1S
SUMMARY LITHOLOGIC LOG

NC-EWDP-1S
Constant Discharge Tests
Date: February 21-23 1999
Static Depth 56.69
To Water
(ft below mp)

Time Since Pumping Began minutes	Depth to Water ft	Draw Down ft
0	56.69	
1	56.68	0.01
2	56.67	0.02
3	56.66	0.03
4	56.66	0.03
5	56.68	0.01
6	56.68	0.01
7	56.67	0.02
8	56.67	0.02
9	56.65	0.04
10	56.67	0.02
20	56.64	0.05
30	57.35	-0.66
40	57.38	-0.69
50	57.39	-0.70
60	57.42	-0.73
70	57.43	-0.74
80	57.46	-0.77
90	57.46	-0.77
100	57.47	-0.78
200	57.59	-0.90
300	57.66	-0.97
400	57.75	-1.06
500	57.80	-1.11
600	57.86	-1.17
700	57.89	-1.20
800	57.95	-1.26
900	57.99	-1.30
1000	57.99	-1.30
1100	58.06	-1.37
1200	58.06	-1.37
1300	58.08	-1.39
1400	58.05	-1.36
1500	58.07	-1.38
1600	58.09	-1.40
1700	58.09	-1.40
1800	58.14	-1.45
1900	58.16	-1.47
2000	58.19	-1.50
2100	58.21	-1.52
2200	58.21	-1.52
2300	58.25	-1.56
2400	58.26	-1.57
2500	58.31	-1.62
2600	58.29	-1.60
2700	58.33	-1.64
2800	58.31	-1.62
2900	57.53	-0.84



Pumping Rate
164 gallons per minute

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-15 Drill Depth From 0 To 60 Page 1 of 6

Driller BRYAN MORRIS/BOYLES BROS Start Date/Time 1-27-99, 0919 End Date/Time 2-3-99, 0649

Drilling Equip./Method AP-1000/11" CROWD-OUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
5	BCS 0000 2851 (1 MIN)	SPRING DEPOSIT SANDY SILT; very pale orange (10YR 8/2), very fine sand, clay.			WEAK REACTION TO 10% HCL
10	BCS 0000 2852 (2 MIN)				WEAK REACTION TO 10% HCL
15	BCS 0000 2853 (1 MIN)	SILTY SAND: trace - some fine subround gravel very fine - fine sand, pale yel brn (10YR 6/2) moist			NO REACTION TO 10% HCL
20	BCS 0000 2854 (1 MIN)	Moist			NO REACTION TO 10% HCL
25	BCS 0000 2855 (2 MIN)	Moist			STRONG REACTION TO 10% HCL
30	BCS 0000 2856 (2 MIN)	Moist			STRONG REACTION TO 10% HCL
35	BCS 0000 2857 (9 MIN)	GRAVELLY SILTY SAND: Trace clay, some coarse ang gravel, pale yel brn (10YR 6/3) Some thin dk yel brn (10YR 4/2) - Med brn (5YR 3/4) clayey layers, moist			Hard @ 32' MODERATE REACTION TO 10% HCL
40	BCS 0000 2858 (10 MIN)	VERY hard cemented with glassy frags & ang welded tuft frags Cuttings coarse & angular - tabular cobbles. Caliche or silicified frags			MODERATE REACTION TO 10% HCL
45	BCS 0000 2859 (17 MIN)	Cobble sized fragments Moist			STRONG REACTION TO 10% HCL
50	BCS 0000 2860 (9 MIN)				STRONG REACTION TO 10% HCL
55	BCS 0000 2861 (19 MIN)	Predom angular coarse gravel & cobbles, moist Lt pink orange (10YR 8/2) - pink gra (5YR 8/1) 52.7, 0646, 1-28-99 52.5, 0755, 2-3-99			STRONG REACTION TO 10% HCL
60	BCS 0000 2862 (22 MIN)				STRONG REACTION TO 10% HCL

NOTE TIME FOR 5' RUN IN () IN 2ND COLUMN

Prepared By KEN DUNNELSON Date 1-27-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-15 Drill Depth From 60 To 120 Page 2 of 6

Driller BRYAN MURRIS / BOYLES BROS Start Date/Time 1-27-99, 0919 End Date/Time 2-3-99, 0644

Drilling Equip./Method AP-1000 / 11" CROWD-OUT BIT Sampling Equip./Method CYCLONE / CUTTINGS
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
65	BCS 0000 2863 (11 MIN)	GRAVELLY SILTY SAND: Coarse subang gravel & cobbles, fine - coarse sand, Pale yel brn (10YR 6/2) MOIST			STRONG REACTION TO 10% HCl
70	BCS 0000 2864 (5 MIN)	ALLUVIUM VERY MOIST			STRONG REACTION TO 10% HCl
75	BCS 0000 2865 (4 MIN)	CLAYEY GRAVEL: fine to coarse ang sand, fine - coarse subang gravel, low plasticity, Pale yel brn (10YR 6/2) WET			MODERATE REACTION TO 10% HCl
80	BCS 0000 2866 (8 MIN)	DECREASE IN AMOUNT OF GRAVEL INCREASE IN AMOUNT OF COARSE SAND			WEAK REACTION TO 10% HCl
85	BCS 0000 2867 (4 MIN)	CLAYEY SAND: Some fine gravel, coarse sand low plasticity, Pale yel brn (10YR 6/2)			NO REACTION TO 10% HCl
90	BCS 0000 2868 (11 MIN)				WEAK REACTION TO 10% HCl
95	BCS 0000 2869 (7 MIN)				WEAK REACTION TO 10% HCl
100	BCS 0000 2870 (6 MIN)	GRAVELLY SAND: Fine angular gravel (pea-size) coarse angular sand, silty, trace of clay moist, Pale yel brn (10YR 6/2). Trace cobbles			WEAK REACTION TO 10% HCl
105	BCS 0000 2871 (9 MIN)	Increased amount of clay			MODERATE REACTION TO 10% HCl
110	BCS 0000 2872 (5 MIN)				MODERATE REACTION TO 10% HCl
115	BCS 0000 2873 (6 MIN)	Decreased amount of clay Some cobbles.			MODERATE REACTION TO 10% HCl
120	BCS 0000 2874 (4 MIN)	SANDY CLAY: Coarse ang sand, some - consid fine ang gravel, low - medium plasticity, Pale, yel brn (10YR 6/2). Trace coarse gravel			STRONG REACTION TO 10% HCl

NOTE: TIME FOR S' RUN IN () IN 2ND COLUMN.

Prepared By KEN DONNELSON Date 1-27-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-15 Drill Depth From 60 To 180 Page 3 of 5

Driller RYAN MORRIS/BOYLES BRUS. Start Date/Time 1-27-99, 0919 End Date/Time 2-3-99, 0644

Drilling Equip./Method AP-1000/11" CROWD-OUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
 DRILLED WITH AIR, SCHRAMM T685 DHH WITH 6 3/4" TRICONE BELOW 160'

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
125	BCS 0000 2875 (5 MIN)	CLAYEY GRAVEL: Coarse sand, predom fine angular gravel, some cobbles, low plasticity			MODERATE REACTION TO 10% HCl WEAK REACTION TO 10% HCl
130	BCS 0000 2876 (7 MIN)	No cobbles			Hit water @ 127: @ 1538, 1-27-99 1540, 1-27-99 0729, 1-28-99
135	BCS 0000 2877 (29 MIN)	SANDY GRAVEL: Coarse sand, trace clay. Gravels consist of silicified, pale yel brn (10YR 6/1) rock with glassy frags.			MODERATE REACTION TO 10% HCl
140	BCS 0000 2878 (4 MIN)	Increased amount of clay, fine subang gravel some cobbles			NO REACTION TO 10% HCl
145	BCS 0000 2879 (8 MIN)				NO REACTION TO 10% HCl
150	BCS 0000 2880 (9 MIN)	NO RECOVERY	?		
155	BCS 0000 2881 (6 MIN)	GRAVELLY CLAY: Predom fine ang gravel, coarse sand, med - high plasticity, Dk yel brn (10YR 5/2)			NO REACTION TO 10% HCl
160	BCS 0000 2882 (25 MIN)	Picking up tabular frags of very hard xtal-rich welded tuff, 1-3 mm clear angular xtals in a Lt brn gry (5YR 6/1) aphanitic matrix.			NO REACTION TO 10% HCl 1039, 1-28-99
165	BCS 0000 2883 (7 MIN)	WELDED TUFF: Densely welded, very hard, 1-3mm sinuadine xtals, xtal-rich "copper" colored biotite. Gry orange pink (5YR 6/2) matrix. Dry-aquifer sealed off.	W W W	60min/1"	1211, 2-2-99 DRILLED WITH SCHRAMM T685 DHH w/ 6 3/4" TRICONE
170	BCS 0000 2884 (7 MIN)		W W W		
175	BCS 0000 2885 (6 MIN)		W W W		
180	BCS 0000 2886 (7 MIN)		W W W		

E: TIME FOR 5' RUN IN () IN 2ND COLUMN.

Prepared By K. DONNELSON Date 2-2-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-15 Drill Depth From 180 To 240 Page 4 of 6

Driller BRYAN MORRIS/BOYLES BROJ Start Date/Time 1-27-99, 0919 End Date/Time 2-3-99, 0644
 & MIKE BOYD

Drilling Equip./Method AP-1000/11" CROWD-OUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
DRILLED WITH AIR - SCHRAMM T685 DHH WITH 6 3/4" TRICONE BELOW 160'

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
185	BCS 0000 2887 (9 MIN)		W W W		
190	BCS 0000 2888 (7 MIN)		W W W		
195	BCS 0000 2889 (6 MIN)	Lt brownish gray (5YR 6/1) Increase in calcite fragments from 190-215.	W W W		COARSE CUTTINGS FROM 185-190
200	BCS 0000 2890 (4 MIN)		W W W		
205	BCS 0000 2891 (6 MIN)		W W W		RETURN WATER BECOMES "MILKY" FROM 195-205.
210	BCS 0000 2892 (7 MIN)		W W W		
215	BCS 0000 2893 (7 MIN)		W W W		PREDOMINANTLY Gray red (10R 4/2) - Dark reddish brn (10R 3/4) FROM 215-280'
220	BCS 0000 2894 (12 MIN)		W W W		
225	BCS 0000 2895 (19 MIN)		W W W		≈ 200 GPM YIELD @ 225'
230	BCS 0000 2896 (15 MIN)		W W W		
235	BCS 0000 2897 (9 MIN)		W W W		MAY BE SOME CAVITIES FROM 230-235' COARSE CUTTINGS FROM 235'-245'. DRILL RODS TIERING. FRACTURED.
240	BCS 0000 2898 (10 MIN)	Considerable white calcite from 235-245'	W W W		

NOTE: TIME FOR 5' RUN IN () IN 2ND COLUMN.

Prepared By K. DANIELSON Date 2-2-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-15 Drill Depth From 240 To 300 Page 5 of 6

Driller BRYAN MORRIS/ROYLES BROS & MIKE BOYD Start Date/Time 1-27-99, 0919 End Date/Time 2-3-99, 0644

Drilling Equip./Method AP-1000/11" CROWD-OUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
DRILLED WITH AIR. SCHRAMM T68SDHH WITH 6 3/4" TELEONE BELOW 160'

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
245	BCS 0000 2899 (27 MIN)		W W W W		
250	BCS 0000 2900 (12 MIN)		W W W W		NO WATER RETURN AT DRILL COLLAR FROM 251 - 260'
255	BCS 0000 2901 (14 MIN)		W W W W		
260	BCS 0000 2902 (15 MIN)		W W W W		
265	BCS 0000 2903 (8 MIN)		W W W W		
270	BCS 0000 2904 (8 MIN)		W W W W		
275	BCS 0000 2905 (8 MIN)		W W W W		
280	BCS 0000 2906 (7 MIN)		W W W W		
285	BCS 0000 2907 (4 MIN)	Pale brn (5YR 5/2) FROM 280 - 284'	W W W W		
290	BCS 0000 2908 (4 MIN)	TUFF: Ash fall, Pale greenish yellow (10Y 8/2) - Grayish yellow green (5GY 7/2), Clayey, very soft with thin layers or frags of gray brn (5YR 4/2) welded tuff	+ + + + + + + + + + + +		
295	BCS 0000 2910 (7 MIN)		+ + + + + + + +		NO WATER RETURN AT COLLAR FROM 290 - 300' 1738, 2-2-99
300	BCS 0000 2910 (15 MIN)		+ + + +		

NOTE: TIME FOR 5' RUN IN () IN 2ND COLUMN.

Prepared By K. DONNELSON Date 2-2-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-15 Drill Depth From 300 To 310' Page 6 of 6

Driller BRYAN MORRIS / MIKE BOYD Start Date/Time 1-27-99, 0919 End Date/Time 2-3-99, 0644

Drilling Equip./Method SCHRAMM T685 DDH Sampling Equip./Method CYCLONE CUTTING
 WITH 6 3/4" TRICONE BELOW 160'

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
305	BCS 0000 2911 (10 MIN)	TUFF: Ash fall, Pale greenish yellow (10Y 8/2) - Grayish yellow green (5GY 7/2), clayey, very soft, with thin layers or small frags of gray brown (5YE 4/2) welded tuff.	+ + + + + + + + + + + + + + + + + + + +		2-3-99, 0627 WEAK REACTION TO 10% HCl NO WATER RETURN AT COLLAR BELOW 301'
310	BCS 0000 2912 (7 MIN)	TUFF: Ash fall, Greenish gray (5GY 6/1), very silty, soft.	+ + + + + + + + + + + + + + + + + + + +		WEAK REACTION TO 10% HCl 2-3-99, 0644
		T.D. = 310'			

Prepared By K. DONNELSON Date 2-3-99 Checked By _____ Date _____



COMPLETION REPORT

MP55 Monitoring Wells (1S) and 3S

Nye County EDWP

Amargosa Valley, NV

Prepared for:

**Nye County Department of Natural Resources
and Federal Facilities
Pahrump, NV**

Prepared by:

Westbay Instruments Inc.

WB740

March 18, 1999

CONTENTS

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3.1 Previous Activities	1
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APPENDIX 1

Monitoring Well EWDP 1S

MOSDAX Data Report, March 12, 1999
Figure 1, Piezometric Profile (all zones), March 12, 1999
Summary MP Casing Log
MP Casing Installation Log (field copy)
MP55 Packer Inflation Field Records
(field records and plots for 4 packers)
MP Drift Diagram
Nye County Document "NC-EWDP-1S Well Installation As-Built Schematic", Feb 19, 1999

APPENDIX 2

Monitoring Well EWDP 3S

MOSDAX Data Report, March 13, 1999
Figure 2, Piezometric Profile (all zones), March 13, 1999
Summary MP Casing Log
MP Casing Installation Log (field copy)
MP55 Packer Inflation Field Records
(field records and plots for 6 packers)
MP Drift Diagram
Nye County Document "NC-EWDP-3S Well Completion Diagram"
Draft, March 10, 1999

1. Introduction

This report and the attached Appendices document the technical services carried out by Westbay Instruments Inc. under Nye County Order No. 75380 dated December 22, 1998. The Westbay MP System for groundwater monitoring was installed in drillholes 1S and 3S at the Nye County EWDP in Amargosa Valley, NV. The MP55 System casing components were installed in steel cased drillholes previously prepared by Nye County.

2. Personnel

Westbay representative Mr. Dave Larsen was on site for the installation from March 9 to 13, 1999.

3. Installation

3.1 Previous Activities

Borehole 1S was drilled by Nye County to a depth of 340 ft below ground surface using reverse circulation air rotary drilling methods. Steel well casing (nominal 6-inch ID and 6.4 inch OD) was grouted in place to a total depth of 290.5 ft. The well casing included two slotted screen sections. The screens consisted of blank steel well pipe (nominal 6-inch ID) with 0.020 inch vertical cut slots.

The open hole depth to water was approximately 54.52 ft below the 6-inch steel casing. The sounded depth of the well was 293.05 ft below the 6-inch steel casing. The steel casing stick-up was 2.0 ft above ground level.

Borehole 3S was drilled by Nye County to a depth of 550 ft below ground surface using reverse circulation air rotary drilling methods. Steel well casing (nominal 6-inch ID and 6.4 inch OD) was grouted in place to a total depth of 295.6 ft. The well casing included one slotted screen section. The screen consisted of blank steel well pipe (nominal 6-inch ID) with 0.020 inch vertical cut slots.

The open hole depth to water was approximately 259.67 ft below the 6-inch steel casing. The sounded depth of the well was 528 ft below the 6-inch steel casing. The steel casing stick-up was 1.6 ft above ground level.

Open-hole geophysical logging was carried out in No. 3S by Nye County and others before installation of the MP55 System casing components. In both 1S and 3S, a swab was run inside the well casing by Nye County to dislodge burrs or internal protrusions associated with the cut slots in the screened sections.

3.2 Preparation of Monitoring Well Design

Nye County prepared a completion diagram titled "NC-EDWP-1S Well Installation As-Built Schematic", dated February 19, 1999 which showed the steel well pipe, slotted screens and backfill layers installed in borehole No. 1S. A copy of this diagram was given to

Westbay on March 7, 1999. Nye County prepared a similar draft diagram, titled "NC-EWDP-3S Well Completion Diagram for borehole No. 3S and gave it to Westbay on March 10, 1999..

An MP Casing Installation Log, which specifies the proposed location of each MP55 System component in the borehole, was prepared for each monitoring well by Westbay based on this information. An MP Drift Diagram which shows the inside diameter of the borehole, steel well pipe and screens, and the outside diameter of each MP55 System component was also prepared by Westbay. The MP Installation Casing Logs were approved by Nye County. The MP Casing Installation Log as approved were used as the installation guides in the field.

Copies of the Nye County drawings, the MP Casing Installation Logs with the annotated field notes and the MP Drift Diagrams are included in the Appendices.

All of the MP55 casing components were supplied by Westbay in nominal metric lengths (typically 3m and 1.5m lengths of MP55 casing). All depths and component positions in the borehole are reported in imperial units (ft and decimal ft) with respect to ground level, which is the surface of the concrete pad surrounding the steel casing at 1S and average ground level at borehole 3S.

The MP55 well arrangement includes primary monitoring zones positioned according to the well screen locations. An MP measurement port coupling and associated magnetic location collar were included in each primary monitoring zone to provide the capability to measure fluid pressures and collect fluid samples. A pumping port coupling was also included in each primary zone to provide purging and hydraulic conductivity testing capabilities.

The MP55 casing components in the lower (instrumented) part of each borehole were our current (0600 model series) packers, ports couplings, regular couplings and casing. The riser pipe above the top MP packer in each well is our older (0300 model series) blank casing and regular couplings. There is an adapter pipe section to convert between the 0600 series and 0300 series casings. The 0300 model series casing items were originally purchased by Nye County for use in Borehole No. 1D and have since been re-assigned to other monitoring wells.

Measurement port couplings were included in QA zones to provide QA testing capabilities. The measurement ports in each of the QA were positioned 5 ft below the MP55 packers to permit routine operation of the squeeze relief venting with the MP55 packer inflation equipment during the inflation process.

3.3 Layout of MP Casing Components

The MP casing components were set out in sequence according to the MP Casing Installation Log on a trailer near the borehole. Each casing length was numbered in order beginning with the lowermost as an aid in confirming the proper sequence of components. The sequential MP casing component numbers are given on the MP Casing Installation Log

and the Summary MP Casing Log, and are used in the following text to identify selected MP casing components (packers and ports).

The appropriate MP System coupling was attached to each piece of casing. Magnetic location collars were attached 2 ft. below the selected measurement ports in each of the primary monitoring zones.

Each casing component was visually inspected, and serial numbers for each packer, measurement port coupling and pumping port coupling were recorded on the field copy of the MP Casing Installation Log included in the Appendix.

3.4 Lowering of MP Components

The casing was lowered into the boreholes on March 10 (No. 1S) and March 12, 1999 (No. 3S). The MP casing components were placed in the borehole in sequence. Each casing joint was tested with a minimum internal pressure of 150 psi for one minute to confirm hydraulic seals. A record of each successful joint test and the placement of each casing component is on the field copy of the MP Casing Log. Geotextile filters were installed over selected measurement port couplings, as indicated by the annotation "F" on the MP Casing Log.

3.5 Hydraulic Integrity Testing

After the casing was lowered into the borehole, the water level inside the MP casing was left overnight at a depth of more than 150 ft below the open borehole water level to confirm hydraulic integrity of the casing. The data from the hydraulic integrity test is shown on page No. 3 of the MP Casing Installation Log in the Appendix. For each well, the test indicated that the MP casing was water tight.

3.6 Positioning of MP Components

After the components were lowered into the well and the hydraulic integrity of the MP casing had been confirmed, the MP casing string was positioned as shown on the MP Casing Installation Log. The Summary MP Casing Log, which shows the final "as-built" location of the well components and the monitoring zone numbering scheme selected by Nye County is also included in the Appendix.

Standard MP55 top completions with Stainless Steel top couplings were not available for installation. These will be added later, and the Summary MP Casing Logs will be updated.

3.7 Inflation of MP System Packers

The MP packers were inflated in sequence beginning with the bottom packer. All of the packers were inflated successfully. The data for inflation of each packer are provided on the MP55 Packer Inflation Field Records included in the Appendix. The inflation data for each packer are also provided on graphical plots of the Packer Inflation Records.

The top MP casing was cut and trimmed to suit the final configuration of the wellhead. A sketch of the as-built top of the MP casing is shown on the first page of the Summary MP Casing Log.

During preparation activities for packer inflation at No. 3S, a steel bolt about 4-inches long and 1-inch diameter was dropped in the well outside the MP casing. There was no sound of the bolt hitting the water inside the steel well casing and it was suspected that the bolt had hung up on an MP coupling or above the uppermost MP packer. The suspected position of the bolt is shown on the MP Casing Installation Log. The presence of the bolt in the annulus outside the MP55 casing has not damaged the hydraulic integrity of the casing or packers and is not expected to have any effect on routine monitoring activities in the well.

4. Fluid Pressure Measurements

After packer inflation was completed, fluid pressures were measured at each measurement port. At that time, the in-situ formation pressures may not have recovered from the pre-installation and installation activities. Longer term monitoring is likely to be required to establish representative fluid pressures.

A plot of the piezometric levels in all zones, including QA zones, is shown on Figures No.1 and No. 2 in the Appendices. These data were examined to confirm proper operation of the measurement ports. The MOSDAX Data Report for each profile is enclosed in the Appendices.

APPENDIX 1

Monitoring Well EWDP 1S

MOSDAX Data Report, for readings on March 12, 1999	- 1 page
Figure 1, Piezometric Profile (all zones), March 12 1999	- 1 page
Summary MP Casing Log	- 3 pages
MP Casing Installation Log (field copy)	- 6 pages
MP55 Packer Inflation Field Records (field records and plots for 4 packers)	- 14 pages
MP Drift Diagram	- 1 page
Nye County Document "NC-EWDP-1S Well Installation As-Built Schematic", Feb 19, 1999	- 1 page

APPENDIX 1

Monitoring Well EWDP 1S

MOSDAX Data Report, for readings on March 12, 1999	- 1 page
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Nye County Document "NC-EWDP-1S Well Installation As-Built Schematic", Feb 19, 1999	- 1 page

MOSDAX Data Report

ESTBAY INSTRUMENTS 1990-1993
Date Of Report: Mon Mar 15 20:40:38 1999
Company Name: Nye County
Project Name: EWDP - Amargosa NV
Well ID: EWDP-1S
Well Description: Plastic MP55
Well Elevation: 0.00 (m.)

Probe Information

Logical Probe-1 - Serial #: 2215 - Description: SAMPLER

Port Information

Port #:00 - Description ATMOSPHERIC - Depth 0.0 (m.) - ACF 1.0
Port #:01 - Description SQA-1 - Depth 147.5 (m.) - ACF 1.0
Port #:02 - Description ZONE 1 - Depth 167.6 (m.) - ACF 1.0
Port #:03 - Description SQA-2 - Depth 198.2 (m.) - ACF 1.0
Port #:04 - Description ZONE 2 - Depth 228.2 (m.) - ACF 1.0

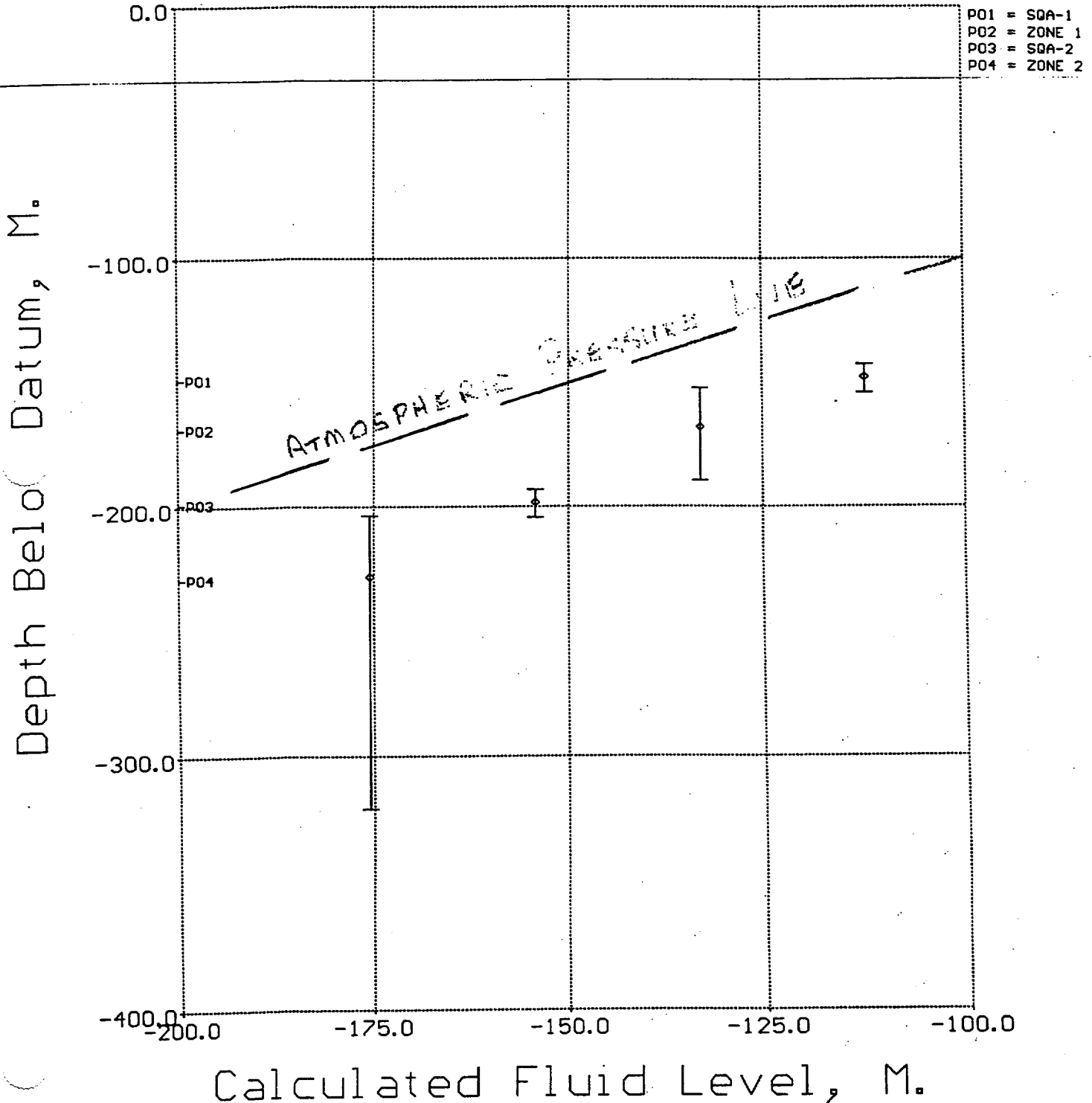
TIME DATE	PORT DESCRIPTION	PRES (psi)	PIEZ DP (ft.)	MOTOR POSITION
Fri Mar 12 09:15:00 1999	ATMOSPHERIC	13.3	0	ARM OUT
Fri Mar 12 09:22:00 1999	ZONE 2	26.6	-218.9	ARM OUT
Fri Mar 12 09:22:00 1999	ZONE 2	88.2	-175.5	SHOE ACTIVATED
Fri Mar 12 09:22:00 1999	ZONE 2	26.5	-218.9	ARM OUT
Fri Mar 12 09:25:00 1999	SQA-2	13.8	-197.8	ARM OUT
Fri Mar 12 09:25:00 1999	SQA-2	75.7	-154.3	SHOE ACTIVATED
Fri Mar 12 09:25:00 1999	SQA-2	13.8	-197.8	ARM OUT
Fri Mar 12 09:27:00 1999	ZONE 1	13.2	-167.6	ARM OUT
Fri Mar 12 09:27:00 1999	ZONE 1	62.4	-133.0	SHOE ACTIVATED
Fri Mar 12 09:27:00 1999	ZONE 1	13.3	-167.6	ARM OUT
Fri Mar 12 09:30:00 1999	SQA-1	13.3	-147.5	ARM OUT
Fri Mar 12 09:30:00 1999	SQA-1	63.6	-112.1	SHOE ACTIVATED
Fri Mar 12 09:30:00 1999	SQA-1	13.3	-147.5	ARM OUT
Fri Mar 12 09:34:00 1999	ATMOSPHERIC	13.2	-0.1	ARM OUT

PIEZOMETRIC PROFILE

WELL: EWDP-1S

Client: Nye County
Profile Date: Fri Mar 12 09:22:00 1999
Comment: Post Inflation Profile

Site: EWDP - Amargosa NU
Description: Plastic MP55
Datum: Ground Level



FILE: 1S120399
Plot By: DL
Checked By: _____
Project: WB740

DIRECT-P
Date: 15 MAR 99
Date: _____
FIGURE: 1

Summary MP Casing Log

Company: Nye County
Well: NC-EWDP-1S
Site: Amargosa Valley NV
Project: EWDP

Job No: WB740
Author: DL

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 279.03 ft.

Borehole Depth: 350.00 ft.
Borehole Inclination:
Borehole Diameter: 10.00 in.

Well Description:

Plastic MP55 System

Other References:

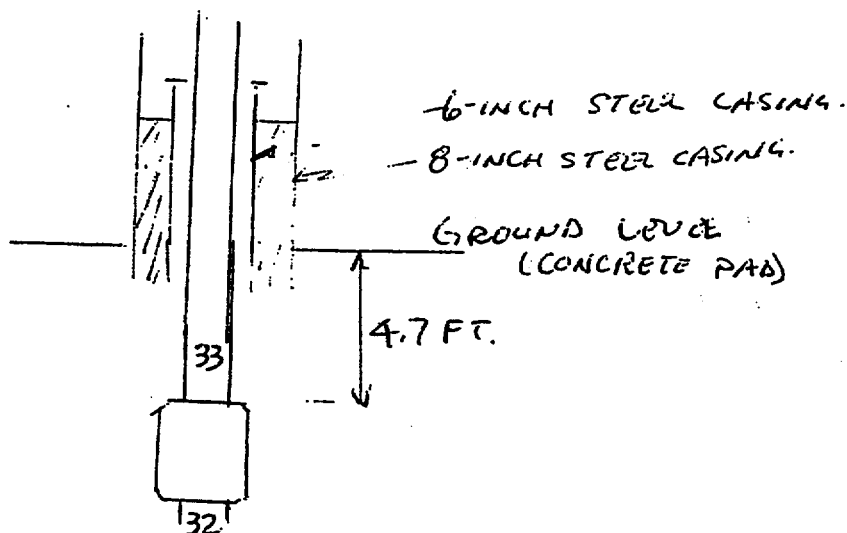
in 6.0 inch steel well casing
Based on Nye County 2-19-99

File Information

File Name: 740_1S.WWD
Report Date: Tue Mar 09 20:31:48 1999

File Date: Mar 09 20:23:28 1999

Sketch of Wellhead Completion



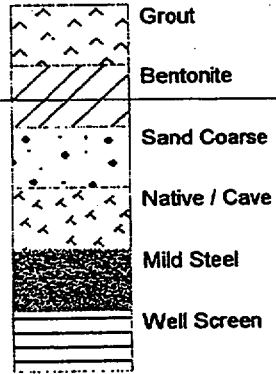
Legend

(Qty) MP Components

Geology

Backfill/Casing

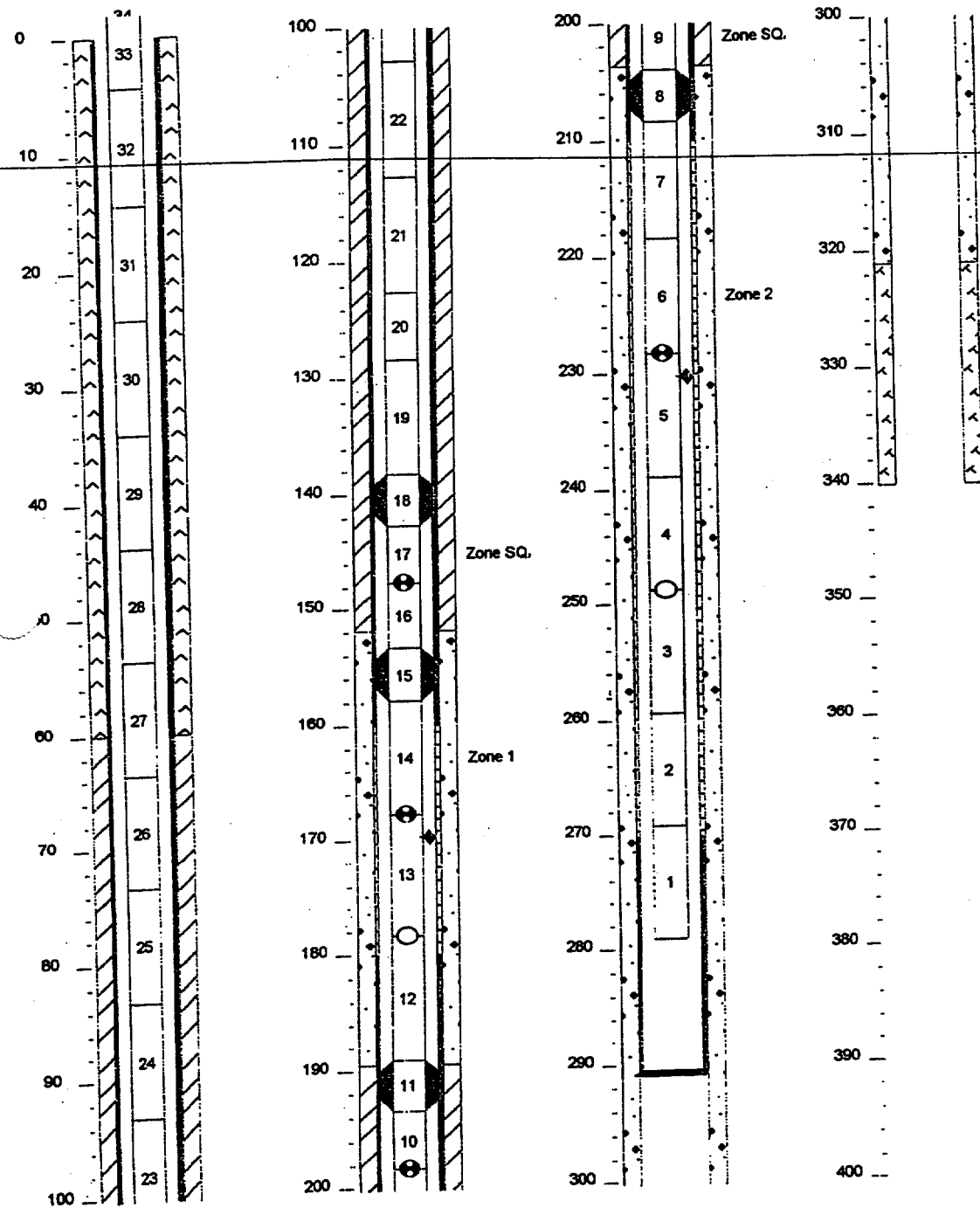
- (2) 0603 - MP55 End Plug
- (13) 0304M30 - MP55 Casing, PVC, 3.0m
- (1) 0601M15A - MP55 Adapter Casing 06_03
- (11) 0601M30 - MP55 Casing, PVC, 3.0m
- (4) 0612M15 - MP55 Packer with stiffeners
- (4) 0601M15 - MP55 Casing, PVC, 1.5m
- (15) 0602 - MP55 Regular Coupling
- (14) 0302 - MP55 Regular Coupling
- (4) 0605 - MP55 Measurement Port
- (2) 0607 - MP55 Hydraulic Pumping Port
- (2) 0608 - MP55 Magnetic Location Collar



Summary MP Casing Log
Nye County

Job No: WB740
Well: NC-EWDP-1S

Scale Feet	MP Log	Zone No.	Scale Feet	MP Log	Zone No.	Scale Feet	MP Log	Zone No.	Scale Feet	MP Log	Zone No.
------------	--------	----------	------------	--------	----------	------------	--------	----------	------------	--------	----------



MP Casing Installation Log

Company: Nye County
Well: NC-EWDP-1S
Site: Amargosa Valley NV
Project: EWDP

Job No: WB740
Author: DL

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 279.03 ft.

Borehole Depth: 350.00 ft.
Borehole Inclination:
Borehole Diameter: 10.00 in.

Well Description:
Plastic MP55 System
Other References:
In 6.0 inch steel well casing
Based on Nye County 2-19-99

File Information

File Name: 740_1S.WWD
Report Date: Tue Mar 09 20:26:08 1999

File Date: Mar 09 11:27:01 1999

Comments

Log Information

Borehole condition confirmed.
MP well design & preparation.
MP well design checked.
MP well and borehole approved to install.

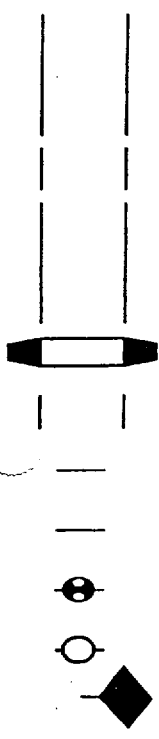
(method) Sounder, inspection Date: 08 MARCH
By: DL/CM Date: 08 MARCH
By: MC/MH Date: 08 MARCH
By: CM for Nye Co Date: 08 MARCH

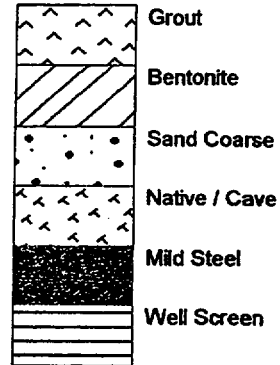
Legend

(Qty) MP Components

Geology

Backfill/Casing

- 
- (2) 0603 - MP55 End Plug
 - (13) 0301M30 - MP55 Casing, PVC, 3.0m
 - (1) 0601M15A - MP55 Adapter Casing 06_03
 - (11) 0601M30 - MP55 Casing, PVC, 3.0m
 - (4) 0612M15 - MP55 Packer with stiffeners
 - (4) 0601M15 - MP55 Casing, PVC, 1.5m
 - (15) 0602 - MP55 Regular Coupling
 - (14) 0302A - MP55 Regular Coupling
 - (4) 0605 - MP55 Measurement Port
 - (2) 0607 - MP55 Hydraulic Pumping Port
 - (2) 0608 - MP55 Magnetic Location Collar



MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-1S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
0		33	<input checked="" type="checkbox"/>		MP55 CASING, PVC 3.0m
4.7 FT			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		32	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		31	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		30	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		29	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		28	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		27	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		26	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		25	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		24	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302B - MP55 Regular Coupling
		23	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m

1530HR FINISH LOWERING

1545HR DTW = 192.45 FT. BELOW MP

MP = 4.46 FT AGL.

0815HR 09MARCH
DTW = 192.245 FT.
192.45 FT. OK DL

MP IS WATER TIGHT.

MP FLOATS.
ADD 5 GAL. TAP WATER.

MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-1S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
100			<input checked="" type="checkbox"/>		0302 ^A - MP55 Regular Coupling
110		22	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302 ^A - MP55 Regular Coupling
120		21	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0302 ^A - MP55 Regular Coupling
		20	<input checked="" type="checkbox"/>		0601M15A - MP55 Adapter Casing 06_03 <u>5.415 FT</u>
130			<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
		19	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
140		18	<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
			<input checked="" type="checkbox"/>	062032	0612M15 - MP55 Packer with stiffeners
		17	<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
			<input checked="" type="checkbox"/>	Zone SQA1	0601M15 - MP55 Casing, PVC, 1.5m
150		16	<input checked="" type="checkbox"/>	057	0605 - MP55 Measurement Port
			<input checked="" type="checkbox"/>		0601M15 - MP55 Casing, PVC, 1.5m
		15	<input checked="" type="checkbox"/>	062045	0602 - MP55 Regular Coupling
			<input checked="" type="checkbox"/>		0612M15 - MP55 Packer with stiffeners
			<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
160		14	<input checked="" type="checkbox"/>	Zone 1	0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	056	0605 - MP55 Measurement Port
170		13	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	0607 017	0607 - MP55 Hydraulic Pumping Port
180		12	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
		11	<input checked="" type="checkbox"/>	062052	0602 - MP55 Regular Coupling
			<input checked="" type="checkbox"/>		0612M15 - MP55 Packer with stiffeners
			<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
190		10	<input checked="" type="checkbox"/>	0601	0601M15 - MP55 Casing, PVC, 1.5m
			<input checked="" type="checkbox"/>		0605 - MP55 Measurement Port

MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-1S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
200		9	<input checked="" type="checkbox"/>	Zone SQA2	0601M15 - MP55 Casing, PVC, 1.5m
		8	<input checked="" type="checkbox"/>	0612035	0602 - MP55 Regular Coupling
210			<input checked="" type="checkbox"/>		0612M15 - MP55 Packer with stiffeners
		7	<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
220			<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
		6	<input checked="" type="checkbox"/>	Zone 2	0602 - MP55 Regular Coupling
230			<input checked="" type="checkbox"/>	058	0601M30 - MP55 Casing, PVC, 3.0m
		5	<input checked="" type="checkbox"/>		0605 - MP55 Measurement Port
240			<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
		4	<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
250			<input checked="" type="checkbox"/>	06708	0601M30 - MP55 Casing, PVC, 3.0m
		3	<input checked="" type="checkbox"/>		0607 - MP55 Hydraulic Pumping Port
260			<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
		2	<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
270			<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
		1	<input checked="" type="checkbox"/>		0602 - MP55 Regular Coupling
280			<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>		0603 - MP55 End Plug Coupling

start lowering
1308 hr 08 MARCH

OPEN HOLE DTW = 54.52 FT
BELOW 6" steel.

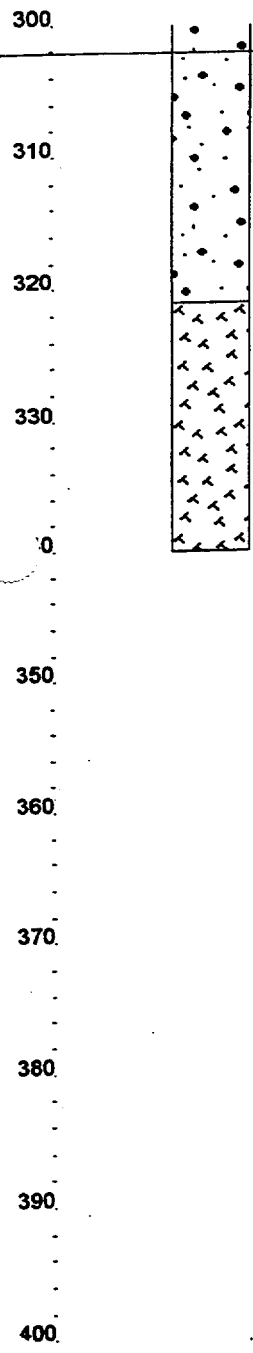
SOUNDED DEPTH = 293.05 FT BELOW
6" steel.

TST TEST P = 300 PSI TO 7M.
TOOL P = 150 AVG.

MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-1S

Scale Feet Fill MP Log QA OK S/N MP Casing Description





MP55 Packer Inflation Field Record

Project: <u>WB 740</u> Client: <u>NYE COUNTY</u> By: <u>DL</u> Date: <u>09 MARCH 99</u>
Location: <u>AMARUSA W</u> Well No. <u>EWDP-1S</u> Borehole Diameter: <u>EWDP-1S</u>
Packer No. <u>062-032</u> Depth: <u>137</u> Computer Data File: <u>062-032</u> .WDF
Inf-Tool No. <u>2321</u> Vent Tool No. <u>2215</u> Volume Pumped: <u>11.3</u> Vol Returned <u>0.3</u>
H-B Valve: (P _H) <u>⊖</u> Offset (P _V) <u>⊖</u> Confirm Venting (Vent Tool Data) (Y/N) <u> </u>
Vent Tool Pressure (Shoe Out, P _O) <u> </u> Final Inf'n Vol: <u>11.0</u> Final Press: <u>296</u> (P _F)
Comments: <u>EST HEAD ABOVE PKR = 59 PSI</u> Calc'd Element Pressure (R _F = P _V - P _O) <u>223.2 psi</u>
<u>PACKER P = 296 - 13.8 - 59 =</u> Confirm Pkr Valve Closed (Yes/No): <u>YES</u>

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	13.8	14.3	1403	-	START, TIE = OFF
0	0	13.8	14.4	1406:00	1	TIE SHOE OUT.
0	0	14.6	14.2	1407:30	-	START PUMP, STOP.
0.2	600	14.7	14.0?	1408:30	2	TIE → INFLATE PKR VALVE OPENED (450)
0.2	0	37.8	14.4	1410:00	3	START PUMPING.
1.0	280	85	14.0	1411:00	4	
2.0	300	135	-	1412:05	5	
3.0	340	158	-	1413:35	6	
4.0	350	159	-	1414:50	7	
5.0	350	170	-	1416:20	8	
6.0	350	186	-	1417:40	9	STOP PUMPING, TOP UP.
6.0	50	139	-	1424:00	10	RESUME
7.0	350	210	-	1425:40	11	
8.0	400	243	-	1427:07	12	
8.8	450	300	-	1428:10	13	TIE = OFF, STOP PUMP
8.8	350	185	-	1430:00	14	RESUME, TIE = INFL.
9.2	2250 250	233	-	1431:30	15	
10.0	300	306	-	1434:15	16	STOP, TIE = OFF
10.0	250	195	-	1437:00	17	RESUME, TIE = INFL.
10.6	300	311	-	1438:45	18	STOP, TIE = OFF
10.6	250	213	-	1441:00	19	RESUME, TIE = INFL.
11.0	300	315	-	1442:15	20	STOP, TIE = OFF

POWER FAIL.

