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
WM-11 PDR

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

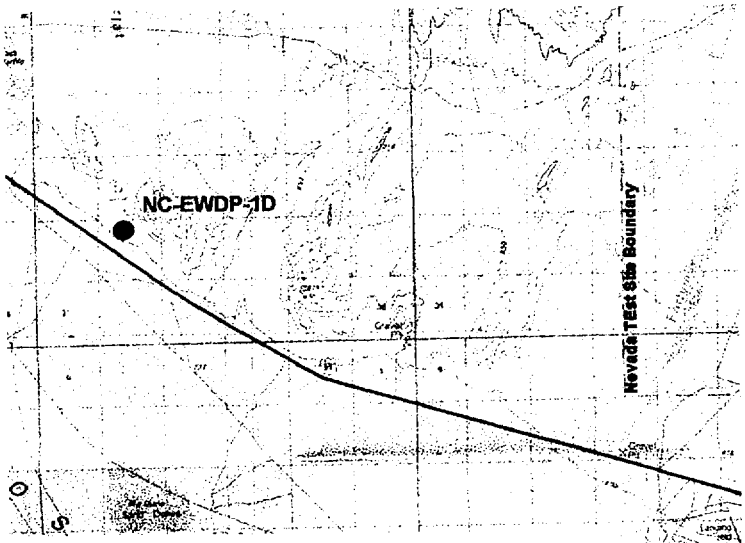
na = not available

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.



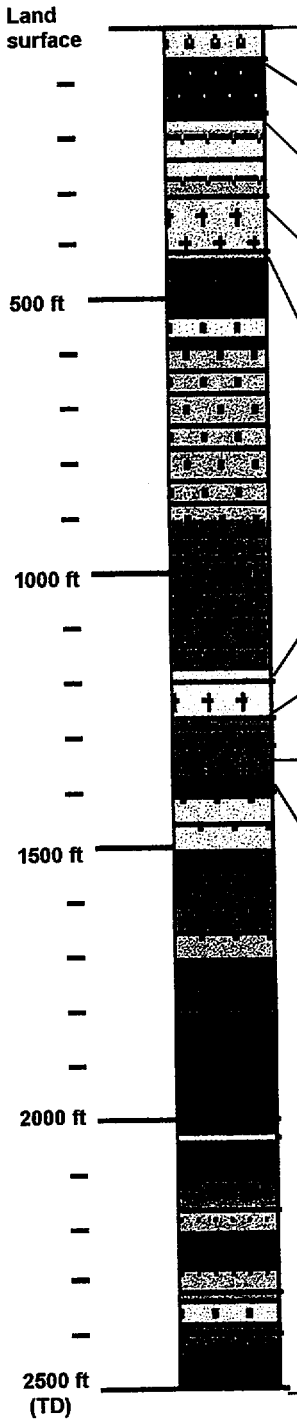
Base: USGS 1:100,000 Beatty Sheet (not to scale)

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



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 sanidine 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 microbreccisa 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 NC-EWDP-1DX Drill Depth From 0.0 To 60 Page 1 of 42

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

Drilling Equip./Method 0-32' 6.0'x1.8' Auger / 32'+ Schramm T685 DHH Sampling Equip./Method 0-32' Auger / 32-105 RC In-hole hammer / 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 (5Y 8/1); some places are rain crusted on surface; poorly consolidated.		Qsd	
	BCS00000 952				
5	BCS00000 953				
10	BCS00000 954				
15	BCS00000 955	Some gravel mixed with fine silty spring deposit material. Gravel is angular.			
20	BCS00000 956				
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 T685DHH. Started drilling 0300HRS on 12-11-98
35	BCS00000 959	Spring deposits, clay-rich, yellowish grey (5Y 8/1). 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				
55	BCS00000 963	- - - Static Water Level - 56.62'			
60					

Prepared By Michael Cline / Jamie Walker Date 12-10-98 / 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-1DX Drill Depth From 60 To 120 Page 2 of 42

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

Drilling Equip./Method SCHRAMM T685 DTH 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
	BCS 00000 964	— Hit water; water in return cuttings at		Qsd	Stopped drilling at 63.0' due to water. Static water level at 56.25' 12-11-98 05:20
65	BCS 00000 965	Alluvial gravels; brownish grey (5YR 4/1), poorly sorted cobbley gravels with a coarse sand matrix. Mostly reddish-grey volcanic clasts. Clay coating (similar to spring deposits) to ~80'.		Qg	
70	BCS 00000 966				
75	BCS 00000 967				
80	BCS 00000 968				
85	BCS 00000 969				
90	BCS 00000 970				
95	BCS 00000 971				
100	BCS 00000 972				
105	BCS 00000 973				
110	BCS 00000 974	— — hard ground - slow drilling Obvious caliche			
115	BCS 00000 975				
120					

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 DHH Sampling Equip./Method _____

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

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

Driller EARL MANGUM / 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
	BCS 00000 988	WELDED CRYSTAL TUFF AS ABOVE BUT PALE YELLOWISH BROWN (10 YR 6/2)		TWT	
185	BCS 00000 989				
190	BCS 00000 990				
195	BCS 00000 991				
200	BCS 00000 992				
205	BCS 00000 993	205 - 220 WELDED CRYSTAL TUFF AS ABOVE BUT LIGHT BROWN (5YR 6/4)			
210	BCS 00000 994				
215	BCS 00000 995				
220	BCS 00000 996				BROKEN GROUND AT 217' WITH WATER PUMPED > 100 GAL/MIN FROM 1115 TO 1135 HRS. Air pumped well commun[illegible] with surface.
225	BCS 00000 997				
230	BCS 00000 998				
235	BCS 00000 999	harder, less fractured			
240					Water sample taken by Don Shellel from sample splitter-240'

Prepared By BENT AAQUIST (DAY) JAMIE WALKER (NIGHT) Date 12-12-98 Checked By BENT AAQUIST 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 T685DHH 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		Twt	
245	BCS 0000 1001				
250	BCS 0000 1002				
255	BCS 0000 1003				
260	BCS 0000 1004				
265	BCS 0000 1