MP55 Packer Inflation Field Record, Part 2

Project: WB 740 Well No. EWDP-1S Packer No. 062-032 Date: 09 MARCH 89

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

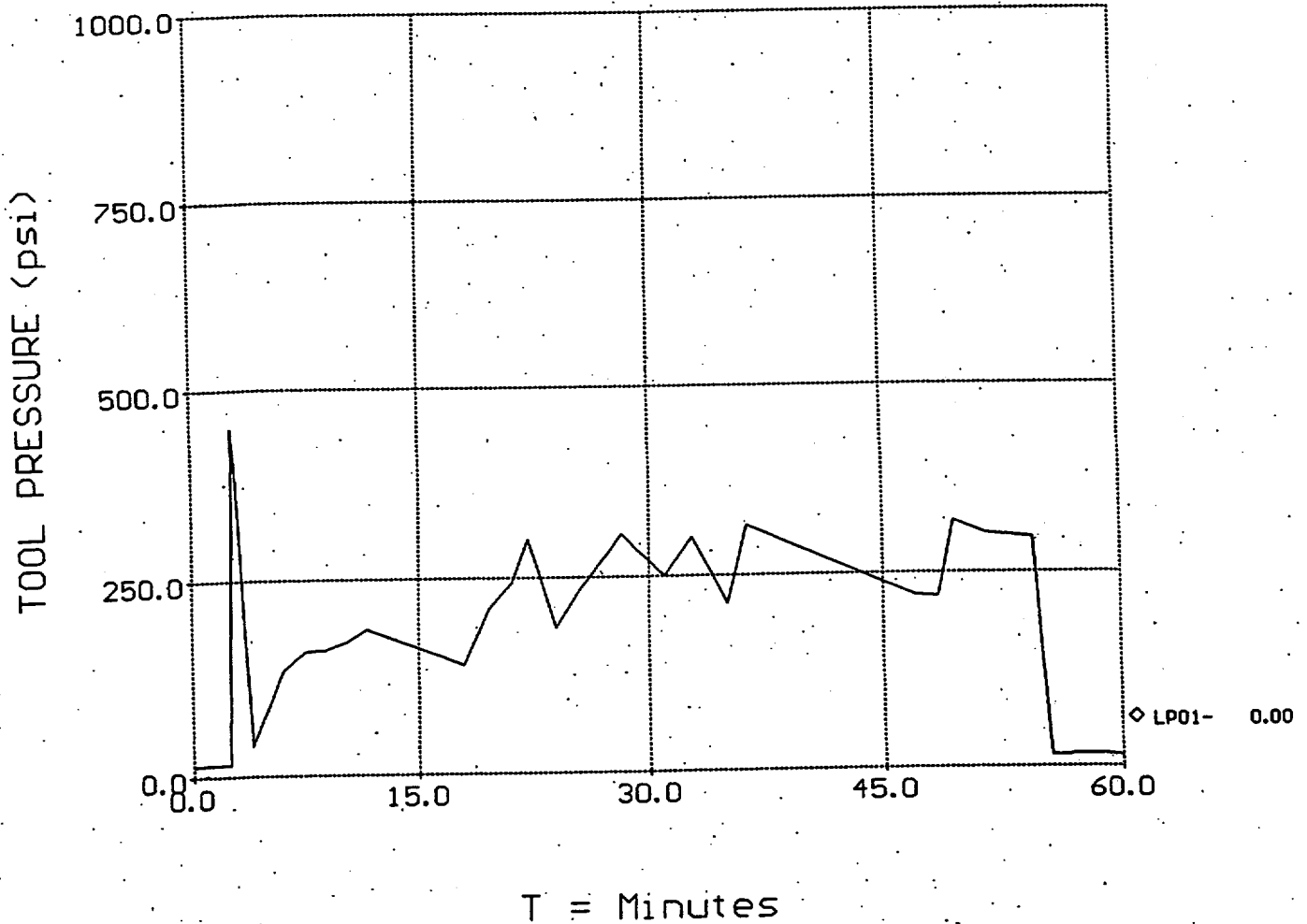
Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
11.0	300	221.0	-	1453	1	RESUME AFTER POWER FAIL
11.0	300	219.9	-	1454:30	2	TIE 2 INFL, PUMP
11.2	350	318	-	1455:30	-	STOP, TIE = OFF.
11.2	300	302	-	1456:30	-	-
11.2	300	297	-	1500:30	3	PUMP UP, STOP
11.3	750	296	-	1500:30	4	TIE = CLOSE
11.3	650	13.8	-	1501:30	-	VENT LINE
11.0	0	13.8	-	1502:30	5	TIE = OFF.
11.0	0	15.69	-	1502:50	-	-
11.0	0	15.69	-	1502:50	6	TIE SHOE IN
11.0	0	13.75	1388	1506:00	7	END.
					<p><u>NOTE:</u> VENT TOOL ^{DO} NOT ACTUATED IN PORT OPEN THE M-PORT VALVE BELOW PACKER.</p> <p>- LATER P-PROFILE DID NOT SHOW SQUEEZE PRESSURE ∴ PACKER INFLATION IS OK.</p>	



PACKER INFLATION RECORD

Client: Nye County
 Site: EWDP - Amargosa, NV
 Description: Plastic MP55
 Well: EWDP-1S
 WB Project: WB740
 Y Offset Pressure: none
 T-Zero = Tue Mar 09 14:06:00 1999

Packer: 0612-032
 Packer Depth: 137 ft
 FILE: 1S_BT1
 Plot By: DL Date: 17 MAR 99.
 Checked By: _____ Date: _____
 Comment:





MP55 Packer Inflation Field Record

Project: <u>W1B740</u> Client: <u>NYE COUNTY</u>	By: <u>DL</u> Date: <u>09 MAR 99</u>
Location: <u>AMARGOSA NV</u> Well No. <u>EWDP-15</u>	Borehole Diameter: <u>6-INCH</u>
Packer No. <u>0612-045</u> Depth: <u>153 ft.</u>	Computer Data File: <u>0612-045</u> .WDF
Inf-Tool No. <u>2321</u> Vent Tool No. <u>2215</u>	Volume Pumped: <u>11.4</u> Vol Returned <u>04</u>
H-B Valve: (P _H) <u>0</u> Offset (P _V) <u>0</u>	Confirm Venting (Vent Tool Data) (Y/N) <u> </u>
Vent Tool Pressure (Shoe Out, P _O) <u> </u>	Final Inf'n Vol: <u>11.0</u> Final Press: <u>246</u> (P _F)
Comments: <u>EMS NOT ACTIVATED & SQUEEZE RELIEF NOT REQUIRED</u>	Calc'd Element Pressure (P _F +P _V -P _O) <u>166psi</u>
	Confirm Pkr Valve Closed (Yes/No): <u>YES</u>

HEAD ABOVE PKR = 66psi PKR P = 246 - 66 - 138 = 166 Software Reminder
I = Inflate, O = Off, C = Close

Pumping Information

0.4

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	13.77	13.42	1321:30	-	START TIE = OFF.
0	0	13.77	13.5	1322:00	1	TIE SHOE OUT.
0	0	17.58	13.5	1325	1	START PUMP
0.4	600	17.7	13.4	1327:00	2	TIE → INFLATE PKR VALVE OPENED
0.4	0	40	13.4	1328:00	3	START PUMPING.
1.0	330	99	-	1328:50	4	
2.0	390	160	-	1329:55	5	
3.0	400	191	-	1331:10	6	
4.0	410	194	-	1332:10	7	
5.0	410	190	-	1333:20	8	
6.0	410	195	-	1334:20	9	Stop Pump, TOP UP RESERVOIR
6.0	75	148	-	1335:30	10	RESUME
7.0	410	200		1336:45	11	
8.0	415	212		1338:10	12	
9.0	425	230		1339:15	13	
10.0	450	252		1340:30	14	
11.1	500	313		1342:00	15	TIE = OFF, STOP PUMP
11.1	200	253		1345:00	-	
11.1	200	247		1347:00	15	Pump up.
11.4	840	246		1348:00	16	TIE → CLOSE
11.4	800	14.35		1349:00		VENT LINE
11.0	0	14.35		1349:30	17	TIE → OFF

MP55 Packer Inflation Field Record, Part 2

Project: W/B 740 Well No. BWDD-15 Packer No. 0d12-645 Date: 09 MARCH 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

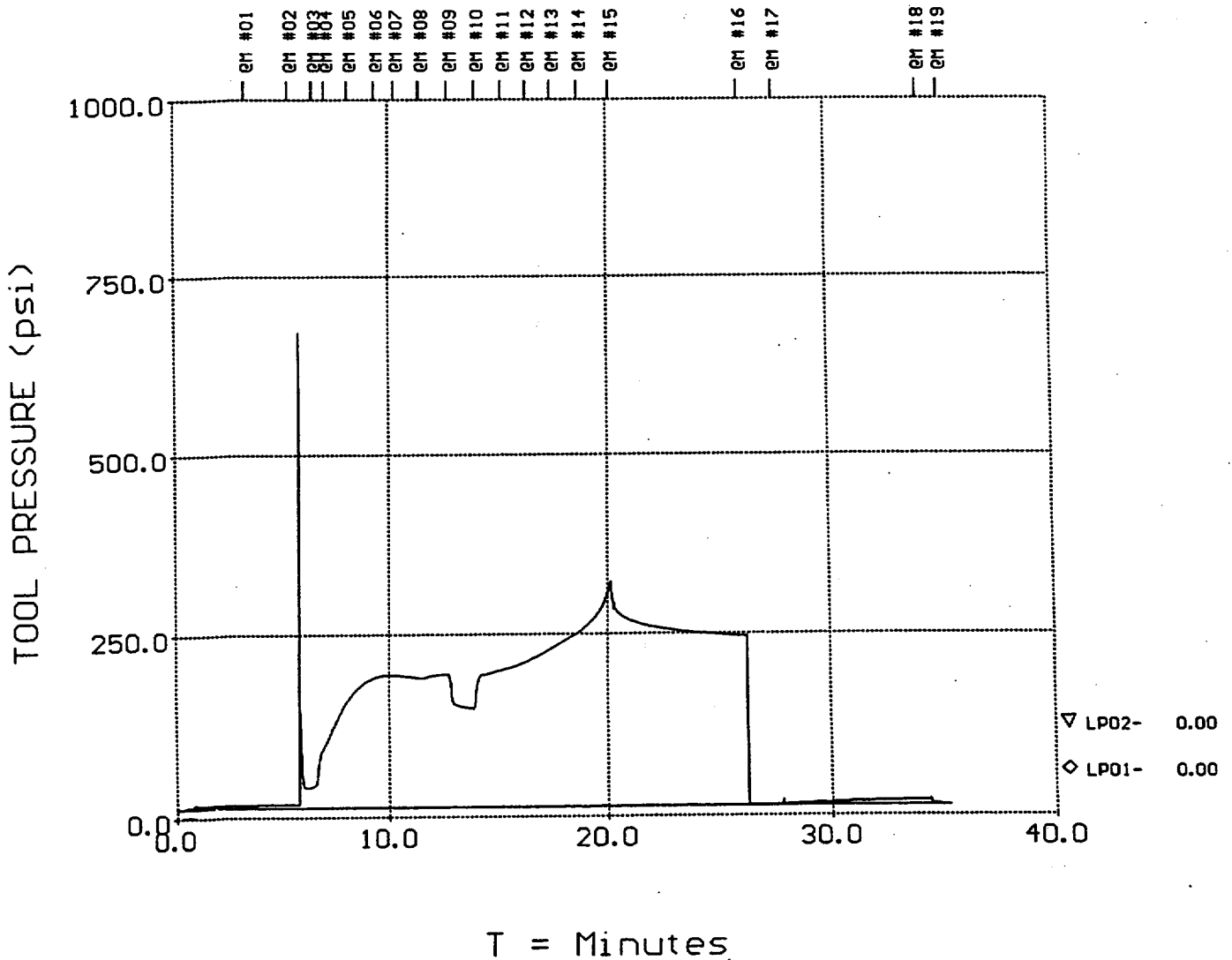
Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
11.0	0	15.0	—	1350:20	—	
11.0	0	17.3	—	1352:20	—	
11.0	0	18.8	—	1354:20	—	
11.0	0	19.9		1356:20	-18-	TIE SHOE IN
11.0	0	13.7	13.2	1357:20	-19-	END



PACKER INFLATION RECORD

Client: Nye County
 Site: EWDP - Amargosa, NV
 Description: Plastic MP55
 Well: EWDP-1S
 WB Project: WB740
 Y Offset Pressure:
 T-Zero = Tue Mar 09 13:21:45 1999

Packer: 0612_045
 Packer Depth: 154 ft
 FILE: 0612_045
 Plot By: DL Date: 15 MAR 99
 Checked By: _____ Date: _____
 Comment:





MP55 Packer Inflation Field Record

Project: <u>WB740</u> Client: <u>NYE COUNTY</u>	By: <u>DL</u> Date: <u>09 MAR 95</u>
Location: <u>AMARGOSA NV</u> Well No. <u>EUDD 15</u>	Borehole Diameter: <u>6-inch</u>
Packer No. <u>0012-052</u> Depth: <u>190</u>	Computer Data File: <u>0012-052</u> .WDF
Inf-Tool No. <u>TIG 2321</u> Vent Tool No. <u>2215</u>	Volume Pumped: <u>10.1</u> Vol Returned <u>0.3</u>
H-B Valve: (P _H) <u>0</u> Offset (P _V) <u>0</u>	Confirm Venting (Vent Tool Data) (Y/N) <u> </u>
Vent Tool Pressure (Shoe Out, P _O) <u> </u>	Final Inf'n Vol: <u>9.81</u> Final Press: <u>250</u> (P _F)
Comments: <u>EST HEAD WATER ABOVE PKR</u> <u>= 82 PSI.</u>	Calc'd Element Pressure (P _F +P _V -P _O) <u>154psi</u>
	Confirm Pkr Valve Closed (Yes/No): <u>YES</u>

$PACKER P = 250 - 82 - 138 = 154$

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	13.63	13.61	1229	1	START TIE = OFF
0	0	13.73	13.6	1230:00		TIE SHOE OUT
0	0	14.02	13.7	1232		EMS SHOE OUT.
0	0	13.9	17.4	1233	1	PUMP UP
0.3	600	13.9	17.5	1234	2	TIE-INFLATE VALUE OPENED
0.3	0	55	17.5	1235	3	START PUMPING.
1.0	300	112	17.5	1236:1	4	
2.0	320	172	17.5	1237:20	5	
3.0	360	194	17.5	1238:30	6	
4.0	370	198	17.5	1239:5	7	
5.0	380	198	17.5	1241:00	8	
6.0	400	204	17.5	1242:20	9	STOP, TOP UP RESERVOIR
6.0	75	162	17.0	1243:30	10	
7.1	350	216	17.4	1245:40	11	
8.0	350	238	17.1	1246:40	12	
9.82	400	345	17.5	1249:00	13	STOP PUMPING.
9.82	250	250	17.5	1249:30	14	START PUMP.
9.83	400	345	17.5	1250:40	15	SHUT VALVE, STOP PUMP
9.8	250	200	17.5	1253	16	OPEN VALVE, PUMP UP
9.8	300	345	17.5	1255:40	17	SHUT VALVE, STOP.
9.8	280	254	17.5	1305:40	18	PUMP UP

MP55 Packer Inflation Field Record, Part 2

Project: WB 740 Well No. EWDP-15 Packer No. 002-052 Date: 09 MAR 99

Software Reminder

I = Inflate, O = Off, C = Close

Pumping Information

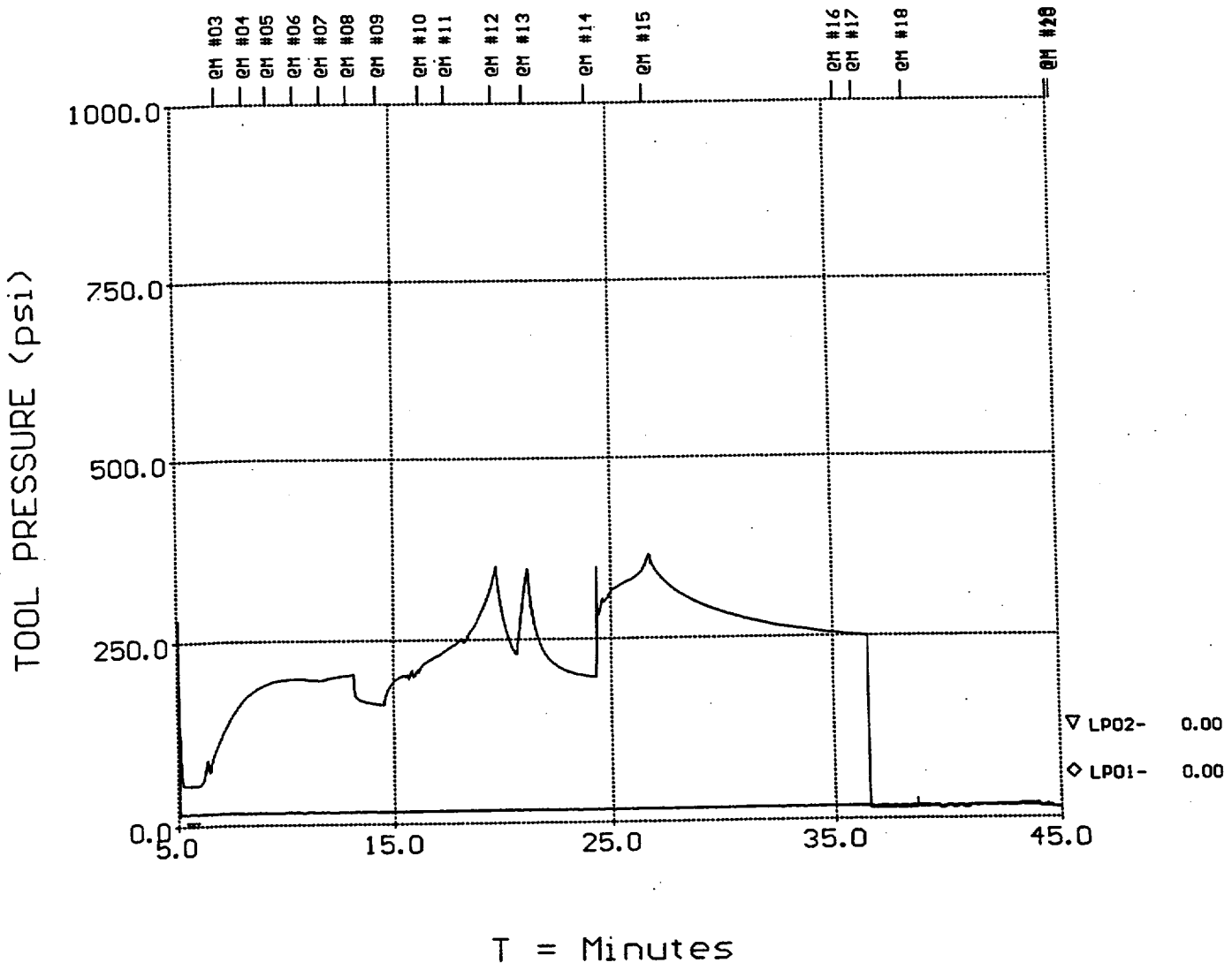
Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
10.1	800	250	17.0	1305:30	17	- TIE VALVE CLOSE
10.1	14.4 750	14.4	17.0	1306:30	18	- VENT LINE
9.8	0	14.4	17	1307:30	18	- TIE VALVE OFF
9.8	0	14.8	17	1308:30	-	- OBSERVE
9.8	0	16.8	17	1310	-	-
9.8	0	18.6	17	1313	19	- TIE SHOE IN
						- EMS SHOE IN
9.8	0	13.8	13.9	1314	20	- END



PACKER INFLATION RECORD

Client: Nye County
Site: EWDP - Amargosa, NV
Description: Plastic MP55
Well: EWDP-1S
WB Project: WB740
Y Offset Pressure:
T-Zero = Tue Mar 09 12:34:05 1999

Packer: 0612_052
Packer Depth: 190 ft
FILE: 0612_052
Plot By: _____ Date: _____
Checked By: _____ Date: _____
Comment:





Westbay
Instruments Inc.

MP55 Packer Inflation Field Record

Project: <u>EWDP - 740</u> Client: <u>NYC COUNTY</u>	By: <u>DL</u> Date: <u>09 MARCH</u>
Location: <u>MARCOA NV</u> Well No. <u>EWDP-15</u>	Borehole Diameter: <u>1612-035</u>
Packer No. <u>0d2-035</u> Depth: <u>202 FT.</u>	Computer Data File: <u>15 050</u> .WDF
Inf-Tool No. <u>TIE 2321</u> Vent Tool No. <u>EMS 225</u>	Volume Pumped: <u>11.2</u> Vol Returned <u>0.6</u>
H-B Valve: (P _H) <u>-</u> Offset (P _V) <u>0</u>	Confirm Venting (Vent Tool Data) (Y/N) <u>-</u>
Vent Tool Pressure (Shoe Out, P ₀) <u>-</u>	Final Inf'n Vol: <u>10.6</u> Final Press: <u>261</u> (P _F)
Comments: <u>NOT ACTIVATE EMS - Squeeze relief not required.</u>	Calc'd Element Pressure (P _F +P _V -P ₀) <u>102psi</u>
	Confirm Pkr Valve Closed (Yes/No): <u>Yes</u>

Software Reminder

I = Inflate, O = Off, C = Close

P₀ = 65
TAP 267 = 300
PKR P = 261 - 65 - 138 = 102psi
Pumping Information

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	17.42	21.73	1139:00	-	START
0	0	17.42	21.25	1139:30	1	TIE SHOE OUT.
0	0	25.23	21.31	1141:00	2	START PUMP → 500.
0.4	600	25.24	21.24	1142:00	3	TIE → OPEN
0.4	600	717	-	1143:30	4	PUMP up to 950 VALVE OPENED
0.6	0	80.5	-	1146:00	5	START PUMPING.
1.0	150	80.4	-	1147:10	6	
2.0	225	161	-	1148:45	7	
3.0	250	185	-	1150:26	8	
4.0	270	187	-	1152:10	9	
5.0	300	197	21.24	1153:40	10	
6.0	300	202	-	1155:15	11	STOP. TOP UP RESERVOIR.
6.0	80	179	-	1156:40	12	RESUME
7.0	300	209		1158:10	13	
8.0	310	222		1159:50	14	
9.0	350	244		1201:20	15	
10.0	380	268	21.23	1202:50	16	
11.0	400	310		1204:10	17	STOP PUMP.
11.0	175	272.7		1206:00		
11.0	175	266		1208:00		
11.0	175	263.8		1209:30	18	TIE VALVE OFF VENT LINE PUMP UP

Form MP55n3.com Dec 18, 1998

MP55 Packer Inflation Field Record, Part 2

Project: WB 740 Well No. EWDP-15 Packer No. DAI-055 Date: 09 MAR 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
11.2	800	26.1	21.3	1211:00	19	VALVE → CLOSE
11.2	790	17.4	21.3	1212:00	20	VENT LINE
10.6	0	17.4	21.3	1213:00	21	VALVE → INFL.
10.6	0	101.35	21.3	1213:10		OBSERVE
10.6	0	101.00	21.3	1218:00	21	VALVE → OFF
10.6	0	60.1	—	1218:10		TIE SHOE IN
10.6	0	17.46	21.3	1219:20	22	END

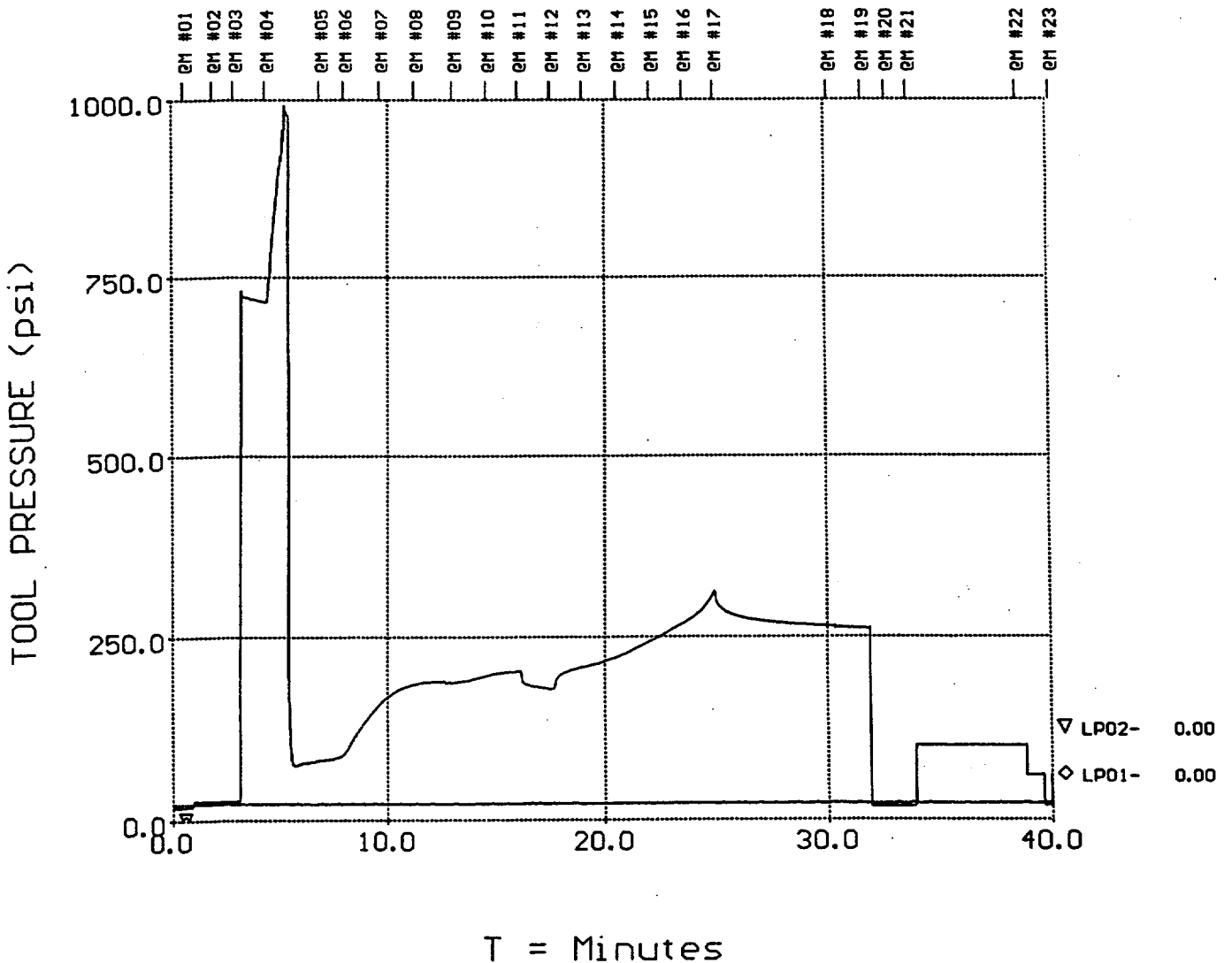
Form MP55in3.com Dec 18, 1998



PACKER INFLATION RECORD

Client: Nye County
Site: EWDP - Amargosa, NV
Description: Plastic MP55
Well: EWDP-1S
WB Project: WB740
Y Offset Pressure:
T-Zero = Tue Mar 09 11:39:11 1999

Packer: 0612_035
Packer Depth: 204 ft
FILE: 612_035
Plot By: DL Date: 15 MAR 99
Checked By: _____ Date: _____
Comment: _____





Westbay
Instruments Inc.

MP55 Packer Inflation Field Record

Project: EWDP	Client: NYC COUNTY	By: DL	Date: 09 MARCH
Location: AMARGOCH M	Well No: EWDP-15	Borehole Diameter: 6"	
Packer No. -	Depth: 0	Computer Data File: 15-BTL.WDF.WDF	
Inf-Tool No. TIW 2221	Vent Tool No. 2215	Volume Pumped: _____	Vol Returned _____
H-B Valve: (P _H) E	Offset (P _V) E	Confirm Venting (Vent Tool Data) (Y/N) _____	
Vent Tool Pressure (Shoe Out, P _o) _____		Final Inf'n Vol: _____	Final Press: _____ (P _F)
Comments: _____		Calc'd Element Pressure (P _F +P _V -P _o) _____	
		Confirm Pkr Valve Closed (Yes/No): _____	

Software Reminder

Pumping Information

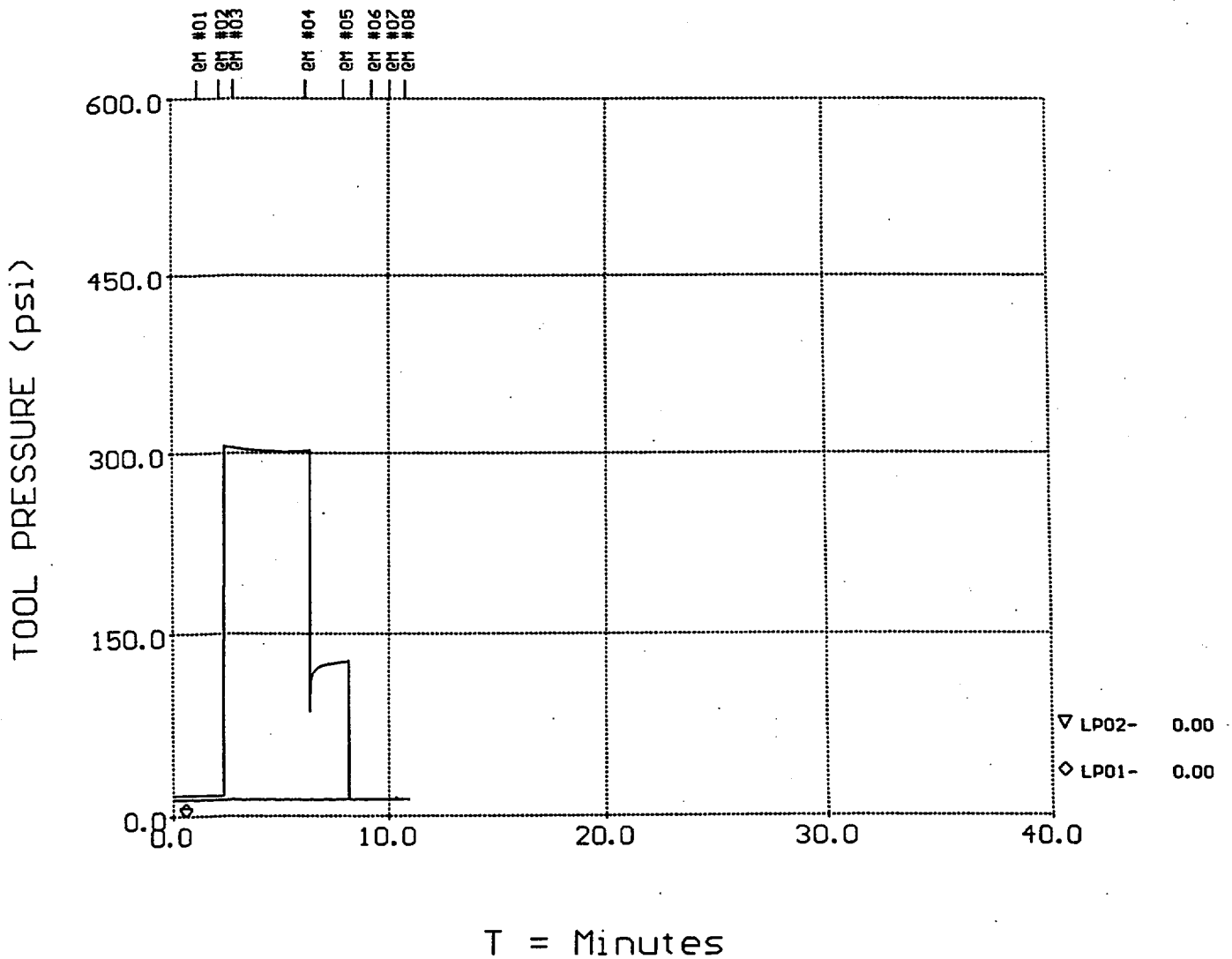
I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	16.99	13.14	0954	0	START
						TIW VALVE OFF, HG. IN. PIPE
0	0	16.89	13.21	0956	1	PUMP LINE TO 300 PSI.
0.1	300	16.78	13.8	0957	2	VALVE INFL.
0.1	300	305.25	13.8	0957:45	3	
0.1	300	302.1	13.8	1001:00	4	VALVE OFF.
0.1	290	125.1	13.8	1003:00	5	VENT LINE VALVE -> C
0.1	290	13.5	13.8	1004:00	6	VENT LINE
0.1	0	13.7	13.8	1005:00	7	VALVE -> CLOSE
						VALVE -> OFF
0.05	0	13.8	13.8	1006:00	8	END

BLANK TEST RECORD

Client: Nye County
 Site: EWDP - Amargosa, NV
 Description: Plastic MP55
 Well: EWDP-1S
 WB Project: WB740
 Y Offset Pressure:
 T-Zero = Tue Mar 09 09:54:54 1999

Packer:
 Packer Depth: surface
 FILE: 1S_BT1
 Plot By: _____ Date: _____
 Checked By: _____ Date: _____
 Comment:





Westbay
Instruments Inc.

MP Drift Diagram

Job No. WB740	Monitoring Well No. 1S	Drawn By: DL
Client: Nye County	Project: EWDP	Date: Mar 8 1999
Drift Approval	Borehole Items:	As per TOM BUQO SKETCH 2-19-99.
	MP Casing Items:	DL 8 MAR 99.



MP System Casing Components				
Item	Model No.	Description	I.D. (in)	O.D. (in)
1.	0301	MP55 Casing	2.25	2.75
2.	0302A	MP55 Regular Coupling	2.25	3.4
3.	0305B	MP55 Measurement Port Coupling	2.25	3.4
4.	0307	MP55 Hydraulic Pumping Port	2.25	3.5
5.	0315B	MP55 Reinforced Packer	2.25	4.3
6.	0303	End Plug	2.25	3.4
7.	0308	Magnetic Location Collar	2.8	3.6
Borehole Completion Items				
A.	N/A	Steel Well Casing	6.0	6.75
B.	N/A	Steel Well Screens with cut slots*	6.0	6.75

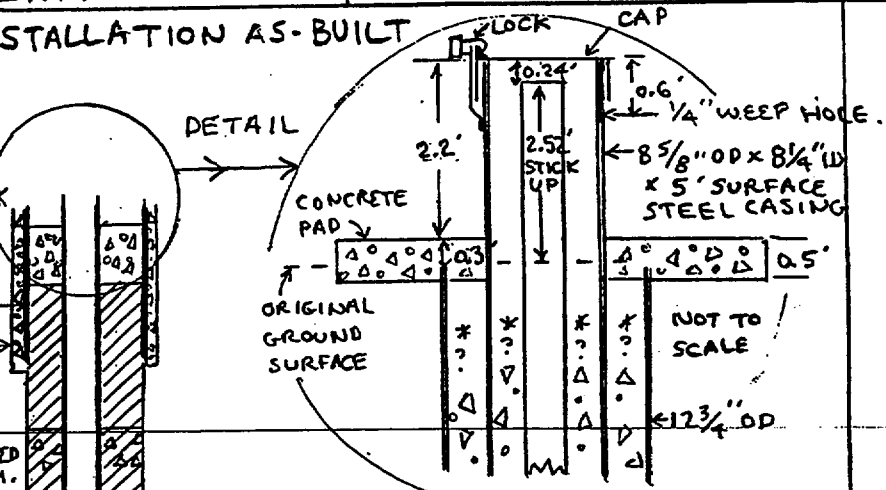
* Confirm that inside of pipe with cut slots has been de-burred.

WELL INSTALLATION AS-BUILT

DEPTH FEET



- 12 3/4" OD x 12' ID x 39.2' STEEL CASING
- 17.5" x 40' HOLE
- 11 BAGS AQUAGUARD (210 GAL), 4 BAGS 3/8" BENTONITE PELLETS CAPPED BY 8 BAGS TYPE I/II CEM.
- 20.01' BLANK
- 20.00' BLANK
- 20.01' BLANK
- 19.99' BLANK
- 20.00' BLANK
- 20.00' BLANK
- 20.01' BLANK
- 20.00' SCREEN
- 10.00' BLANK
- 20.00' BLANK
- 20.01' SCREEN
- 20.00' SCREEN
- 20.00' SCREEN
- 20.00' BLANK
- 0.50' CAP



80 BAGS AQUAGUARD (1370 GAL) CAPPED WITH 3.5 BAGS TYPE I/II CEMENT

6 5/8" OD x 6' ID. STEEL CASING

MMS 6.625 18.97 LB 453 SW WO 01566, 12-98

IPSCO 42FT ASTM A53 B/ASME SA53B E TESTED 1780 A WH.

038 6.625 .280 AY8 MC0190E HT876356

- 151.8' 2100 LBS. 8/12 SAND
- 0.02" SLOTS, VERTICAL 2" LONG, 36 SLOTS PER CIRCUMFERENCE & 70 ROWS. EFFECTIVE SLOT AREA = 0.71 SQ. FT.
- 189.3' 3 BAGS AQUAGUARD (45 GAL) CAPPED WITH 1 1/4 BAGS TYPE I/II CEMENT (25 GAL)
- 0.02" SLOTS, VERTICAL 2" LONG, 36 SLOTS PER CIRCUMFERENCE & 210 ROWS. EFFECTIVE SLOT AREA = 2.12 SQ. FT.

NOTES: * DEPTH TO GROUT IN ANNULUS TO BE DETERMINED AFTER SET UP.
DRAWING DOES NOT INCLUDE CORNER POSTS

COPY

KEN DONNELSON
GEOLOGIST
2-19-99

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS

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APERTURE CARD/PAPER COPY AVAILABLE THROUGH NRC FILE CENTER

NUMBER OF OVERSIZE PAGES FILMED ON APERTURE CARD(S) 1

ACCESSION NUMBERS OF OVERSIZE PAGES:

9906100166-02

**THIS PAGE IS AN
OVERSIZED DRAWING
THAT CAN BE VIEWED AT
THE RECORD TITLED:**

NONE:

BOREHOLE: NC-1S

LOGS: E-LOG TEMP CALIPER

**WITHIN THIS PACKAGE...OR,
BY SEARCHING USING THE
DRAWING NUMBER:**

NONE

NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-2

9906100166-02

Well No. NC-EWDP-2D

Status:

Borehole drilled to depth of 1,618 ft

Latitude/Longitude:

36° 39' 38.521" 116° 27' 56.834"

Legal Description:

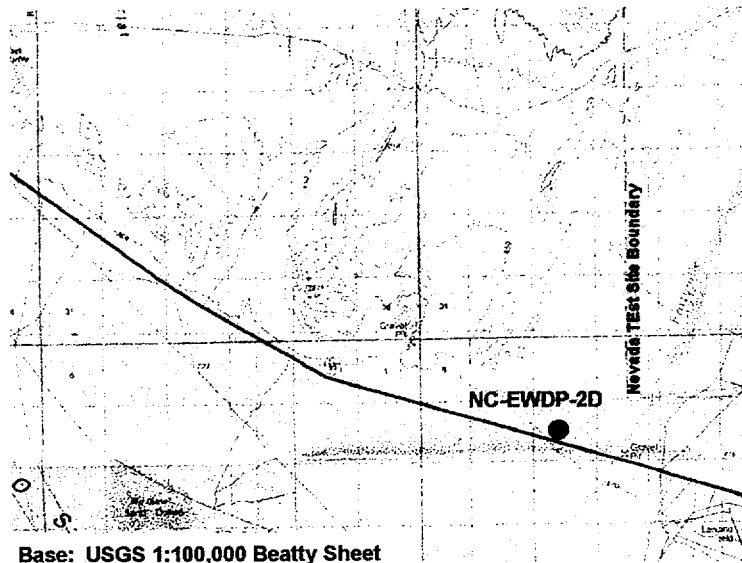
Township 15S Range 49E
Section 9 NW 1/4 SE 1/4 1/4

Elevation:

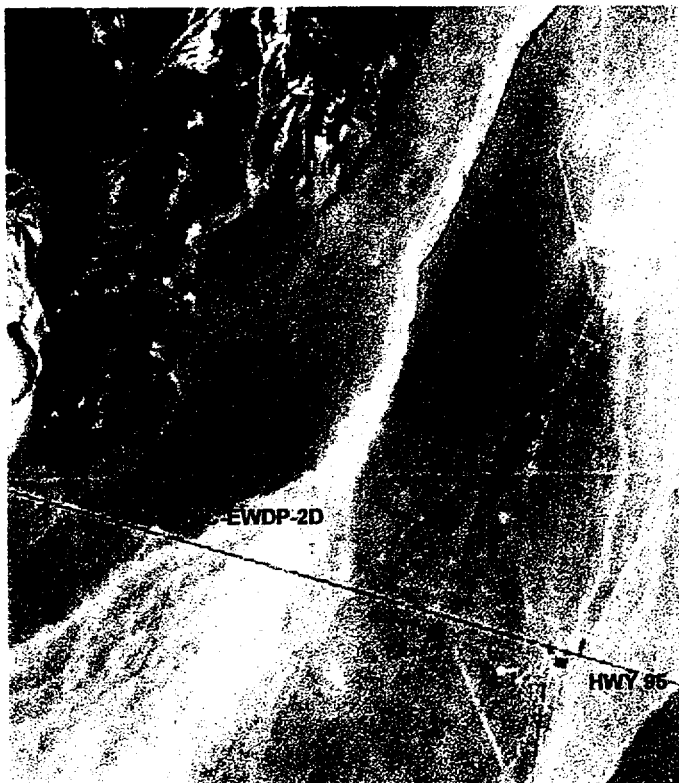
801.21 m AMSL (2628.6 ft ±) GPS

Access:

Highway 95 north from Lathrop Wells
Jct 4.1 miles to gate on north side of
Highway. Take gravel road 0.1 mile
east.



Purpose: 1) provide lithologic samples of deposits; 2) define valley-fill stratigraphic sequence and groundwater flow paths down gradient of proposed repository; and 3) provide water level and water chemistry data.



Base: Thematic Mapper Image of the Big Dune 7.5° Quadrangle

NC-EWDP-2D is located along a key groundwater pathway between Yucca Mountain and Amargosa Desert. This site was selected to define the number and types of aquifers present in the Fourtymile Wash area down gradient of Yucca Mountain. Current plans call for the deepening of this borehole and completion as a monitoring well in Fiscal Year 2000.

**NC-EWDP-2D
SITE SUMMARY**

Land surface

0-1618.4' Valley-fill alluvium

0-40' silty sand, pale yellow brown (10YR 6/2), tr. subround gravel, gravel inc. downhole;
40-80' sandy gravel, fg-cg subround gravel, fg-mg sand;
80-260' gravelly sand, yellow-brown (10YR 6/2), local silt (10YR 8/2) and cobbles, silty 100-140, some clay 202-203' and 235-260;
260-360' gravel, gray red (10R 4/2) to dark yellow brown (10YR 4/2), subang-angular volcanic gravel, local cobbles (335-340), locally sandy (345-360);
360-420' sandy gravel, some silty sections, cobbles 415-420;
420-495' sandy gravels and cobbles, coarse sand, subang.-subround gravel;
495-580' gravel and coarse sand, polymictic, clay-rich zone 530-535 (10YR 7/2), boulders and cobbles 555-580;
580-686' coarse sand, gravel and local cobble beds, reddish brown (10R 4/6), dom. rhyolitic clasts, unconsolidated and caving, 30% yellow-gray clay (5Y 7/2) 610-616', thin clay beds (<1') 645-675, 15% brn-gray clay 675-686; 686-720' clay, light brownish gray, local fine gravel beds (<5%);
720-854' sandy clay, light brown (5YR 6/2), mg-cg sand interbedded?, less than 50% sand, 760-780' pale yellow orange (10YR 7/2), 760-854' grayish orange;
854-934' coarse sand and gravel, brownish gray (5YR 4/1), local clay beds, gen. well sorted, sandy 929-935', gradual color change into next unit;
934-1035' sand and gravel, yellow brown (10YR 5/4), different source than above, weakly calcite cemented;
1035-1095' sandy gravel, greyish pink (5R 8/2) to pinkish gray (5YR 8/1), 30-80% pale pink clasts of rhyolite and darker red' coarser gravel beds 1050-1055, 1072-1075;
1095-1120' gravel and sand, poorly sorted, yellowish gray (5Y 6/2);
1120-1140' clayey gravel, yellowish orange (10YR 7/6), grades into grayish orange pink (5YR 7/2) beyond 1130';
1140-1145' silt, red (5YR 5/6), cemented, white and gray gravel;
1145-1155' sand, pinkish red (5R 6/4), cemented, yellow brown fragments;
1155-1240' gravelly, reworked ash tuffs, pink (5R 8/4) to 1165, subang-rounded clasts of rhyolite and ash clasts, crystalline ashy groundmass, red (5R 5/6) 1165-1190, mod. pink (5R 7/4) 1190-1195, red (5R 5/6); gravel sections 1155-1160, 1195-1200, 1235-1240;
1240-1245' clay, minor gravel, red (5YR 5/6);
1245-1260' gravel, reddish (5R 5/6), quartz porphyritic rhyolitic clasts;
1260-1265' reworked ash tuff, dusky red (5R 3/4), >10% quartz phenos.;
1265-1322' gravel, red (5R 6/6) sub-ang. tuffaceous clasts 50-60%;
1322-1376' sands, calcite cemented, interfingering red (5R 5/4) hematitic and yellow-orange (10YR 6/6) limonitic beds (dominant color), local 1-2' gravel beds 1337-1339', 1359-1360';
1376-1465' sand, gravel and clay interbedded, mostly light brown (5YR 6/4) to grayish red (5R 4/2), some sandy yellow beds as 1322-1376, clay-rich 1388-1393, 1405-1413, gravel-rich 1397-1399, 1450-1457';
1465-1469' reworked tuff bed, light gray (N7), biotitic;
1469-1605' silts, well indurated, gravel beds, brownish gray (5YR 6/1), sections calcareous 1520-1560' ?cement, gravelly 1475-1485', 1535-1540', 1580-1600', tuffaceous 1575-1580', 1585-1590';
1605-1618.4' silt, calcareous, well indurated, pale brown (5YR 5/2)

500 ft

1000 ft

1500

1618 ft
(TD)

**NC-EWDP-2D
SUMMARY LITHOLOGIC LOG**

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-23 Drill Depth From 0.0 To 60.0 Page 1 of 27

Driller BRYAN MORRIS/BOYLES BROS Start Date/Time 1-12-99/1533 End Date/Time _____

Drilling Equip./Method AP-1000/HAMMER BIT Sampling Equip./Method CYCLONE/CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
5	BCS 0000 1451 (2MIN)	VALLEY FILL SILTY SAND: Pale yellow brn (10YR 6/2), some fine sub-ang v. gravel with thin carbonate rind, fine sand Pale brn (5YR 5/2) when wet			INJECTED WATER FOR CUTTINGS RETURN DRILLED WITH 1 1/2" BIT FROM 0-20'
10	BCS 0000 1452 (4MIN)	Gravels and cobbles increasing with depth subrounded gravels & cobbles			
15	BCS 0000 1453 (8MIN)				
20	BCS 0000 1454 (17MIN)	Decrease in amount cobbles, predom fine subang gravel, fine-med sand.			Hole caving
25	BCS 000 1455 (2 MIN)	INCREASE IN AMOUNT OF FINE GRAVEL			PUT ON 1 1/2" BIT AT 20' STOPPED INJECTING WATER
30	BCS 000 1456 (3MIN)				
35	BCS 000 1457 (3MIN)				
40	BCS 000 1458 (2MIN)				
45	BCS 000 1459 (1MIN)	SANDY GRAVEL, f-c subrnd gravel, f-med sand.			1-12-99 1706 40'
50	BCS 000 1460 (2MIN)	SILTY SAND with f subrnd gravel, f sand			1-13-99, 0709
55	BCS 000 1461 (2MIN)				
60	BCS 000 1462 (5MIN)	SANDY GRAVEL, f-c subrnd gravel, fine-med sand			

Prepared By KEN DOWNELOW Date 1-13-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 60.0 To 120.0 Page 2 of 27

Driller BRYAN MORRIS / BOYLES BROS Start Date/Time 1-12-99/1333 End Date/Time _____

Drilling Equip./Method AP-1000/HAMMER BIT Sampling Equip./Method CYCLONE / CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
65	BCS 000 1463 (2 MIN)	SILTY SAND, f subang-subbrnd gravel, f sand			
70	BCS 000 1464 (1 MIN)	INCREASED AMOUNT OF COARSE GRAVEL			
75	BCS 000 1465 (3 MIN)	SANDY GRAVEL, f-c subang-subbrnd gravel, f-med sand, some silt			
80	BCS 000 1466 (2 MIN)	GRAVELLY SAND DECREASE IN AMOUNT OF GRAVEL			
85	BCS 000 1467 (4 MIN)	Some cobbles, increased silt			
90	BCS 000 1468 (4 MIN)	Increased coarse sand			
95	BCS 000 1469 (4 MIN)				
100	BCS 000 1470 (4 MIN)	Increased silt			
105	BCS 000 1471 (5 MIN)				
110	BCS 000 1472 (1 MIN)	Increased coarse sand & decreased silt Increased fine gravel			
115	BCS 000 1473 (4 MIN)				
120	BCS 000 1474 (1 MIN)				

Prepared By K. DONNELSON Date 1/3/99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-20 Drill Depth From 120 To 180 Page 3 of 27

Driller BRYAN MORRIS/BOYLES BROS Start Date/Time 1-12-99, 1333 End Date/Time _____

Drilling Equip./Method AP-1000/HAMMER BIT Sampling Equip./Method CYCLONE/CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
125	BCS 000 1475 (4 min)	GRAVELLY SAND, f-med sand, some silt, predom f submed gravel				
130	BCS 000 1476 (2 min)	INCREASED SILT Very pale orange (10YR 8/2)				
135	BCS 000 1477 (3 min)	INCREASED FINE-COARSE GRAVEL w/ SOME CEMENTATION				
140	BCS 000 1478 (9 min)	SANDY GRAVEL, poorly sorted sand, poorly sorted submed gravel				
145	BCS 000 1479 (4 min)					
150	BCS 000 1480 (3 min)	Decrease in amount of gravel				
155	BCS 000 1481 (3 min)					
160	BCS 000 1482 (2 min)	Some silt				
165	BCS 000 1483 (2 min)	INCREASE IN AMOUNT OF GRAVEL & DECREASE IN SILT. SOME CEMENTATION OF FINE SAND				
170	BCS 000 1484 (3 min)					
175	BCS 000 1485 (3 min)	Predom fine gravel with coarse sand Moderate Brown (5YR 4/4 wet)				INJECT WATER AT 170' FOR DUST CONTROL SAMPLES DAMP
180	BCS 000 1486 (3 min)	Predom coarse submed gravel with f-med sand				

Prepared By KEN DONNELSON Date 1-13-98 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 180 To 240 Page 4 of 27

Driller BRYAN MORRIS / BOYLES BEAS Start Date/Time 1-12-99, 1333 End Date/Time _____

Drilling Equip./Method AP-1000/HAMMER BIT Sampling Equip./Method CYCLONE/CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
185	BCS 000 1487 (3 MIN)	GRAVELLY SAND, coarse subnd gravel, med sand Some silt.			
190	BCS 000 1488 (2 MIN)	Predom fine subnd gravel			
195	BCS 000 1489 (4 MIN)	Predom coarse subnd gravel			
200	BCS 000 1490 (2 MIN)	Predom fine subnd gravel			
205	BCS 000 1491 (6 MIN)	Some clay from 202-203'			Increased hardness at 202.5'
210	BCS 000 1492 (3 MIN)	Predom coarse sand, some gravel			
215	BCS 000 1494 (3 MIN)	Sand, med grained well sorted, trace clay & gravel			
220	BCS 000 1494 (2 MIN)	Sand, coarse grained, trace clay, some fine gravel			
225	BCS 000 1495 (4 MIN)	SANDY GRAVEL, coarse sand, fine angular - subnd gravel			
230	BCS 000 1496 (4 MIN)	INCREASED SAND & DECREASED GRAVEL			
235	BCS 000 1497 (4 MIN)	INCREASED FINE-MED SUBANG-SUBND GRAVEL, trace - some clay			
240	BCS 000 1498 (6 MIN)				

Prepared By KEN DONNELSON Date 1-13-98 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-20 Drill Depth From 240 To 300 Page 5 of 27

Driller BRYAN MORRIS / BOYLES BROS Start Date/Time 1-12-99, 1333 End Date/Time _____

Drilling Equip./Method AP-1000 / HAMMERBIT Sampling Equip./Method CYCLONE / CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
245	BCS 000 1499 (4 MIN)	GRAVELLY SAND, fine subang-subbrnd gravel, coarse sand, trace-some clay			
250	BCS 000 1500 (4 MIN)	CLAYEY SAND, fine-coarse sand, consid fine subang gravel, med plasticity			
255	BCS 000 1501 (8 MIN)	MUDDY, Decrease in clay			1-13-99, 1648 1-14-99, 0653 SAMPLE WET FROM 250-260' BUT NOT YIELDING WATER NO WATER INJECTED
260	BCS 000 1502 (4 MIN)	DAMP			
265	BCS 000 1503 (5 MIN)	GRAVEL, Gray Red (10R4/2) - Dk yel brn (10YR4/2) subang- angular volcanic, fine gravels, some coarse ang sand			Dry
270	BCS 000 1504 (17 MIN)	Increased amount of coarse gravel. Some subbrnd gravel, Some cobble.			Poor recovery
275	BCS 000 1505 (8 MIN)	Increased multi-colored gravel			
280	BCS 000 1506 (15 MIN)	Predom. fine subang gravel. Some cobbles			Had to inject water @ 280' because hole was tight
285	BCS 000 1507 (2 MIN)				
290	BCS 000 1508 (6 MIN)	Some subbrnd medium gravel with clay coating			
295	BCS 000 1509 (8 MIN)				
300	BCS 000 1510 (12 MIN)				

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 300 To 360 Page 6 of 27

Driller RYAN MORRIS / BOYLES BROS Start Date/Time 1-12-99, 1333 End Date/Time _____

Drilling Equip./Method AP-1000 / 11" CROWD OUT BIT Sampling Equip./Method CYCLONE CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
305	BCS 000 1511 (25 MIN)	MUDDY			POOR RECOVERY	
310	BCS 000 1512 (38 MIN)	GRAVEL, multicolored, poorly sorted, subang-subrnd. coarse sand, muddy				ABANDANT RECOVERY LOSING AIR TO LIFT CUTTINGS.
315	BCS 000 1513 (10 MIN)	Decrease in gravel size & increase in angularity WATER LEVEL 312.1', 1502, 1-14-99, WITH HOLE DEPTH AT 350' & DWP AT 347' WATER LEVEL 311.6', 0620, 1-19-99				
320	BCS 000 1514 (4 MIN)	Increased coarse gravel				POOR RECOVERY
325	BCS 000 1515 (5 MIN)	Coarse gravel subrnd				
330	BCS 000 1516 (15 MIN)					
335	BCS 000 1517 (8 MIN)	Extremely muddy. Increased sand & silt				
340	BCS 000 1518 (9 MIN)	Considerable subrnd gravel & cobbles				POOR RECOVERY
345	BCS 000 1519 (4 MIN)	Considerable fine-medium sand				Hit water @ 350' Yields ≈ 40 GPM Drilled to 350 & pulled back DWP to 347 1-14-99, 1349
350	BCS 000 1520 (6 MIN)	Consid coarse sand, subang coarse gravel				1-19-99, 0718
355	BCS 000 1521 (6 MIN)					
360	BCS 000 1522 (24 MIN)					

Prepared By BEN DONNELSON Date 1-19-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-20 Drill Depth From 360 To 420 Page 7 of 27

Driller BYRAN MORRIS / BOYLES BROS Start Date/Time 1-12-99, 1233 End Date/Time _____

Drilling Equip./Method AP-1000/11" CROWD OUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
365	BCS 000 1523 (13MIN)	SANDY GRAVEL, some silt, predom coarse ang sand, subang - subrnd multi-colored gravel			
370	BCS 000 1524 (12MIN)	Predominantly fine angular gravel			
375	BCS 000 1525 (3MIN)				
380	BCS 000 1526 (3MIN)				
385	BCS 000 1527 (10MIN)	Increased coarse gravel silt & fine sand			
390	BCS 000 1528 (2MIN)				
395	BCS 000 1529 (2MIN)	Predom fine sand coarse subrnd gravel & cobbles. Silty			
400	BCS 000 1530 (5MIN)				
405	BCS 000 1531 (7MIN)				Increased water yield @ 405; becoming clearer.
410	BCS 000 1532 (14 MIN)	Decrease in silt & increase in coarse sand			
415	BCS 000 1533 (7MIN)	Increased angular gravel			
420	BCS 000 1534 (15MIN)	Subrnd & subang gravel & cobbles			

Prepared By K. DONNELSON Date 1-19-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-20 Drill Depth From 420 To 480 Page 8 of 27

Driller BRYAN MORRIS/BOYLES ⁸²⁰⁵ Start Date/Time 1-12-99, 1323 End Date/Time _____

Drilling Equip./Method AP-1000/11" CROWD OUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
DRILLED WITH AIR





DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
425	BCS 000 1535 (17 MIN)	SANDY GRAVEL & COBBLES, coarse sand, coarse subang-subrnd multi-colored gravels.				
430	BCS 000 1536 (25 MIN)					Not enough pressure @ 433' to bring up cuttings. Injected Quik-foam with water. 25' plug in pipe. 1-19-99, 1449.
435	BCS 000 1537 (9 MIN)					1-20-99, 1557
440	BCS 000 1538 (20 MIN)	DECREASE IN AMOUNT OF COBBLES				
445	BCS 000 1539 (8 MIN)					
450	BCS 000 1540 (20 MIN)	INCREASED COARSE SAND				
455	BCS 000 1541 (8 MIN)					
460	BCS 000 1542 (14 MIN)					1-20-99, 1731
465	BCS 000 1543 (5 MIN)	Predom. fine subrnd gravel				1-21-99, 0643
470	BCS 000 1544 (22 MIN)	INCREASED AMOUNT OF COARSE SUBRND GRAVEL & COBBLES				
475	BCS 000 1545 (4 MIN)	INCREASED AMOUNT OF COARSE SAND				
480	BCS 000 1546 (8 MIN)					

Prepared By KEN DUNNELSON Date 1-21-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 480 To _____ Page 9 of 27
 Driller BEYAN MORRIS / BOYLES BRW Start Date/Time 1-12-99, 1333 End Date/Time _____
 Drilling Equip./Method AP-1000 / 11" CROWD OUT ^{BIT} Sampling Equip./Method CYCLONE / CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
485	BCS 000 1547 (13 MIN)	Some silt (MUDDY)			
490	BCS 000 1548 (10 MIN)	Increased amount of coarse sand			
495	BCS 000 1549 (6 MIN)	Increased amount of coarse sand			
500	BCS 000 1550 (10 MIN)	INCREASED AMOUNT OF COARSE GRAVEL			1-21-98, 0908 DRILLED TO 500' WITH AP-1000. INSTALLED 499.9' OF 6 5/8" I.D. x 7" O.D. CASING

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 480 To 580 Page 9 of 27

Driller BRYAN MORRIS / 0-500 / LAYNE Start Date/Time 2-10-99 End Date/Time 2-18-99
MOLGUNS/CLEAVES / 500'

Drilling Equip./Method AP-1000/11" 0-500' Sampling Equip./Method Cyclone/cuttings
IR TH75E - 500' - 1618.2B'

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
480	ECS 0000				
485	ECS 0000				
490	ECS 0000				
495	ECS 0000				
500	ECS 0000 2351	MEDIUM - GRAVEL, POLYMICTIC, FINELY COARSE VARIOUS COLOR TYPE, ALSO COARSE SAND			START WELL AS AT 500' 2-10-99 WITH IR TH75E
505	ECS 0000 2352				
510	ECS 0000 2353				
515	ECS 0000 2354				
520	ECS 0150 2355				
525	ECS 0000 2356				RETURN WATER WASH AT 524' WATER WAS RED
530	ECS 0000 2357	532-537' CLAY RICH ZONE, PALE ORANGE 10YR 7/2 MINOR SAND WITH THE CLAY			
535	ECS 0000 2258	537' GRAVEL AS TO 500'			

pared By PELT ANQUIST Date 2-16-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-441XP-2D Drill Depth From 510 To 600 Page 10 of 27

Driller /LAVNE Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR 7A 75E Sampling Equip./Method Cyclone/Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
510	RCS 0000 2359	ALLUVIUM - COARSE GRAVEL, POLYMICTIC, WITH LOCAL COARSE SAND			
515	RCS 0000 2360	HOLE CAVING, LOTS OF GRAVEL RETURN			
520	RCS 0000 2361				
525	RCS 0000 2362	AT 526 PENETRATION ALMOST STOPPED AS IF DRILLING THROUGH A BOULDER			
530	RCS 0000 2363				
535	RCS 0000 2364	AT 565 PENETRATION VERY SLOW ABUNDANT CUTTINGS RETURN, CAVING			
540	RCS 0000 2365	SLOW ROUGH DRILLING, BOULDER			
545	RCS 0000 2366				
550	RCS 0000 2367	Alluvium, coarse sand, gravel and local cobble beds. Gen. pale reddish brown (10R 5/4) to mod. reddish brown (10R 4/6) due to clasts of reddish volcanics. Sands are grey-red. Clasts are dom. rhyolitic volcanics.			2-11-99 Second shift 1200HRS. hole is washing out due to unconsolidated granular material.
555	RCS 0000 2368				
560	RCS 0000 2369				
565	RCS 0000 2370				

Recorded By BENT ANQUIST Date 2-16-99 Checked By _____ Date _____
JAMIE WALKER 2-11-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 600 To 660 Page 11 of 27

Driller CLEAVER / LAYNE Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR TH75E - Sampling Equip./Method Cyclone/cutting

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
600	RCS 0000 2371	Alluvium, as above, coarse sand, gravels and cobbles. Multi-colored volcanic clasts including: red/brown rhyolite, grey brown aphyric rhyolite and light grey to white rhyolite.			
605	BCC 0000 2372				
610	RCS 0000 2373	Similar sandy coarse alluvium w/ ~30% yellow-grey (547%) clay			
615	ECS 0000 2374	Alluvium, as above, coarse sand, gravels and cobbles section with obvious fine brown sand; return water to brown and gritty			problems re-establishing return after rod add 14:03 return becomes very brown due to fine sand
620	ECS 0000 2375				
630	RCS 0000 2376				
625	ECS 0000 2377	Thin clay layer			
640	RCS 0000 2378				
645	ECS 0000 2379	20% light brownish grey clay (5426/1)			
650	RCS 0000 2380				
655	ECS 0000 2381				
660	RCS 0000 2382				

Prepared By Jamie Walker Date 2-11-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID AL-EW1P2D Drill Depth From 660 To 720 Page 12 of 27

Driller CLEAVER/LAYNE Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR TH75E/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
660	BCC 0000 2383	Alluvium, as above, coarse sand, gravel and cobbles. local thin (<1') beds of clay			
665	BCC 0000 2384				
670	BCC 0000 2385				
675	BCC 0000 2386				
680	BCC 0000 2387	15% light brownish grey clay			
685	BCC 0000 2388	Clay, light brownish grey, local gravel beds (<5%)			
690	BCC 0000 2389				
695	BCC 0000 2390				
700	BCC 0000 2391				
705	BCC 0000 2392	Gravel Beds: 20% round pebbles and coarse sand ~50%			
710	BCC 0000 2393				
715	BCC 0000 2394				

Prepared By JAMIE WALKER Date 2-11-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NEENDP-2D Drill Depth From 720 To 780 Page 13 of 27

Driller LEWEL/LAWE to 757.5' Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR THSE/Tricone RC Sampling Equip./Method Cyclone/Cutting

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
720	BCS 0000	Alluvium, Sandy Clay; Light brown (5YR 6/2), med-coarse sand mixed with clay (water bedded). Generally less than 50% sand.			2-16-99 first shift 2-16-99 2nd shift 2-16-99 3rd shift 2-16-99 4th shift 2-16-99 5th shift 2-16-99 6th shift 2-16-99 7th shift 2-16-99 8th shift 2-16-99 9th shift 2-16-99 10th shift 2-16-99 11th shift 2-16-99 12th shift 2-16-99 13th shift 2-16-99 14th shift 2-16-99 15th shift 2-16-99 16th shift 2-16-99 17th shift 2-16-99 18th shift 2-16-99 19th shift 2-16-99 20th shift 2-16-99 21st shift 2-16-99 22nd shift 2-16-99 23rd shift 2-16-99 24th shift 2-16-99 25th shift 2-16-99 26th shift 2-16-99 27th shift 2-16-99 28th shift 2-16-99 29th shift 2-16-99 30th shift 2-16-99 31st shift 2-16-99 32nd shift 2-16-99 33rd shift 2-16-99 34th shift 2-16-99 35th shift 2-16-99 36th shift 2-16-99 37th shift 2-16-99 38th shift 2-16-99 39th shift 2-16-99 40th shift 2-16-99 41st shift 2-16-99 42nd shift 2-16-99 43rd shift 2-16-99 44th shift 2-16-99 45th shift 2-16-99 46th shift 2-16-99 47th shift 2-16-99 48th shift 2-16-99 49th shift 2-16-99 50th shift 2-16-99 51st shift 2-16-99 52nd shift 2-16-99 53rd shift 2-16-99 54th shift 2-16-99 55th shift 2-16-99 56th shift 2-16-99 57th shift 2-16-99 58th shift 2-16-99 59th shift 2-16-99 60th shift 2-16-99 61st shift 2-16-99 62nd shift 2-16-99 63rd shift 2-16-99 64th shift 2-16-99 65th shift 2-16-99 66th shift 2-16-99 67th shift 2-16-99 68th shift 2-16-99 69th shift 2-16-99 70th shift 2-16-99 71st shift 2-16-99 72nd shift 2-16-99 73rd shift 2-16-99 74th shift 2-16-99 75th shift 2-16-99 76th shift 2-16-99 77th shift 2-16-99 78th shift 2-16-99 79th shift 2-16-99 80th shift 2-16-99 81st shift 2-16-99 82nd shift 2-16-99 83rd shift 2-16-99 84th shift 2-16-99 85th shift 2-16-99 86th shift 2-16-99 87th shift 2-16-99 88th shift 2-16-99 89th shift 2-16-99 90th shift 2-16-99 91st shift 2-16-99 92nd shift 2-16-99 93rd shift 2-16-99 94th shift 2-16-99 95th shift 2-16-99 96th shift 2-16-99 97th shift 2-16-99 98th shift 2-16-99 99th shift 2-16-99 100th shift
	BCS 2395				
725	BCS 0000				
	BCS 2396				
730	BCS 0000				
	BCS 2397				
735	BCS 0000				
	BCS 2398				
740	BCS 0000				
	BCS 2399				
745	BCS 0000				
	BCS 2400				
750	BCS 0000				
	BCS 2401				
755	BCS 0000				
	BCS 2402				
760	BCS 0000				
	BCS 2403				
765	BCS 0000				
	BCS 2404				
770	BCS 0000				
	BCS 2405				
775	BCS 0000				
	BCS 2406				

SANDY CLAY WITH FINE GRAVEL OF MIXED LITHOLOGY
CLAY FAIR YELLOWISH ORANGE 10YR 7/2
GRAVEL FRAGMENTS ANDESIA

2-16-99 first shift
2-16-99 2nd shift
2-16-99 3rd shift
2-16-99 4th shift
2-16-99 5th shift
2-16-99 6th shift
2-16-99 7th shift
2-16-99 8th shift
2-16-99 9th shift
2-16-99 10th shift
2-16-99 11th shift
2-16-99 12th shift
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2-16-99 88th shift
2-16-99 89th shift
2-16-99 90th shift
2-16-99 91st shift
2-16-99 92nd shift
2-16-99 93rd shift
2-16-99 94th shift
2-16-99 95th shift
2-16-99 96th shift
2-16-99 97th shift
2-16-99 98th shift
2-16-99 99th shift
2-16-99 100th shift

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 780 To 840 Page 14 of 21

Driller _____ Start Date/Time 2-10-98 End Date/Time _____

Drilling Equip./Method IR TH 75E Sampling Equip./Method Cyclone/Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes			
780	BCS 0000 2407	SANDY CLAY GRAYISH ORANGE 10YR 7/4 LOCAL MINOR COARSE GRAVEL			WATER YELLOWISH BROWN			
785	BCS 0000 2408							
790	BCS 0000 2409							
795	BCS 0000 2410							
800	BCS 0000 2411							
805	BCS 0000 2412							
810	BCS 0000 2413							
815	BCS 0000 2414							
820	BCS 0000 2415							
825	BCS 0000 2416							
830	BCS 0000 2417							
835	BCS 0000 2418							
840								

Recorded By E. ENT ANQUIST Date 2-16-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWRP-2D Drill Depth From 840 To 900 Page 15 of 27

Driller _____ Start Date/Time 2-10-99 End Date/Time _____

Drilling Equip./Method IR 7175E / Sampling Equip./Method Cyclone /cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
840	BCS 0000 2419	SANDY CLAY WITH MINOR GRAVEL CLAY GRAYISH ORANGE 10YR 7/4			
845	BCS 0000 2420				
850	BCS 0000 2421				
855	BCS 0000 2422	Alluvium, coarse sand and gravel; gen brownish grey (5YR 7/4) due to rhyolitic volcanic clasts. Minor local clay beds.			2-16-99 First shift 2-16-99 Second shift
860	BCS 0000 2423	Clay, sand. Fine, hard dry clay and sand; gravel			
870	BCS 0000 2424	Coarse sand & gravel.			
875	BCS 0000 2425				
880	BCS 0000 2426				
885	BCS 0000 2427	becomes finer; mostly coarse-med. sand			
890	BCS 0000 2428	coarse sand, gravel			
895	BCS 0000 2429				
900	BCS 0000 2430				

Prepared By BENT ANDRIST Date 2-16-99 Checked By JAMIE WALKER Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-244P-2D Drill Depth From 900 To 960 Page 16 of 27

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR 7H35E/ Sampling Equip./Method Cyclone Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
900	BCE 0000	Alluvium, as above, coarse sand and gravel, well sorted, very little fine material, ^{sl. fines brown silt, sand in return water; mostly coarse sand in sample.}			
	BCE 2431				
905	BCE 0000	clear return			
	BCE 2432				
910	BCE 0000				
	BCE 2433				
915	BCE 0000				
	BCE 2434				
920	BCE 0000				
	BCE 2435				
925	BCE 0000	fine sand, reaction			high production - 50 gpm consistently
	BCE 2436				
930	BCE 0000	coarse gravel			sl. increase in water flow after #18 added 100 gpm return hose in tubing but only slight increase in flow.
	BCE 2437				
935	BCE 0000	Alluvium sand and gravel, yellowish-brown (10% silt); different source than sands above.			
	BCE 2438				
940	BCE 0000	occasional fine gravel, most by brown volcanic			
	BCE 2439				
945	BCE 0000				
	BCE 2440				
950	BCE 0000				
	BCE 2441				
955	BCE 0000				
	BCE 2442				
960	BCE 0000				

Used By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Corehole ID NC-EWDP-2D Drill Depth From 1020 To 1080 Page 18 of 27

Driller S. Cleaver Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR TH75E/TriCore RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1025	BCS 0000 2455	Alluvium, as above, yellow-brown sand and gravel.			
1030	BCS 0000 2456				
1035	BCS 0000 2457				
1040	BCS 0000 2458	----- Gradation Contact ----- Alluvium, ?older?, greyish pink (5R 8/2) to pinkish-grey (5YR 6/1), sand and gravelly sand. Section contains 30-80% pale pink clasts of ? rhyolite and darker (red-brown) sand.			Driller reports clay hole making 75gpm out of clay
1045	BCS 0000 2459				
1050	BCS 0000 2460				
1055	BCS 0000 2461	coarse polymictic gravel bed			
1060	BCS 0000 2462				
1065	BCS 0000 2463				Drilling rate increases
1070	BCS 0000 2464				
1075	BCS 0000 2465	coarse polymictic gravels			
1080	BCS 0000 2466				

Prepared By JAMIE WALKER Date 2.17.99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Corehole ID# EMP-2D Drill Depth From 1080 To 1140 Page 19 of 27

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1085	2467	Aluminum as above, grayish yellow 5T 8/2. Minor pink clasts 5R 7/2; increase to 5% at 1095. Coarse sand increase to fine gravel at 1095.			2.1694 second shift 2.1799 first shift Water volume 853-p.m.
1095	2468	Aluminum - Gravel, coarse, poorly sorted, overall unit yellowish gray 5T 6/2, angular clasts with moderate sphericity. Rhizolite tuff clasts of varying color and texture.			
1100	2470	Aluminum - Mostly fine sandy material, 5% fine gravel limit grayish red 10 R 5/2. Gravel forton polyhedral, rhizolitic clasts, sub angular with moderate sphericity.			
1105	2471	Aluminum - Gravel, coarse, poorly sorted, overall unit yellowish gray 5T 6/2, angular clasts with moderate sphericity. Rhizolite tuff clasts of varying color and texture.			
1110	2472	Aluminum - Gravel, coarse, poorly sorted, overall unit yellowish gray 5T 6/2, angular clasts with moderate sphericity. Rhizolite tuff clasts of varying color and texture.			
1115	2473	Aluminum - Gravel, coarse, poorly sorted, overall unit yellowish gray 5T 6/2, angular clasts with moderate sphericity. Rhizolite tuff clasts of varying color and texture.			
1120	2474	Aluminum - Gravel, coarse, poorly sorted, overall unit yellowish gray 5T 6/2, angular clasts with moderate sphericity. Rhizolite tuff clasts of varying color and texture.			Water volume increase to 100-1203 p.m. at 1117.
1125	2475	Aluminum - Gravel, coarse, poorly sorted, overall unit yellowish gray 5T 6/2, angular clasts with moderate sphericity. Rhizolite tuff clasts of varying color and texture.			
1130	2476	Aluminum - Gravel, coarse, poorly sorted, overall unit yellowish gray 5T 6/2, angular clasts with moderate sphericity. Rhizolite tuff clasts of varying color and texture.			AT 1139, water turned reddish brown.

Prepared By Beet Hoover Date 2-18-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID: NC-BDP-27 Drill Depth From 1260 To 1320 Page 22 of 27
 Driller: _____ Start Date/Time _____ End Date/Time _____
 Drilling Equip./Method IR 7H75E/Tricone RC Sampling Equip./Method Cyclone/Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1260	1260	Reworked Ash Flow, Dusky Red, SR 3M, Rhyolite with >10% Quartz Phenocrysts	+		
1270	1270	Gravelly light red SR 6 tuffaceous clasts subangular with low sphericity compose 50% - 70% clasts are massive very fine grained	o		DRILL PENETRATION RATE SLOWED TO 1/2 OF WHAT IT WAS ABOVE 1265'
1280	1280				
1290	1290				
1300	1300	Gravelly polyhedral, multicolored, well rounded clasts	o		
1310	1310				
1320	1320				

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1320	1320				
1310	1310				
1300	1300				
1290	1290				
1280	1280				
1270	1270				
1260	1260				

2-17-99 First Shift
 2-17-99 Second Shift

Prepared By BENT ALQUIST Date 2-18-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-ERJDA-2D Drill Depth From 1320 To 1380 Page 23 of 27

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR TH75E/Tri cone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1320	BCS 0000	Alluvium, gravel			distinct color change
1325	2515	Alluvium, fine sands or reworked tuffs, well cemented (Calcite); interfingering red (SR 5/4) hematitic beds with dominantly yellow-orange (10YR 6/6) limonitic beds. Local gravel beds (1-3') suggest unit is sand and not reworked tuffs.			
1330	BCS 0000				
	2516				
1335	BCS 0000				
	2517				
1340	BCS 0000	polymictic gravel bed			
	2518				
1345	BCS 0000				
	2519				
1350	BCS 0000				
	2520				
1355	BCS 0000	coarse sand			
	2521				
1360	BCS 0000	polymictic gravels			
	2522				
1365	BCS 0000				
	2523				
1370	BCS 0000				
	2524				
1375	BCS 0000				
	2525				
1380	BCS 0000	Alluvium, interbedded sand, gravel and clay, unconsolidated, light brown (5YR 6/4) to greyish red (5R 4/2). Very slow drilling. Minor beds of yellow sandy material as above.			distinct color change
	2526				

Prepared By JAMIE WALKER Date 2-17-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-ENR-2D Drill Depth From 1380 To 1440 Page 24 of 27

Driller S. Cleaver Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IRTH75E/Tricon RC Sampling Equip./Method Cyclone/cutting

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1380	BCS 0000	Alluvium, as above, interbedded sand, gravel & clay.			
	2527				
1390	BCS 0000	clay-rich zone			
	2528				
1395	BCS 0000	coarse gravel zone			water flow 1/20 gpm
	2529				
1400	BCS 0000	sandy clay			
	2530				
1410	BCS 0000	clay-rich zone			
	2531				
1415	BCS 0000	sand, gravel, less clay			
	2532				
1420	BCS 0000	sand and gravel			
	2533				
1425	BCS 0000	sand and fine gravel, local dark purple clay layers			
	2534				
1430	BCS 0000				
	2535				
1435	BCS 0000				
	2536				
1440	BCS 0000				
	2537				
	BCS 0000				
	2538				

Prepared By JAMIE WALKER Date 2-18-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NE-EMD-2D Drill Depth From 1440 To 1500 Page 25 of 27

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IRTH75E/Taconic RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1444	BCS 0000 2539	Alluvium, as above, interbedded sand, gravel and clay, unit generally greyish-red (SR 4/2)			return water 41.2°C
1445	BCS 0000 2540				
1450	BCS 0000 2541				
1455	BCS 0000 2542				
1460	BCS 0000 2543	Coarse sandy gravel unit			2-17-99 Second shift 2-18-99 First shift
1465	BCS 0000 2544				
1470	BCS 0000 2544	TUFF, ASH FALL, LIGHT GRAY, MOSTLY PUMICE, 10% EMBEDDED BIOTITE FLAKES	+++++		NOTE: FROM 1465 TO 1618 NO ROCK COLOR CHART WAS AVAILABLE ON 3-12-99 CALCAREOUS
1475	BCS 0000 2545	SILTSTONE, LACUSTINE, BROWN OR GRAY; GRAVEL, VOLCANIC GRAY, BROWN, OR RED. GRAVEL USUALLY 10-20% OF SAMPLE, LOCALLY PREDOMINATES.			CALCAREOUS
1480	BCS 0000 2546	MOSTLY GRAVEL			NOT CALCAREOUS
1485	BCS 0000 2547	MOSTLY GRAVEL			NOT CALCAREOUS
1490	BCS 0000 2548				WEAKLY CALCAREOUS
1495	BCS 0000 2549				WEAKLY CALCAREOUS
1500	BCS 0000 2550				WEAKLY CALCAREOUS

Prepared By ARTHUR J. MENDENHALL Date 3-12-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 1500 To 1560 Page 26 of 27

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR 7H75E/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
1500	BCS 0000	SILTSTONE AND GRAVEL, AS ABOVE	0 0 0		WEAKLY CALCAREOUS	
			0 0 0			
1505	BCS 0000			0 0 0		WEAKLY CALCAREOUS
				0 0 0		
1510	BCS 0000			0 0 0		WEAKLY CALCAREOUS
				0 0 0		
1515	BCS 0000			0 0 0		WEAKLY CALCAREOUS
				0 0 0		
1520	BCS 0000			0 0 0		WEAKLY CALCAREOUS
				0 0 0		
1525	BCS 0000			0 0 0		CALCAREOUS
				0 0 0		
1530	BCS 0000		0 0 0		CALCAREOUS	
			0 0 0			
1535	BCS 0000		0 0 0		CALCAREOUS	
			0 0 0			
1540	BCS 0000	MOSTLY GRAVEL	0 0 0		CALCAREOUS	
			0 0 0			
1545	BCS 0000		0 0 0		CALCAREOUS	
			0 0 0			
1550	BCS 0000		0 0 0		CALCAREOUS	
			0 0 0			
1555	BCS 0000		0 0 0		CALCAREOUS	
			0 0 0			
1560			0 0 0		CALCAREOUS	

Prepared By ARTHUR J. MENDENHALL Date 3-12-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-ENDP-2D Drill Depth From 1560 To 1620 Page 27 of 27

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR TA 75E/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1560	BCS 0000	SILTSTONE AND GRAVEL, AS ABOVE.	0 - 0		WEAKLY CALcareous
1565	BCS 0000		0 - 0		WEAKLY CALcareous
1570	BCS 0000		0 - 0		WEAKLY CALcareous
1575	BCS 0000	40% GRAVEL, 20% SILTSTONE 40% TUFF, REWORKED, GRAY, ABRAIDED BIOTITE PHENOCRYSTS	+ + + + + + + + + +		WEAKLY CALcareous
1580	BCS 0000	MOSTLY GRAVEL	0 0 0 0 0		WEAKLY CALcareous
1585	BCS 0000	10% TUFF, REWORKED, AS ABOVE	+ + + 0		WEAKLY CALcareous
1590	BCS 0000		0 - 0		WEAKLY CALcareous
1595	BCS 0000	MOSTLY GRAVEL	0 0 0 0 0		WEAKLY CALcareous
1600	BCS 0000		0 0 0 0		CALcareous TO WEAKLY CALcareous
1605	BCS 0000	SILTSTONE, LACUSTRINE, BROWN	- - - - -		CALcareous
1610	BCS 0000		- - - - -		CALcareous
1615	BCS 0000		- - - - -		CALcareous
1620	BCS 0000	- HOLE TD'd at 1618.38' due to casing problems.	- - - - -		Plugged off - TILD OUT HOLE TD'd 2-18-99 17:30

Prepared By ARTHUR J. MENDENHALL Date 3-12-99 Checked By _____ Date _____

OVERSIZE DOCUMENT PAGE(S) PULLED

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9906100166-03

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**BOREHOLE: NC-2D
LOGS: NEUTRON DENSITY
GAMMA**

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NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-3

9906100166-03

Well No. NC-EWDP-3D

Status:

Borehole drilled to 2,500 ft.

Latitude\Longitude:

36° 40' 53.597" 116° 32' 17.049"

Legal Description:

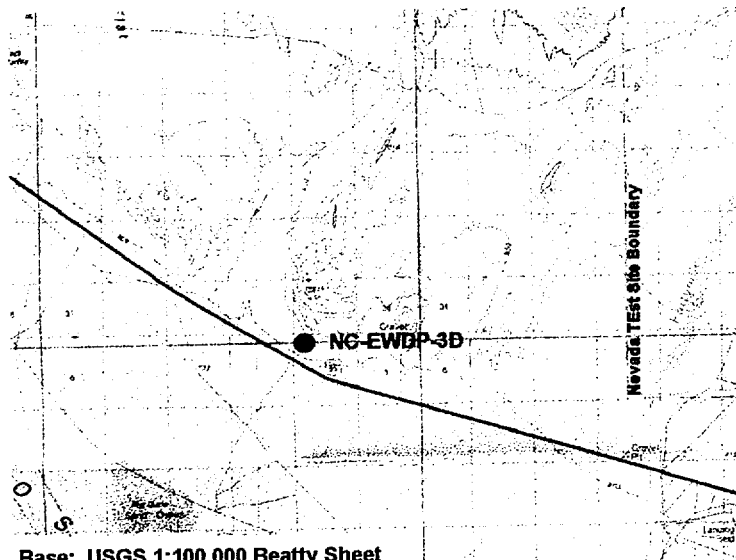
Township 14S Range 48E
Section 35 SW 1/4 SW 1/4 1/4

Elevation:

798.33 m AMSL (2619.2 ft ±) GPS

Access:

Highway 95 north from Lathrop Wells
Jct 7.5 miles to gate on north side of
Highway. Take gravel road 0.15 miles
north.



Purpose: 1) provide lithologic samples of deposits; 2) define valley-fill stratigraphic sequence and groundwater flow paths down gradient of proposed repository; and 3) provide water level and water chemistry data.



Base: Thematic Mapper Image of the Big Dune 7.5° Quadrangle

NC-EWDP-3D is located along a key groundwater pathway between Crater Flat and Amargosa Desert. Because of high water temperatures, specialized West-bay equipment will be ordered and completion of this well is delayed until the equipment is available. Water samples were collected for analysis.

**NC-EWDP-3D
SITE SUMMARY**

Land surface

500 ft

1000 ft

1500 ft

2000 ft

2500 ft
(TD)

0-251' Valley-fill -Alluvium - 0-185' Alluvium, poorly sorted, coarse gravels and sand, fan-deposits; 0-25' pale orange (10YR 8/2 dry), caliche covered clasts; 25-30' no sample; 30-40' grayish red (10R 4/2) to light brown (5YR 6/4); 40-45' no sample; 45-55' alluvium, as 30-40'; 55-65' no sample, 65-185' alluvium, gravel and sand, grayish red (10R 4/2) to light brown (5YR 6/4), poorly sorted; 185-200' alluvial sand, pale yellowish brown (10YR 6/2), poorly sorted; 200-205' alluvium, gravel and sand, caliche covered, pale orange (10YR 8/2); 205-210' no sample; 210-220' alluvium, gravel and sand, light brown (5YR 6/4); 220-225' no sample; 225-251' alluvial sand, pale yellowish brown (10YR 6/2), poorly sorted

251-343' Tertiary Sedimentary Rocks - 251-278' sandstone, lacustrine/fluvial, pale red (10R 6/2), 10-20% mafics, tr. FeOx, poss. weathering surface; 278-295' sandstone, as 251-278', grayish orange (10YR 7/4), 1% volc. clasts; 295-343' siltstone, lacustrine, med. dark gray (N4), weakly calcareous, locally

343-533 Tertiary Volcanics - 343-400' Ash Tuff, reworked, grayish orange pink (5YR 7/2) to pale orange (10YR 8/2), up to 5% qtz/sanidine phenocrysts, 1% mafics, up to 20% volc. clasts, becomes yellowish-gray beyond 390'; 400-412' Ash Tuff, ash flow, med. dark gray (N4), 5% qtz/sanidine phenos, 1% mafics, up to 10% pumice, light gray (N7), unflattened; 412-419' Ash Tuff, ash flow, grayish orange (10YR 7/4), 5% biotite and mafics, 1% qtz/sanidine; 419-477' Tuff, ash, reworked, pale orange (10YR 8/2), 5-10% abraded biotite and mafics, 1-5% qtz/sanidine phenos, up to 20% volc. clasts, becomes grayish yellow green (5GY 7/2) 445-460', yellowish gray (5Y 7/2) 460-478'; 478-533' tuff, ash flow, black (N1), 20-30% pumice (pale orange (10YR 8/2)), 0-50% qtz/sanidine phenos, 0-10% mafics, unflattened pumice, pumice color becomes greenish yellow (10Y 8/2) beyond 505'

533-1285' Tertiary Sedimentary rocks -533-945' siltstones, calcareous, homogeneous, brownish gray (5YR 4/1) to med. dark gray (N4), locally clay-rich esp. 705-805', 805-920' color is darker, dusky brown (5YR 2/2) to med. dark gray (N4), some grayish olive (5Y 4/2); 945-1105' siltstones, lacustrine, noncalcareous, light olive gray (5Y 5/2) to grayish black (N2), locally clay beds to 1285', locally and tuff beds (light gray N8) beyond 980', fine sandstone beds beyond 1210'

1285-1870' Tertiary Mixed Sedimentary and Volcanic sequence - 1285-1340' siltstone/crystal tuff reworked, dk. gray to grayish-black (N3-N2), 2% white pumice and qtz frags. decreasing downhole, tr. vfg pyrite; 1340-1565' siltstone/sandstone, poss. reworked tuff, med gray (N5-N4), qtz. and fsp. crystals, tr. vfg pyrite, grain size is vfg sand to silt, local gray-black (N2) fragments to 1390', local grayish yellow (5Y 8/4) tuff frags. beyond 1540' and cherty siltstone beds (N3) beyond 1520'; 1565-1714' tuff, ash flow, light gray (N7), fine aphyric, local cherty beds? (N2), blebs of vfg pyrite; 1714-1870' siltstone/tuff interbedded, yellowish brown (10YR 2/2) to brownish black (5YR 2/1) siltstones (1714-1739', 1785-1802', 1835-1839', 1854-1864'), laminated, locally 1% pyrite interbedded with crystal tuffs (1739-1785', 1802-1835', 1839-1854', 1864-1870'), medium gray (N5), 10-50% qtz/sanidine crystals, 5-10% hornblende/biotite crystals, local black (N1) lithic fragments

1870-2500' Tertiary Sedimentary rocks -1870-1925' siltstone, sandy, lacustrine, brownish black (5YR 2/1) to yellow brown (10YR 5/4); 1925-1932' siltstone as 1870-1925', clay-rich, light gray (N8); 1932-1945' siltstone, black (N1) to yell-brn (10YR 5/2); 1950-2000' siltstones, fine dark yell-brn (10YR 3/2) mixed with coarser pale yell-brn, becomes gray-brn (5R 3/2) beyond 1990', lt. gray tuff bed 1997-2000'; 2000-2085' sandy siltstone, pale brown (5YR 5/2) to gray and olive gray (5Y 6/1), partly calcareous; 2085-2100' siltstone w/ grey clay beds (N4); 2100-2320' siltstone and marl interbedded, lacustrine, brn-blk siltstone (5YR 2/1) ~60%, pale brown silty marl (5YR 5/2) ~40%, beyond 2235, color is dark grey (N3) and olive-gray (5Y 4/2); 2320-2430' siltstone, lacustrine, dark gray (N3) to yell-brn (10YR 6/2), weakly calcareous; 2430-2500' sandstone and lesser siltstone, med-dk. gray (N3-5), gradational upper contact with clay.

NC-EWDP-3D
SUMMARY LITHOLOGIC LOG

NC-EWDP-3D

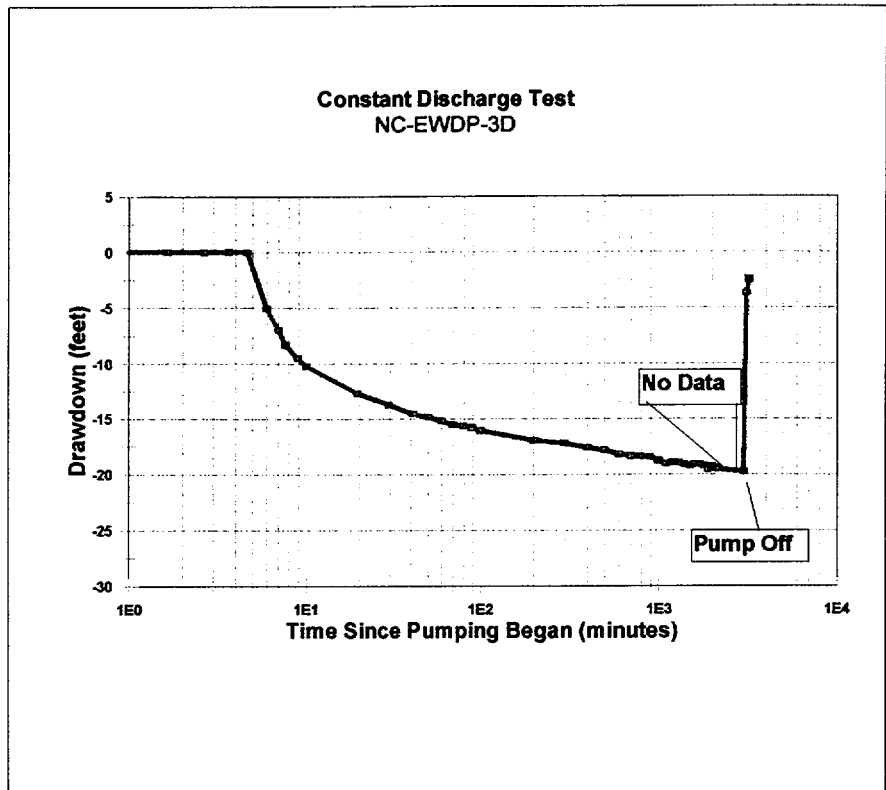
Constant Discharge Test

Date: February 21-23 1999

Static Depth 259.04

To Water
(ft below mp)

Time Since Pumping Began minutes	Depth to Water ft	Draw Down ft
0.67	259.04	-0.00
1.67	259.03	0.01
2.67	259.02	0.02
3.67	259.01	0.03
4.67	259.03	0.01
6.00	264.13	-5.09
7.00	265.98	-6.94
7.67	267.35	-8.31
9.00	268.51	-9.47
10.00	269.28	-10.24
19.67	271.74	-12.70
29.67	272.77	-13.73
41.00	273.60	-14.56
50.33	273.89	-14.85
59.67	274.25	-15.21
70.00	274.58	-15.54
79.67	274.69	-15.65
89.67	274.83	-15.79
100.00	275.11	-16.07
199.67	276.00	-16.96
300.33	276.24	-17.20
399.67	276.65	-17.61
499.67	276.88	-17.84
599.67	277.26	-18.22
699.67	277.41	-18.37
799.67	277.46	-18.42
899.67	277.52	-18.48
999.67	277.82	-18.78
1100.00	278.09	-19.05
1200.00	277.94	-18.90
1300.00	278.04	-19.00
1399.67	278.14	-19.10
1500.00	278.27	-19.23
1600.33	278.11	-19.07
1700.33	278.13	-19.09
1799.67	278.25	-19.21
1900.00	278.57	-19.53
2000.00	278.33	-19.29
2100.33	278.41	-19.37
2169.67	278.55	-19.51
3019.20	278.77	-19.73
3099.87	262.73	-3.69
3200.87	261.57	-2.53
3222.87	261.46	-2.42



Pumping Rate

167 gallons per minute

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DAK-EWDP-3D Drill Depth From 0 To 2500 Page 1 of 42

Driller DAVE HOLGEM/STEVE CLEVER Start Date/Time at 19 FT, 1-20-99/0130 End Date/Time 2-4-99/2340

Drilling Equip./Method INTEGRAL-ROUND THISE Sampling Equip./Method CYCLONE/SPLITTER
SN 6299 REVERSE CIRCULATION

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
5	BCS 0000 1201	ALLUVIUM, ALLUVIAL FAN, CALCIE COVERED VOLCANIC CLASTS, VERY PALE ORANGE 10YR 8/2 (DRY)			
10	BCS 0000 1202				
15	BCS 0000 1203				
20	BCS 0000 1204				
25	BCS 0000 1205				
30	BCS 0000 1206	ALLUVIUM, AS ABOVE, MUCH LESS CALCIE COVERING CLASTS, GRAYISH RED 10R 4/2, VERY DUSKY RED 10R 2/2, OR LIGHT BROWN 5YR 6/4 (MOST ABUNDANT)	NO SAMPLE		12" CASING TO 20'
35	BCS 0000 1207				
40	BCS 0000 1208				
45	BCS 0000 1209				
50	BCS 0000 1210				
55	BCS 0000 1211				NO RETURN
60	BCS 0000 1212				
			NO SAMPLE		STARTED INJECTING WATER TO GET BETTER RETURN
					NO CUTTINGS, NO RETURN

Prepared By ARTHUR J. MENDENHALL Date 1-22-99 Checked By _____ Date _____

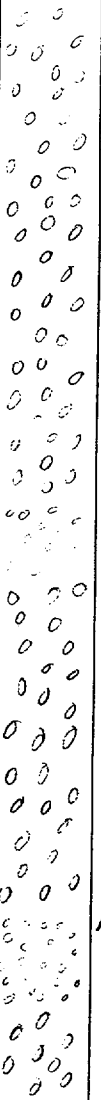
NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DJL-EWDP-3D Drill Depth From 60 To 120 Page 2 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
65	BCS 0000 1213	ALLUVIUM, AS ABOVE	NO SAMPLE		NO CUTTINGS IN RETURN	
70	BCS 0000 1214					
75	BCS 0000 1215					
80	BCS 0000 1216					
85	BCS 0000 1217					
90	BCS 0000 1218					
95	BCS 0000 1219					ABUNDANT FINE CUTTINGS
100	BCS 0000 1220					
105	BCS 0000 1221					
110	BCS 0000 1222					ABUNDANT FINE CUTTINGS
115	BCS 0000 1223					
120	BCS 0000 1224					

Prepared By ARTHUR J. MENDENHALL Date 1-22-99 Checked By Date


NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EMDP-3D Drill Depth From 120 To 180 Page 3 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
125	BCS 0000 1225	ALLUVIUM, AS ABOVE			
130	BCS 0000 1226				
135	BCS 0000 1227				
140	BCS 0000 1228				
145	BCS 0000 1229				
150	BCS 0000 1230				
155	BCS 0000 1231				
160	BCS 0000 1232				
165	BCS 0000 1233				
170	BCS 0000 1234				
175	BCS 0000 1235				
180	BCS 0000 1236				

Prepared By ARTHUR J. MENDENHALL Date 1-22-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole IDNCFEWD2-3D Drill Depth From 180 To 240 Page 4 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
185-190	BCS 0000 1237	ALLUVIUM, AS ABOVE			
190-195	BCS 0000 1238	ALLUVIUM, SAND, POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
195-200	BCS 0000 1239	ALLUVIUM, SAND, POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
200-205	BCS 0000 1240	ALLUVIUM, ALLUVIAL FAN, COMMONLY CALCINE COVERED VOLCANIC CLASTS, VERY PALE ORANGE 10YR 8/2 (DRY)			
205-210	BCS 0000 1241	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRANISH RED (OR 4/2), VERY DUSKY RED (OR 2/2), OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
210-215	BCS 0000 1242	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRANISH RED (OR 4/2), VERY DUSKY RED (OR 2/2), OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
215-220	BCS 0000 1243	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRANISH RED (OR 4/2), VERY DUSKY RED (OR 2/2), OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
220-225	BCS 0000 1244	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRANISH RED (OR 4/2), VERY DUSKY RED (OR 2/2), OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
225-230	BCS 0000 1245	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRANISH RED (OR 4/2), VERY DUSKY RED (OR 2/2), OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
230-235	BCS 0000 1246	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRANISH RED (OR 4/2), VERY DUSKY RED (OR 2/2), OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
235-240	BCS 0000 1247	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRANISH RED (OR 4/2), VERY DUSKY RED (OR 2/2), OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
240-245	BCS 0000 1248	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRANISH RED (OR 4/2), VERY DUSKY RED (OR 2/2), OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			

Prepared By ANDREA J. Mendenhall Date 1-22-99 Checked By Date

FIRST INDICATION OF GRAUDWATER

CUTTINGS WASHED THROUGH SIEVE

CUTTINGS WASHED THROUGH SIEVE

200' 230' ONLY MINIMAL CUTTINGS IN RETRAK

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID INC-ENVDP-3D Drill Depth From 360 To 420 Page 7 of _____

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
365	BCS 0000 1273	TUFF, ASH, REWORKED, AS ABOVE	+ + + + + + + + +		
370	BCS 0000 1274	0-5% VOLCANIC CLASTS	+ + + + + + + + +		
375	BCS 0000 1275		+ + + + + + + + +		
380	BCS 0000 1276		+ + + + + + + + +		
385	BCS 0000 1277		+ + + + + + + + +		
390	BCS 0000 1278	YELLOWISH GRAY 5Y 7/2	+ + + + + + + + +		
395	BCS 0000 1279		+ + + + + + + + +		
400	BCS 0000 1280	YELLOWISH GRAY 5Y 7/2 AND VERY PALE ORANGE 10YR 8/2	+ + + + + + + + +		7" CASING TO 397'
405	BCS 0000 1281	TUFF, ASH FLOW, MEDIUM DARK GRAY N4, 5% QUARTZ/SANIDINE PHENOCRASTS, 1% MAFICS, UP TO 10% LIGHT GRAY N7 PUMICE.	+ + + + + + + + +		PUMICE SHOWS NO FLATTENING
410	BCS 0000 1282		+ + + + + + + + +		
415	BCS 0000 1283	TUFF, ASH FLOW, GRAYISH ORANGE 10YR 7/4, 5% BIOTITE AND MAFICS 1% QUARTZ/SANIDINE	+ + + + + + + + +		
420	BCS 0000 1284		+ + + + + + + + +		

Prepared By ARTHUR J. MENDENHALL Date 1-23-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DNC-EWDP-3D Drill Depth From 480 To 540 Page 9 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
485	BCS 0000 1297	TUFF, ASH FLOW, AS ABOVE	+ + + + + + + + +		1% VOLCANIC LITHICS POSSIBLE WEATHERING SURFACE PUMICE DARK YELLOWISH ORANGE 10YR 6/6
490	BCS 0000 1298				
495	BCS 0000 1299				
500	BCS 0000 1300				
505	BCS 0000 1301				
510	BCS 0000 1302	PUMICE BECOMING MODERATE GREENISH YELLOW 10Y 7/4	+ + + + + + + + +		
515	BCS 0000 1303	PUMICE BECOMING PALE GREENISH YELLOW 10Y 8/2	+ + + + + + + + +		
520	BCS 0000 1304		+ + + + + + + + +		
525	BCS 0000 1305		+ + + + + + + + +		
530	BCS 0000 1306		+ + + + + + + + +		
535	BCS 0000 1307	SILTSTONE, LACUSTRINE, BROWNISH GRAY 5YR 4/1, CALCAREOUS	- - - - - - - - -		
540	BCS 0000 1308				

Prepared By ARTHUR J. MENDENHALL Date 1-23-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NYC-EWDP-3D Drill Depth From 540 To 600 Page 10 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
545	BCS 0000 1309	SILTSTONE, AS ABOVE, MED DARK GRAY NY, CALCAREOUS LOCALLY CLAY RICH	---		
	BCS 0000 1310				
550	BCS 0000 1311				
	BCS 0000 1312				
555	BCS 0000 1313				
	BCS 0000 1314				
560	BCS 0000 1315				
	BCS 0000 1316				
565	BCS 0000 1317				
	BCS 0000 1318	575-585 MINOR FRAGMENTS OF WHITE CRYSTAL TUFF	---		
570	BCS 0000 1319				
	BCS 0000 1320				
575	BCS 0000 1320				

Prepared By RENT AARQUIST Date 1-24-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 660 To 720 Page 12 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
665	BCS 0000 1333	SILTSTONE AS ABOVE, MINOR CRYSTAL TUPE FRAGMENTS - MAY HAVE FALLEN FROM HIGHER UP IN HOLE			
670	BCS 0000 1334				
675	BCS 0000 1335				
680	BCS 0000 1336				
685	BCS 0000 1337				
690	BCS 0000 1338				
695	BCS 0000 1339				
700	BCS 0000 1340				
705	BCS 0000 1341				
710	BCS 0000 1342		705-710 50% GRAY CLAY WITH SILTSTONE		
715	BCS 0000 1343				
720	BCS 0000 1344				

Prepared By BENT ANQUIST Date 1-24-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDE3D Drill Depth From 720' To 780' Page 13 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
725	BCS 0000 1345	SILTSTONE, AS ABOVE WITH MUCH CLAY, SMALL SAMPLE IN BUCKETS, CLAY RICH TO 765'			SILTSTONES STILL CALCAREOUS
730	BCS 0000 1346	TRACE VOLCANIC CLASTS			
735	BCS 0000 1347				
740	BCS 0000 1348				
745	BCS 0000 1349	CLAYEY			
750	BCS 0000 1350	CLAYEY			
755	BCS 0000 1351	TRACE VOLCANIC CLASTS			
760	BCS 0000 1352	TRACE VOLCANIC CLASTS			
765	BCS 0000 1353				
770	BCS 0000 1354	765-775' MORE COARSE MATERIAL IN BUCKET SAMPLES, LESS CLAY			
775	BCS 0000 1355				
780	BCS 0000 1356	775 TO 805 CLAY RICH SILTSTONE			

Prepared By ARTHUR J. MEMENHALL Date 1-24-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NJC-EWDP-3D Drill Depth From 780' To 840' Page 14 of _____

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
785	BCS 0000 1357	SILTSTONE AS ABOVE	-		SILTSTONE STILL CALCAREOUS
790	BCS 0000 1358		-		
795	BCS 0000 1359		-		
800	BCS 0000 1360		-		
805	BCS 0000 1361	CLAYEY	-		
810	BCS 0000 1362	DUSKY BROWN SYR 2/2, LIATER RETURN TURNED GREENISH GRAY THEN BROWN, MORE COARSE RETURN IN BUCKETS	-		
815	BCS 0000 1363	MED. DARK GRAY N4	-		
820	BCS 0000 1364		-		
825	BCS 0000 1365		-		
830	BCS 0000 1366	DUSKY BROWN SYR 2/2	-		
835	BCS 0000 1367	MED. DARK GRAY N4	-		
840	BCS 0000 1368		-		

Prepared By ARTHA J. MENDEMHALL Date 1-24-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DNC-EWDP-3D Drill Depth From 900 To 960 Page 16 of _____

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
905	BCS 0000 1381	SILTSTONE, AS ABOVE			
910	BCS 0000 1382	MINOR CLAY			
915	BCS 0000 1383				
920	BCS 0000 1384				
925	BCS 0000 1385	SILTSTONES BECOMME NONCALCAREOUS			
930	BCS 0000 1386				
935	BCS 0000 1387				
940	BCS 0000 1388	COMMON CLAY			
945	BCS 0000 1389				
950	BCS 0000 1390	SILTSTONE, LACUSTRAIVE, LIGHT OLIVE GRAY 5Y 5/2 OR BRNISH BLACK N2, NONCALCAREOUS			
955	BCS 0000 1391	COMMON CLAY			
960	BCS 0000 1392	MINOR CLAY			

Prepared By ARTHUR J. MENDENHALL Date 1-25-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID ~~DM-0002-3D~~ Drill Depth From 960 To 1020 Page 17 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
965	BCS 0000 1393	SILTSTONE, AS ABOVE SOME CLAY			
970	BCS 0000 1394	CLAY			
975	BCS 0000 1395				
980	BCS 0000 1396				
985	BCS 0000 1397	SILTSTONE, LACUSTRINE, GREENISH GRAY 5GY 6/1 OR DARK GRAY N3 10% TUFF, ASH FALL, VERY LIGHT GRAY N8, TRACE MAFICS			
990	BCS 0000 1398	SILTSTONE, LACUSTRINE, LIGHT OLIVE GRAY 5Y 5/2 OR GRAYISH BLACK N2			
995	BCS 0000 1399				
1000	BCS 0000 1400				
1005	BCS 0000 1401	SILTSTONE, LACUSTRINE, OLIVE GRAY 5Y 3/2			
1010	BCS 0000 1402				
1015	BCS 0000 1403	40% TUFF, ASH FALL, LIGHT BLuish GRAY 5B 7/1, 0-20% MAFICS, ALSO QUARTZ/SANIDINE PHENOCRYSTS			
1020	BCS 0000 1404				

Prepared By ARTHUR J. MENDENHALL Date 1-25-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EMDP-3D Drill Depth From 1020 To 1080 Page 10 of _____

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
		SILTSTONE, AS ABOVE			
1025	BCS 0006 1405				
1030	BCS 0000 1406				
1035	BCS 0000 1407				
		AT 1035' DRILLER REPORTED HE HIT MORE WATER AND THE HAMMER BIT IS DROWNING OUT.			
1040	BCS 0006 1408				
		AT 1040' TRIPPING OUT TO SWITCH TO TRICONE BIT			
1045	BCS 0000 1409				
1050	BCS 0000 1410				
		CLAY			
1055	BCS 0000 1411				
1060	BCS 0000 1412				
1065	BCS 0000 1413				
1070	BCS 0000 1414				
1075	BCS 0000 1415				
		20% VOLCANIC CLASTS, PALE REDDISH BROWN 10R 5/4			
1080	BCS 0000 1416				

Prepared By ARTHUR J. MENDENHALL Date 1-25-99 Checked By _____ Date _____

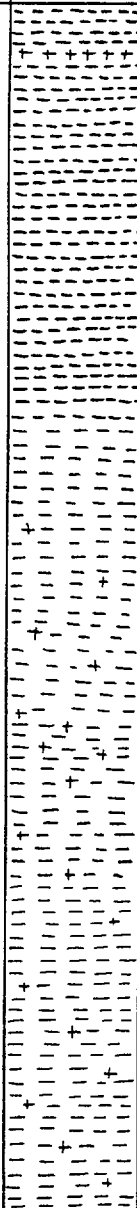
NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1080 To 1140 Page 19 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 1417	SILTSTONE, AS ABOVE 20% TUFF, ASH FALL, LIGHT GRAY N7, TRACE PYRITE			
1085	BCS 0000 1418	SILTSTONE BECOMMING GRAYISH BLACK AND NONCALCAREOUS			
1090	BCS 0000 1419				
1095	BCS 0000 1420				
1100	BCS 0000 1421				
1105	BCS 0000 1422	SILTSTONE, MED DARK GRAY N4, NONCALCAREOUS, 3% LIGHT BROWN FINE TUFF FRAGMENTS SYR 6/4			
1110	BCS 0000 1423				
1115	BCS 0000 1424	SILTSTONE, DARK GRAY N3, NONCALCAREOUS, 5-8% TUFF FRAGMENTS LIGHT BROWN SYR 6/4			
1120	BCS 0000 1425	SILTSTONE, DARK GRAY N3, NONCALCAREOUS, MINOR TUFF FRAGMENTS AS TO 1105'			
1125	BCS 0000 1426				
1130	BCS 0000 1427				
1135	BCS 0000 1428				
1140					

Prepared By ARTHUR J MENDENHALL Date 1-25-99 Checked By Date
BENT AARQUIST 1-26-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1260' To 1320' Page 22 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 2553	SILTSTONE DARK GRAY N3 WITH VERY FINE GRAINED SANDSTONE MED BROWNISH GRAY SYR 5/1, ~35% RETURN WATER TEMP 29.5°C			
1265	BCS 0000 2554	SILTSTONE DARK GRAY N3 TO OLIVE GRAY SY 4/1			
1270	BCS 0000 2555	RETURN WATER TEMP 32.0°C			
1275	BCS 0000 2556				
1280	BCS 0000 2557				
1285	BCS 0000 2558	SILTSTONE, REWORKED CRYSTAL TUFF DARK GRAY N3 TO GRAYISH BLACK N2 WITH 2% WHITE N9 PUMICE FRAGMENTS AND QUARTZ PHENOCRYSTS TRACE FINE PYRITE LOCALLY			
1290	BCS 0000 2559				
1295	BCS 0000 2560	WHITE PUMICE AND QUARTZ PHENOCRYSTS 5%			
1300	BCS 0000 2561	WHITE PUMICE AND QUARTZ PHENOCRYSTS CONTENT DECREASE DOWN HOLE TO 1% AT 1320'			
1305	BCS 0000 2562				
1310	BCS 0000 2563				
1315	BCS 0000 2564				
1320					

Prepared By BENT AAGUST Date 1-26-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1380' To 1440' Page 24 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

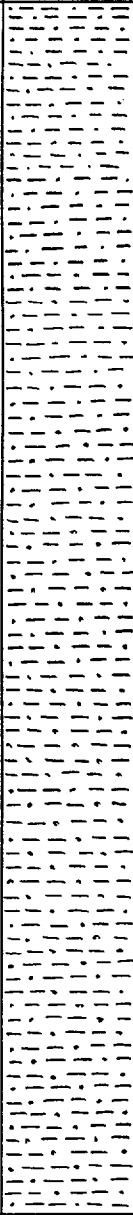
DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1385'	BCS 0000 2577	COARSE SILTSTONE TO FINE GRAINED SANDSTONE POSSIBLE REWORKED TUFF - SOME FRAGMENTS HAVE WELDED TEXTURES. QUARTZ AND FELDSPAR CRYSTALS COMMON TRACE OF VERY FINE GRAINED PYRITE LOCALLY SIMILAR TO ABOVE - GRAYISH BLACK IR FRAGMENTS ARE NOT PRESENT BELOW 1390'	[Vertical line pattern]		
1390'	BCS 0000 2578				
1395'	BCS 0000 2579				
1400'	BCS 0000 2580				
1405'	BCS 0000 2581				
1410'	BCS 0000 2582				
1415'	BCS 0000 2583				
1420'	BCS 0000 2584				
1425'	BCS 0000 2585				
1430'	BCS 0000 2586				
1435'	BCS 0000 2587				
1440'	BCS 0000 2588				

Prepared By BENT AAQUIST Date 1-26-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DNC-EWDP-3D Drill Depth From 1440' To 1500' Page 25 of _____
 Driller _____ Start Date/Time _____ End Date/Time _____
 Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
	BCS 0000 2589	COARSE SILTSTONE TO FINE SANDSTONE AS ABOVE				
1445	BCS 0000 2590					
1450	BCS 0000 2591					
1455	BCS 0000 2592					
1460	BCS 0000 2593					
1465	BCS 0000 2594					
1470	BCS 0000 2595					
1475	BCS 0000 2596					
1480	BCS 0000 2597					5% GRAYISH BLACK NR FRAGMENTS
1485	BCS 0000 2598					
1490	BCS 0000 2599					
1495	BCS 0000 2600					
1500						

Prepared By BENT AARQUIST Date 1-26-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NYC-EWDF-3D Drill Depth From 1620' To 1680' Page 28 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
1625	BCS 0000 2625	TUFF, ASH FLOW, AS ABOVE LITHICS INCREASING TOWARD BOTTOM OF UNIT A 1625 FT.	+ + + + + + + +			
1630	BCS 0000 2627	TUFF, ASH FLOW, MEDIUM LIGHT GRAY NG, 15% QUARTZ/SANIDINE PHENOCRYSTS, 5% BIOTITE AND OTHER MAFIC PHENOCRYSTS, 20-30% LITHICS, BLACK M, DUSKY YELLOWISH BROWN 10YR 2/2, OR GRAYISH BROWN 5YR 3/2, TRACE PYRITE	+ + + + + + + +			
1635	BCS 0000 2628		+ + + + + + + +			
1640	BCS 0000 2629		+ + + + + + + +			
1645	BCS 0000 2630		+ + + + + + + +		RETURN WATER 32.5°C	
1650	BCS 0000 2631		+ + + + + + + +			
1655	BCS 0000 2632		+ + + + + + + +			
1660	BCS 0000 2633		+ + + + + + + +		RETURN WATER 31.9°C	
1665	BCS 0000 2634		+ + + + + + + +			
1670	BCS 0000 2635		+ + + + + + + +			
1675	BCS 0000 2636		1675-1700 30-40% LITHICS	+ + + + + + + +		
1680				+ + + + + + + +		

Prepared By ARTHUR J. MENDELBAUM Date 1-26-99 Checked By Date

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DNC-EMRP-3D Drill Depth From 1680 To 1740 Page 29 of _____

Driller _____ Start Date/Time _____ End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1685	BCS 0000 2637	10-20% LITHICS	+ +		
1690	BCS 0000 2638		+ + + + + + + + + + + + + + + + + + + +		
1695	BCS 0000 2639		+ + + + + + + + + + + + + + + + + + + +		
1700	BCS 0000 2640		+ + + + + + + + + + + + + + + + + + + +		
1705	BCS 0000 2641		+ + + + + + + + + + + + + + + + + + + +		
1710	BCS 0000 2642		+ + + + + + + + + + + + + + + + + + + +		
1715	BCS 0000 2643	SILTSTONE, SANDY, DUSKY YELLOWISH BROWN 10YR 2/2 OR DARK YELLOWISH BROWN 10YR 4/2, LAMINATED, UP TO 1% MOSTLY DISSEMINATED PYRITE.	- -		
1720	BCS 0000 2644	5% TUFF, ASH FALL, VERY LIGHT GRAY NB	+ +		
1725	BCS 0000 2645		+ + + + + + + + + + + + + + + + + + + +		
1730	BCS 0000 2646		+ + + + + + + + + + + + + + + + + + + +		
1735	BCS 0000 2647		+ + + + + + + + + + + + + + + + + + + +		
1740	BCS 0000 2648		+ + + + +		

Prepared By ARTHUR J. MENDEZ Date 1-26-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EW02-3D Drill Depth From 2040 To 2100 Page 35 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
2045	BCS 0000 2709	SILTSTONE, AS ABOVE				
2050	BCS 0000 2710					
2055	BCS 0000 2711					
2060	BCS 0000 2712					
2065	BCS 0000 2713					
2070	BCS 0000 2714	SILTSTONE LIGHT OLIVE GRAY 5Y 6/1 WITH THIN BLACK LAMINAE				
2075	BCS 0000 2715	SILTSTONE AS ABOVE 2065'				
2080	BCS 0000 2716					RETURN WATER TEMP 30.6°C
2085	BCS 0000 2717					
2090	BCS 0000 2718	SILTSTONE AS ABOVE, WITH CLAY LAYERS CLAY IS CALCAREOUS, MED'XN GRAY N4 SLOW DRILL PENETRATION				
2095	BCS 0000 2719	AT 2089.5 WATER WAS BLOWN 2090 WATER GRAY				
2100	BCS 0000 2720	2097' WATER DARK GRAY FOR 1'				

Prepared By ARTHUR J. MENDENHALL Date 1-27-99 Checked By Date
BENT AAQUIST 1-28-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EVW-3D Drill Depth From 2160 To 2220 Page 37 of
Driller Start Date/Time End Date/Time
Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
		SILTSTONE AND MALLIAS ABOVE.			
2165	BCS 0000 2733				
	BCS 0000 2734				
	BCS 0000 2735				
2175	BCS 0000 2736				
	BCS 0000 2737				
	BCS 0000 2738				
2180	BCS 0000 2739				
	BCS 0000 2740				
	BCS 0000 2741				
	BCS 0000 2742				
	BCS 0000 2743				
	BCS 0000 2744				
		TRACE GYPSUM			
		MOSTLY SILTSTONE			

BIT GRINDING ROCK TO SAND SIZE
WATER 35.3°C
SAME AS ABOVE
WATER 39°C

Prepared By AARON T. McREYNOLDS Date 1-28-99 Checked By Date
2-2-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 2220 To 2280 Page 38 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2225	BCS 0000 2745	SILTSTONE AND MARL, AS ABOVE			BIT GRINDING ROCK TO MOSTLY SAND SIZE
2230	BCS 0000 2746	AS ABOVE MED LIGHT GRAY N6 TO LIGHT GRAY N7			
2235	BCS 0000 2747				
2240	BCS 0000 2748	AS ABOVE BUT WITH 10% FRAGMENTS YELLOWISH GRAY SY 8// TRACE PY MASSES			
2245	BCS 0000 2749	SILTSTONE AND MARL 90% DARK GRAY N3, 10% GRAYISH - YELLOW SY 7/4			
2250	BCS 0000 2750	SILTSTONE AND MARL, 20% DARK GRAY N3, 70% OLIVE GRAY SY 4 1/2 10% GRAYISH YELLOW SY 7/4			
2255	BCS 0000 2751				
2260	BCS 0000 2752				
2265	BCS 0000 2753	SILTSTONE AND MARL, DARK GRAY N3			
2270	BCS 0000 2754	AS ABOVE BUT WITH 15% LIGHT OLIVE GRAY SY 5/2			
2275	BCS 0000 2755				
2280	BCS 0000 2756				

Prepared By ARTHUR J. MENDENHALL Date 2-2-99 Checked By Date
BENT AQUIST 2-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-ENRF-3D Drill Depth From 2280 To 2340 Page 39 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2285	BCS 0000 2757	SILTSTONE AND MARL, LIGHT OLIVE GRAY 5Y 5/2	[Vertical line with horizontal dashes]		
2296	BCS 0000 2758		[Vertical line with horizontal dashes]		
2296	BCS 0000 2759		[Vertical line with horizontal dashes]		
2295	BCS 0000 2760	SILTSTONE AND MARL, DARK GRAY N3	[Vertical line with horizontal dashes]		
2300	BCS 0000 2761		[Vertical line with horizontal dashes]		WATER 35.5°C
2305	BCS 0000 2762		[Vertical line with horizontal dashes]		WATER 37.0°C
2310	BCS 0000 2763		[Vertical line with horizontal dashes]		
2315	BCS 0000 2764		[Vertical line with horizontal dashes]		AT 2316 PENETRATION RATE DROPPED TO 1/2 OF ABOVE
2320	BCS 0000 2764		[Vertical line with horizontal dashes]		
2325	BCS 0000 2765	SILTSTONE, LAGUSTRINE, DARK GRAY N3 OR PALE YELLOWISH BROWN 10YR 6/2, WEAKLY CALCAREOUS	[Vertical line with horizontal dashes]		
2325	BCS 0000 2766		[Vertical line with horizontal dashes]		
2330	BCS 0000 2766		[Vertical line with horizontal dashes]		
2330	BCS 0000 2767	SILTSTONE, LAGUSTRINE, DARK GRAY N3	[Vertical line with horizontal dashes]		
2335	BCS 0000 2767		[Vertical line with horizontal dashes]		
2340	BCS 0000 2768		[Vertical line with horizontal dashes]		

Prepared By BERT AQUILA Date 2-4-99 Checked By Date

ARTHUR J. MENDENHALL 2-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NYC-EWD-3D Drill Depth From 2400 To 2460 Page 41 of

Driller Start Date/Time End Date/Time

Drilling Equip./Method Sampling Equip./Method

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
2405	BCS 0000 2781	SILTSTONE, LACUSTRINE, DARK GRAY N3, OR SANDSTONE, LACUSTRINE, MEDIUM GRAY N5, VERY FINE GRAINED, VERY WEAKLY CALCAREOUS	[Hand-drawn lithologic symbols]		
2410	BCS 0000 2782	WEAKLY CALCAREOUS	[Hand-drawn lithologic symbols]		
2415	BCS 0000 2783		[Hand-drawn lithologic symbols]		
2420	BCS 0000 2784	SILTSTONE, LACUSTRINE, DARK GRAY N3, MINOR SANDSTONE, LIGHT GRAY N7	[Hand-drawn lithologic symbols]		
2425	BCS 0000 2785		[Hand-drawn lithologic symbols]		
2430	BCS 0000 2786		[Hand-drawn lithologic symbols]		
2435	BCS 0000 2787	SILTSTONE, LACUSTRINE, DARK GRAY N3, SANDSTONE, MEDIUM GRAY N5, CLAY, MEDIUM GRAY IN THIS INTERVAL ONLY	[Hand-drawn lithologic symbols]		GRADATIONAL CONTACT BETWEEN OVERLYING SILTSTONE AND SANDSTONE
2440	BCS 0000 2788		[Hand-drawn lithologic symbols]		
2445	BCS 0000 2789		[Hand-drawn lithologic symbols]		
2450	BCS 0000 2790		[Hand-drawn lithologic symbols]		
2455	BCS 0000 2791		[Hand-drawn lithologic symbols]		
2460	BCS 0000 2792		[Hand-drawn lithologic symbols]		

Prepared By ARTHUR J. MENDEMAH Date 2-4-99 Checked By Date

OVERSIZE DOCUMENT PAGE(S) PULLED

SEE APERTURE CARD FILES

APERTURE CARD/PAPER COPY AVAILABLE THROUGH NRC FILE CENTER

NUMBER OF OVERSIZE PAGES FILMED ON APERTURE CARD(S) 1

ACCESSION NUMBERS OF OVERSIZE PAGES:

9906100166-04

**THIS PAGE IS AN
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THAT CAN BE VIEWED AT
THE RECORD TITLED:**

NONE:

BOREHOLE: NC-3D

**LOGS: E-LOGS/TEMP DENSITY
NEUTRON CALIPHER SONIC
DEVIATION**

**WITHIN THIS PACKAGE...OR,
BY SEARCHING USING THE
DRAWING NUMBER:**

NONE

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D-4

9906100166-04

Well No. NC-EWDP-3S

Status:

Completed

Latitude\Longitude:

36° 40' 53.614" 116° 32' 17.18"

Legal Description:

Township 14S Range 48E

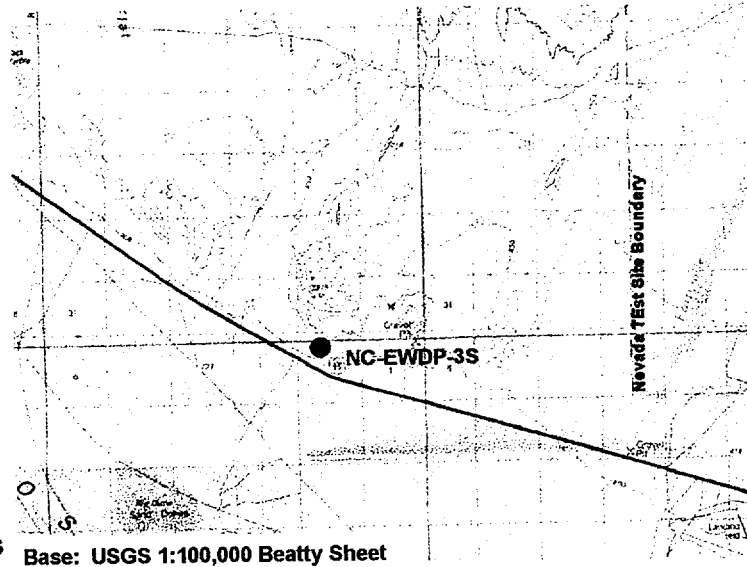
Section 35 SW 1/4 SW 1/4 1/4

Elevation:

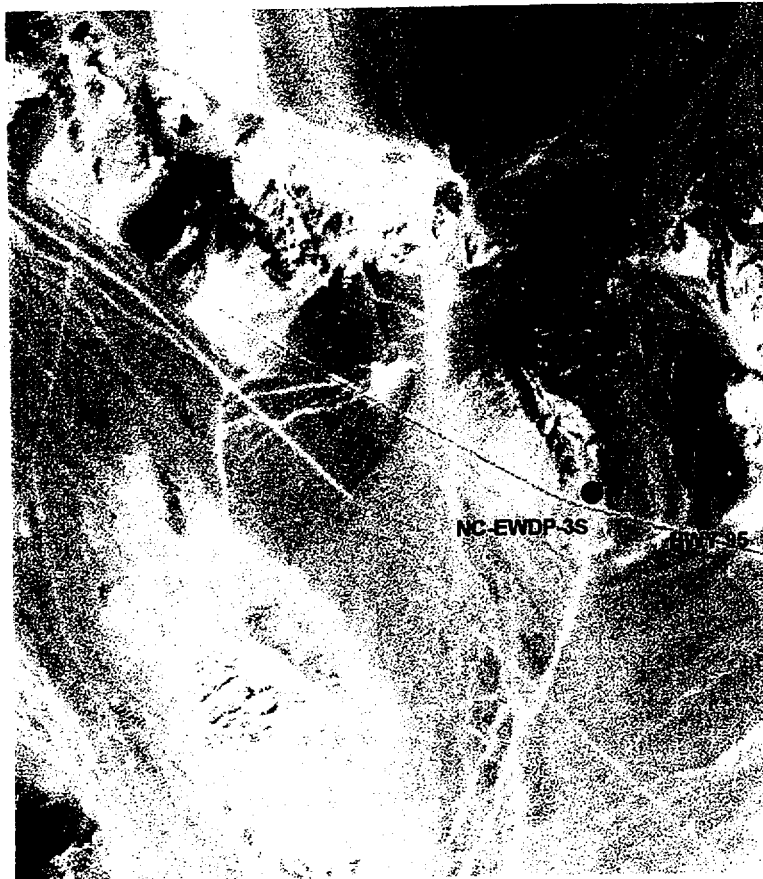
798.28 m AMSL (2619.0 ft ±) GPS

Access:

Highway 95 north from Lathrop Wells Jct 7.5 miles to gate on north side of Highway. Take gravel road 0.15 miles north; turn east and follow tire tracks.



Purpose: 1) provide lithologic samples of deposits; 2) define valley-fill stratigraphic sequence and groundwater flow paths down gradient of proposed repository; and 3) provide water level and water chemistry data.



Base: Thematic Mapper Image of the Big Dune 7.5° Quadrangle

NC-EWDP-3S is located along a key groundwater pathway between Crater Flat and Amargosa Desert. The well was completed as a satellite to NC-EWDP-3D to provide water level and water chemistry data from the upper Tertiary volcanic aquifers. The well has three monitoring zones. The upper zone is in the upper Tertiary volcanic rocks in a fractured, bedded tuff. The middle zone is completed deeper in the same unit and the lower zone is completed in a thick sequence of reworked ash fall tuffs. Water samples were collected for analysis.

**NC-EWDP-3S
SITE SUMMARY**

Land surface

100 ft

200 ft

300 ft

400 ft

500 ft

550 ft
(TD)

0-110' Valley-fill Deposits - 0-20 silty sand, some gravel and clay, pale orange (10YR 8/2); 20-35' silty gravelly and, mg -cg angular sand, fg gravel, v. pale orange (10YR 8/2); 35-60' silty gravelly sand, cg angular sand, fg angular gravel, gray-orange(10YR 7/4); 60-110' sandy gravel, cg angular sand, fg angular-subangular gravel; boulder 106-109', welded tuff, gray orange pink (10R 5/2).

110-298' Tertiary Volcanics- 110-293' bedded tuff or tuffaceous sandstone, vfg vitric, weakly cemented, yellowish gray, (5Y 7/2-8/1), becomes better cemented beyond 160', some sandy plastic clay beds beyond 200', color changes to gray-orange (10YR 6/4) beyond 230', limonitic and siliceous cement layers and nodules beyond 245', 282-293' yellow gray (5Y 8/1 8/6 7/4). 293-295' no sample; 295-298' Tuff, pale reddish-brown (10 5/4-3/4), up to 20% bio/fsp/qtz phenos, poss. gravels

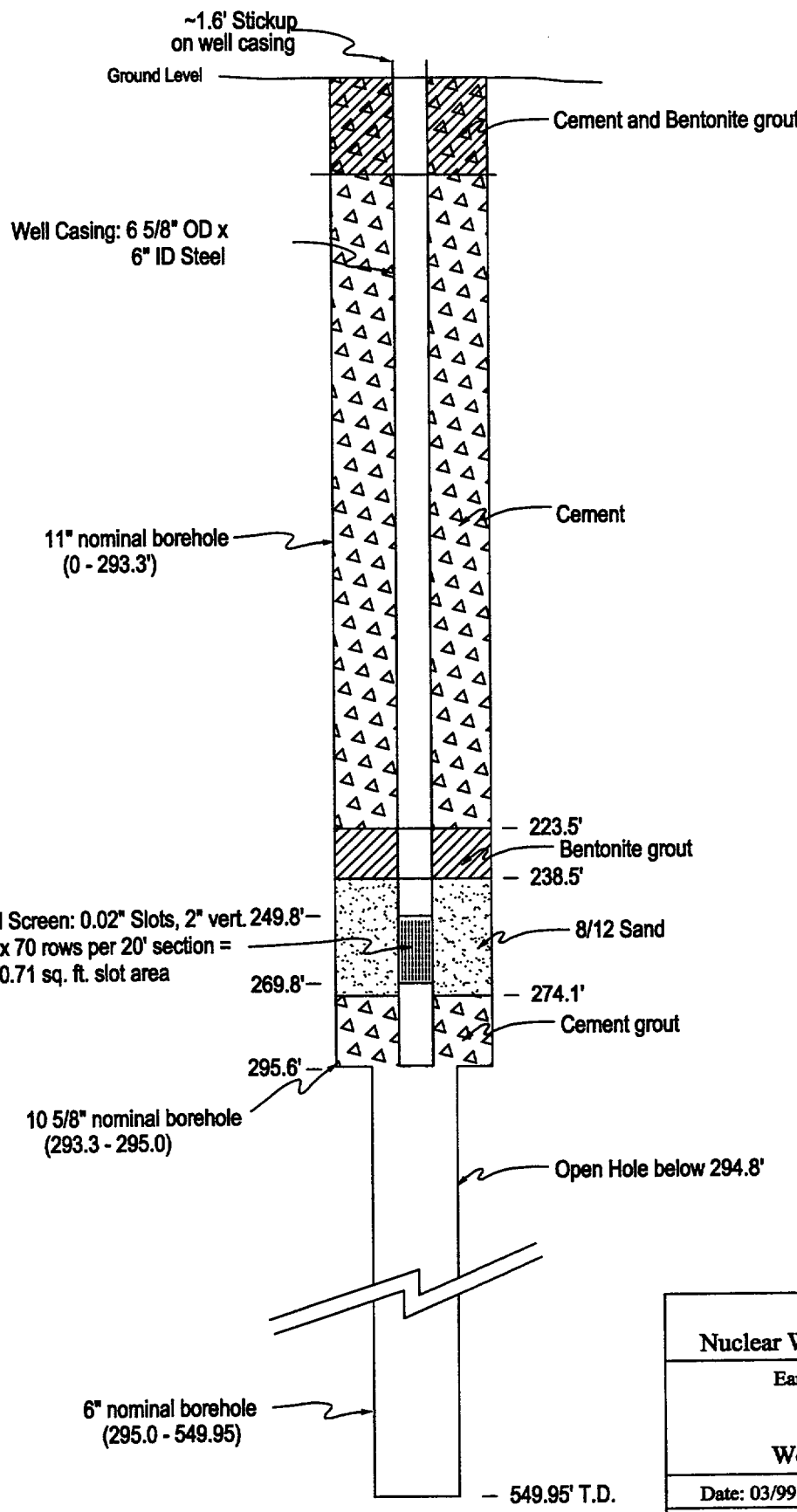
298-346' Tertiary Sedimentary rocks- 298-346' siltstones, lacustrine, dk. gray (N4), calcareous; 300-320 no sample; 325-345 no sample

346-530' Tertiary Volcanics- 346-530' tuff, ash fall or reworked, light-med. gray (N3-N6), up to 5% bio, up to 5% qtz; 395-405' dark gray (N3) calcareous siltstone, 460-465' & 490-495' 10% porphyritic lithic clasts, orange-pink (10R 8/2), 475-480, color becomes pinkish gray (5YR 7/1)

530-550' Tertiary Sedimentary rocks - 530-545' Siltstone, dark gray (N4), clay beds, calcareous; 545-550' Sandstone, fg-mg, med. gray (N5), w/ calcareous clay (white N9)

NC-EWDP-3S

SUMMARY LITHOLOGIC LOG



- NOTES**
1. Horizontal scale exaggerated 50X.
 2. All depths referenced to ground level.
 3. All casing and screen is flush threaded.
 4. Well casing not to horizontal scale.

<p>Nye County, Nevada Nuclear Waste Repository Project Office</p>	
<p>Early Warning Drilling Program</p>	
<p>NC - EWDP - 3S</p>	
<p>Well Completion Diagram</p>	
<p>Date: 03/99</p>	<p>Geologist: AJM/JSW</p>
<p>Scale: 1" = 50'</p>	<p>Drawn by: JSW</p>

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-35 Drill Depth From 0 To 60 Page 1 of 60

Driller BEVAN MORRIS / BOYLES BROS Start Date/Time 2-6-99/0942 End Date/Time _____

Drilling Equip./Method AP-1000 / 11" CROWD-OUT BIT Sampling Equip./Method CUTTINGS / CYCLONE
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
5	BCS 0000 1751 (1 MIN)	SILTY SAND: Some fine angular gravel, trace clay fine sand, very pale orange (10YR 8/2)			Weak reaction to 10% HCl
	BCS 0000 1752 (2 MIN)	Decrease in amount of gravel			Strong reaction to 10% HCl
10	BCS 0000 1753 (2 MIN)				Moderate reaction to 10% HCl
15	BCS 0000 1754 (2 MIN)	Trace of coarse angular gravel			Moderate reaction to 10% HCl
25	BCS 0000 1755 (3 MIN)	SILTY GRAVELLY SAND: Fine angular gravel, medium - coarse angular sand, very pale orange (10YR 8/2)			Moderate reaction to 10% HCl
30	BCS 0000 1756 (1 MIN)			Moderate reaction to 10% HCl	
35	BCS 0000 1757 (2 MIN)			Moderate reaction to 10% HCl	
40	BCS 0000 1758 (3 MIN)	SILTY GRAVELLY SAND: Fine angular gravel, coarse angular sand, gray orange (10YR 7/4)			Moderate-weak reaction to 10% HCl
45	BCS 0000 1759 (3 MIN)				Moderate-weak reaction to 10% HCl
50	BCS 0000 1760 (4 MIN)				Moderate reaction to 10% HCl
55	BCS 0000 1761 (3 MIN)				Strong reaction to 10% HCl
60	BCS 0000 1762 (5 MIN)	Decrease in amount of silt, some coarse angular gravel.			Moderate reaction to 10% HCl

NOTE: TIME FOR 5' RUN IN () IN 2ND COLUMN

Prepared By KED DONNELSON Date 2-6-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-35 Drill Depth From 60 To 120 Page 2 of 10

Driller BRYAN MORRIS / BOYLES EROS Start Date/Time 2-6-99 / 0942 End Date/Time _____

Drilling Equip./Method AP-1000 / 11" CROWD-OUT BIT Sampling Equip./Method CUTTINGS/CYCLONE
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
65	BCS 6006 1763 (6 MIN)	SANDY GRAVEL: Some cobbles, trace silt, coarse angular sand, angular-subangular gravel, gray red (10R 4/2). Gravel consist predominantly of welded tuff. Predom. fine gravel.			Strong reaction to 10% HCl
70	BCS 6000 1764 (6 MIN)	Decrease in amount of silt Increase in amount of coarse sand			Strong reaction to 10% HCl
75	BCS 6000 1765 (3 MIN)	Pale Red (10R 6/2)			Moderate reaction to 10% HCl
80	BCS 6000 1766 (5 MIN)	Decrease in amount of silt			Weak reaction to 10% HCl
85	BCS 6000 1767 (9 MIN)	Some coarse gravel			No reaction to 10% HCl
90	BCS 6000 1768 (4 MIN)				No reaction to 10% HCl
95	BCS 6000 1769 (4 MIN)				No reaction to 10% HCl
100	BCS 6000 1770 (4 MIN)	Increased amount of coarse angular gravel			Weak reaction to 10% HCl
105	BCS 6000 1771 (5 MIN)				No reaction to 10% HCl
110	BCS 6000 1772 (47 MIN)	Boulder, may be 3' thick, consist of welded tuff (Buffrog), Gray orange pink (10R 5/2)			No reaction to 10% HCl
115	BCS 6000 1773 (5 MIN)	BEDDED TUFF: Tuffaceous sandstone, very fine-fine grained, weakly cemented, vitric, yellowish gray (5Y 7/2-8/1)		No reaction to 10% HCl.	
120	BCS 6000 1774 (9 MIN)	Some fine welded tuff fragments.		No reaction to 10% HCl Moist	

NOTE: TIME FOR 5' RUN IN () IN 2ND COLUMN

Prepared By KEN DOWNESLOW Date 2-6-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-25 Drill Depth From 120 To 180 Page 3 of 10

Driller RYAN MORRIS / ROYCE PROS. Start Date/Time 2-6-99/0942 End Date/Time _____

Drilling Equip./Method AP-1000/1 1/2" CEWD-OUTBIT Sampling Equip./Method CUTTINGS/CYCLONE
DEWED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
125	BCS 0000 1775 (5 MIN)	BEDDED TUFF: Tuffaceous sandstone, very fine-fine grained, weakly cemented, vitric, very light gray (NB) some fine grayish yellow (5Y 8/4) grains	+ +		No reaction to 10% HCl from 120-180' INJECTED H ₂ O from 125-180' TO STABILIZE HOLE
130	BCS 0000 1776 (13 MIN)				
135	BCS 0000 1777 (1 MIN)				
140	BCS 0000 1778 (6 MIN)				
145	BCS 0000 1779 (7 MIN)				
150	BCS 0000 1780 (7 MIN)				
155	BCS 0000 1781 (7 MIN)				
160	BCS 0000 1782 (6 MIN)				
165	BCS 0000 1783 (6 MIN)				
170	BCS 0000 1784 (7 MIN)				
175	BCS 0000 1785 (6 MIN)				
180	BCS 0000 1786 (9 MIN)				

tc: Time for 5' run in () in 2nd column

Prepared By K. DONNELSON Date 2-6-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-35 Drill Depth From 180 To 240 Page 4 of 10

Driller BRYAN MORRIS/BOYLES BROS Start Date/Time 2-6-99/0942 End Date/Time _____

Drilling Equip./Method AP-1000/11" CROWD-OUT BIT Sampling Equip./Method CUTTINGS/CYCLONE
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes		
185	BCS 0000 1787 (6 MIN)	Some gray orange (10YR 6/4) high plasticity sandy clay. Increased cementation	+++++		No reaction to 10% HCl from 180-200'		
190	BCS 0000 1788 (7 MIN)				INJECTED H ₂ O FROM 185-190'		
195	BCS 0000 1784 (7 MIN)				INJECTED H ₂ O FROM 195-200'		
200	BCS 0000 1791 (7 MIN)				2-6-99, 1604 2-7-99, 0654 NO REACTION TO 10% HCl FROM 200-240'		
205	BCS 0000 1791 (19 MIN)				INJECTED WATER FROM 200-210'		
210	BCS 0000 1792 (11 MIN)				"Lumpy" cuttings, becoming more "lumpy" with depth	+++++	
215	BCS 0000 1793 (6 MIN)						
220	BCS 0000 1794 (7 MIN)						
225	BCS 0000 1795 (9 MIN)						
230	BCS 0000 1797 (12 MIN)						
235	BCS 0000 1798 (5 MIN)	Color change due to limonitic mottling. May be approaching groundwater.					
240	BCS 0000 1798 (9 MIN)						

NOTE: DRILL TIME FOR 5' RUN IN () IN 2ND COLUMN

Prepared By K. DOWNELSON Date 2-7-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NE-EWDP-35 Drill Depth From 240 To 300 Page 5 of 10

Driller BRYAN MORRIS / RYLES BROS Start Date/Time 2-6-99/0942 End Date/Time _____

Drilling Equip./Method AP-1000 / 11" CROWD-OUT BIT Sampling Equip./Method CUTTINGS / CYCLONE
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
245	BCS 0000 1799 (4 MIN)	Some hard silica layers or nodules, cryptocrystalline (opaline?) Pale yellow brn (10YR 6/2) & white	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		NO REACTION 10% HCl FROM 240 - 290'
250	BCS 0000 1800 (8 MIN)	Decrease in amount of limonite	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		
255	BCS 0000 1802 (8 MIN)	Decrease in amount of limonite & increase in amount of silica cement. Yel gry (5Y 7/2) - Very light gray (N8).	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		
260	BCS 0000 1803 (9 MIN)	Increase in amount of silica cement	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		
265	BCS 0000 1804 (9 MIN)	Strong limonitic haloes (6mm) around siliceous nodules? Very fine grained sandstone	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		
270	BCS 0000 1805 (13 MIN)	Softer. No limonite.	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		
275	BCS 0000 1806 (4 MIN)	Very hard, silicified, resembles quartzite	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		
280	BCS 0000 1807 (29 MIN)	Yellow gray (5Y 8/1). Very silty	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		
285	BCS 0000 1808 (26 MIN)	Pale yellow orange (10YR 8/8) - Gray yellow (5Y 7/4) & yellow gray (5Y 8/1). Silty	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		
290	BCS 0000 1808 (21 MIN)	some "cherty" & silicified v. fine-grained sandstone with bentonitic clay layers & trace of calcite veins. Sandstone is very thin bedded.	++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++		2-7-99, 1222
295	100 SAMPLE BCS 0000 1810 (68 MIN)	60% TUFF, ASH FLOW, WELDED, PALE REDDISH BROWN (10R 5/4), DARK REDDISH BROWN (10R 3/4), OR GRAYISH ORANGE PINK, 0 TO 20% PHENOCRYSTS OF BIOTITE AND FELDSPAR/QUARTZ.	W W W W W W W W W W W W W W W W		2-12-99, 0930 SAMPLES WET. NOT INJECTING WATER. START INJECTING WATER @ 293' REFUSED @ 293.25', 1038 L
300	(1 MIN)	SILTSTONE, LACUSTRINE, MEDIUM DARK GRAY NA, CALCAREOUS	== == == == == == == == == == == == == == == ==		ZERO TO STRONG REACTION TO 10% HCl WELD ASH FLOW TUFF MAY BE GRAVELS DUE TO THEIR COARSE NATURE.

NOTE: DRILL TIME FOR 5' RUN IN () IN 2ND COLUMN

Prepared By KEW DORRIS (SO) Date 2-12-99 Checked By _____ Date _____
ARTHUR J. MENDENHALL 3-2-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-35 Drill Depth From 300 To 360 Page 6 of 10

Driller DAVE HOLQUIN Start Date/Time 2-6-99/0942 End Date/Time _____

Drilling Equip./Method INVERSE-ROTARY/REVERSE CIRCULATION Sampling Equip./Method CUTTINGS/CYCLONE/SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
305	BCS 0000 1811 (MIN)				NO SAMPLE 300-320
310	BCS 0000 1812 (MIN)				
315	BCS 0000 1813 (MIN)				
320	BCS 0000 1814 (MIN)				
325	BCS 0000 1815 (MIN)	SILT, LACUSTINE, MEDIUM DARK GRAY N4, CALCAREOUS			STRONG REACTION TO 10% HCl
330	BCS 0000 1816 (MIN)				NO SAMPLE 325-345
335	BCS 0000 1817 (MIN)				
340	BCS 0000 1818 (MIN)				
345	BCS 0000 1819 (MIN)				
350	BCS 0000 1820 (MIN)	20% SILTSTONE, LACUSTINE, DARK GRAY N3, CALCAREOUS 80% TUFF, ASH FALL, MEDIUM LIGHT GRAY N6 OR VERY LIGHT GRAY N8, 0-5% SMALL BIOTITE PHENOCRYSTS	+++++		STRONG REACTION TO 10% HCl NO REACTION TO 10% HCl 20% LIGHT BROWN SYR 6/1 TUFF IN 345-350 INTERVAL SUGGEST A WEATHERING SURFACE AT CONTACT.
355	BCS 0000 1821 (MIN)		+++++		
360	BCS 0000 1822 (MIN)		+++++		

NOTE: DRILL TIME FOR 5' RUN 100" 5 IN 2ND COLUMN.

Prepared By ARTHUR J. MENDEMHALL Date 3-2-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DC-EWD-395 Drill Depth From 360 To 420 Page 7 of 10

Driller DAVE HOLQUIN/STEVE CLEVER Start Date/Time 2-6-79/0942 End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method CUTTINGS/CYCLONE/SAMPLE SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
365	BCS 0000 1823	TUFF, ASH FALL, AS ABOVE.	+++++		
	BCS 0000 1824		+++++		
	BCS 0000 1825		+++++		
	BCS 0000 1826		+++++		
	BCS 0000 1827		+++++		
	BCS 0000 1828		+++++		
	BCS 0000 1829		+++++		
	BCS 0000 1830		+++++		
	BCS 0000 1831		+++++		
	BCS 0000 1832		+++++		
375	BCS 0000 1826	TUFF, ASH FALL, PINKISH GRAY SR 8/2, 0-5% BIOTITE AND QUARTZ PNEUCLASTS.	+++++		VERY FINE CUTTINGS (NOT WASHED ?)
	BCS 0000 1827		+++++		
	BCS 0000 1828		+++++		
	BCS 0000 1829		+++++		
	BCS 0000 1830		+++++		
	BCS 0000 1831		+++++		
	BCS 0000 1832		+++++		
	BCS 0000 1833		+++++		
	BCS 0000 1834		+++++		
	BCS 0000 1835		+++++		
395	BCS 0000 1829	10% SILSTONE, LACUSTRINE, DARK GRAY [V], CALCAREOUS, STYI INCREASE IN WATER RETURN	+++++		10% SILSTONE IN 390-395 AND 395-400 INTERVALS
	BCS 0000 1830		+++++		
	BCS 0000 1831		+++++		
	BCS 0000 1832		+++++		
	BCS 0000 1833		+++++		
	BCS 0000 1834		+++++		
	BCS 0000 1835		+++++		
	BCS 0000 1836		+++++		
	BCS 0000 1837		+++++		
	BCS 0000 1838		+++++		
415	BCS 0000 1833		+++++		
	BCS 0000 1834		+++++		
	BCS 0000 1835		+++++		
	BCS 0000 1836		+++++		
	BCS 0000 1837		+++++		
	BCS 0000 1838		+++++		
	BCS 0000 1839		+++++		
	BCS 0000 1840		+++++		
	BCS 0000 1841		+++++		
	BCS 0000 1842		+++++		
420	BCS 0000 1842		+++++		

Prepared By ALTIMA J. Mendenhall Date 3-2-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-39 Drill Depth From 420 To 480 Page 8 of 10

Driller _____ Start Date/Time 2-6-99/0742 End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method CUTTINGS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
425	BCS 0000 1835 (MIN)	ASH FLOW TUFF, MED LIGHT GRAY NG, 1% BIOTITE PHENOCRYSTS 2-4% QUARTZ PHENOCRYSTS 10% FRAGMENTS OF ABOVE UNIT POSSIBLE REMORDED ASH FLOW	++++		
	BCS 0000 1836		++++		
430	(MIN)		++++		
	BCS 0000 1837		++++		
435	(MIN)		++++		
	BCS 0000 1838		++++		
440	(MIN)		++++		
	BCS 0000 1839		++++		
	(MIN)		++++		
	BCS 0000 1840		445-450 FINE GRAINED UNIT OF ABOVE WITH 10% QUARTZ CRYSTALS	++++	
450	(MIN)	++++			
	BCS 0000 1841	++++			
455	(MIN)	++++			
	BCS 0000 1842	++++			
460	(MIN)	460-465 10% PORPHYRITIC CLASTS GRAYISH ORANGE PINK 10R B/2	++++		
	BCS 0000 1843	++++			
465	(MIN)	++++			
	BCS 0000 1844	++++			
470	(MIN)	++++			
	BCS 0000 1845	++++			
475	(MIN)	475-480 PINKISH GRAY SYR 7/1	++++		
	BCS 0000 1846	++++			
480	(MIN)	++++			

Prepared By RENT ANQUIST Date 3-2-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole IDXC-EWD-35 Drill Depth From 480 To 540 Page 9 of 10

Driller _____ Start Date/Time 2-6-94/5942 End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method CUTTING

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
BCS 0000 1848		ASH Flow TUFF. REWORKED, NS ABOVE	+ + + + +		
(MIN)			+ + + + +		
BCS 0000 1848		470-495 HAS 10% MODERATE ORANGE PINK CRSTS SYR B/Y	+ + + + +		
(MIN)			+ + + + +		
BCS 0000 1850		510-515 5% MOD. LF. H ₂ O CLAY ALTERATION	+ + + + +		
(MIN)			+ + + + +		
BCS 0000 3352		523-530 HAS 5-10% MODERATE PINK GR/Y TO LIGHT RED SR 6/6 TUFF CRSTS	+ + + + +		
(MIN)			+ + + + +		
BCS 0000 3357		SILTSTONE, MED DARK GRAY NY TO FINE GRAINED SANDSTONE, COMPOSITIONALLY SIMILAR TO ABOVE ASH FLOW UNIT	+ + + + +		
(MIN)			+ + + + +		
BCS 0000 3358		535-540 MEDIUM CALCAROUS CLAY	+ + + + +		
(MIN)			+ + + + +		
SAL (MIN)			+ + + + +		

Prepared By Bert Anagnost Date 3-3-98 Checked By _____ Date _____

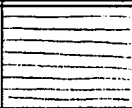
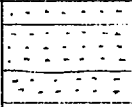
NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-35 Drill Depth From 540 To 550 Page 10 of 60

Driller _____ Start Date/Time 2-6-99/0942 End Date/Time _____

Drilling Equip./Method _____ Sampling Equip./Method CUTTINGS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
545	BCS 0000 3354 (M.D.)	CLAY DARK GRAY N3, VERY CALCAREOUS			
550	PCS 0000 3360 (M.D.)	SANDSTONE, FINE TO MED GRAINED, MEDIUM GRAY N5 WITH CALCAREOUS CLAY 10% WHITE N9 TO YELLOWISH GRAY S79/1 GRAINS			
	T.D. 3-2-99				

Prepared By BENT HAQUIST Date 3-3-99 Checked By _____ Date _____



COMPLETION REPORT

MP55 Monitoring Wells 1S and **3S**

Nye County EDWP

Amargosa Valley, NV

Prepared for:

**Nye County Department of Natural Resources
and Federal Facilities
Pahrump, NV**

Prepared by:

**Westbay Instruments Inc.
WB740
March 18, 1999**

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1. Introduction	1
2. Personnel	1
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3.3 Layout of MP Casing Components	2
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APPENDIX 1

Monitoring Well EWDP 1S

MOSDAX Data Report, March 12, 1999
Figure 1, Piezometric Profile (all zones), March 12, 1999
Summary MP Casing Log
MP Casing Installation Log (field copy)
MP55 Packer Inflation Field Records
(field records and plots for 4 packers)
MP Drift Diagram
Nye County Document "NC-EWDP-1S Well Installation As-Built Schematic", Feb 19, 1999

APPENDIX 2

Monitoring Well EWDP 3S

MOSDAX Data Report, March 13, 1999
Figure 2, Piezometric Profile (all zones), March 13, 1999
Summary MP Casing Log
MP Casing Installation Log (field copy)
MP55 Packer Inflation Field Records
(field records and plots for 6 packers)
MP Drift Diagram
Nye County Document "NC-EWDP-3S Well Completion Diagram"
Draft, March 10, 1999

1. Introduction

This report and the attached Appendices document the technical services carried out by Westbay Instruments Inc. under Nye County Order No. 75380 dated December 22, 1998. The Westbay MP System for groundwater monitoring was installed in drillholes 1S and 3S at the Nye County EWDP in Amargosa Valley, NV. The MP55 System casing components were installed in steel cased drillholes previously prepared by Nye County.

2. Personnel

Westbay representative Mr. Dave Larsen was on site for the installation from March 9 to 13, 1999.

3. Installation

3.1 Previous Activities

Borehole 1S was drilled by Nye County to a depth of 340 ft below ground surface using reverse circulation air rotary drilling methods. Steel well casing (nominal 6-inch ID and 6.4 inch OD) was grouted in place to a total depth of 290.5 ft. The well casing included two slotted screen sections. The screens consisted of blank steel well pipe (nominal 6-inch ID) with 0.020 inch vertical cut slots.

The open hole depth to water was approximately 54.52 ft below the 6-inch steel casing. The sounded depth of the well was 293.05 ft below the 6-inch steel casing. The steel casing stick-up was 2.0 ft above ground level.

Borehole 3S was drilled by Nye County to a depth of 550 ft below ground surface using reverse circulation air rotary drilling methods. Steel well casing (nominal 6-inch ID and 6.4 inch OD) was grouted in place to a total depth of 295.6 ft. The well casing included one slotted screen section. The screen consisted of blank steel well pipe (nominal 6-inch ID) with 0.020 inch vertical cut slots.

The open hole depth to water was approximately 259.67 ft below the 6-inch steel casing. The sounded depth of the well was 528 ft below the 6-inch steel casing. The steel casing stick-up was 1.6 ft above ground level.

Open-hole geophysical logging was carried out in No. 3S by Nye County and others before installation of the MP55 System casing components. In both 1S and 3S, a swab was run inside the well casing by Nye County to dislodge burrs or internal protrusions associated with the cut slots in the screened sections.

3.2 Preparation of Monitoring Well Design

Nye County prepared a completion diagram titled "NC-EDWP-1S Well Installation As-Built Schematic", dated February 19, 1999 which showed the steel well pipe, slotted screens and backfill layers installed in borehole No. 1S. A copy of this diagram was given to

Westbay on March 7, 1999. Nye County prepared a similar draft diagram, titled "NC-EWDP-3S Well Completion Diagram for borehole No. 3S and gave it to Westbay on March 10, 1999..

An MP Casing Installation Log, which specifies the proposed location of each MP55 System component in the borehole, was prepared for each monitoring well by Westbay based on this information. An MP Drift Diagram which shows the inside diameter of the borehole, steel well pipe and screens, and the outside diameter of each MP55 System component was also prepared by Westbay. The MP Installation Casing Logs were approved by Nye County. ~~The MP Casing Installation Log as approved were used as the installation guides in the field.~~

Copies of the Nye County drawings, the MP Casing Installation Logs with the annotated field notes and the MP Drift Diagrams are included in the Appendices.

All of the MP55 casing components were supplied by Westbay in nominal metric lengths (typically 3m and 1.5m lengths of MP55 casing). All depths and component positions in the borehole are reported in imperial units (ft and decimal ft) with respect to ground level, which is the surface of the concrete pad surrounding the steel casing at 1S and average ground level at borehole 3S.

The MP55 well arrangement includes primary monitoring zones positioned according to the well screen locations. An MP measurement port coupling and associated magnetic location collar were included in each primary monitoring zone to provide the capability to measure fluid pressures and collect fluid samples. A pumping port coupling was also included in each primary zone to provide purging and hydraulic conductivity testing capabilities.

The MP55 casing components in the lower (instrumented) part of each borehole were our current (0600 model series) packers, ports couplings, regular couplings and casing. The riser pipe above the top MP packer in each well is our older (0300 model series) blank casing and regular couplings. There is an adapter pipe section to convert between the 0600 series and 0300 series casings. The 0300 model series casing items were originally purchased by Nye County for use in Borehole No. 1D and have since been re-assigned to other monitoring wells.

Measurement port couplings were included in QA zones to provide QA testing capabilities. The measurement ports in each of the QA were positioned 5 ft below the MP55 packers to permit routine operation of the squeeze relief venting with the MP55 packer inflation equipment during the inflation process.

3.3 Layout of MP Casing Components

The MP casing components were set out in sequence according to the MP Casing Installation Log on a trailer near the borehole. Each casing length was numbered in order beginning with the lowermost as an aid in confirming the proper sequence of components. The sequential MP casing component numbers are given on the MP Casing Installation Log

and the Summary MP Casing Log, and are used in the following text to identify selected MP casing components (packers and ports).

The appropriate MP System coupling was attached to each piece of casing. Magnetic location collars were attached 2 ft. below the selected measurement ports in each of the primary monitoring zones.

Each casing component was visually inspected, and serial numbers for each packer, measurement port coupling and pumping port coupling were recorded on the field copy of the MP Casing Installation Log included in the Appendix.

3.4 Lowering of MP Components

The casing was lowered into the boreholes on March 10 (No. 1S) and March 12, 1999 (No. 3S). The MP casing components were placed in the borehole in sequence. Each casing joint was tested with a minimum internal pressure of 150 psi for one minute to confirm hydraulic seals. A record of each successful joint test and the placement of each casing component is on the field copy of the MP Casing Log. Geotextile filters were installed over selected measurement port couplings, as indicated by the annotation "F" on the MP Casing Log.

3.5 Hydraulic Integrity Testing

After the casing was lowered into the borehole, the water level inside the MP casing was left overnight at a depth of more than 150 ft below the open borehole water level to confirm hydraulic integrity of the casing. The data from the hydraulic integrity test is shown on page No. 3 of the MP Casing Installation Log in the Appendix. For each well, the test indicated that the MP casing was water tight.

3.6 Positioning of MP Components

After the components were lowered into the well and the hydraulic integrity of the MP casing had been confirmed, the MP casing string was positioned as shown on the MP Casing Installation Log. The Summary MP Casing Log, which shows the final "as-built" location of the well components and the monitoring zone numbering scheme selected by Nye County is also included in the Appendix.

Standard MP55 top completions with Stainless Steel top couplings were not available for installation. These will be added later, and the Summary MP Casing Logs will be updated.

3.7 Inflation of MP System Packers

The MP packers were inflated in sequence beginning with the bottom packer. All of the packers were inflated successfully. The data for inflation of each packer are provided on the MP55 Packer Inflation Field Records included in the Appendix. The inflation data for each packer are also provided on graphical plots of the Packer Inflation Records.

The top MP casing was cut and trimmed to suit the final configuration of the wellhead. A sketch of the as-built top of the MP casing is shown on the first page of the Summary MP Casing Log.

During preparation activities for packer inflation at No. 3S, a steel bolt about 4-inches long and 1-inch diameter was dropped in the well outside the MP casing. There was no sound of the bolt hitting the water inside the steel well casing and it was suspected that the bolt had hung up on an MP coupling or above the uppermost MP packer. The suspected position of the bolt is shown on the MP Casing Installation Log. The presence of the bolt in the annulus outside the MP55 casing has not damaged the hydraulic integrity of the casing or packers and is not expected to have any effect on routine monitoring activities in the well.

4. Fluid Pressure Measurements

After packer inflation was completed, fluid pressures were measured at each measurement port. At that time, the in-situ formation pressures may not have recovered from the pre-installation and installation activities. Longer term monitoring is likely to be required to establish representative fluid pressures.

A plot of the piezometric levels in all zones, including QA zones, is shown on Figures No.1 and No. 2 in the Appendices. These data were examined to confirm proper operation of the measurement ports. The MOSDAX Data Report for each profile is enclosed in the Appendices.

APPENDIX 2

Monitoring Well EWDP 3S

MOSDAX Data Report, for readings on March 13, 1999	- 1 page
Figure 1, Piezometric Profile (all zones), March 13, 1999	- 1 page
Summary MP Casing Log	- 3 pages
MP Casing Installation Log (field copy)	- 8 pages
MP55 Packer Inflation Field Records (field records and plots for 6 packers)	- 20 pages
MP Drift Diagram	- 1 page
Nye County Document "NC-EWDP-3S Well Completion Diagram", Draft, March 10, 1999	- 1 page

MOSDAX Data Report

WESTBAY INSTRUMENTS 1990-1993
 Date Of Report: Mon Mar 15 20:41:08 1999
 Company Name: Nye County
 Project Name: EWDP - Amargosa NV
 Well ID: EWDP-3S
 Well Description: Plastic MP55
 Well Elevation: 0.00 (m.)

Probe Information

Logical Probe-1 - Serial #: 2215 - Description: SAMPLER

Port Information

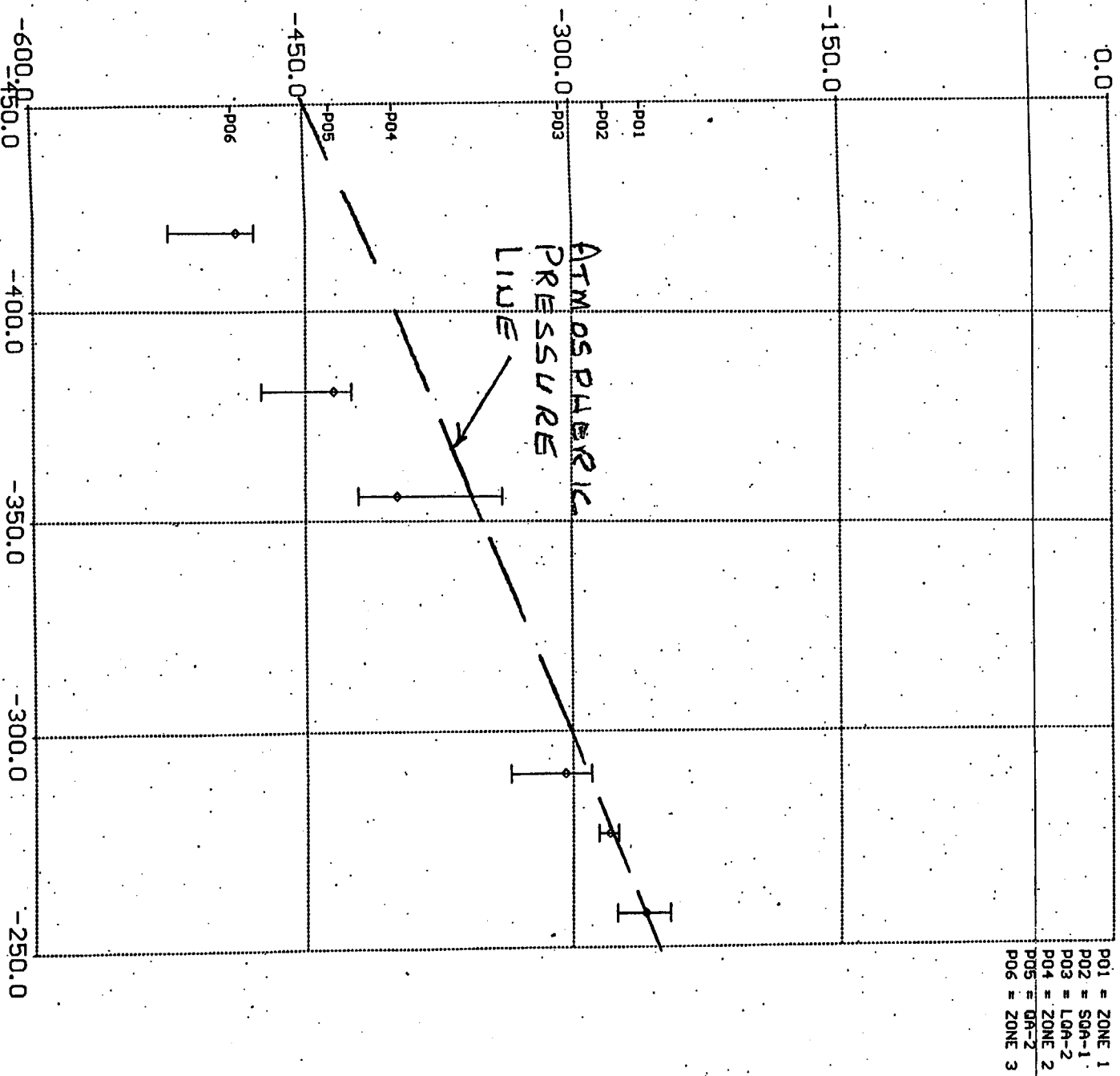
Port #:00 - Description ATMOSPHERIC - Depth 0.0 (m.) - ACF 1.0
 Port #:01 - Description ZONE 1 - Depth 258.5 (m.) - ACF 1.0
 Port #:02 - Description SQA-1 - Depth 279.3 (m.) - ACF 1.0
 Port #:03 - Description LQA-2 - Depth 304.3 (m.) - ACF 1.0
 Port #:04 - Description ZONE 2 - Depth 398.2 (m.) - ACF 1.0
 Port #:05 - Description QA-2 - Depth 433.8 (m.) - ACF 1.0
 Port #:06 - Description ZONE 3 - Depth 488.3 (m.) - ACF 1.0

TIME DATE	PORT DESCRIPTION	PRES (psi)	PIEZ DP (ft.)	MOTOR POSITION
Sat Mar 13 16:20:00 1999	ATMOSPHERIC	13.1	0.0	ARM OUT
Sat Mar 13 16:12:00 1999	ZONE 1	13.1	-258.5	ARM OUT
Sat Mar 13 16:13:00 1999	ZONE 1	14.2	-257.7	SHOE ACTIVATED
Sat Mar 13 16:13:00 1999	ZONE 1	13.1	-258.5	ARM OUT
Sat Mar 13 16:09:00 1999	SQA-1	13.1	-279.3	ARM OUT
Sat Mar 13 16:10:00 1999	SQA-1	17.5	-276.2	SHOE ACTIVATED
Sat Mar 13 16:10:00 1999	SQA-1	13.1	-279.3	ARM OUT
Sat Mar 13 16:06:00 1999	LQA-2	13.2	-304.2	ARM OUT
Sat Mar 13 16:06:00 1999	LQA-2	33.1	-290.2	SHOE ACTIVATED
Sat Mar 13 16:06:00 1999	LQA-2	13.1	-304.3	ARM OUT
Sat Mar 13 16:02:00 1999	ZONE 2	13.2	-398.1	ARM OUT
Sat Mar 13 16:02:00 1999	ZONE 2	73.3	-355.9	SHOE ACTIVATED
Sat Mar 13 16:02:00 1999	ZONE 2	13.2	-398.2	ARM OUT
Sat Mar 13 15:57:00 1999	QA-2	13.1	-433.8	ARM OUT
Sat Mar 13 15:58:00 1999	QA-2	88.5	-380.8	SHOE ACTIVATED
Sat Mar 13 15:58:00 1999	QA-2	13.1	-433.8	ARM OUT
Sat Mar 13 15:55:00 1999	ZONE 3	26.7	-478.7	ARM OUT
Sat Mar 13 15:55:00 1999	ZONE 3	111.9	-418.8	SHOE ACTIVATED
Mar 13 15:54:00 1999	ZONE 3	26.7	-478.7	ARM OUT

PIEZOMETRIC PROFILE WELL: EMDP-3S

Client: Nye County
Profile Date: Sat Mar 13 16:13:00 1999
Comment:

Site: EMDP - Amargosa NU
Description: Plastic MP55
Datum: Ground Level



FILE: 3S130399
Plot By: DL
Checked By: DL
Project: MB740

DIRECT-P
Date: 7 MAR 99
FIGURE: 2



Westbay
Instruments Inc.

Summary Casing Log

Company: Nye County
Well: NC-EWDP-3S
Site: Amargosa Valley NV
Project: EWDP

Job No: WB740
Author: DL

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 524.41 ft.

Borehole Depth: 550.00 ft.
Borehole Inclination:
Borehole Diameter: 10.00 in.

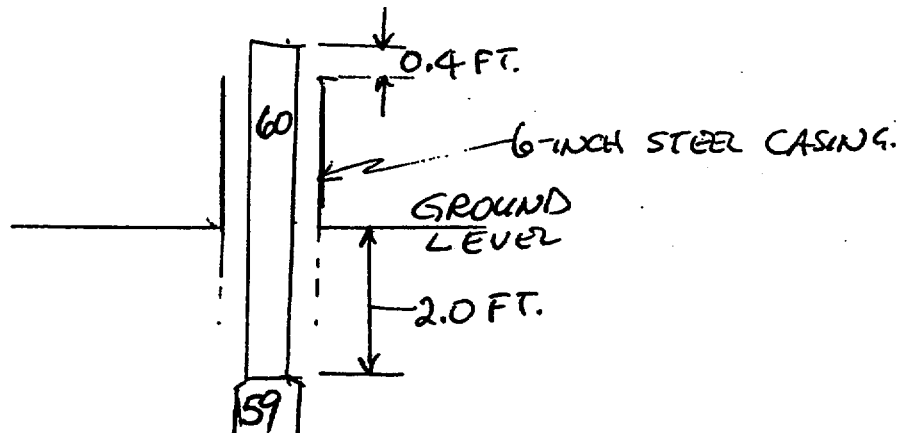
Well Description:
Plastic MP55 System
Other References:
In 6.0 inch steel well casing
Based on Nye County sketch 2/12/99

File Information

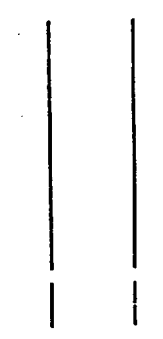
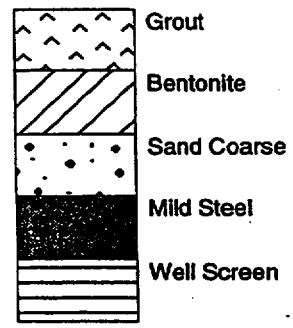
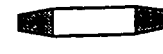

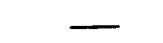



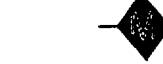
File Name: 740_3S.WWD
Report Date: Tue Mar 16 05:10:35 1999

File Date: Mar 12 00:29:15 1999

Sketch of Wellhead Completion

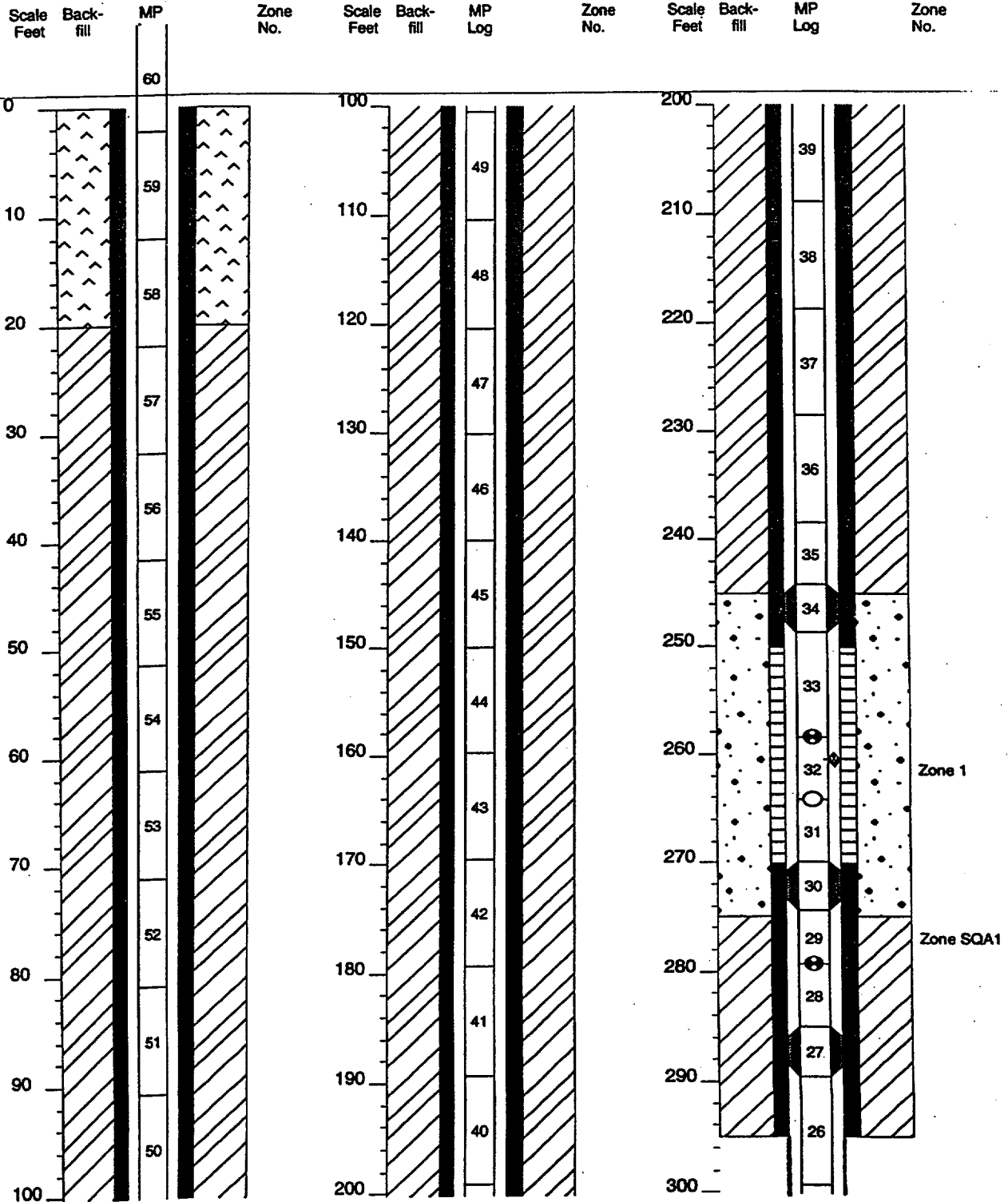


Legend

(Qty) MP Components	Geology	Backfill/Casing
	<p>(2) 0603 - MP55 End Plug</p> <p>(23) 0601M30 - MP55 Casing, PVC, 3.0m</p> <p>(24) 0301M30 - MP55 Casing, PVC, 3.0m</p> <p>(1) 0601M15A - MP55 Adapter Casing 06_03</p>	
	<p>(6) 0612M15 - MP55 Packer with stiffeners</p>	
	<p>(6) 0601M15 - MP55 Casing, PVC, 1.5m</p>	
	<p>(28) 0602 - MP55 Regular Coupling</p>	
	<p>(25) 0302A - MP55 Regular Coupling</p>	
	<p>(6) 0605 - MP55 Measurement Port</p>	
	<p>(3) 0607 - MP55 Hydraulic Pumping Port</p>	
	<p>(3) 0608 - MP55 Magnetic Location Collar</p>	

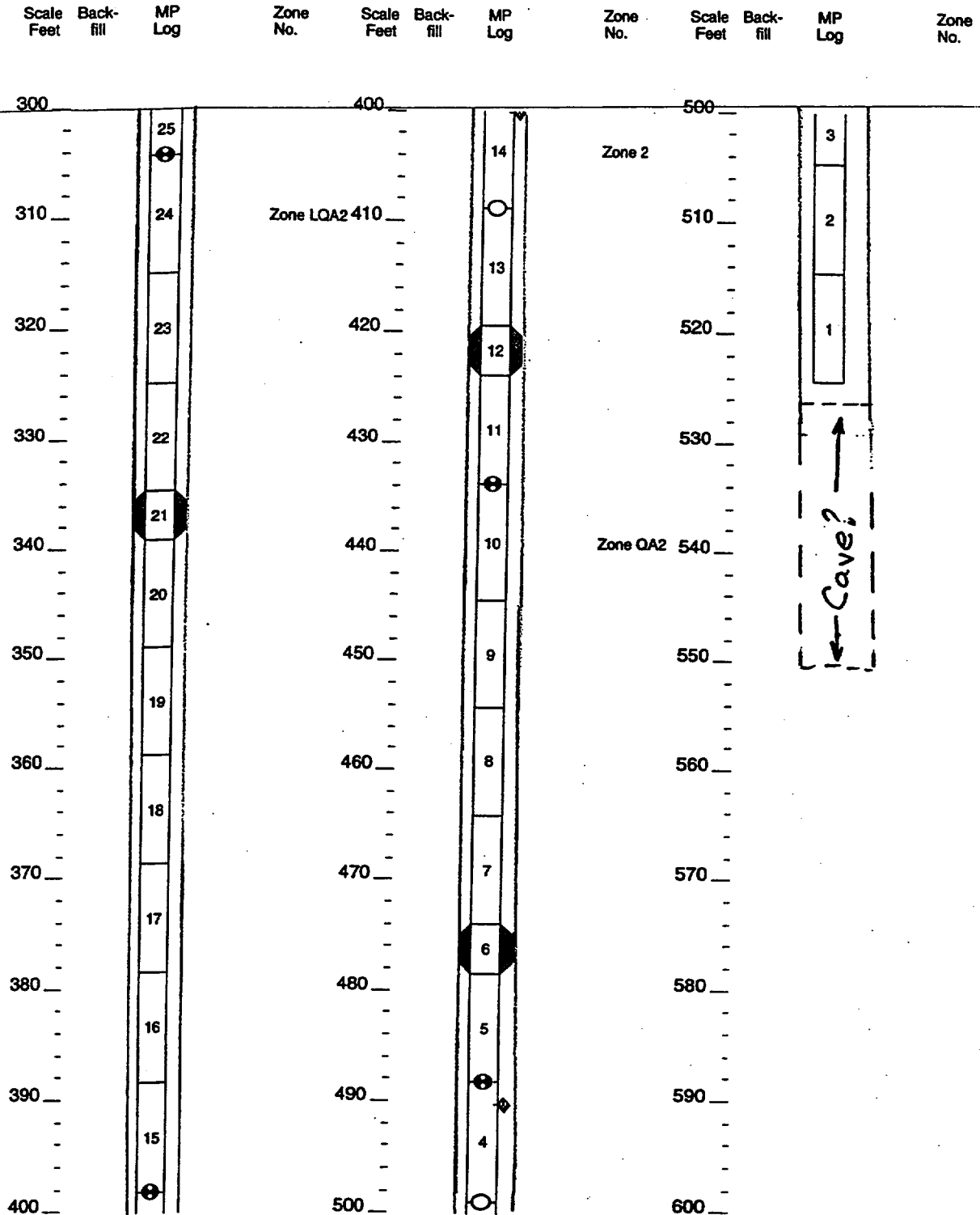
Summary Casing Log
Nye County

Job No: WB740
Well: NC-EWDP-3S



Summary Casing Log
Nye County

Job No: WB740
Well: NC-EWDP-3S



MP Casing Installation Log

Company: Nye County
Well: NC-EWDP-3S
Site: Amargosa Valley NV
Project: EWDP

Job No: WB740
Author: DL

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 524.41 ft.

Borehole Depth: 550.00 ft.
Borehole Inclination:
Borehole Diameter: 10.00 in.

Well Description:
Plastic MP55 System

Other References:
In 6.0 inch steel well casing
Based on Nye County sketch 2/12/99

File Information

File Name: 740_3S.WWD
Report Date: Fri Mar 12 00:23:12 1999

File Date: Mar 12 00:09:36 1999

Comments

Log Information

Borehole condition confirmed.
MP well design & preparation.
MP well design checked.
MP well and borehole approved to install.

(method)	<u>CALIPER</u>	Date:	<u>11 MAR 99</u>
By:	<u>NS/DL</u>	Date:	<u>11 MAR 99</u>
By:	<u>DL/GM</u>	Date:	<u>12 MAR 99</u>
By:	<u>NS</u>	Date:	<u>11 MAR 99</u>

Legend

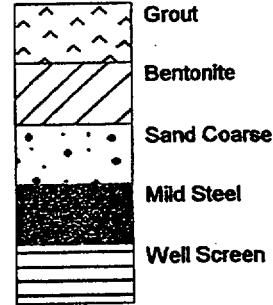
(Qty) MP Components

Geology

Backfill/Casing



- (2) 0603 - MP55 End Plug
- (7) 0601M15 - MP55 Casing, PVC, 1.5m
- (24) 0301M30 - MP55 Casing, PVC, 3.0m
- (1) 0601M15A - MP55 Adapter Casing 06_03
- (6) 0612M15 - MP55 Packer with stiffeners
- (22) 0601M30 - MP55 Casing, PVC, 3.0m
- (28) 0602 - MP55 Regular Coupling
- (25) 0302A - MP55 Regular Coupling
- (6) 0605 - MP55 Measurement Port
- (3) 0607 - MP55 Hydraulic Pumping Port
- (3) 0608 - MP55 Magnetic Location Collar



MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-3S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
0		60			0301M30 MP55 CASING, PVC, 3.0m.
		59	✓		0302A - MP55 Regular Coupling
10		58	✓ 33		0301M30 - MP55 Casing, PVC, 3.0m
		57	✓ 55		0302A - MP55 Regular Coupling
20		56	✓ 17		0301M30 - MP55 Casing, PVC, 3.0m
		55	✓ 45		0302A - MP55 Regular Coupling
30		54	✓ 15		0301M30 - MP55 Casing, PVC, 3.0m
		53	✓ 35		0302A - MP55 Regular Coupling
40		52	✓		0301M30 - MP55 Casing, PVC, 3.0m
		51	✓ 55		0302A - MP55 Regular Coupling
50		50	✓ 38		0301M30 - MP55 Casing, PVC, 3.0m
60			✓		0302A - MP55 Regular Coupling
70					0301M30 - MP55 Casing, PVC, 3.0m
80					0302A - MP55 Regular Coupling
90					0301M30 - MP55 Casing, PVC, 3.0m
100					0302A - MP55 Regular Coupling

202 ft. edges

1709 hr
DTW IN MP = 478.4'
STICKUP = 6'2" above steel

0845 hr
DTW IN MP = 472.88'
below ~~STAMP~~
STICKUP = 0.60'
cut off 5.62'
co = 478.5' to
YESTERDAY'S RET
co MP IS WATER TUB

472.35
5.62
478.50

MP Casing Installation Log
 e County

Job No: WB740
 Well: NC-EWDP-3S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
100			<input checked="" type="checkbox"/>	13	0302A - MP55 Regular Coupling
		49	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
110			<input checked="" type="checkbox"/>	10	0302A - MP55 Regular Coupling
		48	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
120			<input checked="" type="checkbox"/>	19	0302A - MP55 Regular Coupling
		47	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
130			<input checked="" type="checkbox"/>	06	0302A - MP55 Regular Coupling
		46	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
140			<input checked="" type="checkbox"/>	55	0302A - MP55 Regular Coupling
		45	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
150			<input checked="" type="checkbox"/>	50	0302A - MP55 Regular Coupling
		44	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
160			<input checked="" type="checkbox"/>	35	0302A - MP55 Regular Coupling
		43	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m
170			<input checked="" type="checkbox"/>	18	0302A - MP55 Regular Coupling
	42	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m	
180		<input checked="" type="checkbox"/>	50	0302A - MP55 Regular Coupling	
	41	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m	
190		<input checked="" type="checkbox"/>	17	0302A - MP55 Regular Coupling	
	40	<input checked="" type="checkbox"/>		0301M30 - MP55 Casing, PVC, 3.0m	
200		<input checked="" type="checkbox"/>	02	0302A - MP55 Regular Coupling	

MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-3S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
200					
210		39	✓		0301M30 - MP55 Casing, PVC, 3.0m
			✓	150	0302A - MP55 Regular Coupling
220		38	✓		0301M30 - MP55 Casing, PVC, 3.0m
			✓	54	0302A - MP55 Regular Coupling
230		37	✓		0301M30 - MP55 Casing, PVC, 3.0m
			✓	6	0302A - MP55 Regular Coupling
240		36	✓		0301M30 - MP55 Casing, PVC, 3.0m
			✓	150	0302A - MP55 Regular Coupling
250		35	✓		0601M15A - MP55 Adapter Casing 06_03
			✓	10	0602 - MP55 Regular Coupling
		34	✓	0612-037 ✓	0612M15 - MP55 Packer with stiffeners
			✓	46	0602 - MP55 Regular Coupling
260		33	✓		0601M30 - MP55 Casing, PVC, 3.0m
			✓	45 0605-043 ✓	0605 - MP55 Measurement Port
		32	✓	Zone 1	0601M15 - MP55 Casing, PVC, 1.5m
			✓	24 0607-01 ✓	0607 - MP55 Hydraulic Pumping Port
270		31	✓		0601M15 - MP55 Casing, PVC, 1.5m
			✓	23	0602 - MP55 Regular Coupling
		30	✓	0612-042 ✓	0612M15 - MP55 Packer with stiffeners
			✓	33	0602 - MP55 Regular Coupling
280		29	✓	Zone SQA1	0601M15 - MP55 Casing, PVC, 1.5m
			✓	47 0605-060 ✓	0605 - MP55 Measurement Port
		28	✓		0601M15 - MP55 Casing, PVC, 1.5m
			✓	20	0602 - MP55 Regular Coupling
290		27	✓	0612-038 ✓	0612M15 - MP55 Packer with stiffeners
			✓	10	0602 - MP55 Regular Coupling
300		26	✓		0601M30 - MP55 Casing, PVC, 3.0m
			✓	24	0602 - MP55 Regular Coupling

(*) Suspected position of 4-inch long steel bolt dropped outside the MP casing.
DL 13 MAR 99

MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-3S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
300		25	<input checked="" type="checkbox"/>		0601M15 - MP55 Casing, PVC, 1.5m 0605 - MP55 Measurement Port
			<input checked="" type="checkbox"/>	0605-059 ✓	
310		24	<input checked="" type="checkbox"/>	Zone LQA2	0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	50	0602 - MP55 Regular Coupling
320		23	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	16	0602 - MP55 Regular Coupling
330		22	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	40	0602 - MP55 Regular Coupling
340		21	<input checked="" type="checkbox"/>	0612-044 ✓	0612M15 - MP55 Packer with stiffeners
			<input checked="" type="checkbox"/>	24	0602 - MP55 Regular Coupling
		20	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	48	0602 - MP55 Regular Coupling
350		19	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	60	0602 - MP55 Regular Coupling
360		18	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	10	0602 - MP55 Regular Coupling
370		17	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	03	0602 - MP55 Regular Coupling
380		16	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	44	0602 - MP55 Regular Coupling
390		15	<input checked="" type="checkbox"/>		0601M30 - MP55 Casing, PVC, 3.0m
			<input checked="" type="checkbox"/>	05 0605-038 ✓	0605 - MP55 Measurement Port
400					

MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-3S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
400		14	✓	Zone 2	0601M30 - MP55 Casing, PVC, 3.0m
410		13	✓	0607-016 ✓ 48	0607 - MP55 Hydraulic Pumping Port
420		12	✓	0612-054 ✓ 38	0601M30 - MP55 Casing, PVC, 3.0m 0602 - MP55 Regular Coupling 0612M15 - MP55 Packer with stiffeners 0602 - MP55 Regular Coupling
430		11	✓		0601M30 - MP55 Casing, PVC, 3.0m
440		10	✓	0605-039 ✓ 52	0605 - MP55 Measurement Port
450		9	✓	Zone QA2	0601M30 - MP55 Casing, PVC, 3.0m
460		8	✓	0602-034 ✓	0602 - MP55 Regular Coupling
470		7	✓	0601M30-009 ✓	0601M30 - MP55 Casing, PVC, 3.0m
480		6	✓	0602-038 ✓	0602 - MP55 Regular Coupling
490		5	✓	0612-048 ✓ 46	0612M15 - MP55 Packer with stiffeners 0602 - MP55 Regular Coupling
500		4	✓	0605-047 ✓ 26	0605 - MP55 Measurement Port
		3	✓		0601M30 - MP55 Casing, PVC, 3.0m
		2	✓	0607-015 ✓ 39	0607 - MP55 Hydraulic Pumping Port

MP Casing Installation Log
Nye County

Job No: WB740
Well: NC-EWDP-3S

Scale Feet	Fill	MP Log	QA OK	S/N	MP Casing Description
500		3	✓		0601M15 - MP55 Casing, PVC, 1.5m
			✓	20	0602 - MP55 Regular Coupling
510		2	✓		0601M30 - MP55 Casing, PVC, 3.0m
			✓	15	0602 - MP55 Regular Coupling
520		1	✓		0601M30 - MP55 Casing, PVC, 3.0m
			✓		0603 - MP55 End Plug Coupling

1300 HR
START

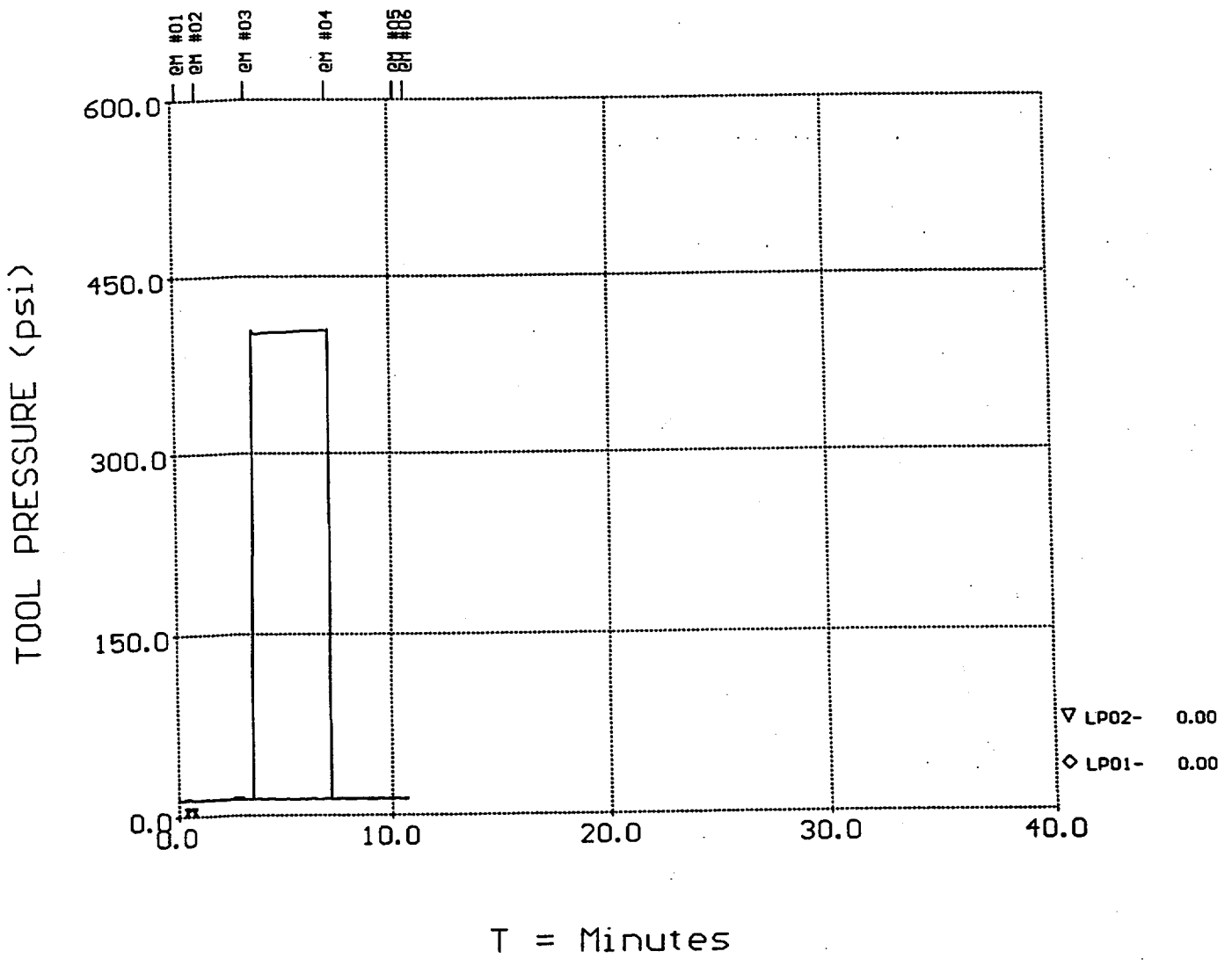
10 MARCH 99: DTW IN OPEN HOLE = 259.67 FT
6-INCH STEEL = 1.56 FT ABOVE GROUND.
NO 8-INCH STEEL.
SOUNDED BOREHOLE TD = 536 FT BELOW 6" STEEL.

12 MARCH 99: AFTER PURGE PUMPING 70 GPM / 2 HR:
SOUNDED BOREHOLE 528 FT BELOW 6" STEEL.
TJT Pressure = 150 PSI
TEST P = 300 PSI TOTAL, 150 PSI NET.

BLANK TEST RECORD

Client: Nye County
Site: EWDP - Amargosa, NV
Description: Plastic MP55
Well: EWDP-3S
WB Project: WB740
Y Offset Pressure:
T-Zero = Sat Mar 13 09:43:20 1999

Packer:
Packer Depth: surface
FILE: 3S_BT1
Plot By: _____ Date: _____
Checked By: _____ Date: _____
Comment:





Westbay
Instruments Inc.

MP55 Packer Inflation Field Record

Project: <u>WB 740</u> Client: <u>NYE COUNTY</u>	By: <u>DL</u> Date: <u>13 MAR 99</u>
Location: <u>AMARGOSA NV</u> Well No. <u>EWDP-35</u>	Borehole Diameter: <u>6 inch, in steel</u>
Packer No. <u>062-038</u> Depth: <u>284</u>	Computer Data File: <u>062-038</u> .WDF
Inf-Tool No. <u>2321</u> Vent Tool No. <u>2215</u>	Volume Pumped: <u>11.7</u> Vol Returned <u>0.3</u>
H-B Valve: (P _H) <u>0</u> Offset (P _V) <u>0</u>	Confirm Venting (Vent Tool Data) (Y/N) <u> </u>
Vent Tool Pressure (Shoe Out, P _O) <u> </u>	Final Inf'n Vol: <u>11.4</u> Final Press: <u>275</u> (P _F)
Comments: <u>OPEN! HOLD DTW = ~260 FT.</u>	Calc'd Element Pressure (P _F +P _V -P _O) <u>251 psi</u>
<u>EST. HEAD ABOVE PKR = ~24 FT.</u>	Confirm Pkr Valve Closed (Yes/No): <u>YES</u>

$PKR P = 275 - 10.4 - 13.8 = 250.7$

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	13.9	13.2	1259:00	-	START TIE = OFF
0	0	13.9	13.2	1300:00	1	TIE SHOE OUT (21)
0	0	14.0	13.2	1301:00	-	PUMP TO 400 PSI.
0.3	400	14.0	13.2	1302:30	2	TIE VALVE → INFLATE
0.3	400					PKR VALVE OPENED (450?)
0.3	0	33	13.2	1302:30	3	START PUMPING (3)
1.0	250	80	13.2	1303:10	4	
2.0	300	133		1304:10	5	
3.0	300	160		1305:15	6	
4.0	320	160		1306:30	7	
5.0	320	167		1307:35	8	
6.0	320	174		1308:45	9	STOP PUMP, TOP UP
6.0	0	176		1309:45	10	RESUME PUMPING.
7.0	330	180		1310:55	11	- missed tag.
8.0	350	201		1312:05	12	
9.0	375	223		1313:13	13	
10.0	375	248		1314:23	13	
11.0	450	302		1315:35	14	TIE → OFF STOP PUMP
11.0	120	264		1316:30	15	
11.0	120	257		1317:30	-	
11.0	120	253		1318:30	-	
11.0	120	248		1320:30	-	Pump to 600 PSI.
						600 PSI - DISCOVER TIE VALVE STILL INFL.

Form MP55inf3.com Dec 18, 1998

MP55 Packer Inflation Field Record, Part 2

Project: WB740 Well No. EWDP-3S Packer No. 0612-08 Date: 13 MAR 99

Software Reminder

I = Inflate, O = Off, C = Close

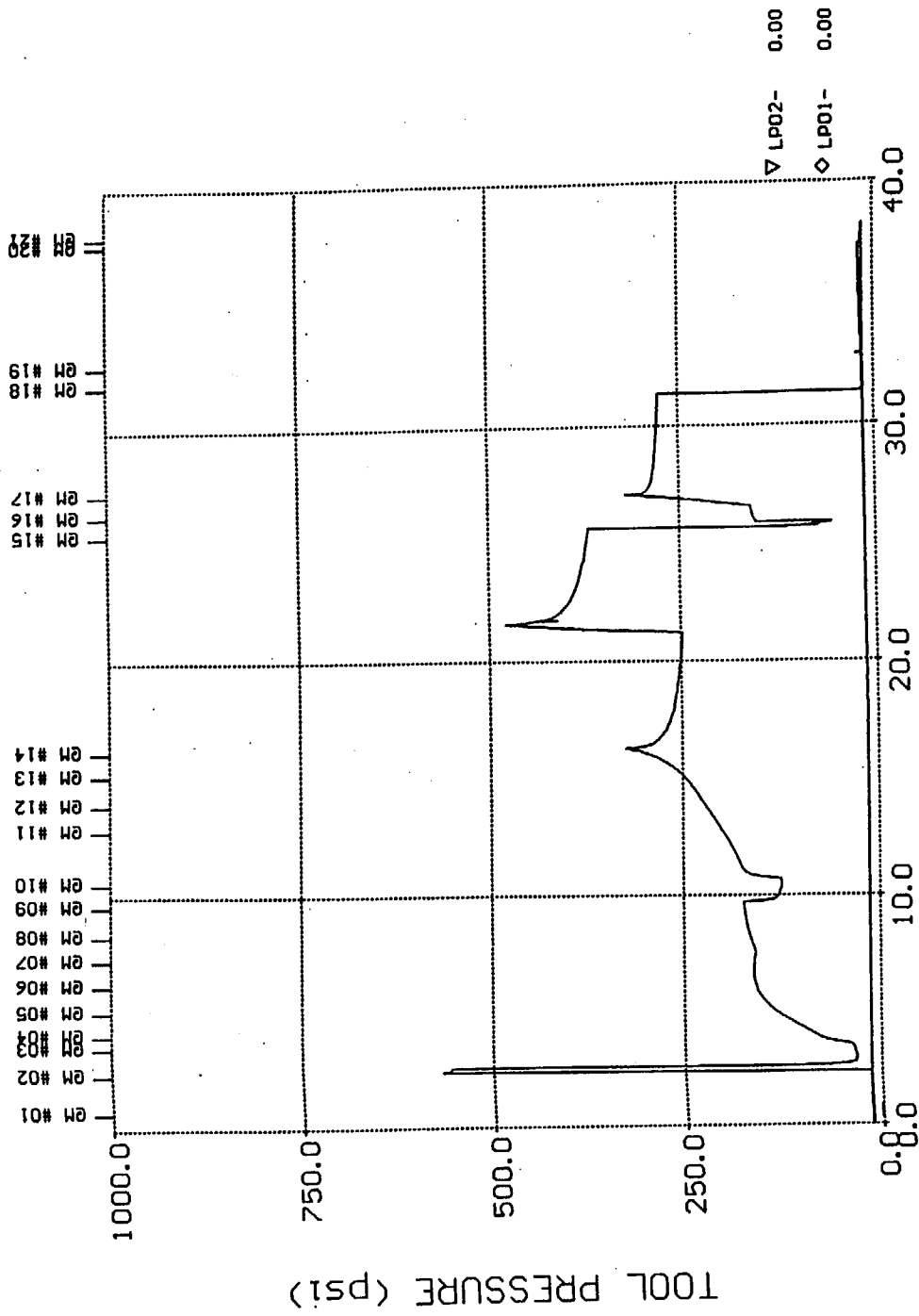
Pumping Information

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
11.3	450	450	—	1321	—	STOP PUMPING TIE → OFF, CONFIRMED
11.3	300	371	—	1324	—	VENT LINE
11.1	0	369	—	1324:15	15	— CLOSE VALVE — VENT PER.
				1325-		— BACK TO INFLATE
11.1	0	158	—	1326:30	16	PUMP
11.6	300	300	—	1326:20	17	TIE → OFF. STOP PUMP
11.6	250	283		1327	—	
11.6	250	280		1328	—	
11.6	250	277		1329	—	
11.6	250	276		1330	—	PUMP TO 600
11.7	600	275		1330:30	18	TIE → CLOSE — MISSED TAG
11.7	600	14.3		1331:30	—	VENT LINE
11.4	0	14.4		1332	19	TIE → OFF
11.4	0	14.9		1332:30	—	
11.4	0	15.9		1333:30	—	
11.4	0	16.8		1334:30		
11.4	0	17.4		1335:30		
11.4	0	17.9		1336:30	20	TIE SHOE IN (20)
11.4	0	13.7	13.2	1337:20	21	END

PACKER INFLATION RECORD

Client: Nye County
 Site: EWDP - Amargosa, NU
 Description: Plastic MP55
 Well: EWDP-3S
 WB Project: WB740
 Y Offset Pressure:
 T-Zero = Sat Mar 13 12:59:11 1999

Packer: 0612_038
 Packer Depth: 286 ft
 FILE: 0612_038
 Plot By: DL Date: 15 MAR 99
 Checked By: _____ Date: _____
 Comment: _____



T = Minutes



MP55 Packer Inflation Field Record

Project: <u>WB 740</u> Client: <u>NYE COUNTY</u>	By: <u>DL</u> Date: <u>13 MAR 99</u>
Location: <u>AMARGOSA NV</u> Well No. <u>EWDP-38</u>	Borehole Diameter: <u>6-INCH STEEL</u>
Packer No. <u>0612-037</u> Depth: <u>244</u>	Computer Data File: <u>0612-037</u> .WDF
Inf-Tool No. <u>2321</u> Vent Tool No. <u>2215</u>	Volume Pumped: <u>11.4</u> Vol Returned <u>0.4</u>
H-B Valve: (P _H) <u>⊖</u> Offset (P _V) <u>⊖</u>	Confirm Venting (Vent Tool Data) (Y/N) <u> </u>
Vent Tool Pressure (Shoe Out, P ₀) <u> </u>	Final Inf'n Vol: <u>11.0</u> Final Press: <u>236</u> (P _F)
Comments: <u>OPEN ROLE ATW = 260 FT.</u> <u>EST HEAD ABOVE PKR = 0 FT</u>	Calc'd Element Pressure (P _F +P _V -P ₀) <u>222 PSI</u>
	Confirm Pkr Valve Closed (Yes/No): <u>YES</u>

$PKR P = 236 - 13.7 = 222$

Software Reminder

I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	13.7	13.1	1447	-	START TIE = OFF.
0	0	13.7	13.1	1447:30	1	TIE SHOE OUT.
0	0	14.2	13.1	1449:00	2	PUMP TO 400 PSI.
0.1	400	14.1	13.2	1449:30	1	TIE → INFLATE
0.1	400	503	13.2	1451:00	-	PUMP
0.5	1000	1000	-	-	-	NOT OPEN PKR VALVE - TIE VALVE OFF, VENT LINE - SHOE IN, RE-LAND. TRY AGAIN
0	0	13.7	13.2	1456	-	TIE SHOE OUT. (2)
0	0	14.3	13.2	1457	2	PUMP LINE → 400
0.1	400	14.3	13.2	1458:00	2	TIE → INFLATE
0.1	400	548	13.2	1458:30	-	PUMP
		630				PKR VALVE OPEN.
0.2	0	36	13.2	1459	3	START PUMPING
1.0	230	66	13.2	1500:10	4	
2.0	270	111	13.2	1501:05	5	(7)MS AIR IN
3.0	300	131	13.2	1502:10	6	
4.0	300	134	13.2	1503:20	7	
5.0	300	132	13.2	1504:30	8	
6.0	300	136	13.2	1505:40	9	STOP PUMP, TOP UP
6.0	0	105	13.2	1506:40	10	RESUME
7.0	320	145	13.2	1507:50	11	

MP55 Packer Inflation Field Record, Part 2

Software Reminder

I = Inflate, O = Off, C = Close

Project: WB 740 Well No. EWDP-35 Packer No. 0612-037 Date: 13 MAR 99

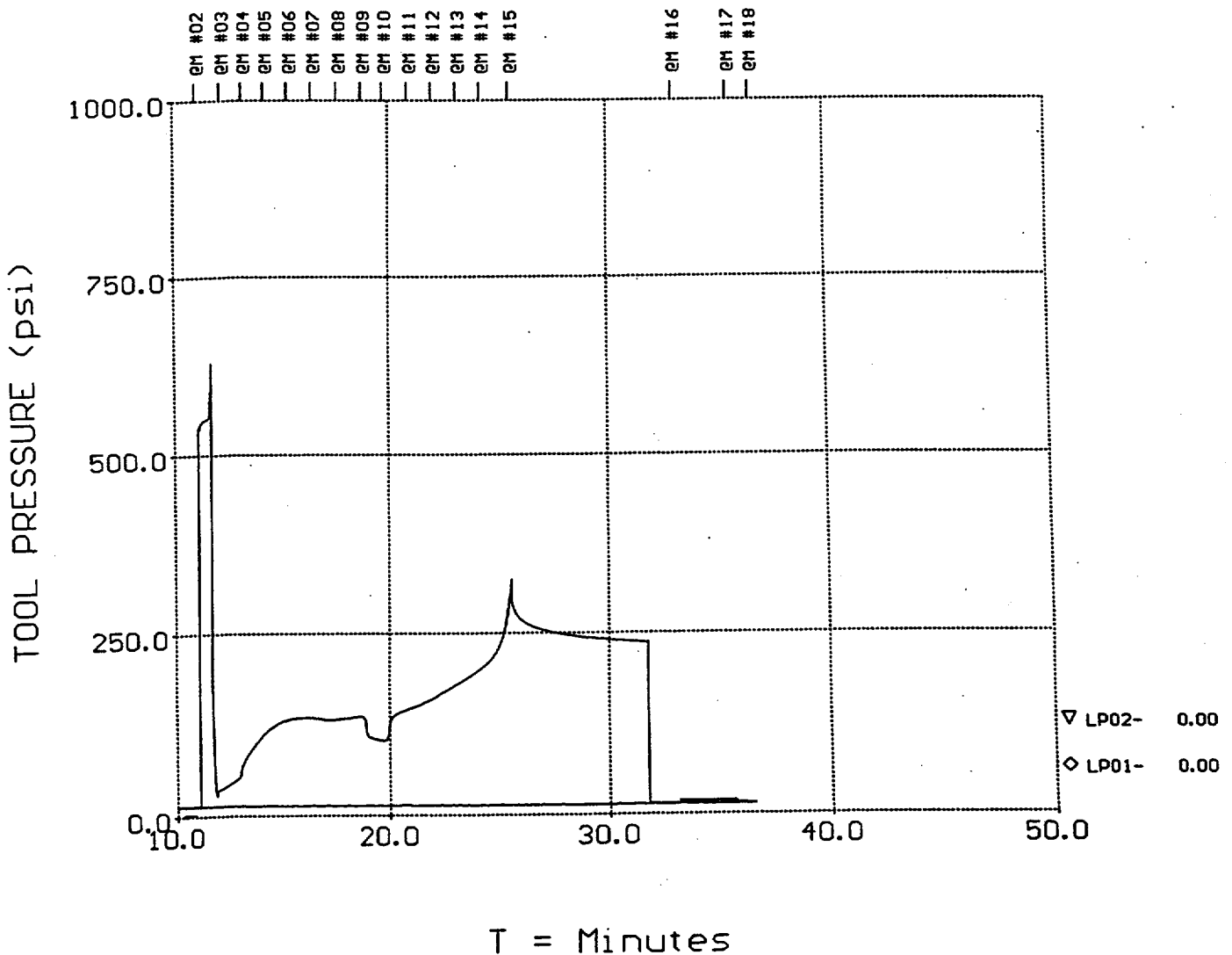
Pumping Information

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
8.0	320	160	13.2	1508:55	12	
9.0	350	181	13.2	1510:00	13	
10.0	370	201	13.2	1511:10	14	
11.3	475	301	13.2	1512:35	15	TIE → OFF, STOP PUMP
11.3	470	265	13.2	1513	—	
11.3	470	253	13.2	1514	—	
11.3	470	246.6	13.2	1515	—	
11.3	470	242.6	13.2	1516	—	
11.3	470	239.6	13.2	1517	—	
11.3	470	237.2	13.2	1518	—	PUMP TO 600 PSI.
11.4	600	236.2	13.2	1518:30	16	TIE → CLOSE
11.4	600	14.0	13.2	1519:30	—	VENT LINE
11.0	0	14.0	13.2	1520:00	17	TIE → OFF
11.0	0	17.45	13.2	1520:30	—	
11.0	0	17.55	13.2	1521:30	—	
11.0	0	17.45	13.2	1522:30	17	TIE SHOE IN (21)
11.0	0	13.85	13.2	1523:30	18	END

PACKER INFLATION RECORD

Client: Nye County
 Site: EWDP - Amargosa, NV
 Description: Plastic MP55
 Well: EWDP-3S
 WB Project: WB740
 Y Offset Pressure:
 T-Zero = Sat Mar 13 14:56:53 1999

Packer: 0612_037
 Packer Depth: 244 ft
 FILE: 0612_037
 Plot By: OL Date: 15 MAR 99
 Checked By: _____ Date: _____
 Comment:





MP55 Packer Inflation Field Record

Project: <u>WB740</u>	Client: <u>NYE COUNTY</u>	By: <u>DL</u>	Date: <u>13 MAR 99</u>
Location: <u>AMARGOSA NV</u>	Well No. <u>QWDD-3S</u>	Borehole Diameter: <u>6 1/4"</u>	
Packer No. <u>0612-08</u>	Depth: <u>474 ft</u>	Computer Data File: <u>0612-04E</u>	<u>.WDF</u>
Inf-Tool No. <u>2321</u>	Vent Tool No. <u>2215</u>	Volume Pumped: <u>11.9</u>	Vol Returned <u>0.3</u>
H-B Valve: (P _H) <u>⊕</u>	Offset (P _V) <u>⊕</u>	Confirm Venting (Vent Tool Data) (Y/N)	
Vent Tool Pressure (Shoe Out, P _o) <u>—</u>		Final Inf'n Vol: <u>11.62</u>	Final Press: <u>298</u> (P _F)
Comments: <u>OPEN HOLE DTW ~ 260'</u>		Calc'd Element Pressure (P _F +P _V -P _o) <u>191.3psi</u>	
<u>EST D head above pkr = 214ft = 93psi</u>		Confirm Pkr Valve Closed (Yes/No): <u>YES</u>	

$P_{KR} P = 298 - 93 - 13.7 =$

Software Reminder

I = Inflate, O = Off, C = Close

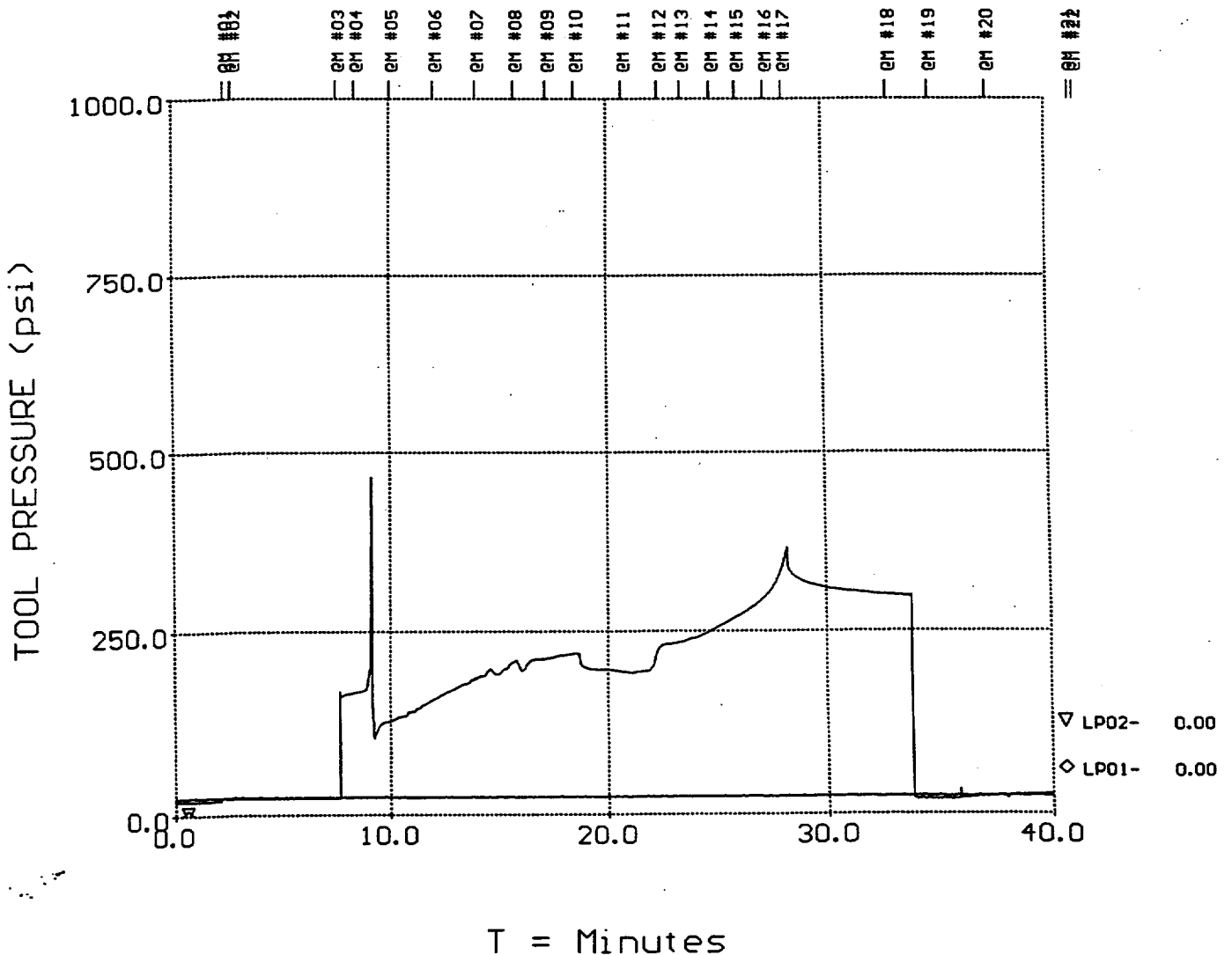
Pumping Information

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	19.46	23.77	1040:45	-	START, TIE VALVE OFF
0	0	19.58	23.77	1042:00	1	TIE SHOE OUT.
0	0	22.95	23.77	1043:00	2	PUMP UP LINE
0.5	0	22.89	23.60	1048:00	3	TIE VALVE → INFL.
0.5	0	16.5	—	1049	4	Pump up
1.0	~260	450	—	1049:40	—	VALVE OPENED
1.0	0	126	24	1050:30	5	START PUMPING.
2.0	100	197	24	1052:38	6	
3.0	150	185	24	1054:35	7	increase pumping rate
4.0	230	210	24	1056:40	8	-pumping variable - vapour lock?
5.0	250	213	24	1058:00	9	
6.0	250	220	24	1059:10	10	STOP, TOP UP RESERVOIR.
6.0	0	195	24	1101:20	11	RESUME
7.0	260	226	24	1102:55	12	
8.0	300	235	24	1104:00	13	
9.0	300	250	24	1105:20	14	
10.0	320	270	25.24	1106:35	15	
11.0	330	300	24	1107:50	16	
11.8	380	350	24	1108:50	17	TIE OFF, STOP PUMP
11.8	270	310	24	1110:30	18	
11.8	270	299	24	1113:50	19	Pump up STOP
11.9	600	298	24	1114:00	20	TIE CLOSE
11.9	600	2003	24	1115:00	21	VENT LINE.

PACKER INFLATION RECORD

Client: Nye County
 Site: EWDP - Amargosa, NV
 Description: Plastic MP55
 Well: EWDP-3S
 WB Project: WB740
 Y Offset Pressure:
 T-Zero = Sat Mar 13 10:40:31 1999

Packer: 0612_048
 Packer Depth: 474 ft
 FILE: 0612_048
 Plot By: DL Date: 15 MAR 99
 Checked By: _____ Date: _____
 Comment:



MP55 Packer Inflation Field Record

Project: <u>W13740</u>	Client: <u>NYE COUNTY</u>	By: <u>DL</u>	Date: <u>13 MARCH 1999</u>
Location: <u>AMARGOSA NV</u>	Well No. <u>EWDP-3S</u>	Borehole Diameter: <u>6"</u>	
Packer No. <u>0612-054</u>	Depth: <u>420 ft.</u>	Computer Data File: <u>0612-054</u>	<u>.WDF</u>
Inf-Tool No. <u>2321</u>	Vent Tool No. <u>2215</u>	Volume Pumped: <u>11.7</u>	Vol Returned <u>0.2</u>
H-B Valve: (P _H) <u>0</u>	Offset (P _V) <u>0</u>	Confirm Venting (Vent Tool Data) (Y/N) _____	
Vent Tool Pressure (Shoe Out, P ₀) _____		Final Inf'n Vol: <u>11.5</u>	Final Press: <u>319</u> (P _F)
Comments: <u>OPEN HOLE DTW = 2260 FT.</u>		Calc'd Element Pressure (P _F +P _V -P ₀) <u>236 psi</u>	
<u>EST. HEAD ABOVE PKR = 160 FT. = 69 psi</u>		Confirm Pkr Valve Closed (Yes/No): <u>YES</u>	

$PKR P = 319 - 139 = 69 = 236 \text{ psi}$

Pumping Information

Software Reminder

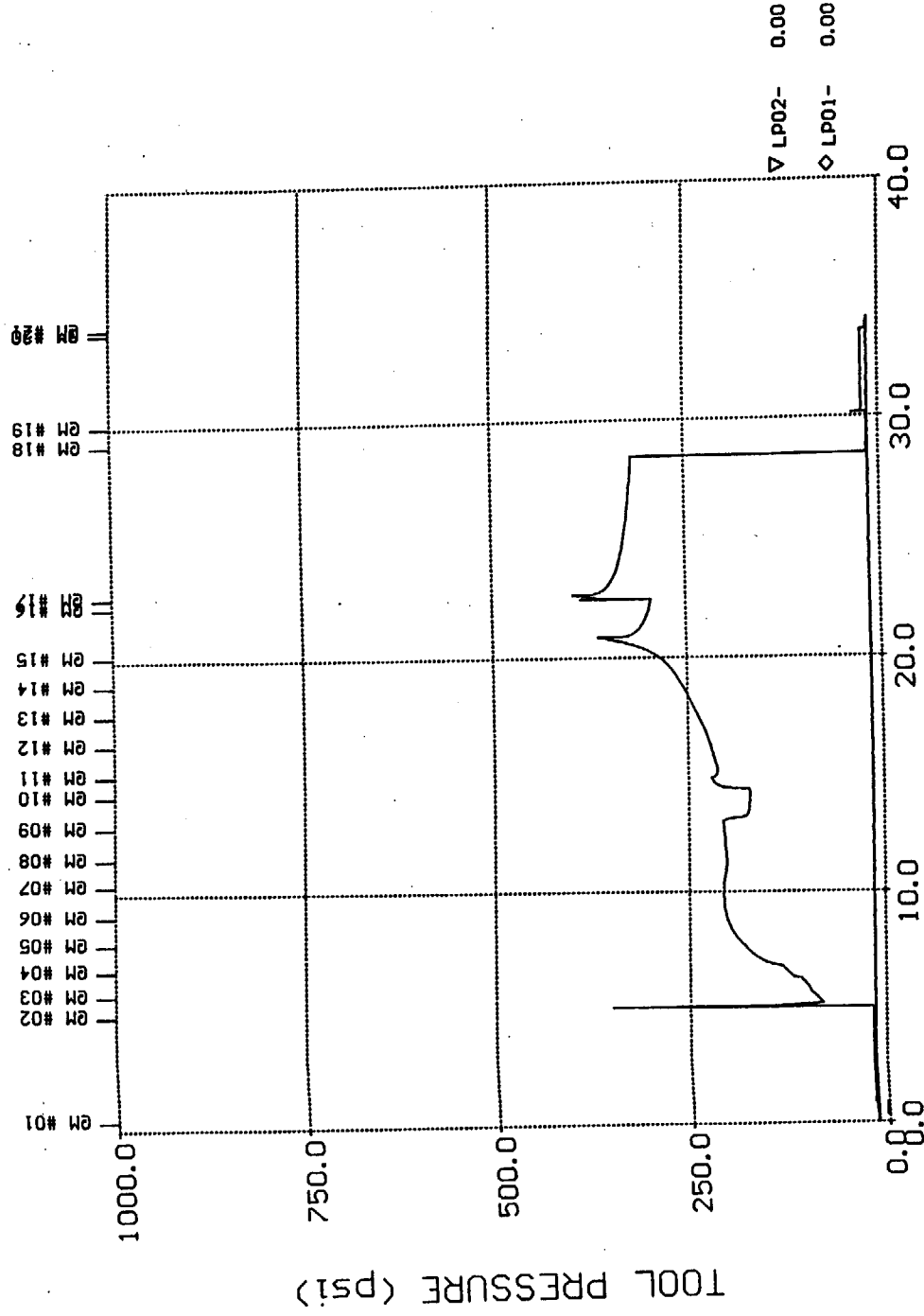
I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	13.9	13.5	1131:30	-	START, TIE = OFF
0	0	13.9	13.5	1132:00	1	TIE SHOE OUT (20)
0	0	15.9	13.5	1133:00	2	START PUMP → 600, STOP
0.2	600	16.0	13.5	1136:30	2L	TIE → INFLATE
						PKR VALVE OPENED (350)
0.2	0	8.6	13.5	1137:10	3	START PUMPING.
1.0	175	127	13.5	1138:20	4	
2.0	250	184	13.5	1139:30	5	
3.0	280	203	13.5	1140:40	6	
4.0	280	204	13.5	1142:00	7	
5.0	280	202	13.5	1143:20	8	
6.0	280	205	13.5	1144:30	9	STOP PUMP, TOP UP.
6.0	0	172	13.5	1145:30	10	RESUME
7.0	280	211	13.5	1146:40	11	
8.0	290	222	13.5	1147:55	12	
9.0	300	238	13.5	1149:10	13	
10.0	310	258	13.5	1150:30	14	
11.0	330	292	13.5	1151:45	15	
11.5	400	350	13.5	1152:30	16	TIE → OFF, STOP PUMP
11.5	350	299	13.5	1153:40	16	PUMP UP, TIE INFL.
11.6	350	300	13.5	1154:20	17	TIE → OFF, STOP PUMP
11.6	280	341	13.5	1155:00	-	
11.6	270	333	13.5	1156:00	--	

PACKER INFLATION RECORD

Client: Nye County
 Site: EWDP - Amargosa, NV
 Description: Plastic MP55
 Well: EWDP-3S
 WB Project: WB740
 Y Offset Pressure:
 T-Zero = Sat Mar 13 11:31:31 1999

Packer: 0612_054
 Packer Depth: 420 ft
 FILE: 0612_054
 Plot By: DL Date: 15 MARE 99
 Checked By: ----- Date: -----
 Comment: -----



T = Minutes



MP55 Packer Inflation Field Record

Project: <u>WB740</u> Client: <u>NYE COUNTY</u>	By: <u>DL</u> Date: <u>13 MARCH 99</u>
Location: <u>AMARILLO NW</u> Well No. <u>EWOP-3S</u>	Borehole Diameter: <u>6-inch</u>
Packer No: <u>2d2-c44</u> Depth: <u>335 FT.</u>	Computer Data File: <u>0612-c44</u> .WDF
Inf-Tool No. <u>2321</u> Vent Tool No. <u>2215</u>	Volume Pumped: <u>11.4</u> Vol Returned <u>0.21</u>
H-B Valve: (P _H) <u>0</u> Offset (P _V) <u>0</u>	Confirm Venting (Vent Tool Data) (Y/N) <u> </u>
Vent Tool Pressure (Shoe Out, P _O) <u> </u>	Final Inf'n Vol: <u>11.21</u> Final Press: <u>237</u> (P _F)
Comments: <u>OPEN HOLE DTW = ~260 FT</u>	Calc'd Element Pressure (P _F + P _V - P _O) <u>191 ps</u>
<u>EST. HEAD ABOVE PACKER 75 Ft.</u>	Confirm Pkr Valve Closed (Yes/No): <u>YES</u>

$P_{KR} = P = 237 - 22 - 13.9 = 191.1$

Software Reminder

I = Inflate, O = Off, C = Close

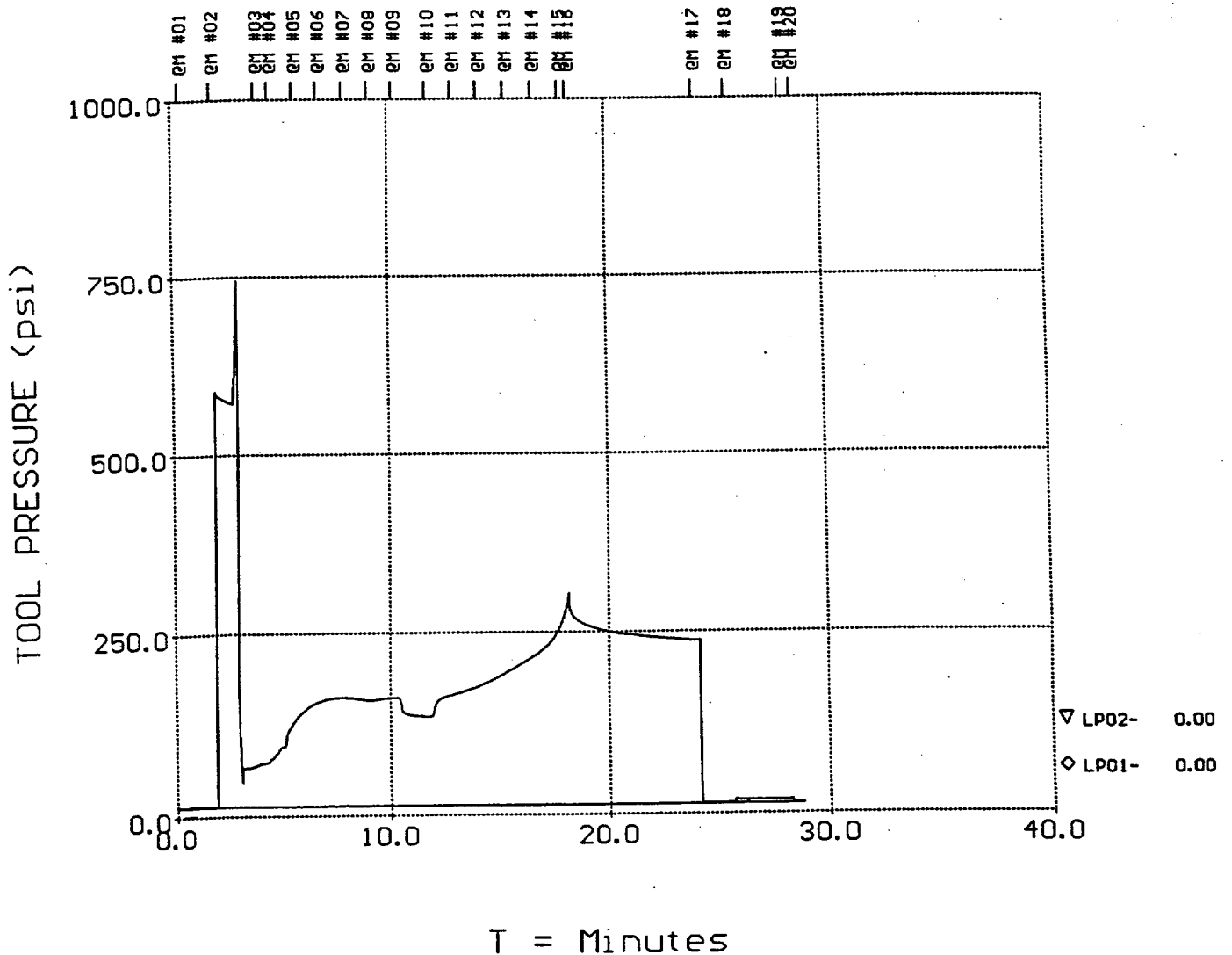
Pumping Information

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	13.93	13.2	1217:50	-	START, TIE = OFF
0	0	13.9	13.2	1218:20	1	TIE SHOE OUT. (20)
0	0	13.114	13.2	1219:00	-	PUMP TO 400PSI.
0.3	400	14.3	13.2	1219:40	2	TIE → INFLATE
0.3	400	573.9	13.2	1220:30	-	PUMP, then stop
0.35	745	745	13.2	1220:	-	VALVE OPENED (245)
0.35	0	69	13.2	1221:30	3	PUMP (3)
1.0	200	77	13.2	1222:20	4	
2.0	250	131	13.2	1223:30	5	
3.0	290	157	13.2	1224:40	6	
4.0	300	161	13.2	1225:50	7	
5.0	300	157	13.2	1227:00	8	
6.0	300	161	13.2	1228:10	9	STOP PUMP, TOP UP
6.0	0	135	13.2	1229:30	10	RESUME PUMPING.
7.0	290	165	13.2	1230:45	11	
8.0	300	177	13.2	1232:00	12	
9.0	300	195	13.2	1233:14	13	
10.0	320	217	13.2	1234:25	14	
11.0	350	260	13.2	1235:40	15	
11.3	380	350	13.2	1236:10	16	TIE → OFF, STOP PUMP
11.3	350	249	13.2	1238:00	17	
11.3	350	241	13.2	1240:00	18	
11.3	350	238	13.2	1241:00	17	PUMP LINE → 600

PACKER INFLATION RECORD

Client: Nye County
 Site: EWDP - Amargosa, NV
 Description: Plastic MP55
 Well: EWDP-3S
 WB Project: WB740
 Y Offset Pressure:
 T-Zero = Sat Mar 13 12:17:50 1999

Packer: 0612_044
 Packer Depth: 335 ft
 FILE: 0612_044
 Plot By: _____ X Date: 15 MAR 99
 Checked By: _____ Date: _____
 Comment:



MP55 Packer Inflation Field Record

Project: <u>WB 740</u>	Client: <u>NYE COUNTY</u>	By: <u>DL</u>	Date: <u>13 MAR 99</u>
Location: <u>AMAROSA NY</u>	Well No. <u>EWDD - 35</u>	Borehole Diameter: <u>6-inch steel</u>	
Packer No. <u>202-042</u>	Depth: <u>269</u>	Computer Data File: <u>0602-042</u> .WDF	
Inf-Tool No. <u>2321</u>	Vent Tool No. <u>2215</u>	Volume Pumped: <u>11.3</u> Vol Returned <u>0.31</u>	
H-B Valve: (P _H) <u>0</u>	Offset (P _V) <u>0</u>	Confirm Venting (Vent Tool Data) (Y/N) _____	
Vent Tool Pressure (Shoe Out, P ₀) _____		Final Inf'n Vol: <u>11.01</u> Final Press: <u>259</u> (P _F)	
Comments: <u>OPEN HOLE DTW = 260 FT</u>		Calc'd Element Pressure (P _F + P _V - P ₀) <u>241 PSI</u>	
<u>EST HEAD ABOVE DKR = 9 FT = 4 PSI</u>		Confirm Pkr Valve Closed (Yes/No): <u>YES</u>	

DKR P = 259 - 4 - 13.9 = 241 psi
Pumping Information

Software Reminder

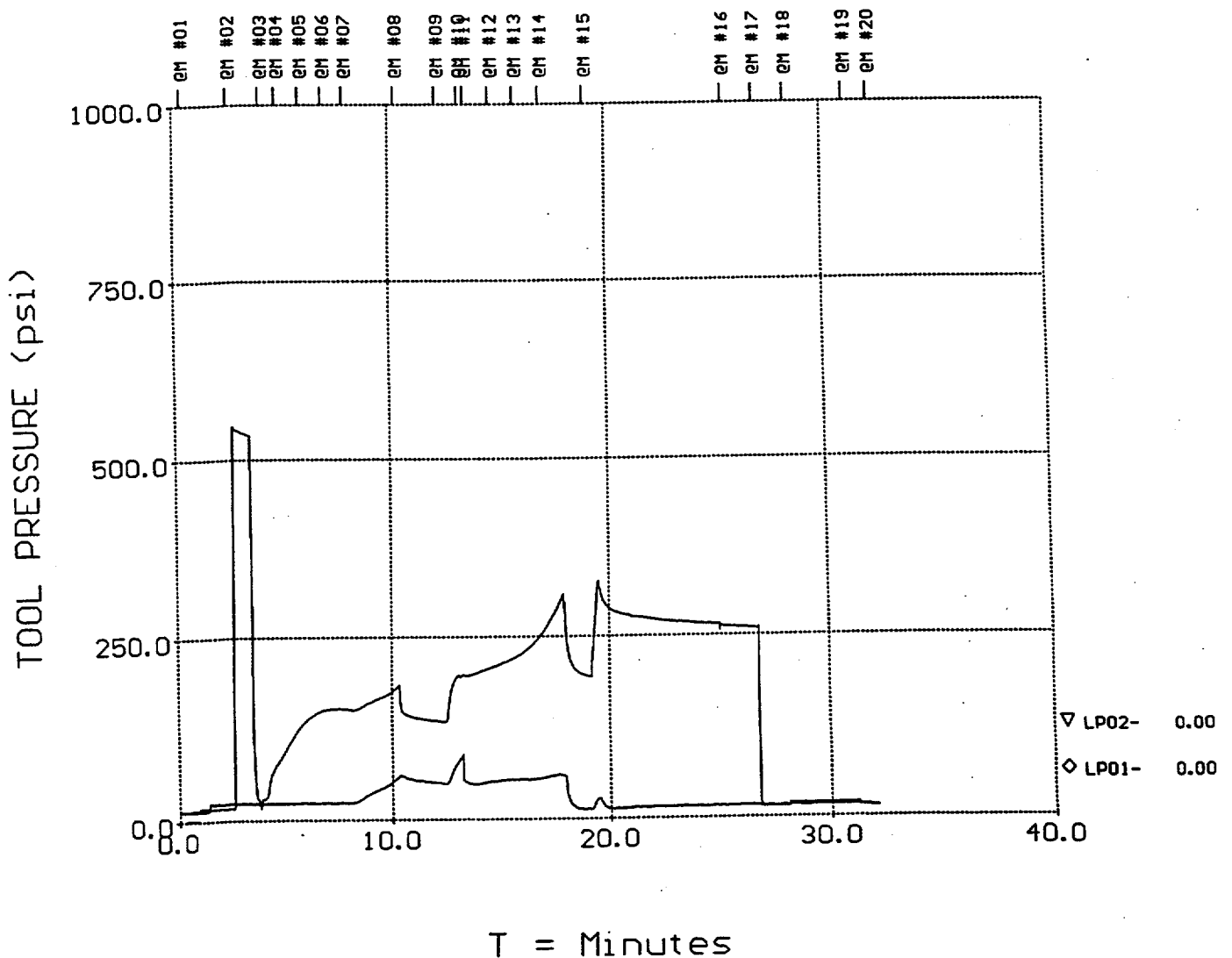
I = Inflate, O = Off, C = Close

Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
0	0	13.9	13.2	1344	-	START, TIE = OFF
0	0	13.8	13.2	1344:30	1	TIE SHOE OUT (21)
0	0	16.8	13.2	1345:10	-	EMS SHOE OUT.
0	0	16.9	22.8	1346	-	PUMP TO 400, STOP
0.1	400	16.9	22.9	1346:30	2	TIE → INFLATE.
0.1	400	539	2.3	1347:30	-	P PAK VALVE OPENED
0.1	0	27.9	2.3	1348:00	3	START PUMPING.
1.0	290	79	2.3	1348:50	4	
2.0	300	129	2.3	1349:55	5	
3.0	310	149	2.3	1350:50	6	
4.0	320	150	2.3	1352:00	7	
5.0	320	161	3.7	1353:05	8	MISS TAG.
6.0	330	178	5.6	1354:10	8	STOP PUMPING, TOP UP.
6.0	0	13.5	5.0	1356:10	9	RESUME → SQUEEZE CR.
6.5	350	196	7.8	1357:00	10	OPEN EMS VALVE
7.0	350	197	4.8	1357:45	11	
8.0	350	208	5.1	1358:45	12	
9.0	375	223	5.4	1359:50	13	
10.0	410	256	5.6	1401:00	14	
10.8	450	303	6.0	1402:10	15	STOP PUMP, TIE = OFF
10.8	160	195	1.2	1403:00	16	TIE → INFL, at Pump.
11.1	350	304	2.5	1403:30	17	STOP PUMP, TIE = OFF
11.1	150	286	12.8	1404:00	18	EMS VALVE CLOSE OFF

PACKER INFLATION RECORD

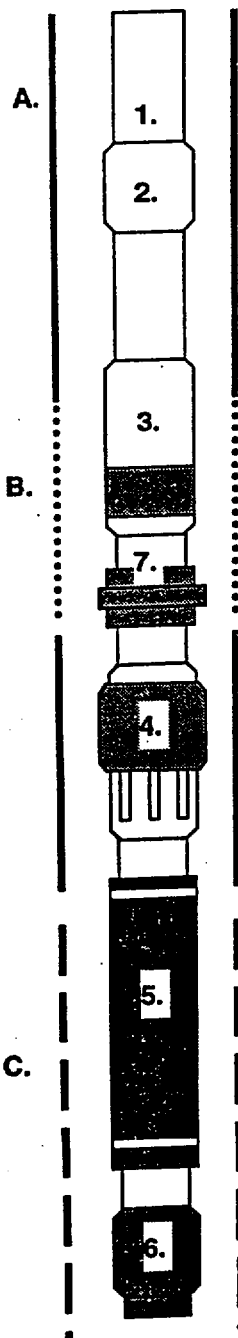
Client: Nye County
Site: EWDP - Amargosa, NV
Description: Plastic MP55
Well: EWDP-3S
WB Project: WB740
Y Offset Pressure:
T-Zero = Sat Mar 13 13:43:57 1999

Packer: 0612_042
Packer Depth: 270 ft
FILE: 0612_042
Plot By: DL Date: 15 MAR 99
Checked By: _____ Date: _____
Comment:



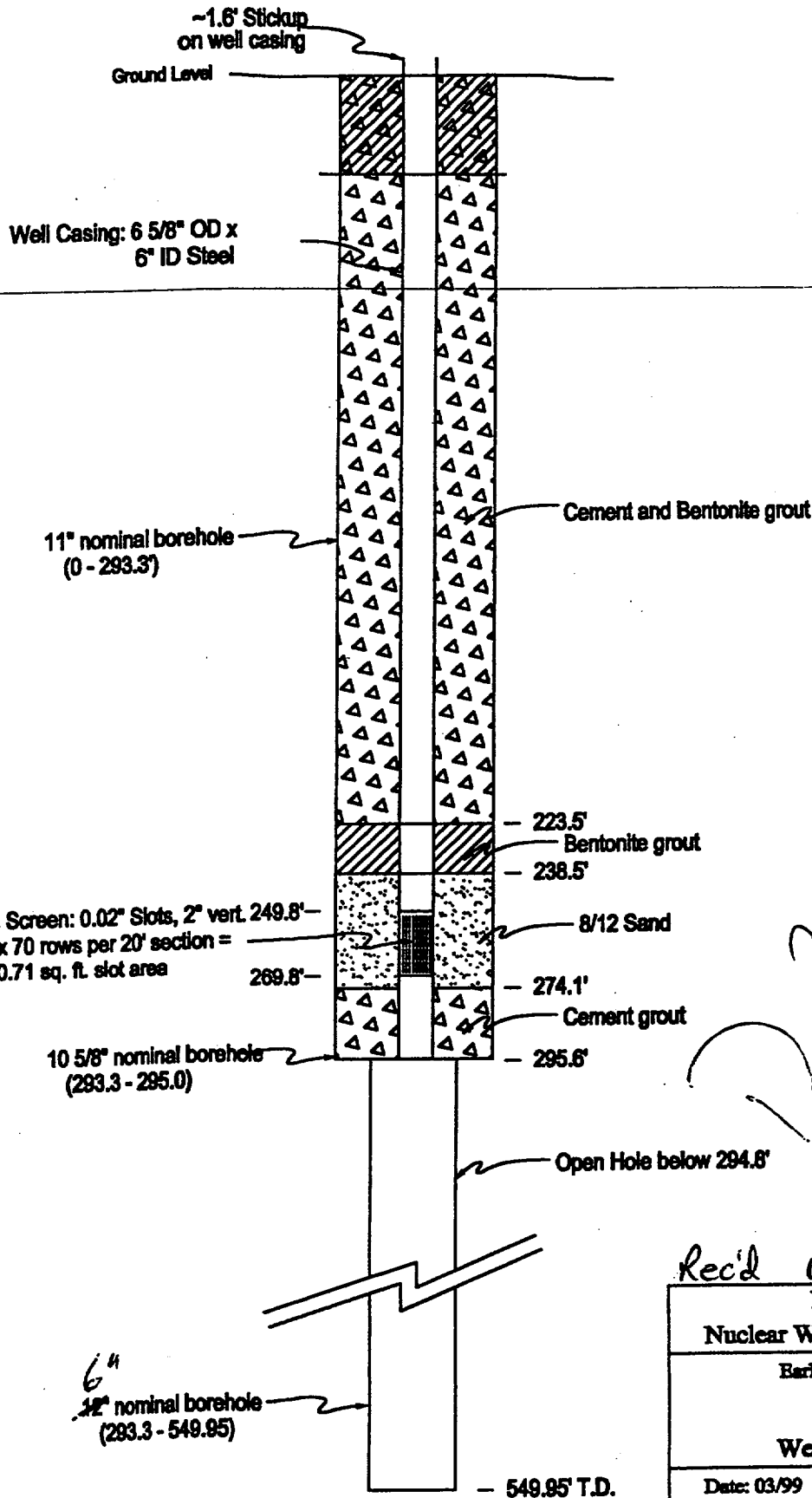
MP Drift Diagram

Job No. WB740	Monitoring Well No. 3S	Drawn By: DL
Client: Nye County	Project: EWDP	Date: Mar 11 1999
Drift Approval	Borehole Items:	NS. 11 MAR99.
	MP Casing Items:	DL 12 MAR99



MP System Casing Components				
Item	Model No.	Description	I.D. (in)	O.D. (in)
1.	0301	MP55 Casing	2.25	2.75
2.	0302A	MP55 Regular Coupling	2.25	3.4
3.	0305B	MP55 Measurement Port Coupling	2.25	3.4
4.	0307	MP55 Hydraulic Pumping Port	2.25	3.5
5.	0315B	MP55 Reinforced Packer	2.25	4.3
6.	0303	End Plug	2.25	3.4
7.	0308	Magnetic Location Collar	2.8	3.6
Borehole Completion Items				
A.	N/A	Steel Well Casing	6.0	6.75
B.	N/A	Steel Well Screens with cut slots*	6.0	6.75
C.	N/A	Open Borehole	6.0+	N/A

+ Caliper log 11 Mar 1999: borehole diameter 6 to >10 inches
 * Confirm that inside of pipe with cut slots has been de-burred.



NOTES

1. Horizontal scale exaggerated 50X.
2. All depths referenced to ground level.
3. All casing and screen is flush threaded.

Rec'd 10 MARCH DL. W3740

Nye County, Nevada	
Nuclear Waste Repository Project Office	
Early Warning Drilling Program	
NC - EWDP - 3S	
Well Completion Diagram	
Date: 03/99	Geologist: AJM/JSW
Scale: 1" = 50'	Drawn by: JSW

OVERSIZE DOCUMENT PAGE(S) PULLED

SEE APERTURE CARD FILES

APERTURE CARD/PAPER COPY AVAILABLE THROUGH NRC FILE CENTER

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ACCESSION NUMBERS OF OVERSIZE PAGES:

9906100166-05

**THIS PAGE IS AN
OVERSIZED DRAWING
THAT CAN BE VIEWED AT
THE RECORD TITLED:**

NONE:

BOREHOLE: 3S

**LOGS: E-LOGS CALIPHER
NEUTRON DENSITY SONIC VDL
DEVIATION**

**WITHIN THIS PACKAGE...OR,
BY SEARCHING USING THE
DRAWING NUMBER:**

NONE

NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-5

99061900166-05

Well No. NC-EWDP-5S

Status:

Completed

Latitude\Longitude:

36° 40' 11.529" 116° 22' 37.071"

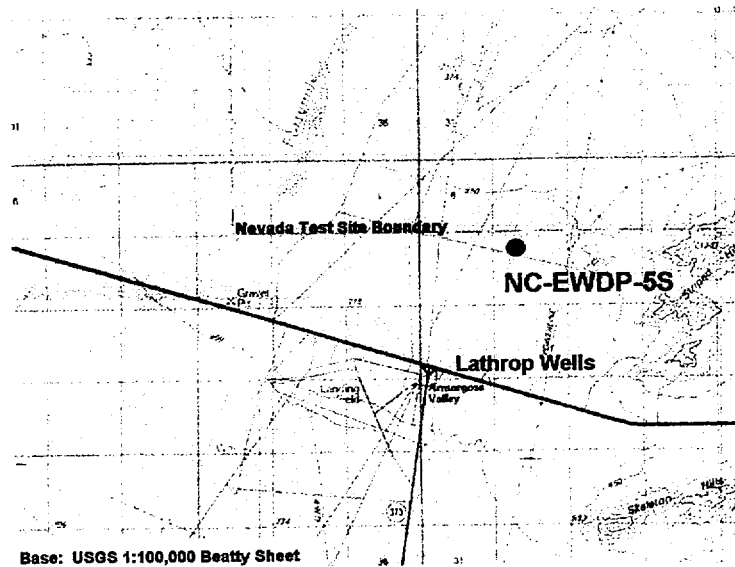
Legal Description:

Township 15 South Range 50 East
Section 8 NW 1/4 NE 1/4 1/4

Elevation:

839.4 m AMSL (2753.7 ft ±) from GPS

Access: Highway 95 north to NTS Gate 510 access road; turn north. Go north about 1.8 mi to gravel road just south of NTS boundary; turn east and go 1.4 mi.



Purpose: 1) provide lithologic samples of deposits; 2) define stratigraphic sequence and groundwater flow paths down gradient of proposed repository; and to provide water level and water chemistry data.



Base: Thematic Mapper Image of the Lathrop Wells 7.5° Quadrangle

NC-EWDP-5S is located adjacent to an existing powerline road immediately south of the Nevada Test Site Boundary. The site was selected for a shallow (500 ft) well to help define the hydraulic gradient between the Lathrop Wells area and Rock Valley. The borehole was drilled and logged to a total depth of 1,200 ft. During drilling, the first 500 ft. were drilled with no indication of water, however, after a break in operations, groundwater was measured at 375 ft. below land surface. The borehole was advanced to a total depth of 1,200 feet and a single piezometer set for long-term water level and water chemistry monitoring.

**NC-EWDP-5S
SITE SUMMARY**

Land surface

200 ft

400 ft

600 ft

800 ft

1000 ft

1167 ft
(TD)

0-1200' Valley-fill alluvium;

0-220' sandy gravels, local silty sections, 0-85' generally gray-orange (10YR 7/4), 85-125' gray orange pink (5YR 7/2), 125-200' dark yellow orange (10YR 6/6), 200-220' gray orange pink (5YR 7/2); 220-265' gravel and cobbles, multicolored, becoming clayey by 245' and yell-brn (10YR 5/4), sandy 255-265'; 265-290' sandy clay, yell-brn (10YR 5/4), fine-med. sand, med. plasticity, some fine gravel; 290-310' bedded tuff?, grey orange (10YR 7/4), sandy, thin clayey layer, tuff and vitric frags;

310-360' clayey sand and gravels, gray orange brown (10YR 7/4), gravelly 310-320', sandy 320-355', becomes lt. brn (5YR 6/4) and silty; 360-425' bedded tuff?, very pale orange (10YR 8/2), alternating sandy beds with sandy clay, tr. gravel; 425-495' clayey sand and gravels, sandy, low-med. plasticity, pale yell-brn (10YR 6/2) to 460', gravelly, very pale orange (10YR 8/2) 460-480', yell-brn (10YR 5/4), gravelly, med-high plasticity (480-490'), sandy 490-495'; 495-505' silty sand, pale brown (5YR 5/2), tr. gravel; 505-510' no sample; 510-525' coarse gravels and sand, yell-brn (10YR 5/2); 525-550' clay sand and gravel, orange pink (5YR 6/2) clay, yell-brn (10YR 7/2) subrounded gravel;

550-630' sand and gravel, minor clay. clay content increasing beyond 590'; 630-645' coarse sand and gravel;

645-695' clay, sand and gravel, yellow brown (10YR 7/2), locally sand-rich; 695-700' sand, pale yellowish-brown (10YR 6/2); 700-755' sand and gravel, reverse graded bed sets, grayish red (10YR 4/2) with greenish yellow (10Y 7/4) clasts to 720', pale red (10R 6/2) to pale yell-brn (10YR 6/2) to 755'; 755-771' sand, pale yellowish brown (10YR 6/2); 771-795' sand and gravel, grayish red (5YR 4/2); 795-867' clayey sand and clay, pale orange (10YR 7/2), becomes gravelly 810-820' and 830-835', reddish orange (10R 6/6) 835-845', pale yellowish orange (10YR 7/2) 845-867'; 867-925' gravelly sand with clay beds, pale reddish brown (10R 5/4), sandy clay 895-900' yellowish orange (10YR 7/2), yellowish gray (5Y 8/1) 900-925'; 925-935' clay and sandy clay, grayish orange (10YR 7/4); 935-955' gravelly sand and clay; 955-1115' sandy clay and clay, homogeneous sequence, yellowish brown (10YR 5/4) 955-965', pale orange brown (10YR 7/2) 965-1020', grayish orange (10YR 7/4) 1020-1115'; gravelly interbeds 1060-1067', 1083-1086';

1115-1200' coarse sand and gravel with clay beds, light brown (5YR 5/6) to reddish brown (10R 5/4), subround gravel, clayey zones 1123-1132', 1160-1167';

NC-EWDP-5S

SUMMARY LITHOLOGIC LOG

CUTTINGS SAMPLE LOG

NC-EWDP-55

Borehole ID _____ Drill Depth From 0 To 60 Page 1 of 20

Driller BRYAN MORRIS/BOYLES BROS Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99, 1717

Drilling Equip./Method AP-1000 / 11" CROWDER OUT BIT Sampling Equip./Method CYCLONE / CUTTINGS
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
0	BCS 0000 1651 (2MIN)	VALLEY FILL GRAVELLY SAND: Coarse subrand, carbonate coated volcanic gravel, fine silty sand, gray orange (10YR 7/4)			
2	BCS 0000 1652 (5MIN)	Increased amount of gravel & cobbles. Pale yellow (10YR 6/2) Moist			HARD @ 6'
4	BCS 0000 1653 (4MIN)	SANDY GRAVEL: Fine - coarse sand, coarse subang - subrand, carbonate coated gravels & cobbles (10YR 7/4). Silty.			
6	BCS 0000 1654 (4MIN)	Very silty with fine sand & subrand cobbles No carbonate coating			
8	BCS 0000 1655 (3MIN)	Increased amount of fine gravels			HARD @ 22'
10	BCS 0000 1656 (4MIN)	Increased amount of fine gravel & coarse sand Decreased amount of silt.			
12	BCS 0000 1657 (4MIN)				
14	BCS 0000 1658 (8MIN)	INCREASED AMOUNT OF GRAVEL & COBBLES			
16	BCS 0000 1659 (4MIN)	INCREASED AMOUNT OF SAND			
18	BCS 0000 1660 (6MIN)	INCREASED AMOUNT OF GRAVEL			
20	BCS 0000 1661 (2MIN)	INCREASED AMOUNT OF SILT			
22	BCS 0000 1667 (5MIN)	INCREASED AMOUNT OF FINE GRAVEL			

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NOTE: DRILL TIME FOR EACH INTERVAL () IN 2ND COLUMN.

CUTTINGS SAMPLE LOG

NC-EWDP-55
 Borehole ID _____ Drill Depth From 60 To 120 Page 2 of 20

Driller BRYAN MORRIS/BOYLES BRGS Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99, 1717

Drilling Equip./Method AP-1000/11" CROWDER CUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
65	BCS 0006 1663 (3 MIN)	GRAVELLY SAND: fine-med sand, silty, predom fine submed volcanic gravel, Gray orange (10YR 7/4) sand			
70	BCS 0000 1664 (3 MIN)	Some cobbles			1-22-99, 1704
75	BCS 0000 1665 (2 MIN)	GRAVELLY SAND: Poorly sorted, angular sand Gray orange (10YR 7/4) - DK Yel org (10YR 6/C). fine gravel trace silt, some cemented grains			1-23-99, 0653
80	BCS 0000 1666 (4 MIN)				
85	BCS 0000 1667 (4 MIN)	SANDY GRAVEL: silty, some cobbles, poorly sorted sand. Some color as as above. Cemented grains			
90	BCS 0000 1668 (9 MIN)	GRAVELLY SAND; tr - some silt, some cobbles, fine-med sand, subang - submed gravel. Gray orange pink (5YR 7/2)			
95	BCS 0000 1669 (3 MIN)				
100	BCS 0000 1670 (7 MIN)	Increased amount of gravel & silt			
105	BCS 0000 1671 (6 MIN)	Decrease in amount of gravel & silt			
110	BCS 0000 1672 (9 MIN)	SANDY GRAVEL & COBBLES: some silt, f-med sand, submed gravel & cobbles			
115	BCS 0000 1673 (5 MIN)	Decrease in amount of sand			
120	BCS 0000 1674 (8 MIN)	Increase in amount of sand & silt			

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CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 120 To 180 Page 3 of 20

Driller BRYAN MORRIS / BOYLES BROS Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99, 1717

Drilling Equip./Method AP-1000/11" CRAWL OUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
25	BCS 0000 1675 (5 MIN)	GRAVELLY SAND: fine subang. - subrund gravel, fine sand, silty. Gny orange (10YR 7/4) - Dk yel org (10YR 6/6)			
30	BCS 0000 1676 (7 MIN)	Color changes to dk yel orange (10YR 6/6) slightly moist. Increased amount of silt			
35	BCS 0000 1677 (3 MIN)	INCREASED AMOUNT OF GRAVEL			
40	BCS 0000 1678 (5 MIN)	INCREASED AMOUNT OF COARSE SAND & DECREASE IN AMOUNT OF SILT			
45	BCS 0000 1679 (3 MIN)	SANDY GRAVEL: coarse sand, fine subrund gravel			
50	BCS 0000 1680 (6 MIN)	INCREASED AMOUNT OF COARSE GRAVEL & SILT			
55	BCS 0000 1681 (4 MIN)	GRAVELLY SAND: fine silty sand, fine subrund gravel, Dk yel orange (10YR 6/6)			
60	BCS 0000 1682 (5 MIN)	SANDY GRAVEL: fine silty sand, some cobbles Dk yel orange (10YR 6/6)			
65	BCS 0000 1683 (5 MIN)	Coarse gravel, no silt, coarse sand			
70	BCS 0000 1684 (6 MIN)	Trace - some silt. Gny orange pink (5YR 7/2)			
175	BCS 0000 1685 (3 MIN)	fine subangular gravel with coarse sand Dk yel orange (10YR 6/6) sand.			POOR RECOVERY LOSING CIRCULATION
180	BCS 0000 1686 (13 MIN)	INCREASE IN AMOUNT OF COARSE GRAVEL			POOR RECOVERY LOSING CIRCULATION

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NOTE: DRILL TIME FOR CUTTINGS IN 2ND COLUMN

CUTTINGS SAMPLE LOG

Borehole ID NC-ENDP-55 Drill Depth From 180 To 240 Page 4 of 20

Driller BRYAN MORRIS / BOYLES BRAS. Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99, 1717

Drilling Equip./Method AP-1000 / 1" CROWD OUT BIT Sampling Equip./Method CYCLONE / CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
185	BCS 0000 1687 (4 MIN)	SANDY GRAVEL; coarse ang sand, poorly sorted subrund gravel, no silt (clean sand & gravel)			POOR RECOVERY
190	BCS 0000 1688 (6 MIN)				POOR RECOVERY
195	BCS 0000 1689 (2 MIN)	INCREASED AMOUNT OF SILT DK yel orange (10YR 6/6)			
200	BCS 0000 1690 (3 MIN)	Decreased amount of silt (fairly clean gravels)			
205	BCS 0000 1691 (5 MIN)	SAND; tr - some gravel, medium sand, no silt, clean ang sand, well sorted sand Gry orange pink (5YR 7/2)			
210	ACS 0000 1692 (7 MIN)	SANDY GRAVEL; f - med sand, subrund coarse gravel, tr - some silt.			
215	BCS 0000 1693 (3 MIN)	Predom. fine subrounded gravel & poorly sorted sand. No silt.			
220	BCS 0000 1694 (7 MIN)	poorly sorted sand & gravel. No silt.			
225	BCS 0000 1695 (17 MIN)	MULTICOLORED VOLCANIC GRAVEL & COBBLES, very few fines.			
230	BCS 0000 1696 (14 MIN)				
235	BCS 0000 1697 (18 MIN)				
240	BCS 0000 1698 (16 MIN)				

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NOTE: DRILL TIME FOR 5' RUN IN () IN 2ND COLUMN.

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP.55 Drill Depth From 240 To 300 Page 5 of 20

Driller BRYAN MORRIS/BOYLES BRAS Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99, 177

Drilling Equip./Method AP-1000/11" CROWN OUT BIT Sampling Equip./Method CYCLONE / CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
245	BCS 0000 1699 (25 MIN)	GRAVEL & COBBLES; subrd, multicolored, volcanic			INJECTED WATER DUE TO TIGHT FORMATION
250	BCS 0000 1700 (7 MIN)	CLAYEY GRAVEL & COBBLES; some fine sand, subrd gravel & cobbles, muddy, Mod yel brn (10YR 5/4)			
255	BCS 0000 1701 (32 MIN)				
260	BCS 0000 1702 (1 MIN)	SANDY GRAVEL; Fine - med silty sand, coarse - fine subrd gravel, some cobbles;			
265	BCS 0000 1703 (17 MIN)	Increased amount of fine gravel			
270	BCS 0000 1704 (13 MIN)	SANDY CLAY; Mod yel brn (10YR 5/4) + med sand, med plasticity, some fine gravel			
275	BCS 0000 1705 (9 MIN)	Increased amount of fine gravel & sand			
280	BCS 0000 1706 (9 MIN)	Decreased amount of gravel			
285	BCS 0000 1707 (9 MIN)				1-23-99, 1710
290	BCS 0000 1708 (18 MIN)				1-24-99, 0646
295	BCS 0000 1709 (23 MIN)	BEDDED TUFF?: Gray orange (10YR 7/4) Mod hard fine sandstone with thin clayey layers & dk red brn (10R 3/4) welded tuff ang frags & blk vitric ang frags			
300	BCS 0000 1710 (12 MIN)				

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID DC-EWDP-55 Drill Depth From 300 To 360 Page 6 of 20

Driller BRYAN MORRIS/BOYLES Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99

Drilling Equip./Method AP-1000/11" CROWD-OUT BIT Sampling Equip./Method CYCLONE / CUTTINGS
DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
305	BCS 0000 1711 (9 MIN)	SANDY CLAY: fine sand, trace - some fine gravel, high plasticity. Gray orange brn (10YR 7/4). BEDDED TUFF?: Gray orange brn (10YR 7/4), fine sand-stone with thin clayey layers & dk rd brn (10R 3/4) welded tuff & blk vitric ag frag's			
310	BCS 0000 1717 (18 MIN)	SAME AS 300-302.5			
315	BCS 0000 1713 (9 MIN)	CLAYEY GRAVEL?: Gray orange brn (10YR 7/4) fine poorly sorted, angular to subrnd gravels. Predom bedded tuff. Hi plasticity - med plasticity.			
320	BCS 0000 1714 (10 MIN)	Decreased amount of gravel & increased amount of sand & silt (mud)			
325	BCS 0000 1715 (6 MIN)	SANDY CLAY; Fine sand, some gravel			
330	BCS 0000 1716 (8 MIN)	Decreased amount of gravel			
335	BCS 0000 1717 (7 MIN)	INCREASED AMOUNT OF GRAVEL			
340	BCS 0000 1718 (8 MIN)	DECREASED AMOUNT OF GRAVEL			
345	BCS 0000 1719 (5 MIN)	INCREASED AMOUNT OF GRAVEL			
350	BCS 0000 1720 (8 MIN)				
355	BCS 0000 1721 (3 MIN)				
360	BCS 0000 1722 (6 MIN)	CLAYEY & SILTY SAND: COLOR CHANGES TO LT BRN (5YR 6/4) Med - low plasticity			

CUTTINGS BELOW 350' RETURNING AS CLAY "BALLS" INSTEAD OF MUD (STOPPED INJECTION WATER)
 MOISTURE INCREASING WITH DEPTH

DRAFT

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 360 To 420 Page 7 of 20

Driller BRYAN MORRIS / BOYLES BROS Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99, 1717

Drilling Equip./Method AP-1000/11" CROWD OUT BIT Sampling Equip./Method CYCLONE / CUTTINGS
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
365	BCS 0000 1723 (4 MIN)	BENDED TUFF? VERY PALE ORANGE (10YR 8/2) Alternating med hrd sandstone & sandy clay.			
370	BCS 0000 1729 (10 MIN)	Pale yel brn (10YR 6/2) Increased amount of clay			
375	BCS 0000 1725 (4 MIN)	Lt brn (5YR 6/4)			
380	BCS 0000 1726 (8 MIN)				SOUNDED WATER 375'-380' 2-8-99 0130HRS
385	BCS 0000 1727 (4 MIN)				
390	BCS 0000 1728 (8 MIN)				
395	BCS 0000 1729 (5 MIN)	Increased amount of angular gravel			
400	BCS 0000 1730 (8 MIN)				
405	BCS 0000 1731 (5 MIN)				
410	BCS 0000 1732 (10 MIN)	INCREASED AMOUNT OF SAND			
415	BCS 0000 1733 (5 MIN)	Trace coarse ang. gravel			
420	BCS 0000 1734 (10 MIN)				

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NOTE: DRILL TIME FOR 5' RUN IN () IN 2ND COLUMN.

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 420 To 48 Page 8 of 20

Driller BRYAN MORRIS / BOYLES BROS Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99, 177

Drilling Equip./Method AP-1000/11" C RWD. OUT BIT Sampling Equip./Method CYCLONE/CUTTINGS
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
425	BCS 0000 1735 (6 MIN)				
430	BCS 0000 1736 (9 MIN)	CLAYEY SAND, med. coarse ang sand, fine ang & tabular gravel. Pale yellow brn (10YR 6/2). Low-medium plasticity.			
435	BCS 0000 1737 (4 MIN)				
440	BCS 0000 1738 (10 MIN)	Some coarse angular gravel & cobbles			
445	BCS 0000 1739 (6 MIN)	Increased amount of gravel some subround gravel			
450	BCS 0000 1740 (14 MIN)				
455	BCS 0000 1741 (7 MIN)	Decrease in amount of clay low plasticity			
460	BCS 0000 1742 (17 MIN)				
465	BCS 0000 1743 (8 MIN)	CLAYEY GRAVEL, Multicolored volcanic, fine subround gravel, some coarse sand, low plasticity Predom very pale orange (10YR 8/2) sandy bedded tuff.			START INJECTING WATER AT 460- HOLE TIGHT
470	BCS 0000 1744 (7 MIN)	Increased amount of coarse subround gravel.			
475	BCS 0000 1745 (4 MIN)	MUDDY decrease in amount of gravel			
480	BCS 0000 1746 (8 MIN)				

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NOTE: DRILL TIME FOR 5' RUN IN () IN 2ND COLUMN.

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 480 To 540 Page 9 of 20

Driller BRYAN MORRIS / HOLQUIN / LAYNE Start Date/Time 1-22-99 / 1526 End Date/Time 1-24-99 (0-500') 1717
2-8-99 / 0825 2-10-99 (500-1200') 083

Drilling Equip./Method AP-1000/11" - 0-500' / IR TH75E - Hammer / Tricone 520-1200' Sampling Equip./Method Cyclone / Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
485	BCS 0000 1747 (3 min)	Gravelly, Sandy Clay; Mod. Yellow-brown (104R 5/4), fine subround gravel, coarse sand, medium-high plasticity			Stopped injecting water at 480'
490	BCS 0000 1748 (11 min)				
495	BCS 0000 1749 (4 min)	Clayey Sand; Fine subround gravel, coarse sand, low-med. plasticity.			
500	BCS 0000 1750 (8 min)	Silty Sand; Trace coarse gravel and clay; poorly sorted sand, pale brown (54R 5/2)			
505	BCS 0000 2951 N/C	No chip sample			T.D. w/ AP-1000 1-24-99 1717 Start w/ IR TH75E 2-8-99 1st shift
510	BCS 0000 2952 N/S	No sample 505-510 NO RETURN			
515	BCS 0000 2953	Coarse gravels, sand MOSTLY YELLOWISH BROWN 10YR 5/2 OF RHYOLITE CRYSTAL TUFFS			DRILLING WITH VERY THICK MUD TO LIFT CUTTINGS AND SAND, AND TO PREVENT CROSS-OVER SUB FROM PLUGGING UP
520	BCS 0000 2954				
525	BCS 0000 2955				
530	BCS 0000 2956	Clay, sand and gravel. CLAY IS ORANGE PINK 5YR 6/2 GRAVEL IS MOSTLY PALE YELLOWISH BROWN 10YR 6/2 SUBROUNDED, WITH MODERATE SPHERICITY CLASTS OF RHYOLITE CRYSTAL TUFFS			
535	BCS 0000 2957				
540	BCS 0000 2958				

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 540 To 600 Page 10 of 20

Driller HOLQUIN/LAYNE Start Date/Time 2-8-99/0825 End Date/Time 2-10-99/0835

Drilling Equip./Method IR TH 75E/Hammer RC Sampling Equip./Method Cyclone/Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
540	BCS 0000 2959	Alluvium; as above, clay/sand/gravel			
545	BCS 0000 2960				
550	BCS 0000 2961	Sand and gravel, minor clay SUBROUNDED WITH MODERATE SPHERICITY RHYOLITE CRYSTAL TUFS			
555	BCS 0000 2962				
560	BCS 0000 2963				
565	BCS 0000 2964				
570	BCS 0000 2965				
575	BCS 0000 2966				
580	BCS 0000 2967				
585	BCS 0000 2968				
590	BCS 0000 2969				
595	BCS 0000 2970				
600					

DP/ET

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NEEWB-55 Drill Depth From 600 To 660 Page 11 of 20

Driller HOLLIN/LAUNE Start Date/Time 2-8-99 End Date/Time 2-10-99

Drilling Equip./Method 1RTH 75E/Hammer Re Sampling Equip./Method Cyclone Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
600	BCS 0000 2971	Alluvium, as above, sand, gravel and clay			
605	BCS 0000 2972				
610	BCS 0000 2973				
615	BCS 0000 2974				
620	BCS 0000 2975				
625	BCS 0000 2976				
630	BCS 0000 2977				
635	BCS 0000 2978				
640	BCS 0000 2979				
645	BCS 0000 2980				
650	BCS 0000 2981				
655	BCS 0000 2982				

CLAY

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 660 To 720 Page 12 of 13

Driller HOLQUIN/CLEAVER/LAUNE Start Date/Time 2.8.99/0825 End Date/Time 2.10.99/0835

Drilling Equip./Method IR TH75E/Hammer RC to Tricone RC beyond Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
660	BCS 0000 2983	Alluvium, as above, clay/sand/gravel LOCALLY VERY SANDY			
665	BCS 0000 2984				
670	BCS 0000 2985				
675	BCS 0000 2986				
680	BCS 0000 2987				
685	BCS 0000 2988				
690	BCS 0000 2989	10% ANGULAR CLASTS MODERATE GREENISH YELLOW 10Y 7/4			2.8.99 first shift 2.8.99 second shift
695	BCS 0000 2990	SAND PALE YELLOWISH BROWN 10YR 6/2			
700	BCS 0000 2991	SAND AND GRAVEL, REVERSE GRADING, FINING DOWN HOLE OVERALL UNIT IS GRAYISH RED 10R 4/2 WITH 5-10% MODERATE GREENISH YELLOW 10Y 7/4 CLASTS			
705	BCS 0000 2992				
710	BCS 0000 2993				
715	BCS 0000 2994				2.8.99 Plugged off
720					2.9.99 1700

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 720 To 780 Page 13 of 20

Driller S. CLEAVER/LAYNE Start Date/Time 2-8-99/0825 End Date/Time 2-10-99/0835

Drilling Equip./Method 1R TH 75E/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
720	BCC 0000 2995	ALLUVIUM, AS ABOVE, SAND AND GRAVEL			
725	BCC 0000 2996	SAND PALE RED 10R 6/2 TO PALE YELLOWISH BROWN 10YR 6/2 GRADES DOWN INTO GRAVEL			
730	BCC 0017 2997	GRAVEL CONTENT INCREASES DOWN TO 740'			
735	BCC 0000 2998				
740	BCC 0000 2999	SAND AS ABOVE 750 - 755 MOSTLY GRAVEL			
745	BCC 0000 3000				
750	BCC 0000 3001				
755	BCC 0000 3002	SAND PALE YELLOWISH BROWN 10YR 6/2			
760	BCC 0000 3003	GRADATIONAL CONTACT GRAVEL WITH MINOR AMOUNTS OF SAND MOSTLY GRAYISH RED 5R 4/2			
765	BCC 0000 3004				
770	BCC 0000 3005				
775	BCC 0000 3006				
780					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-200D-55 Drill Depth From 780 To 840 Page 14 of 20
 Driller S. CLEVER/LAUNE Start Date/Time 2-5-99/0825 End Date/Time 2-10-99/0835
 Drilling Equip./Method IR TITSE/Tricone PC Sampling Equip./Method Cyclone/Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
763	BCS 0000 3007	ALLUVIUM, SAND AND GRAVEL, AS ABOVE			
765	BCS 0000 3008				
770	BCS 0000 3009				
790	BCS 0000 3010	CLAYEY SAND, CLAY; PALE ORANGE 10YR 7/2			
805	BCS 0000 3011				
810	BCS 0000 3012				
815	BCS 0000 3013	GRAVEL RICH Y10-B20; 10-20% clay			
820	BCS 0000 3014				
825	BCS 0000 3015				
830	BCS 0000 3016	CLAY RICH SAND GRABING INTO GRAVEL AS ABOVE			
835	BCS 0000 3017				
840	BCS 0000 3018				

CLAY RICH SAND GRABING DOWN TO SANDY GRAVEL Y10Y
 MODERATE REDDISH ORANGE 10R 6/2 GRABING INTO FAIRER

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 840 To 900 Page 15 of 20

Driller S. CLEAVER/LAYNE Start Date/Time 2.8.99/0825 End Date/Time 2.10.99/0835

Drilling Equip./Method IR TH75E/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
840	BCC 0000 3019	ALLUVIUM, GRAVELY SAND, AS ABOVE			
845	BCC 0000 3020	SANDY CLAY AND CLAY PALE YELLOWISH ORANGE 10YR 7/2			
850	BCC 0000 3021				
855	BCC 0000 3022				
860	BCC 0000 3023				
865	BCC 0000 3024				
870	BCC 0000 3025	GRAVELLY SAND WITH CLAY BEDS. PALE REDDISH BROWN (10R 5/4)			
875	BCC 0000 3026				2.09.99 SECOND SHIFT 2.10.99 FIRST SHIFT
880	BCC 0000 3027				
885	BCC 0000 3028				
890	BCC 0000 3029				
895	BCC 0000 3030	SANDY CLAY: PALE YELLOWISH ORANGE 10YR 7/2 TO GRAYISH ORANGE 10YR 7/4			
900					

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EW02-55 Drill Depth From 900 To 960 Page 16 of 20

Driller S. CLEAVEIK / LANE Start Date/Time 2.8.99/0825 End Date/Time 2.10.99/0835

Drilling Equip./Method IR 7H75E / Tritone RC Sampling Equip./Method Cyclone/Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology.	GRAPHIC LOG	Lithologic Unit	Notes
900	BCS 0000 3032	GRAVELLY SAND AND CLAY YELLOWISH GRAY 5Y 8/1			
905	BCS 0000 3032				
910	BCS 0000 3032				
915	BCS 0000 3033	SANDY CLAY AND CLAY GRAYISH ORANGE 10YR 5/4			
920	BCS 0000 3036				
925	BCS 0000 3025				
930	BCS 0000 3037	GRAVELLY SAND AND CLAY			
935	BCS 0000 3028				
940	BCS 0000 3039				
945	BCS 0000 3040	SANDY CLAY AND CLAY MUDY K. BROWN 10YR 5/4			
950	BCS 0000 3041				
955	BCS 0000 3042				

16

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 960 To 1020 Page 17 of 20

Driller HOLQUIN/LAYNE Start Date/Time 2.8.99/0825 End Date/Time 2.10.99/0835

Drilling Equip./Method IR TH75E/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
960	BCS 0000 3043	SANDY CLAY, CLAY, AS ABOVE, LESS SAND				
965	BCS 0000 3644	SANDY CLAY, homogeneous PALE ORANGE BROWN 10YR 7/2				
970	BCS 0000 3045					
975	BCS 0000 3046					
980	BCS 0000 3047					2.9.99 second shift
985	BCS 0000 3048					2.10.99 first shift
990	BCS 0000 3049					
995	BCS 0000 3050					
1000	BCS 0000 3051					
1005	BCS 0000 3052					
1010	BCS 0000 3053					
1015	BCS 0000 3054					
1020						

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDR-55 Drill Depth From 1020 To 1080 Page 18 of 20

Driller HOLQUIN/LAYNE Start Date/Time 2.8.99/0825 End Date/Time 2.10.99/0835

Drilling Equip./Method IR TH 75E/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1020	BCS 0000 3055	ALLUVIUM, SANDY CLAY, AS ABOVE GRAYISH ORANGE 104R7H			
1025	BCS 0000 3056				
1030	BCS 0000 3057				
1035	BCS 0000 3058				
1040	BCS 0000 3059				
1045	BCS 0000 3060				
1050	BCS 0000 3061				
1055	BCS 0000 3062				
1060	BCS 0000 3063				
1065	BCS 0000 3064				
1070	BCS 0000 3065				
1075	BCS 0000 3066				
1080					

Gravelly interbed

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NE-EWDP-55 Drill Depth From 1080 To 1140 Page 19 of 20
 Driller HOLQUIN/LAYNE Start Date/Time 2-8-99/0825 End Date/Time 2-10-99/0835
 Drilling Equip./Method IR-7H75E/Tricone RC Sampling Equip./Method Cyclone Feedings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1080	BCS 0000	Alluvium, SANDY CLAY/CLAY, AS ABOVE gravelly interbed			
	3063 BCS 0000				
1085	BCS 3068				
1090	BCS 0000				
1095	3069 BCS 0000				
1100	3070 BCS 0000				
1105	3071 BCS 0000				
1110	3072 BCS 0000				
1115	3073 BCS 0000				
1120	3074 BCS 0000	SAND (COARSE) AND GRAVEL WITH INTERBEDDED CLAYS LIGHT BEOWN (5/16 5/16) TO PALE REDDISH BEOWN (1/16 5/16). Grave (clasts are subround).			
1125	3075 BCS 0000				
1130	3076 BCS 0000	Clayey zone			
1135	3077 BCS 0000				
1140	3078 BCS 0000				

DP/AR

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWOP-5S Drill Depth From 1140 To 1200 Page 20 of 20

Driller HOLQUIN/LAYNE Start Date/Time 2-8-99/0825 End Date/Time 2-10-99/0835

Drilling Equip./Method 1R TH 75E/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1140	BCS 0000 3079	ALLUVIUM, COARSE SAND AND GRAVEL, AS ABOVE			
1145	BCS 0000 3080				
1150	BCS 0000 3081				
1155	BCS 0000 3082				
1160	BCS 0000 3083				
1165	BCS 0000 3084				
1170	BCS 0000 3085				
1175	BCS 0000 3086				
1180	BCS 0000 3087				
1185	BCS 0000 3088				
1190	BCS 0000 3089	COARSE SAND AND GRAVELS WITH MINOR CLAYS			
1195	BCS 0000 3090				

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T.D. = 1200' AT 0835 2-10-99

OVERSIZE DOCUMENT PAGE(S) PULLED

SEE APERTURE CARD FILES

APERTURE CARD/PAPER COPY AVAILABLE THROUGH NRC FILE CENTER

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GAMMA**

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NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-6

9906L00166 - 06

Well No. NC-EWDP-9S

Status:

Completed

Latitude\Longitude:

36° 41' 44.613" 116° 33' 46.723"

Legal Description:

Township 14S Range 48E

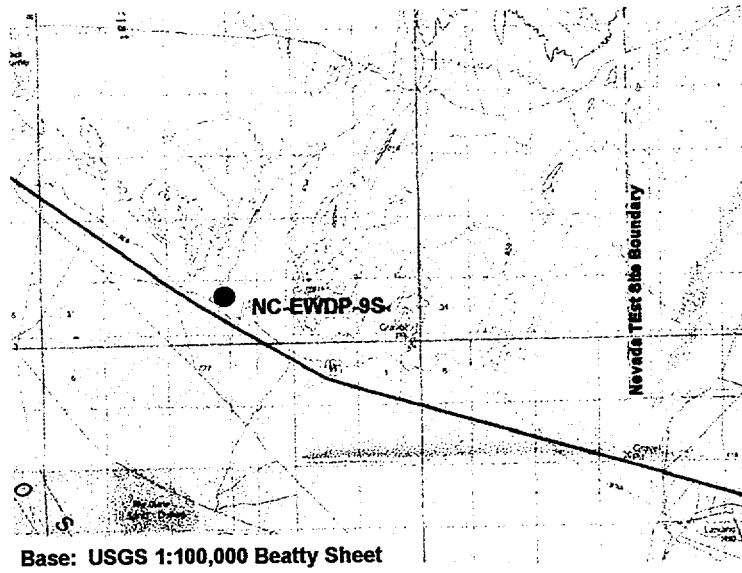
Section 33 NE 1/4 NE 1/4 1/4

Elevation:

797.31 m AMSL (2615.8 ft ±) GPS

Access:

Highway 95 west from Lathrop Wells Jct 9.4 miles to gate on north side of Highway. Take gravel road 0.3 miles; turn east and follow tire tracks.



Purpose: 1) provide lithologic samples of spring deposits; 2) define valley-fill stratigraphic sequence and groundwater flow paths down gradient of proposed repository; 3) provide aquifer test data; and 4) provide water level and water chemistry data.



Base: Thematic Mapper Image of the Big Dune 7.5° Quadrangle

NC-EWDP-9S is located on paleospring deposits adjacent to the wash that drains the southwest flank of Yucca Mountain. The site is located down gradient of fractured volcanic rocks that provide a pathway for groundwater flow from the Yucca Mountain area. The paleospring deposits are of note as these types of deposits are associated with past climates. The drill site selected is adjacent to an existing road in an area which has previously been disturbed. The borehole was drilled and logged to a total depth of 397 ft and completed with four screened intervals with Westbay sampling and pressure ports in the well casing. Prior to completion, a 48 hour constant discharge test was conducted. Water samples were collected for analysis.

**NC-EWDP-9S
SITE SUMMARY**

Land surface

100 ft

200 ft

300 ft

397 ft
(TD)

0-45' Spring Deposits - 0-10.5' claystone, yellow gray (5Y 8/1), v. soft-soft, dry, vfg; 10.5-13.5' sandy claystone, uncemented, fg, dry; 13.5-16.0' claystone, as above, plastic; 16.0-16.5' claystone, yellow gray (5Y 8/1) v. soft-soft, plastic, vfg, dry; 16.5-19.5' yellow gray (5Y 7/2) siltstone, w/sand, soft-v. soft; 19.5-21.0' yellow gray (5Y 7/2) sandy silt, w/ f-mg sand & trace fine ang. gravel; 21.0-22.5' yellow gray (5Y 7/2) gravelly sand, f-m sand, fine ang. gravel; 22.5-45.0 yellow gray (5Y 7/2) silty sand, fg, w/ fg ang-sub rounded gravel & volcanic cobbles

45-180' Valley-fill Deposits - 45-130' light brown (5YR 6/4, 5/6), fg-cg subang. gravel, becoming coarser with depth, trace to some clay below 95', occasional boulders; 130 -152.5' pale red brown (10R 5/4) clayey gravel, cg, subang. to ang. gravel, plastic, wet; 152.5-180' pale red brown (10R 5/4) sandy gravel & cobbles, cg, ang, clayey below 160'

180-235' Valley-fill Deposits - 180-235' welded tuff, gray red (10R 4/2), hard, fractured, devitrified, some black dendrites, some clay below 205'. (Possibly Tertiary Volcanics)

235-285' Valley-fill Deposits - 235-256' sandy gravel, gray red (10R 4/2) welded tuff fragments & medium light gray (N6) to pale blue (5B 6/2) limestone fragments, cg, subang. gravels & cg sand, conglomeratic; 256-260' gravelly sand, as above w/ trace clay; 260-265 sand, white and brown, cg, some cg subang. gravel, conglomeratic, 265-285 sand & gravel, white and brown, sand, cg subang. gravel (mixed lithologies), conglomeratic light brown sandy matrix with limestone clasts & cobbles, healed breccia (?)

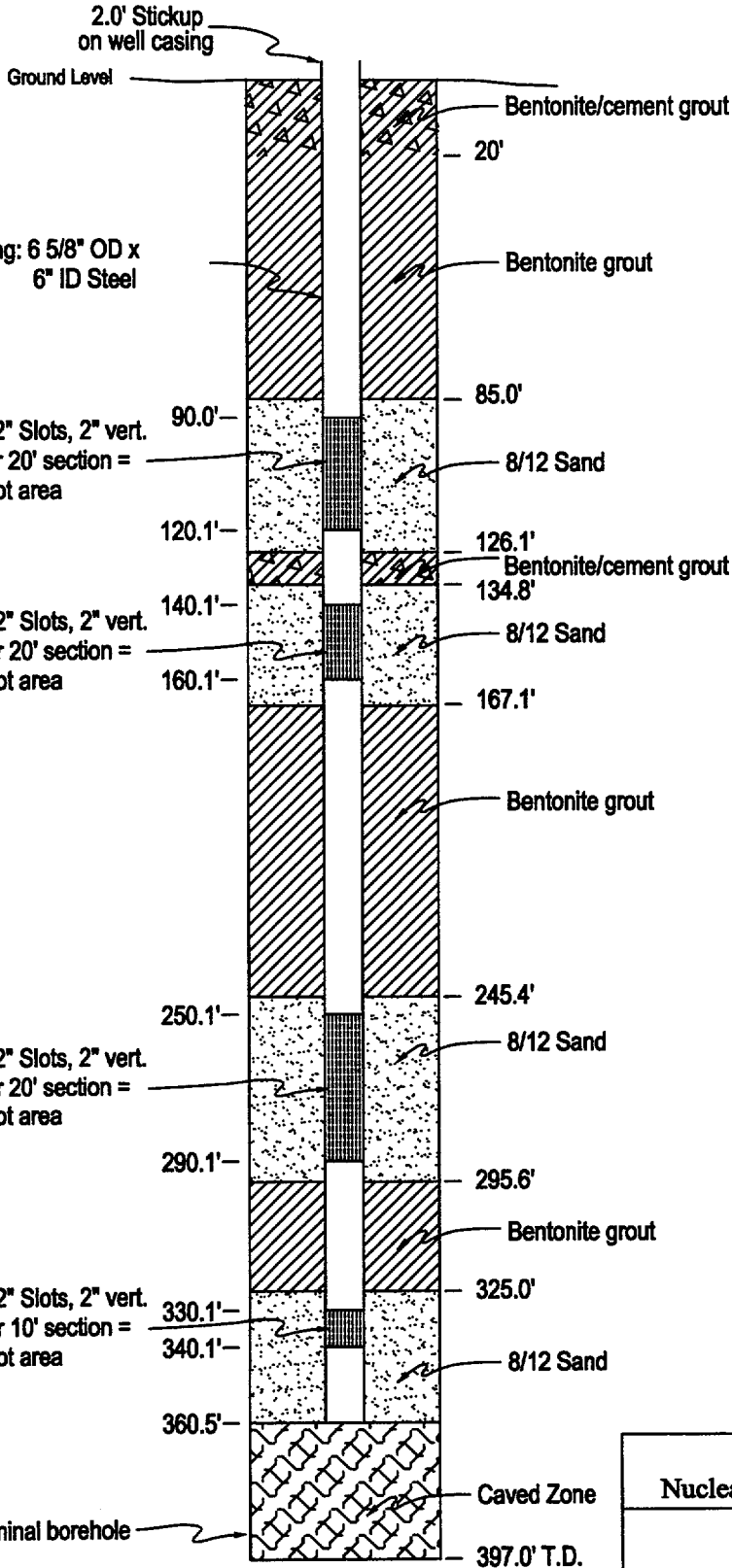
285-337' Tertiary Volcanics - 285-321' welded tuff, gray red (10R 4/2) devitrified, crystal rich, some black dendrites, very hard, some thin soft "waxy" light brown (5YR 5/6) claystone layers; 321-337' brecciated tuff, gray red (10R 4/2) welded tuff, brecciated with white calcite veining, some limestone fragments, very hard

337-387' Tertiary Volcanics - 337-379' bedded tuff, light brown (5YR 5/6-6/4), w/considerable plastic bentonitic (?) clay, becoming softer and moderate orange pink (5YR 8/4) to light brown (5YR 5/6) below 355'; 379-387 tuff breccia, grayish orange pink (10R 8/2) with ang. clasts of gray red (10R 4/2) welded tuff, clayey

387-397' Tertiary Volcanics - 387-397' tuff breccia, gray red (10R 4/2) matrix with welded tuff clasts, fg matrix and moderately soft-moderately hard, welded tuff is very hard

NC-EWDP-9S

SUMMARY LITHOLOGIC LOG



- ### NOTES
1. Horizontal scale exaggerated 50X.
 2. All depths referenced to ground level.
 3. All casing and screen is flush threaded.
 4. Well casings not to horizontal scale.

Nye County, Nevada Nuclear Waste Repository Project Office	
Early Warning Drilling Program NC - EWDP - 9S Well Completion Diagram	
Date: 03/99	Geologist: KDD
Scale: 1" = 50'	Drawn by: JSW

Borehole ID NC-EWDP-95X Page 1 of 1

Borehole Location/Coordinates _____

Elevation: Kelly Bushing _____ Datum Used _____

Ground Surface _____ Platform Elevation _____

Drilling Equipment/Method: DRILL SYSTEMS (BECKER) AP-1000

Sampling Equipment/Method: CALIFORNIA SAMPLER SPLITSPOON, 2" I.D. X 1.84' LENGTH

Start Date/Time: 12-8-98, 0951 Finish Date/Time: 12-8-98, 1244

Drilling Contractor/Driller: BOYLES BROS. / BRYAN MORRIS Hole Size: 10³/₄" CASING, 12" BIT

Static Groundwater Depth/Date: _____ Core Size: SPLITSPOON 2"

Casing Record: _____

ELEVATION (Feet)	DEPTH (Feet)	RECOVERY Feet/Feet/%	TOP/BOTTOM Of Core in Box	FIELD BOREHOLE ANALYTICAL SAMPLE NUMBER	GRAPHIC LOG	CORE DESCRIPTION
	1.0/67			19-31-33		<u>SPRING DEPOSIT</u>
	0.9/60			32-28-19		<u>MUDSTONE: Yellow Gray (SY 8/1) Very soft-soft, dry, very fine-grained.</u>
5	1.1/73			18-20-26		
	0.8/53			35-38-23		
	0.5/33			38-63-41		
	0.3/20			65-57-36		
10	1.0/67			22-62-109		
	0.9/60			19-57-49		<u>SAND: Yellow Gray (SY 8/1), uncemented, fine, dry,</u>
	1.5/100			10-24-70		
15	1.1/73			37-112-89		<u>MUDSTONE: Yellow Gray (SY 8/1), very soft-soft, very fine-grained, dry</u>
	1.3/87			78-103-96		<u>CLAYSTONE: Yel Gray (SY 7/2), Mod soft, high plasticity, slightly moist</u>
	1.2/80			39-80-95		
	1.1/73			59-134-128		<u>SILTSTONE: Yel Gray (SY 7/2), sandy, soft-very soft.</u>
20	1.5/100			43-31-151		<u>SANDY SILT: Yel Gray (SY 7/2) fine-med grained sand, trace fine angular gravel (SB S/1).</u>
22.5	1.5/100			43-98-112		<u>GRAVELLY SAND: Yel gray (SY 7/2) fine-med sand, fine angular volcanic gravel.</u>
						<u>STOPPED CORING AT 22.5'</u>

Logged By K. DONNELSON Date 12-8-98 Checked By Bert Anquist Date 1-4-99

Borehole ID NC-EWDP-95 Page 1 of 2

Borehole Location/Coordinates _____

Elevation: Kelly Bushing _____ Datum Used _____

Ground Surface _____ Platform Elevation _____

Drilling Equipment/Method: CS 1500

Sampling Equipment/Method: HQ WIRELINE CORING, CORED WITH AIR

Start Date/Time: 12-3-98, 0814 Finish Date/Time: _____

Drilling Contractor/Driller: BOYLES BROS. / G. MALLARD Hole Size: _____

Static Groundwater Depth/Date: _____ Core Size: HQ

Casing Record: _____

ELEVATION (Feet)	DEPTH (Feet)	RECOVERY Feet/Feet/%	TOP/BOTTOM Of Core in Box	FIELD BOREHOLE ANALYTICAL SAMPLE NUMBER	GRAPHIC LOG	CORE DESCRIPTION
------------------	--------------	----------------------	---------------------------	---	-------------	------------------

1000

		0/0	0.0			SPRING DEPOSIT
5	(10 MIN)	0/0				MUDSTONE: Yellow gray (5Y 8/1), soft, fine-grained, silty, numerous root holes, some lime-coated pores, < 5% dark lithic fragments < 5mm diam. Dry. (Description from outcrop)
10	(7 MIN)	0/0				Same as above but very soft. Obtained sample by raising & dropping core barrel to jam in tube.
	1.8/20	0/0		BOX 1		
	(1 MIN)	0/0				
15		0/0				
	(11 MIN)		17.3			Same as above. Obtained sample by raising & dropping core barrel to jam in tube.
	1.4/18					
	(3 MIN)					
20		0/0				
	(9 MIN)					
25		0/0				
	(9 MIN)					
30		0/0				Loosing circulation below 30'
	(11 MIN)					
35		0/0				
	(12 MIN)					
40		0/0				
	(17 MIN)					
45		0/0				

Borehole ID NC-EWDP-95

Page 2 of 2

ELEVATION (Feet)	DEPTH (Feet)	RECOVERY Feet/Feet/%	TOP/BOTTOM Of Core in Box	FIELD BOREHOLE ANALYTICAL SAMPLE NUMBER	GRAPHIC LOG	CORE DESCRIPTION

(13 MIN)	0%					<p style="text-align: center;">Hole cased to 52.4'</p> <p style="text-align: center; font-size: 2em; transform: rotate(-45deg);">COPY</p>
(27 MIN)	0%					
(13 MIN)	0%					
(12 MIN)	0/0					
(14 MIN)	0/0					
(11 MIN)	0/0					

END OF SHIFT
 0.2' section of hard volcanics. Likely a clast in a softer matrix. Rhyolite, reddish-brn (SR 6/2); aphanitic ground mass, hard, < 1% fine (< 1mm) broken quartz phenocrysts, 2% light colored < 1mm ? (c-s) phenocrysts. No volcanic textures, likely a welded tuff clast in spring deposit.
 Drilling is slower; driller saying that rods are "booby" or binding with cuttings
 End of Hole 72.7'
 Hole shut down due to drilling difficulties and lack of recovery

Logged By TAMIE WALTER

Date 12-3-98 (WIGHT)

Checked By BEAR ANDREWS

Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWPD-095X Drill Depth From 22.5 To 80.0 Page 1 of 7

Driller BRYAN MORRIS / BOYLES BROS. Start Date/Time 12-8-98, 1358 End Date/Time 12-12-98, 1032

Drilling Equip./Method AP-1000(BECKER) 10³/a" Sampling Equip./Method CUTTINGS / CYCLONE
DILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
		0.0 - 22.5' SAMPLES TAKEN BY 2" CALIFORNIA SAMPLER (TREATED AS CORE)			
25	BCS 00000 850	VALLEY FILL			12-8-98
	BCS 00000 849	SILTY SAND: Yell gray (SY 7/2), fine sand, fine ang gravel Increased fine ang volc. gravel			
30	BCS 00000 848				
35	BCS 00000 847	Considerable subang gravel & cobblec (subang dk volc gravel)			
40	BCS 00000 846				
45	BCS 00000 845	GRAVELLY SAND: Lt brn (SYR - 6/4 - 5/6) (SYR 5/6) fine subang gravel, f-mod gravel, trace silt, some coarse gravel. Slightly moist - moist			
50	BCS 00000 844				
55	BCS 00000 843				
60	BCS 00000 842	Basalt boulder at 63' Increased coarse sand & silt moist			
65	BCS 00000 841				
70	BCS 00000 840	considerable coarse subang gravel			
75	BCS 00000 839				
80					

COPY

Prepared By V. DODD WILSON Date 12-8-98 Checked By BOB ANGLIST Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWPD-095X Drill Depth From 80.0 To 140.0 Page 2 of 7
 Driller BRYAN MORRIS / BUYLEY BROS Start Date/Time 12-8-98, 1358 End Date/Time 12-12-98, 1032
 Drilling Equip./Method AP-1000 (BECKER) Sampling Equip./Method CUTTINGS / CYCLOPE
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
83.8	BCS 00000 838	GRAVELLY SAND: Lt brn (SYR 5/6) - Pale rd brn (10R 5/4), fine - coarse subang; gravel med - coarse sand, moist, trace silt			
87	BCS 00000 837				
91-92	BCS 00000 836	Hard from 91-92' Increased coarse, v. moist sand			
95	BCS 00000 835	Trace of clay Sand less dense from 95-97'			
98.5	BCS 00000 834	12-10-98, 0645 VERY MOIST TRACE - some clay			12-8-98 AP 12-10-98, 0645
105	BCS 00000 833	Increased coarse gravel			
112.3	BCS 00000 832	12-9-98, 1542			SATURATED BELOW 110'
115	BCS 00000 831	SAMPLE MUDDY some coarse angular gravel			WATER AT 115'
120	BCS 00000 830	Considerable gravel some clay			
129	BCS 00000 829				
134.8	BCS 00000 828	CLAYEY GRAVEL: Pale rd brn (10R 5/4), coarse subang - ang gravel, hi plasticity clay, wet			Poor RECW.
135	BCS 00000 827	12-9-98, 1355			Plugged cyclone
140					

Prepared By K. DOWNESON Date 12-9-98 Checked By BERT ANGELOST Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-095X Drill Depth From 140.0 To 200.0 Page 3 of 7
 Driller BYAN MORRIS / BOYLES BROS Start Date/Time 12-8-98, 1358 End Date/Time 12-12-98, 1032
 Drilling Equip./Method AP-100G (BECKER) Sampling Equip./Method CUTTINGS/CYCLONE
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
145	BCS 00000 826	CLAYEY GRAVEL; Pale Red brn (10R 5/4) coarse subang-ang grave, hi. plasticity. Increased clay & silt. wet			12-9-98
150	BCS 00000 825	∇ 146.5', 12-12-98, 0637 WITH CASING AT 396' = Increased gravel			
155	BCS 00000 824	SANDY GRAVEL & COBBLES. Pale Red brn (10R 5/4) coarse, angular gravel. May be reworked. Increased gravel			WATER AT 155'
160	BCS 00000 823	∇ 149.4, 12-9-98, 1303 = Increased clay			
165	BCS 00000 822	Increased sand & silt			
170	BCS 00000 821	Increased clay & cobbles (min)			
175	BCS 00000 819	∇ 177.7', 12-9-98, 1201 w/casing @ 210' =			
180	BCS 00000 818	WELDED TUFF; Grayish Red (10R 4/2), hard fractured, devitrified.			YIELDING WATER @ 178'
185	BCS 00000 817				
190	BCS 00000 816				
195	BCS 00000 751	∇ 196.4', 12-9-98, 1123 w/casing @ 210' =			

COPY

Prepared By KEN DOWNS Date 12-9-98 Checked By BENT ANQUIST Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-095X Drill Depth From 200.0 To 260.0 Page 4 of 7
 Driller BRYAN MOGERS / Bates 8005 Start Date/Time 12-8-98 1358 End Date/Time 12-12-98 1032
 Drilling Equip./Method AP-1000 (Buckeye) Sampling Equip./Method CUTRAGS / CYCLONE
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
205	BCS 00000 812	WELDED TUFF: Grayish Red (10R 4/2), dehydrated Some blk dendrites, hard			12-9-98 Hand drilling @ 202.5'
210	BCS 00000 811	some clay coating			
215	BCS 00000 808	Some clay some dk grey vitric rock (in vacuo 83%) May be out of turf & into alluvium			Hand drilling @ 221'
220	BCS 00000 807	Clayey			
225	BCS 00000 806	Clayey			
230	BCS 00000 805	SNAPP GRAVEL: coarse sand, coarse subangular gravel. Grayish red (10R 4/3) welded turf & med L gray (MG) - Pale blue (5B 6/3) Limestone. Some cobbles. (conglomeratic)			12-9-98 12-10-98 ADC
240	BCS 00000 804				
245	BCS 00000 803				
250	BCS 00000 802				
255	BCS 00000 801	GRAVELLY SAND: coarse sand, fine - coarse sub- angular gravel. Color same as above. Trace of clay (conglomeratic)			Hand drilling at 255'
260					

Prepared By KTU DOWNESON Date 12-10-98 Checked By JEFF ANASTAS Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-095X Drill Depth From 260.0 To 320.0 Page 5 of 7
 Driller BRYAN MORRIS / BOYLS BCS Start Date/Time 12-8-98, 1359 End Date/Time 12-12-97, 1032
 Drilling Equip./Method AP-1000 (BECKER) Sampling Equip./Method CUTTINGS / CYCLONE
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
265	795	SAND, coarse, some coarse subang gravel, white and brown sand grains (conglomeratic)	[Hand-drawn graphic log showing coarse sand and gravel]		12-10-98
270	799	SAND & GRAVEL: coarse white & brn sand, coarse subang mixed gravel (conglomeratic)			
275	798	Lt brn sandy matrix with limestone clasts ang-subang clasts. Some limestone cubble clasts. Healed breccia	[Hand-drawn graphic log showing sandy matrix with clasts]		Hard drilling at 283'
280	797	Increased gravel, trace clay, some silt			
285	796	WELDED TUFF: grayish red (10K 4/2), devitrified, crystal rich, some blk dendrites. Very hard			
290	795	Some thin layers (10mm) of Lt brn (5YR 5/6) "waxy" soft claystone w/ some blk grains			Hard drilling @ 290'
295	794				
300	793	fractured:	[Hand-drawn graphic log showing fractured material]		30 min to drill from 295-300' 10 min to drill from 300-305'
305	792				
310	791				
315	790	muddy	[Hand-drawn graphic log showing muddy material]		7 min to drill 305-310'
320	789	cuttings decrease from gravel to sand size			

Prepared By K. DONWELSON Date 12-10-98 Checked By Bent Anquist Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC-EWDP-095X
 Borehole ID _____ Drill Depth From 320.0 To 380.0 Page 6 of 7
 Driller BRYAN MORRIS / BOYLES BROS Start Date/Time 12-8-98-1358 End Date/Time 12-12-98, 1032
 Drilling Equip./Method AP-1000 (BECKER) Sampling Equip./Method CUTTINGS/CYCLONE
 DRILLED WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
325	BCS 00000 788	WELDED TUFF: Grayish Red (10R 4/2), devitrified BRECCIATED TUFF: Grayish Red (10R 4/2) welded tuff, Lt brn (5YR 5/6) brecciated tuff with white calcite veining. Some limestone fragments. Very hard. Some gry rd (10R 5/2) brecciated matrix			Hard drilling from 320-325' (200 min)
330	BCS 00000 787	Increased Lt brn (5YR 5/6) matrix with some clay.			12-10-98 12-11-98, PAY SHIFT Changed bit
335	BCS 00000 786				Increased water @ 339'
340	BCS 00000 785	BEDDED TUFF: Lt brn (5YR 5/6) - (5YR 6/4) Considerable hi plasticity clay, soft. Increased clay with depth.			
345	BCS 00000 784	BENTONITIC CLAY			
350	BCS 00000 783				
355	BCS 00000 782				
360	BCS 00000 781	softer becoming med orange pink (5YR 6/4) mottled with Lt brn (5YR 5/6)			
365	BCS 00000 780				
370	BCS 00000 779				
375	BCS 00000 778				
380	BCS 00000 777	TUFF BRECCIA: Grayish orange pink (10R 6/2)			Harder at 379'

Prepared By K. DONNELSON Date 12-11-98 Checked By BENT ARQUIST Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-095X Drill Depth From 380.0 To 397.6 Page 7 of 7
 Driller BRYAN MARSH / BOYLE BROS Start Date/Time 12-8-98, 1358 End Date/Time 12-12-98, 1032
 Drilling Equip./Method AP-1000 (BECKER) Sampling Equip./Method CYCLONE/CUTTINGS
 DRILLER WITH AIR

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
385	BCS 00000 776 BCS 00000	with angular clast of grayish red (10R 4/2) welded tuff. Some grayish red & Lt brn (5YR 5/6) bentonitic clay. Mod hard fine grained matrix. Grading to soft gray rd (10R 4/2) w. plastic soft clay			
390	775 BCS 00000	TUFF BRECCIA: Grayish red (10R 4/2) matrix with gray red (10R 4/2) welded tuff clasts trace clay. Predom welded tuff. Matrix is fine grained & mod soft - mod hard. Welded tuff is very hard			Hard below 390'
395	779 BCS 00000 773				12-11-98 12-12-98 T.D. = 397.6 @ 12-12-98 1032
400					
405					
410					
415					
420					
425					
430					
435					
440					

COPY

Prepared By KEN DONNELSON Date 12-12-98 Checked By BENT ANQUIST Date 1-4-99

**NC-EWDP-9S
Constant Discharge Test**

Date: January 15-17 1999

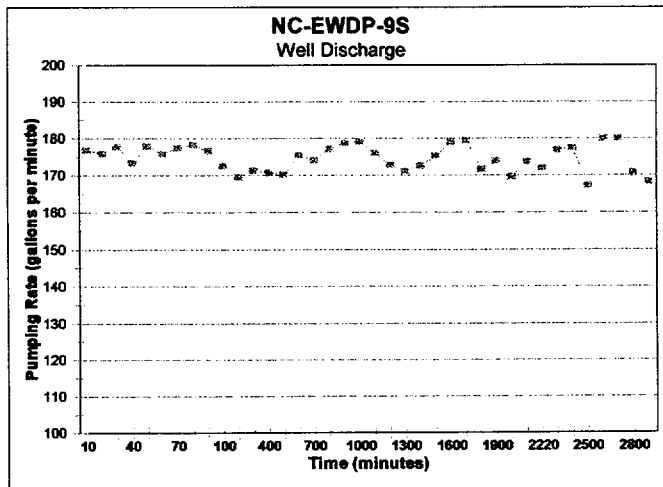
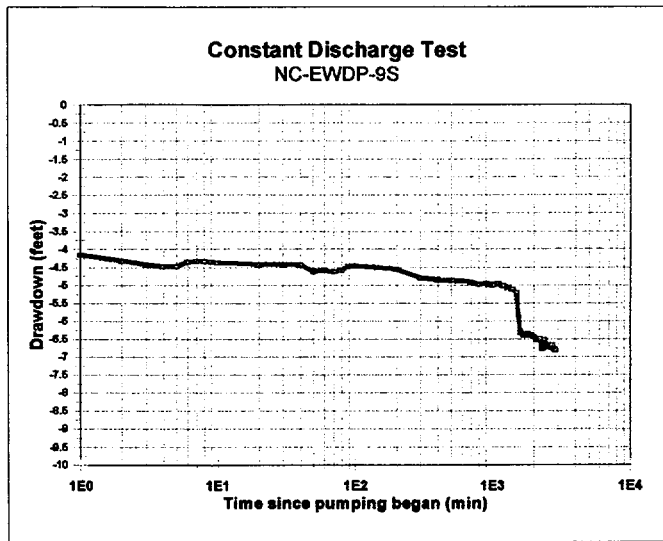
Static Depth 100.9

To Water
(ft below mp)

Time (min)	Water Level ft < mp	Drawdown (ft)	Time per 60 gals. (seconds)	Gallons per Minute
1	105.05	-4.15		
2	105.21	-4.31		
3	105.32	-4.42		
4	105.37	-4.47		
5	105.37	-4.47		
6	105.26	-4.36		
7	105.23	-4.33		
8	105.24	-4.34		
9	105.25	-4.35		
10	105.27	-4.37	20.35	177
20	105.32	-4.42	20.47	176
30	105.32	-4.42	20.25	178
40	105.32	-4.42	20.75	173
50	105.51	-4.61	20.22	178
60	105.48	-4.58	20.47	176
70	105.52	-4.62	20.28	178
80	105.48	-4.58	20.19	178
90	105.37	-4.47	20.38	177
100	105.35	-4.45	20.87	172
200	105.45	-4.55	21.22	170
300	105.70	-4.80	21.00	171
400	105.74	-4.84	21.08	171
500	105.77	-4.87	21.14	170
600	105.78	-4.88	20.52	175
700	105.82	-4.92	20.67	174
800	105.87	-4.97	20.32	177
900	105.86	-4.96	20.13	179
1000	105.88	-4.98	20.10	179
1100	105.86	-4.96	20.45	176
1200	105.92	-5.02	20.82	173
1300	105.97	-5.07	21.03	171
1400	106.02	-5.12	20.85	173
1500	106.10	-5.20	20.53	175
1600	107.22	-6.32	20.12	179
1700	107.29	-6.39	20.05	180
1800	107.26	-6.36	20.97	172
1900	107.29	-6.39	20.70	174
2000	107.36	-6.46	21.21	170
2100	107.42	-6.52	20.72	174
2220	107.40	-6.50	20.92	172
2300	107.67	-6.77	20.34	177
2400	107.43	-6.53	20.29	177
2500	107.64	-6.74	21.51	167
2660	107.58	-6.68	20.00	180
2700	107.58	-6.68	20.00	180
2800	107.67	-6.77	21.08	171
2865	107.72	-6.82	21.37	168

Avg. Pumping Rate

175 gpm



Recovery Data

Time (seconds)	Depth to Water (ft)
0	107.72
10	105.70
20	104.20
30	103.85
40	103.60
50	103.20
60	102.65
70	102.10
80	101.50
90	101.45
100	101.35
120	101.35
150	101.35
180	101.30
210	101.30
240	101.26
270	101.25
300	101.23
450	101.10
600	101.00

**Analysis of Pre-Completion Pressure Testing In Borehole NC-EWDP 9SX,
Yucca Mountain, Nevada**

**Prepared for:
The Nye County Nuclear Waste Repository Project Office**

Prepared by: Questa Engineering Corporation

January, 1999

PURPOSE AND SUMMARY

On January 15, 1999, various tests were performed as part of the pre-completion testing of the NC-EWDP 9SX borehole. A pump-spinner test was performed to determine the percentage of the total flow contributed by the individual zone within the wellbore. At the conclusion of the pump-spinner test, a sustained 48 hour aquifer pump test was performed in order to determine formation properties such as permeability and skin. The purpose of this report is to present the results of the pressure analysis derived from the aquifer test and any conclusions that might be drawn from the pre-completion testing.

CONCLUSIONS AND RECOMMENDATIONS

1. **The average permeability for the entire wellbore is very high, averaging between 40 and 75 Darcys. Permeability computed for the deepest zone (330'-340'), is in excess of 100 Darcys.**
2. **The individual zones all display high skin effect.**
3. **The apparent "Wellbore Storage" is high and variable due to the wellbore geometry and the free surface of the water.**
4. **The presence of boundaries is inferred at 2000'-3000' distance from the well.**
5. **Modeling of the pressure recovery data is complicated by the multiple layers, and high apparent storage.**
6. **The general test methodology is valid for use on future wells. Test results can be confirmed, if needed, once the Westbay equipment is installed.**

DISCUSSION

In late December 1998, following the drilling of the NC-EWDP 9SX borehole, 6-5/8" casing was set to preserve the borehole integrity. A total of 100' of screened pipe and gravel was placed in four separate intervals opposite zones believed to be productive. A copy of the wellbore diagram is attached as **Figure 1**. Approximately 3 weeks later, on January 14, 1999, an electrical submersible pump was placed in the borehole and the well was "developed" at approximately 125 gpm.

On January 15, 1999, a series of production logging runs were made with a spinner log. Runs were made both static and with the pump running. The static runs confirmed that no significant crossflow was occurring. With the pump running, multiple logging runs were made and static measurements were taken between the screened intervals to determine the percentage contribution to the total flow, each interval made. The location of the static fluid level and the required setting depth of the pump prevented the exact allocation for each of the top two zones. Using the available data, it was possible to determine approximately 60% of the flow was coming from the bottom interval (330'-340'), 20% was coming from the interval between 250' -290', and the remaining 20% was coming from the top two zones.

Following the spinner log, the submersible pump was run back in and set at approximately 220'. The pump was turned on and pumping began at a rate of 175 gpm or 6000 bpd. During the test, the depth to fluid and the flow rate were measured at regular intervals and recorded by hand. The depth to fluid was measured using a well sounding tape. The flow rate was determined using a turbine meter and confirmed using the time required to fill a 55 gallon drum.

Following 48 hours of production, the pump was shut off and the pressure recovery was measured in a similar fashion. In order to analyze the fluid level information with commercial software programs, it was necessary to convert the readings to a down hole pressure. The arbitrary datum used in this conversion was 290'. A Cartesian plot of the pressure and rate information is attached as **Figure 2**.

Inspection of the raw fluid level data indicates a sudden drop of approximately 1' occurred at approximately 25 hours. Detailed analysis of the data suggests this sudden drop was a wellbore or measurement phenomenon rather than a true reservoir response. In order to correct for this sudden drop, 1' of fluid level was added for all data points after 25 hours until the pressure recovery began. A copy of the adjusted Cartesian plot is attached as **Figure 3**.

The adjusted pressure file was then analyzed independently using two commercial pressure analysis software packages: Kappa Engineering's *Sapphire* program and Fekete's *Welltest* program. Over 50 different model runs were prepared to evaluate the reservoir characteristics.

A copy of one of the model runs from the Fekete *Welltest* program is attached as **Figure 4**. Attempts to simultaneously match both the 48 hour drawdown and the 15 minute recovery proved to be difficult. The difficulty appears to have been caused by the presence of several productive zones, which can make analysis difficult under the best of circumstances. Analysis of the log-log plots indicates three different wellbore storage volumes may be present. The three volumes are believed to represent the casing volume, the gravel pack volume, and the volume of the cone of depression in the free water surface.

One difficulty with standard analysis methods, is the high extrapolated pressure from the recovery analysis. After only 15 minutes of shut-in, the pressure had built back to within 0.05 psi of the original pressure. Any extrapolation then yields a pressure in excess of the known original pressure. Review of Reference 1 gives a likely cause for these phenomena: the slope of the recovery plot is a function of the total transmissivity (kh) of the zones being tested, but the ultimate recovery is dictated by the storativity (ch) of the zones being tested. The high apparent compressibility of the top layer thus dominates the long term recovery pressure and causes the recovery curve extrapolation to be too high.

As stated, it was not possible to get a good model match for both the pressure drawdown and the recovery. However, the numerous model matches performed did accurately model the 48 hours of drawdown data and do provide some common elements:

High Permeability: All models yielded permeabilities in the 40-75 Darcy range. Multiple layer models based on the spinner log had permeabilities in excess of 100 Darcys in the bottom interval.

High Skin Damage: All models displayed large positive values for skin. Most were in excess of +10. This "damage" is believed to be caused by several factors.

- Flow convergence to the wellbore.
- Partial penetration effects.
- Lower permeability in the gravel pack and screens relative to the formation.
- Free surface convergence at the top (minor effect).
-

One additional observation is possible from the data. Assuming the pressure data are valid, then the decline in pressure during the test would imply multiple boundaries are present in at least the bottom, high permeability zone. The best matches were obtained with multiple boundaries 2000'-3000' from the wellbore.

III. REFERENCES

1. Lefkovits, H. C., Hazebroek, P., Allen, E. E., Mathews, C. S.: "A Study of the Behavior of Bounded Reservoirs Composed of Stratified Layers", *Soc. of Pet. Eng. J.* (March 1961) 43-58; *Transactions, AIME*, 222.
2. Chow, V. T. , 1964, *Handbook of Applied Hydrology*, McGraw-Hill Book Company, New York, p. 13-13 to 13-27.
3. Nye County Nuclear Waste Repository Project Office, 1998, "Pump-Spinner Logging of Pre-Completed Boreholes", Technical Procedure TP-9.0.
4. Nye County Nuclear Waste Repository Project Office, 1998, "Analysis of Pressure Transient Tests", Technical Procedure TP-9.7.

APPENDIX: PRESSURE ANALYSIS REPORTS

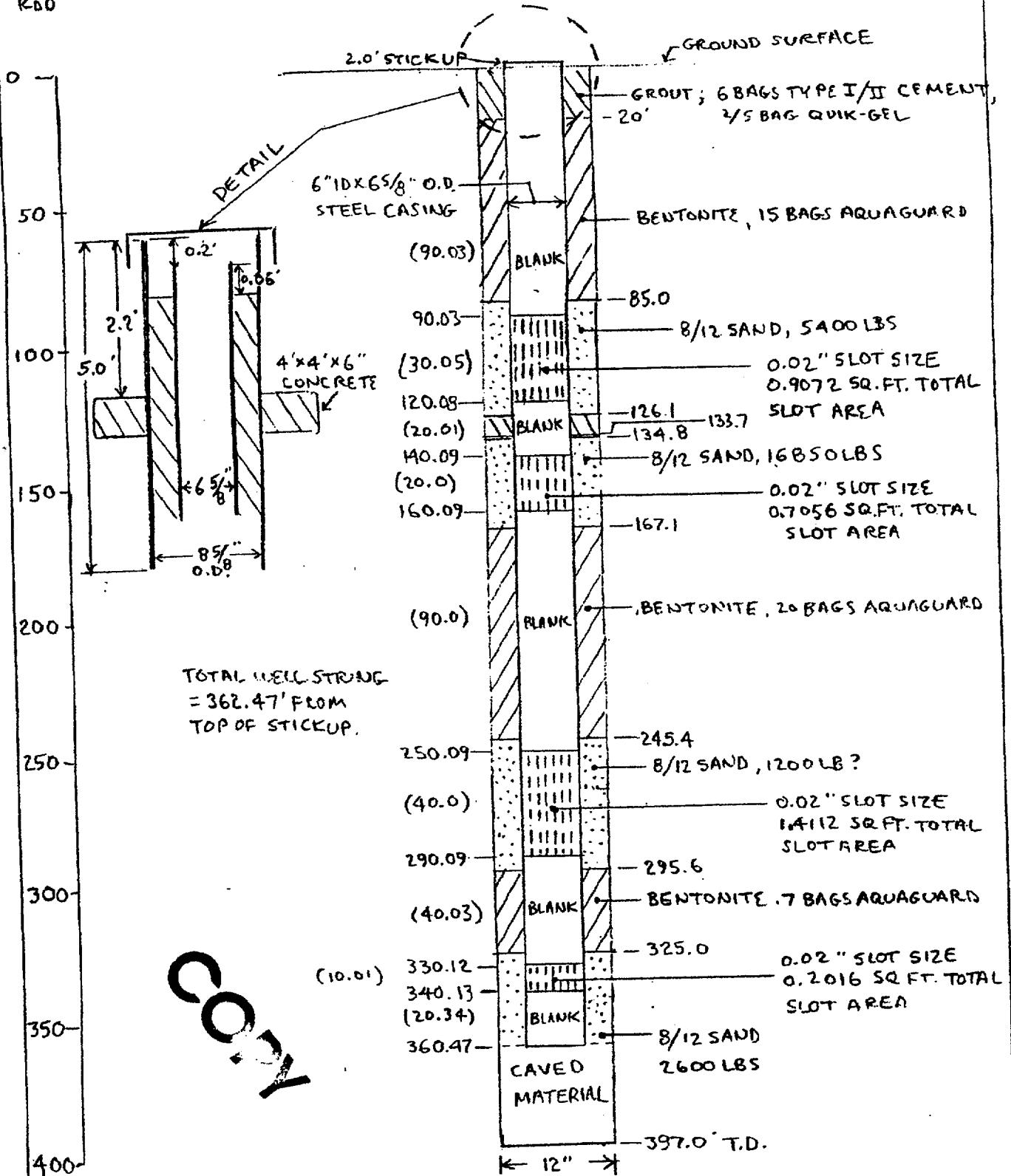
Note: This appendix comprises about 250 pages of supplemental data that are not included with this data transmittal. The data sets may be obtained by contacting the Nye County Nuclear Waste Repository Project Office at (775) 727-7727.

NC-EWDP-9SX WELL INSTALLATION AS-BUILT SCHEMATIC

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS



DEPTH



- NOTES:
- 133.7 - 134.8' BENTONITE SEAL
4 BAGS AQUAGUARD, 9 SHOVELS
CaCl.
 - 134.8 - 126.1' GROUT SEAL:
4 BAGS TYPE I/II CEMENT,
3 SHOVELS QUIK-GEL, 7 SHOVELS
CaCl.
 - NUMBERS IN () INDICATE LENGTH OF SCREEN
OR BLANK SECTION.
 - HORIZONTAL SCALE EXAGGERATED.
 - 5' SCREEN SECTION HAS 10 ROWS OF 36 SLOTS.
2" LONG SLOTS. 7/8" - 1" BETWEEN ROWS.
 - 20' SCREEN SECTION HAS 70 ROWS OF 36 SLOTS.

Nye County EWDP 9SX
Pressure @ 290' Datum
Drawdown and Build-Up
January 15-17, 1999

Strip Chart

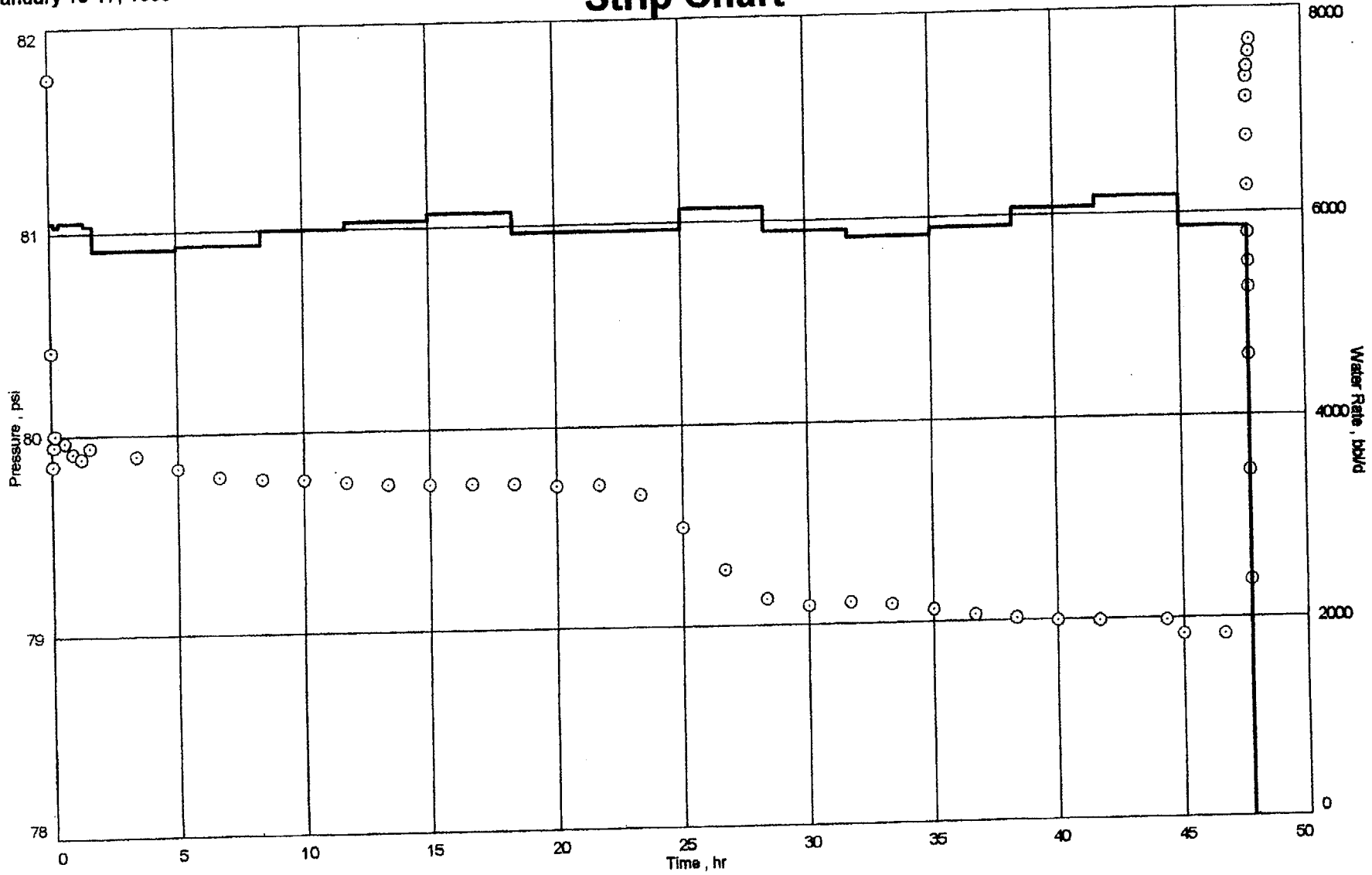


Figure 2

QEC Document Ref. 99SS002.DOC



Nye County- EWDP 9-S
Post Spinner Aquifer Test
January 15-17, 1999
Adjusted Pressure @ 290' Datum

Strip Chart

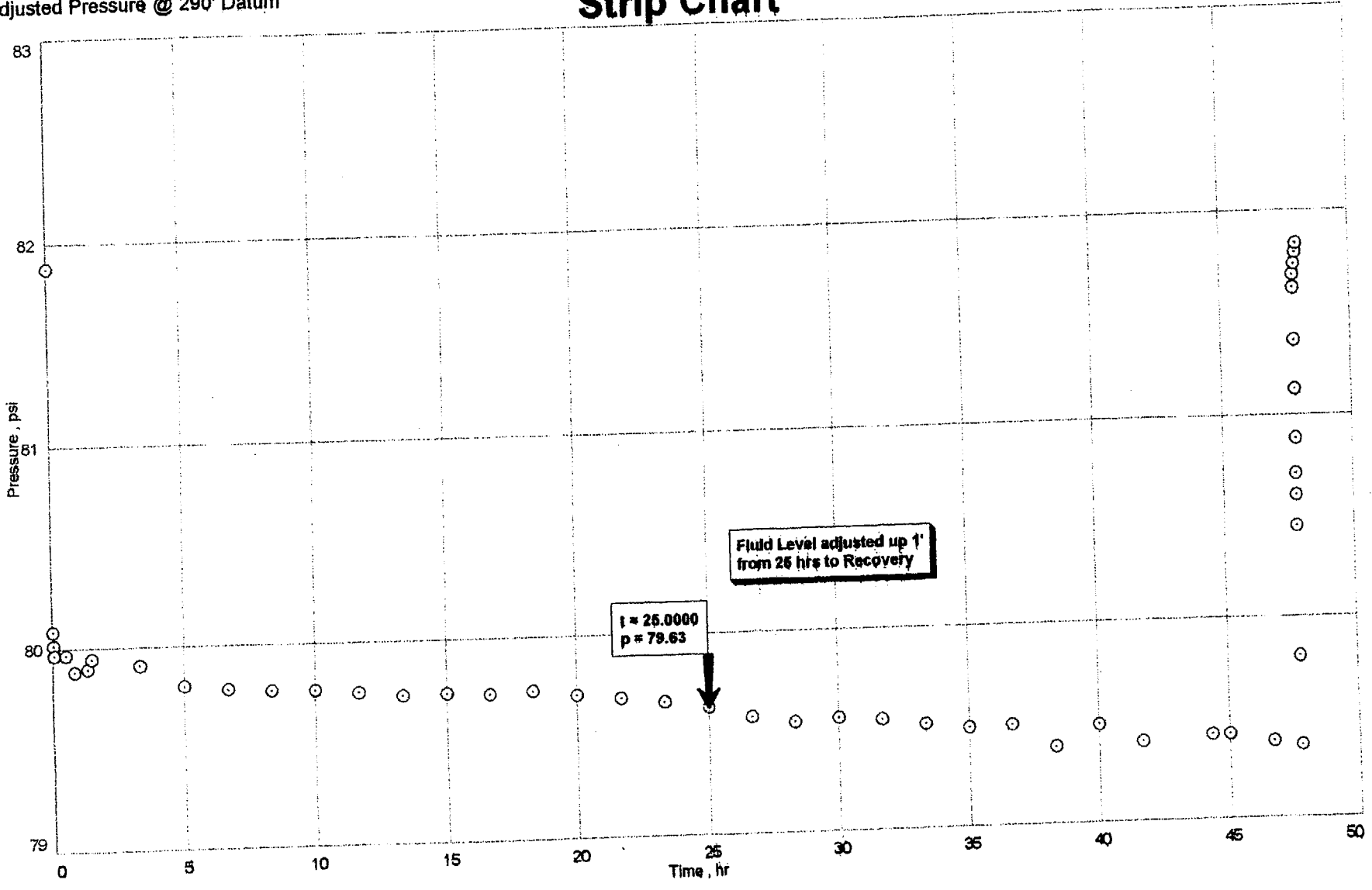


Figure 3

QEC Document Ref. 99SS002.DOC



Multi Layer Model #2

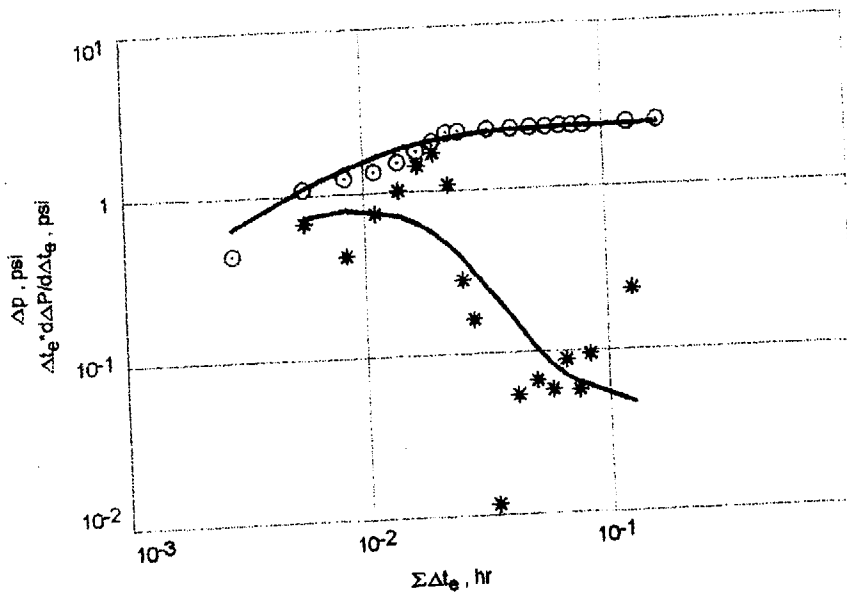
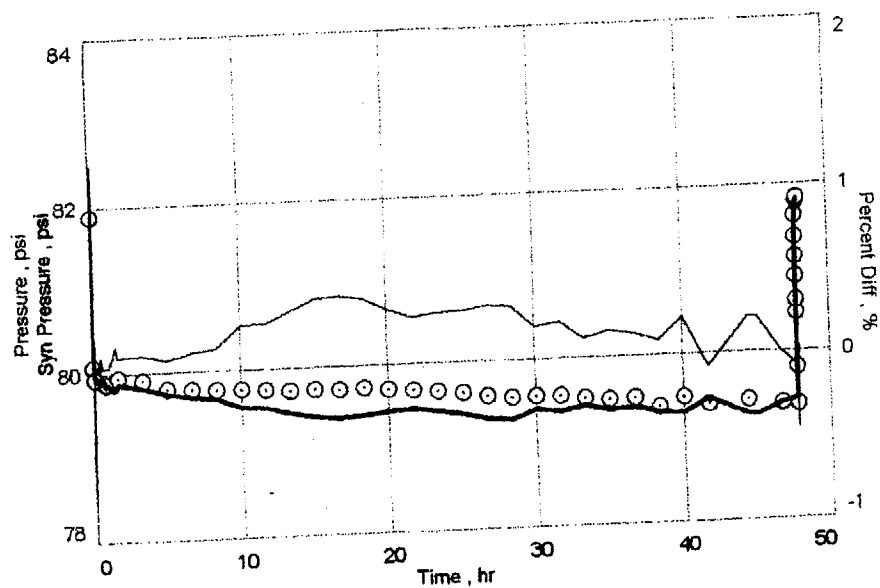
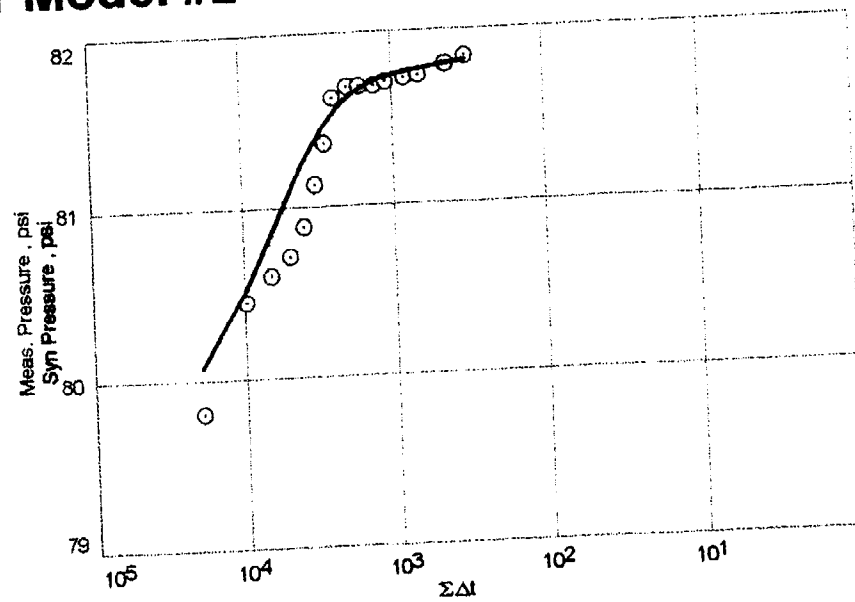
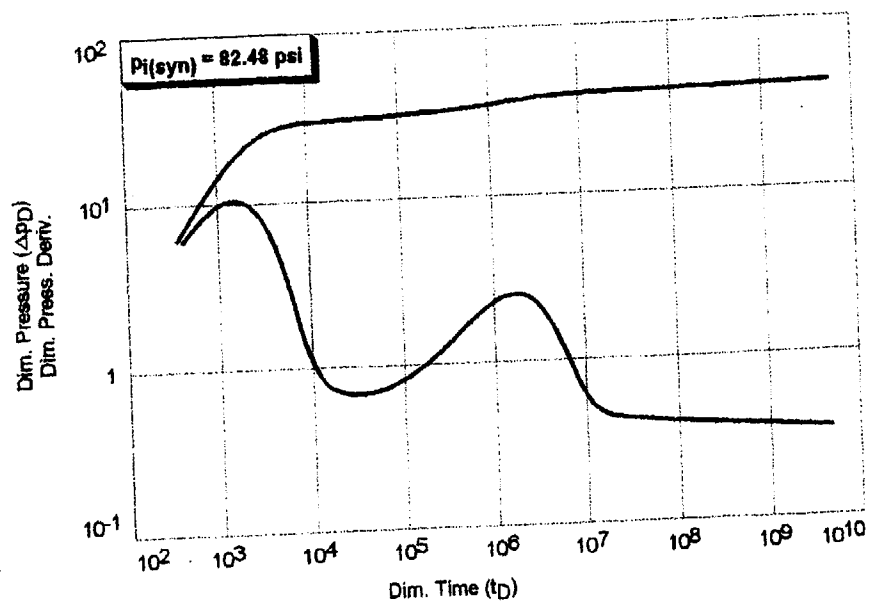


Figure 4

QEC Document Ref. 99SS002.DOC



Multi-Layer Water Well Model

Case Name : Multi Layer Model #2

Nye County- EWDP 9-S
Post Spinner Aquifer Test

January 15-17, 1999

Scott Stinson, P.E., Questa Engineering

Model Parameters

	Layer 1	Layer 2	Layer 3
Total Mobility	$(k/\mu)_{11} = 148955.30 \text{ md/cp}$	$(k/\mu)_{12} = 32629.28 \text{ md/cp}$	$(k/\mu)_{13} = 116533.13 \text{ md/cp}$
Permeability	$k_1 = 127822.271 \text{ md}$	$k_2 = 28000.000 \text{ md}$	$k_3 = 100000.000 \text{ md}$
Net Pay	$h_1 = 70.00 \text{ ft}$	$h_2 = 50.00 \text{ ft}$	$h_3 = 42.00 \text{ ft}$
Skin	$s_1 = 53.853$	$s_2 = 5.000$	$s_3 = 100.000$
Outer Radius	$r_{e1} = 923.703 \text{ ft}$	$r_{e2} = 100000.000 \text{ ft}$	$r_{e3} = 1536.816 \text{ ft}$
Total Porosity	$\phi_{11} = 30.00 \%$	$\phi_{12} = 30.00 \%$	$\phi_{13} = 30.00 \%$
Total Compressibility	$c_{11} = 1.19000e-2 \text{ psi}^{-1}$	$c_{12} = 6.32779e-6 \text{ psi}^{-1}$	$c_{13} = 6.32779e-6 \text{ psi}^{-1}$
Viscosity	$\mu_1 = 0.858 \text{ cp}$	$\mu_2 = 0.858 \text{ cp}$	$\mu_3 = 0.858 \text{ cp}$
Wellbore Storage Constant Dim. (CD)	50.00		

Formation Parameters

Water Saturation (S_w)	100.00 %
Oil Saturation (S_o)	0.00 %
Gas Saturation (S_g)	0.00 %
Wellbore Radius (r_w)	0.25 ft
Formation Temperature (T)	80.0 °F

Fluid Properties

PVT Reference Pressure (ppVT)	50.00 psi
Specific Gravity (G)	1.000
Solution Gas Ratio (R_{sv})	0 scf/bbl
Gas Viscosity (μ_g)	0.0108 cp
Water Viscosity (μ_w)	0.858 cp
Gas Formation Volume Factor (B_g)	0.053854 bbl/scf
Water Formation Volume Factor (B_w)	1.001
Gas Compressibility (c_g)	$2.02582e-2 \text{ psi}^{-1}$
Water Compressibility (c_w)	$3.24576e-6 \text{ psi}^{-1}$

Production and Pressure

$Q_1 B_1$	5788.532 bbl/d
Final Water Rate	5760.000 bbl/d
Final Gas Rate	0.000 MMCF/D
Final Flowing Pressure (p_{wf})	79.36 psi
Final Measured Pressure	81.84 psi
Initial Pressure (p_i)	81.88 psi

Synthesis Results

Average Error	0.05 %
Synthetic Initial Pressure (p_i)	82.48 psi
Extrapolated Pressure at Specified Time	82.48 psi
Pressure Drop Due To Skin (Δp_s)	2.47 psi
Flow Efficiency (FE)	0.190
Damage Ratio (DR)	5.286

Forecasts

Specified Flowing Pressure (p_{wfs})	79.36 psi
3 - Month Constant Rate	5683.586 bbl/d
6 - Month Constant Rate	5647.080 bbl/d
Specified Forecast Time	12.00 month
Forecast Constant Rate @ Current Skin	5612.013 bbl/d
PI / H (Actual)	1809.796 bbl/d/p
Forecast Constant Rate @ Skin=0	30571.304 bbl/d
PI / H (Ideal)	9818.765 bbl/d/p
Forecast Constant Rate @ Skin=-4	56167.714 bbl/d

9955002 Doc

NYE COUNTY NUCLEAR WASTE REPOSITORY OFFICE
 INDEPENDENT SCIENTIFIC INVESTIGATION
 YUCCA MOUNTAIN, NEVADA

WELL TEST ANALYSIS QUALITY CONTROL CHECKLIST

Test Information

Borehole: EWDP 9-SX

Test Date: 1/15-18/99

Test Type: Constant Rate Drawdown w/ Rec.

Remarks: _____

Interval Tested: Screens 90-120, 140-160, 250-290, 330-340
 Datum: Top of Casing for Fluid levels, 290' for Pressure file
 Observation Well(s)?: None

Source of Data

Pressure File: 9sData

Type of Pressure Gauge: Well Sounder, manual

Rate File: 9sdata

Type of Flow Meter: Stop Watch & 55 gal drum

Source: Hand input from T. Buqo fax
 Units: FL in ft., Conv. To PSI at 290' $(290' - fl) * 0.433$
 Source: Fax from T. Buqo
 Units: GPM, converted to BPD

Assumptions

	Value	Units	Source	Comments
Height	100'-162'	ft	"as built"	Screen interval=100', zone 162'
Porosity	30%		Est	Assumed for High Porosity
Viscosity	0.858	cp	Welltest	Software value
Wellbore Radius	0.25	ft	est	Casing id
Compressibility	6.3×10^{-8}	psi ⁻¹	Welltest	Software value, top zone @0.012 psi ⁻¹
Temperature	80	deg F	Assumed	surface water samples @ 28.4 Deg C

Results**Cartesian Plot Analysis:** Attach Plot

Length of Flow: 47.75 hrs

Steady State? No

Pseudo-Steady State? Yes

Remarks: _____

Log-Log Plot Analysis: Attach Plot

Flow Regimes Noted: (Circle Appropriate Types; Include Flow Regime Plot if Appropriate)

Wellbore Storage

Bilinear

Linear

Radial

Spherical

Other

Remarks: Changing Wellbore Storage noted on LL plots, Sharp drop in FL not due to reservoir

Analysis Procedures

Software Utilized: Fekete-Welltest File Name: EWDP9SX.fwt

Location: SHS Laptop (Compaq)

Result Summary (Include Units)

Permeability: 40-75 Darcy

Skin: Greater than 10

Effective Flow Time: 47.75 hours

Average Flow Rate: 175 GPM, 6,000 BPD

Total Flow Volume: 501,375 gal 11,937 bbls

Remarks: Extrapolated pressure is probably too high, see report for discussion.

Final Flowing Pressure: 79.80 psi, (105.70')

Extrapolated Reservoir Pressure: 82.48 psi (98.82')

Radius of Investigation: 35,000'

Other: _____

Other: _____

Analyzed by: Scott H Stinson, P.E.

Analysis Date: 1/22/99

**THIS PAGE IS AN
OVERSIZED DRAWING
THAT CAN BE VIEWED AT
THE RECORD TITLED:**

NONE:

BOREHOLE: NC-9S

**LOGS: NEUTRON DENSITY
GAMMA DEVIATION**

**WITHIN THIS PACKAGE...OR,
BY SEARCHING USING THE
DRAWING NUMBER:**

NONE

NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-7

9906100166-07

Well No. NC-Washburn-1X

Status:

Completed

Latitude\Longitude:

36° 39' 50.772" 116° 25' 26.835"

Legal Description:

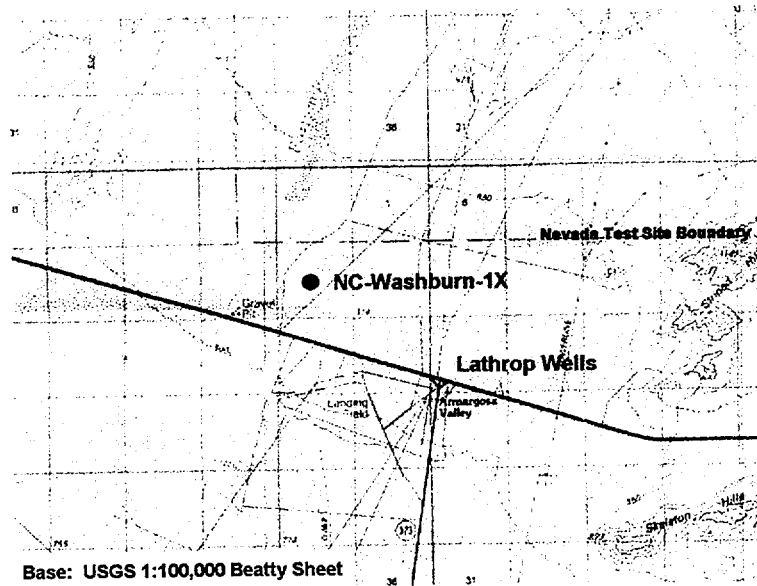
Township 15 S Range 49 E
Section 11 NW 1/4 SE 1/4 1/4

Elevation:

823.48 m AMSL (2701.7 ft ±) GPS

Access:

Highway 95 west from Lathrop Wells
about 2.2 mi; turn north on gravel
road. Go north 1.0 mi. Site is
located on west side of road.



Purpose: 1) investigate reported anomalous water level; 2) determine thickness and depth of clay layer in area west of Lathrop Wells; 3) provide water level and water chemistry data; and 4) investigate reported occurrence of gas and oil shows.



Base: Thematic Mapper Image of the Lathrop Wells 7.5° Quadrangle

NC-Washburn-1X is located near the site of an abandoned borehole drilled in 1958. According to the Well Drillers Report for this well, the depth to water is 815 ft below land surface. The Well Drillers Report also indicated a show of oil and gas at a depth of 793-804 ft. The borehole was not cased and has subsequently caved. To avoid problems during drilling and the liability of plugging & abandoning the existing borehole, NC-Washburn-1X was sited about 1/4 mile from the original Washburn well site. The well was drilled to a depth of 658 ft. and the static water level in the well after completion was 353.8 ft. below land surface. The clay that is 400+ feet thick at Lathrop Wells is only 7 feet thick at NC-Washburn-1X. Water samples were collected for analysis.

**NC-WASHBURN- 1X
SITE SUMMARY**

Land surface

0-658' Valley-fill Alluvium

0-165' silty sand w/ cobbles, mod. yell-brn (10YR 6/2), fg sand 0-5', coarsens, <10% gravel, cobbles in beds, mostly volcanic clasts, tuffs and basalt; coarse cobbles 90-95'; coarse gravel beyond 110'

200 ft

165-295' coarse gravels, reddish brown (10R 4/2) due to red rhyolitic clasts, subround to round, coarse sand bed 193-200'

295-315' coarse sand

315-382' pebble gravels, locally sandy

400 ft

382-397' coarse sand and fine pebbles
397-425' coarse pebbly gravel
425-430' coarse sand
430-440' no return
440-445' gravel, multicolored

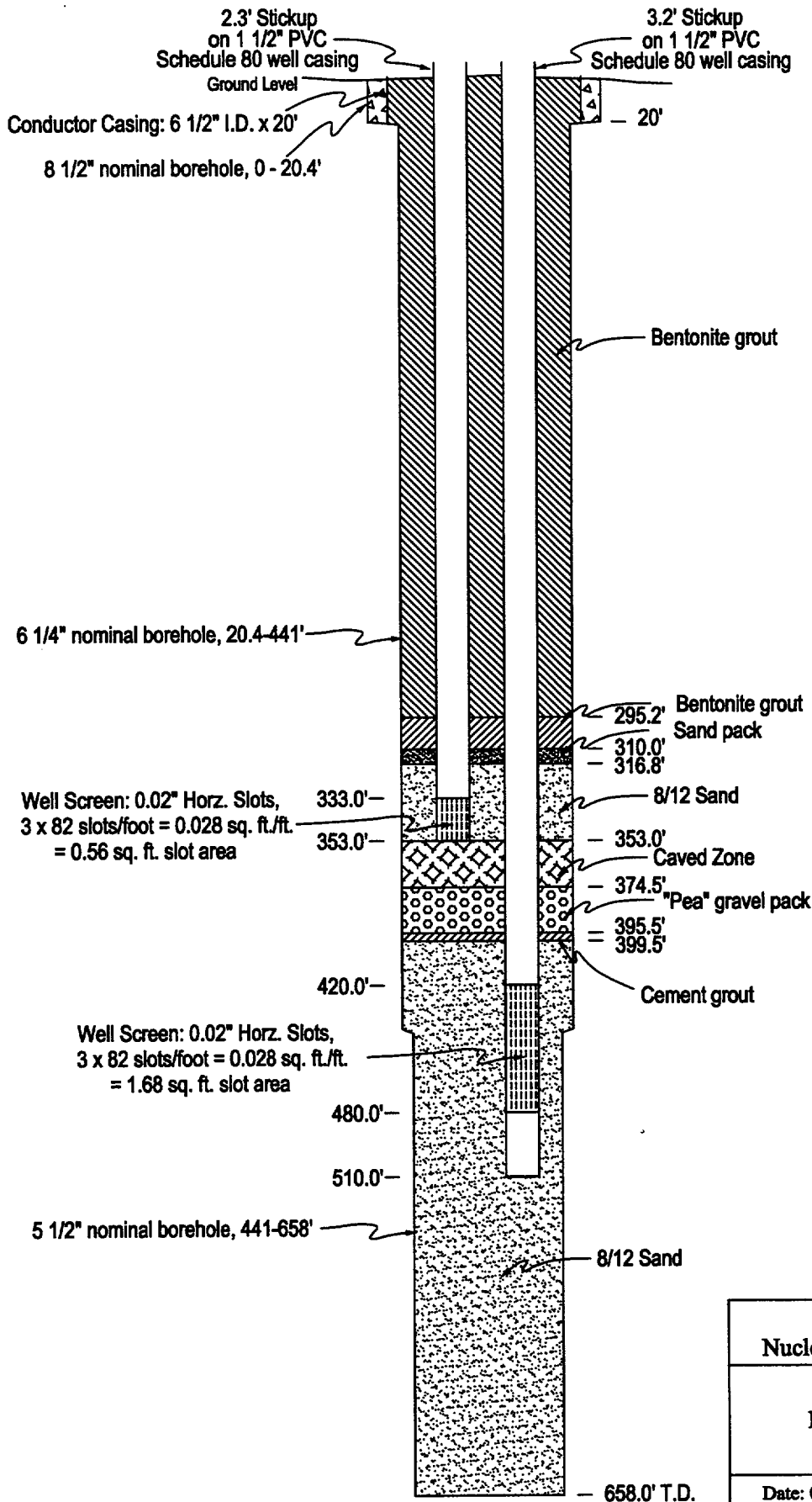
445-545' sandy gravel, various clast types, gen. red brown colors, 1' ft. boulder 480-481, 530-540' coarser gravels

600 ft

545-552' clay with fine pebbles and sand, light brown (5YR 5/6)
552-658' sand, coarse sand and fine gravel, common dark red and grey rhyolitic pebbles, cobbles beyond 640', 655-658 no sample

658 ft
(TD)

**NC-Washburn-1X
SUMMARY LITHOLOGIC LOG**



NOTES

1. Horizontal scale exaggerated 75X.
2. All depths referenced to ground level.
3. All casing and screen is flush threaded.
4. Sand pack is a mixture of #30 and 10-20 sand.
5. 395.8 - 395.5 is 8/12 Sand.
6. 12 joints (240') of 3/4" tremie pipe left in annular space above 295.2'.
7. Well casings not to horizontal scale.

Nye County, Nevada
Nuclear Waste Repository Project Office

Early Warning Drilling Program
NC - EWDP - Washburn-1X
Well Completion Diagram

Date: 03/99
Scale: 1" = 75'

Geologist: MC/JSW
Drawn by: JSW

11 *Tom Buep*
NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC-WASHBURN-1X

Borehole ID _____ Drill Depth From 0.0 To 658.0 FT Page 1 of 11

Driller EARL MANGUM/NIEL HALE Start Date/Time 12/1/98, 1245 End Date/Time 12/5/98 2030

Drilling Equip./Method SCHRAMM 685 DHH Sampling Equip./Method cuttings collected at collar from 0-20'

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
0-5	BCS 00000 251	VALLEY FILL 0.0-658.0 SILTY SAND: Pale yel brn (10YR 6/2) dry; Moderate yel brn (10YR 5/4) when wet. Fine sand from 0.0-5.0'. Sand coarse below 5.0' < 10% fine subangular volcanic gravels. Some cobbles from 3.0-5.0'. Occasional boulders below 5.0'.			Samples wet from 0-20' due to injected water
5-10	BCS 00000 252				
10-15	BCS 00000 253				
15-20	BCS 00000 254				
20-25	BCS 00000 255	COBBLES COMMON, WITH SILT & SAND MIXED LITHOLOGY, WELDED TUFFS AND TUFFACEOUS UNITS			B. ARQUIST WELDING SLAG IN SAMPLE WHILE FIXING SAMPLE SPLITTER. 1 1/2" SCHED 80 PVC HOLE FILLED WITH AQUAGUARD
25-30	BCS 00000 256				
30-35	BCS 00000 257				
35-40	BCS 00000 258				
40-45	BCS 00000 259				
45-50	BCS 00000 260				
50-55	BCS 00000 261				
55-60	BCS 00000 262				

COPY

LOGGED BY K. DONNELSON 0-20'

Prepared By BENT ARQUIST Date 12-2-98 Checked By ARTHUR J. MENDENHALL 1/4/99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC-WASHBURN-1X

Borehole ID _____ Drill Depth From 60 To 120 Page 2 of 11
 Driller ERIC WILLIAMS Start Date/Time N/A End Date/Time N/A
 Drilling Equip./Method SCRAM 685 DHH Sampling Equip./Method CUTTINGS COLLECTED IN BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Lithologic Unit	Notes
--------------	--	--------------------------------------	-----------------	-------

65	BGS 263	Mixed Lithology - Mostly Tuffs and Welded Tuffs		
70	BGS 264			
75	BGS 265			
80	BGS 266	BASALT FRAGMENTS COMMON BELOW 80'		
85	BGS 267	CAICHE PRESENT ON 5% OF ROCK FRAGMENTS		
90	BGS 268			
95	BGS 269			LARGE PEBBLES & COBBLES CLOGGING X-OVER. BLOCKING RETURN. DRILLER TRIPPED OUT TO FIELD BARS ON X-OVER. WHEN HE GOT TO 100'
100	BGS 270			
105	BGS 271			
110	BGS 272			
115	BGS 273	BASALT FRAGMENTS COMMON, MINOR FLUO-BANDED RHYOLITE MOSTLY TUFF FRAGMENTS		
120	BGS 274			

GRAPHIC LOG

Lithologic Unit

Notes

1 1/2" SCRP BOPVC
HOLE FILLED WITH
MOUNGUARD

CORRE ANCHOR CAVEL
PLUGGING RETURN AT
TIMES

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN-1X Drill Depth From 120 To 180 Page 3 of 11
 Driller EARLIFE-GUY/NEIL HALE Start Date/Time N/A End Date/Time N/A
 Drilling Equip./Method SCHRAMM 685 DHH Sampling Equip./Method WET / BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
125	BCS 00000 275	VALLEY FILL MIXED LITHOLOGY MOSTLY TUFFS			
130	BCS 00000 277	COARSE GRAVEL			
135	BCS 00000 278				
140	BCS 00000 279	HOSTLY COARSE SAND/GRIT			
145	BCS 00000 280	COARSE GRAVEL			
150	BCS 00000 281				
155	BCS 00000 282				
160	BCS 00000 283	--- SHIFT CHANGE - NIGHT SHIFT ON (A. MENDENHALL, logging by Jame Walker J. WALKER)			
165	BCS 00000 284	<u>Coarse Gravels</u> coarse gravels, mostly w/ volcanic clasts of reddish rhyolite (10R 4/2).			
170	BCS 00000 285				
175	BCS 00000 286	becoming coarser w/ large pebbles in return.			

OPY

1 1/2" SCHED 80 PVC
 HOLE FILLED WITH
 AQUAGUARD

Prepared By PHIL ALLEN / JAMIE WALKER Date 12-2-98 Checked By A. MENDENHALL Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC- WASHBURN - 1X

Borehole ID _____ Drill Depth From 180 To 240 Page 4 of 11

Driller NEIL HALE / EARL MAGNOLI Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM GBS DEH Sampling Equip./Method WET / BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
185	BCS 00000 287	Coarse gravels w/ volcanic clasts (as above)			
190	BCS 00000 288				
195	BCS 00000 289	Reddish (10R 4/2) volcanic boulder (~2')			
200	BCS 00000 290	Coarse sand bed - lost return, bit plugging at exchange Plugged bit ~ 196' - tripped out three times (20:30 - 05:00) — end of night shift —			
205	BCS 00000 291	COARSE GRAVEL - ANGULAR TO ROUND, VOLCANIC CLASTS PEBBLE SIZE			12-3-98 DAY SHIFT
210	BCS 00000 292				1 1/2" SCHED 80 PVC HOLE FILLED WITH AQUAGUARD
215	BCS 00000 293				
220	BCS 00000 294				
225	BCS 00000 295	GRAVEL MOSTLY ROUNDED			
230	BCS 00000 296				
235	BCS 00000 297				
240	BCS 00000 298				

OPY

Prepared By Jim Walker/BENT Date 12-2-98 Checked By Arthur J. Mendonca Date 1/4/99
ARQUIST

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC WASHBURN-1X

Borehole ID _____ Drill Depth From 240 To 300 Page 5 of 11

Driller ELMER W. BAQUIST Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 605 DHH Sampling Equip./Method WET BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
245	BCS 00000 299	COARSE GRAVEL, PEBBLES, MOSTLY ROUND			12 SECTIONS OF 20' LONG 3/4" TREMIE PIPE LOST IN HOLE. BOTTOM OF PIPE AT 295' IN BENTONITE HOLE PLUG.
250	BCS 00000 300				
255	BCS 00000 301				
260	BCS 00000 302				
265	BCS 00000 303				
270	BCS 00000 304				
275	BCS 00000 305				
280	BCS 00000 306				
285	BCS 00000 307				
290	BCS 00000 308				
295	BCS 00000 309	VERY COARSE SAND			FROM HERE TO SURFACE HOLE FILLED WITH AQUAGUARD
300	BCS 00000 310				

COPY

1 1/2" SCHED 80 PVC

BENTONITE HOLE PLUG

Prepared By ELMER W. BAQUIST Date 12-2-98 Checked By ARTHUR J. MENDENHALL Date 1/4/99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC-WASHBURN-1X

Borehole ID _____ Drill Depth From 200 To 260 Page 6 of 11

Driller ERIC W. HARRISON Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DTH Sampling Equip./Method WET BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
305	BCS 00000 311	Mostly coarse sand			Zone filled with bentonite hole plug
310	BCS 00000 312				Zone filled with 10-20 sand
315	BCS 00000 313				Zone filled with 30 sand
320	BCS 00000 314				Sched. BC 1 1/2" PVC PIPE
325	BCS 00000 315				Zone filled with 8-12 sand
330	BCS 00000 316	Coarse pebble with minor sand			Zone filled with B-12 sand
335	BCS 00000 317				2 0.020" 3/8" PVC SCHEDULE 80 1 1/2" PVC SCHEDULE 80
340	BCS 00000 318				DRILLING WITH MORE POLYMER HEAD TO STABILIZE HOLE
345	BCS 00000 319				
350	BCS 00000 320				
355	BCS 00000 321				Zone filled with CAVE MATERIAL
360	BCS 00000 322				DRILL DOWN FROM 1230 TO 1515 WAS TRIPPED OUT TO PUT ADAPTOR ON ABOVE POWER TO PREVENT SAND FROM PLUGGING PORTS

COPY

Prepared By ERIC HARRISON Date 12-2-99 Checked By ANDREW MEYER Date 1/4/99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

NC - WASHBURN - 1X

Borehole ID _____ Drill Depth From 360 To 420 Page 7 of 11

Driller ERIK M. HAY / NEIL HALE Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DHH Sampling Equip./Method NET BUCKET

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes	
365	BCS 00000 323	VALLEY FILL COARSE PEBBLE GRAVEL			ZONE FILLED WITH CAVED MATERIAL AFTER GRAVEL WAS ADDED	
370	BCS 00660 324					
375	BCS 00000 325					
380	BCS 00000 326					ZONE FILLED WITH 10 - 5 GALLON BUCKETS OF PEA GRAVEL
385	BCS 00000 327	COARSE SAND TO FINE PEBBLE				
390	BCS 00000 328					1 1/2" SCHED 80 PVC ZONE REQUIRED 7150 POUNDS OF 8-12 SAND AND 34 - 5 GALLON BUCKETS OF PEA GRAVEL TO FILL
395	BCS 00000 329	COARSE PEBBLY GRAVEL COARSE SAND				
400	BCS 00000 330	COARSE PEBBLY GRAVEL STARTED BETWEEN 397' AND 398'				395.8' CEMENT PLUG
405	BCS 00000 331	- HOLE MAKING A LITTLE WATER - APPARENT AT 401.5'				400'
410	BCS 00000 332					8-12 SAND PACK PACK DAY SHIFT STOPPED DRILLING AT 404' 12-3-98
415	BCS 00000 333					
420	BCS 00000 334					

COPY

Prepared By BENT AQUIST Date 12-3-98 Checked By ARTHUR J. MEYER Date 1/4/99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN-1X Drill Depth From 420 To 480 Page 8 of 11

Driller EARL MANGUM / NEW HALE Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 625 DMH Sampling Equip./Method MET BUCKET

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
425	BCS 00000 335	VALLEY FILL			
430	BCS 00000 336	COARSE SAND, similar to coarse sand at 193' with similar lost return.			8/12 SAND PACK
435	BCS 00000 337	NO CUTTINGS RECOVERED	No SAMPLE		0.020" SLOT SCHED 80 1 1/2" PVC SCREEN
440	BCS 00000 338	NO CUTTINGS RECOVERED	No SAMPLE		
445	BCS 00000 339	POOR RECOVERY Primarily multicolored gravels.			FROM 0600 - 1410 12-4-98 SPENT RECONDITIONING HOLE
450	BCS 00000 340	NO CUTTINGS RECOVERED	No SAMPLE		
455	BCS 00000 341	Sandy gravels; various rock fragment types; gen. red-brown colors, very little fine material			END OF DAY SHIFT START OF NIGHTSHIFT 12-4-98 from 1800 - 0340 of 12-4-98/12-5-98 changing to new bit type (non-exchange) and re-starting recovery
460	BCS 00000 342				
465	BCS 00000 343				
470	BCS 00000 344				
475	BCS 00000 345				
480	BCS 00000 346				

Prepared By BENT HOGST/EMILIE WALKER Date 12-5-98 Checked By ARTHUR J. McNEWMAN Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN-1X Drill Depth From 480 To 540 Page 9 of 11

Driller NEIL HALE Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DMT Sampling Equip./Method WET BUCKET

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
485	BCS 00000 347	Sandy gravels as above 1' boulder 480-481		1/2" PVC BLANK SECTION	
490	BCS 00000 348				
495	BCS 00000 349				
500	BCS 00000 350				
505	BCS 00000 351				
510	BCS 00000 352				
515	BCS 00000 353				
520	BCS 00000 354				
525	BCS 00000 355				
530	BCS 00000 356				
535	BCS 00000 357				
540	BCS 00000 358				

COPY

Prepared By JAMIE WALKER Date 12-4-98 Checked By ANDREW J. MENDENHALL Date 1-4-99
NIGHT SHIFT

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WABURN-1X Drill Depth From 540 To 600 Page 10 of 11

Driller NEIL HALE / EARL MANGUM Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 D#4 Sampling Equip./Method WET BUCKET

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BSC 00000	SANDY GRAVELS, AS ABOVE			
545	359 BSC 00000	Clay with fine pebbles and sand, light brown (54R 5/6)			
550	360 BSC 00000	Coarse sands and gravels.			
555	361 BSC 00000				
560	362 BSC 00000				END OF NIGHT SHIFT 538' DAY 12-5-98
565	363 BSC 00000				POOR SAMPLE RECOVERY 565 - 570'
570	364 BSC 00000	SAND, Pale ye' brn (10YR 6/2), fine-grained, some gravels, trace clay.			
575	365 BSC 00000	COARSE ANG SAND WITH FINE GRAVELS, Brn gray (5YR 4/1) OVERALL COLOR, COMPOSED OF MULTICOLOR GRAINS			
580	366 BSC 00000				CLEARED HOLE DOWN TO 575' FROM 0655 TO
585	367 BSC 00000				
590	368 BSC 00000				
595	369 BSC 00000				
600	370 BSC 00000				

COPY

Prepared By JANIE WALKER Date 12-4-98 / NIGHT / 12/5/98 DAY Checked By ARTHUR J. MENDENHALL Date 1/4/99

KEN DONNELSON

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID UC-WASHBURN-1X Drill Depth From 600.0 To 658 T.D. Page 11 of 11

Driller EARL MANGUM/NEIL HALE Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DMH Sampling Equip./Method NET BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
600	BSC 00000 371	COARSE ANGULAR SAND WITH FINE GRAVELS, MULTICOLORED GRAINS	(Symbolic representation of coarse sand with fine gravels)		
605	BSC 00000 372	Increased orange grains from 605-610'	(Symbolic representation of orange grains)		
610	BSC 00000 373	Increased white, soft, opaque gravel (zeolite?) below 610	(Symbolic representation of white soft gravel)		
615	BSC 00000 374		(Symbolic representation)		
620	BSC 00000 375		(Symbolic representation)		
625	BSC 00000 376		(Symbolic representation)		
630	BSC 00000 377		(Symbolic representation)		
635	BSC 00000 378	12/5/98 DAY SHIFT NIGHT SHIFT	(Symbolic representation)		Stopped drilling at 638' Started producing water at 1222, 12-5-98 ≈ 40gpm, 76-80°F STOPPED RUNNING @ 145'
640	BSC 00000 379	Coarse sand and gravels, multicolored, common dark red rhyolite pebbles/cobbles and grey glassy quartz porphyritic rhyolite pebbles (N7). Slightly coarser than section 620-635'.	(Symbolic representation of coarse sand and gravels)		Resumed drilling after hydrological tests while awaiting arrival of geophysical logging
645	BSC 00000 380		(Symbolic representation)		
650	BSC 00000 381		(Symbolic representation)		
655	NO SAMPLE	hole stopped @ 658' for geophysical logging	NO SAMPLE		
			T.D.		

COPY

Prepared By KEN DANNELSON/JAMIE WALKER Date 12/5/98 Checked By ARTHUR J. MENDENHALL Date 1-4-99

OVERSIZE DOCUMENT PAGE(S) PULLED

SEE APERTURE CARD FILES

APERTURE CARD/PAPER COPY AVAILABLE THROUGH NRC FILE CENTER

NUMBER OF OVERSIZE PAGES FILMED ON APERTURE CARD(S) 1

ACCESSION NUMBERS OF OVERSIZE PAGES:

9906100166-08

**THIS PAGE IS AN
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OR FIGURE,**

**THAT CAN BE VIEWED AT
THE RECORD TITLED:**

NONE:

BOREHOLE: WB 1X

LOGS: GAMMA NEUTRON

**DENSITY CALIPHER SONIC RESISTIVITY
DEVIATION FLUID LOGS**

**WITHIN THIS PACKAGE...OR,
BY SEARCHING USING THE
DRAWING NUMBER:**

NONE

NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

9906100166-08

D-8

Instructions for extracting (unzipping)

Nye County Early Warning Drilling Program geophysical data files:
(Windows 3.x, 95, 98, NT only)

- 1) Insert floppy disk in drive "x", usually a: ;
- 2) From Explorer (or File Manager), click on drive "x";
- 3) Double click on file "EWDPGeop" - application;
- 4) The PKSFX dialog box should appear, which allows setting extraction

options; click on the "Recreate subdirectories" button and click
"Extract"; all of the files will be extracted onto the C:\ drive

with this directory structure

```
C:\EWDPGeop
C:\EWDPGeop\1S\ files from NC-EWDP-1S well
C:\EWDPGeop\1D\ files from NC-EWDP-1D well
```

.
.
.

for all eight wells

NOTE: if the "Recreate subdirectories" option is not selected, files will be extracted directly into the root directly (a very messy option). The drive selector can also be invoked to extract files to other drives if needed.

Geophysical Logging Summary of Files

Hole No.	Filename	Extension	Description of Log	Depths Logged From	To
NC-EWDP-1D	1DXRAD	. AB1	Density, Gamma, Neutron	0	1601
	1DXRADR	. AB1	Density, Gamma, Neutron Repeat	0	266
	1DXDEEP	. AB1	Density, Gamma, Neutron	2	2472
	1DXDEEPR	. AB1	Density, Gamma, Neutron Repeat	2250	2472
	1DXELOG	. EDO	Compiled E-log Full Well	289	2425
	DEVO1DX	. CMP	Deviation	0	1601
	DEVO1DX	. ANG	Deviation	0	1601
	DEVO1DX	. XYZ	Deviation	0	1601
	DEVO1DX	. CMP	Deviation - Full Well	0	2400
	DEVO1DX	. ANG	Deviation - Full Well	0	2400
DEVO1DX	. XYZ	Deviation - Full Well	0	2400	
NC-EWDP-1S	1S	. EBO	E-Logs / Temperature	0	238
	1S309R	. EBO	E-Logs / Temperature	257	306
	1SR	. CA0	Caliper	125	235.9
	1S309R	. CB0	Caliper	257	306
	1S309R	. CA0	Unprocessed Caliper	257	302
NC-EWDP-2D	2D	. AB1	Density, Gamma, Neutron	2	428
	2DR	. AB1	Density, Gamma, Neutron Repeat	43	320
NC-EWDP-3D	3DELOGF	. EB0	E-Logs, Sonic	110	2222
	3DELOG	. EB0	E-Logs, Sonic Repeat	1999	2236
	3DFINAL	. AC1	Density, Neutron, Caliper, Sonic	0	2223
	DEVO3D	. CMP	Deviation	0	2500
	DEVO3D	. ANG	Deviation	0	2500
	DEVO3D	. XYZ	Deviation	0	2500
NC-EWDP-3S	3SFULL	. AB1	E-Logs, Nuetron, Density	0	530
	3SREPT	. AB1	E-Logs, Nuetron, Density Repeat	297	540
	DEVO3S	. CMP	Deviation	0	540
	"	. ANG	Deviation	0	540
	"	. XYZ	Deviation	0	540
	3SMAIN	. SFO	Sonic	257	526
	3S	. SFO	Sonic Repeat	295	526
NC-EWDP-5S	5S	. AB1	Density, Gamma, Neutron	2.5	1158
	5SREPT	. AB1	Density, Gamma, Neutron Repeat	466	702
	5SELOG	. AB1	E-Logs, Caliper	466	960
	5SELOG	. AB1	E-Logs, Caliper Repeat	945	1158
	DEVO5S	. CMP	Deviation	0	1160
	"	. ANG	Deviation	0	1160
	"	. XYZ	Deviation	0	1160
NC-EWDP-9SX	09SXRAD	. AA1	Density, Gamma, Neutron	0	397
	09XRADR	. AB1	Density, Gamma, Neutron Repeat	197	396
	*	. FBO	Spinner		
NC-EWDP-WASHBURN-1X	1XELOG	. AB!	E-Logs / Temperature	326	516
	WASHBURN	. AD1	Density, Gamma, Neutron	0	657.5
	DEVO1D	. CMP	Deviation	0	640
	"	. ANG	Deviation	0	640
	"	. XYZ	Deviation	0	640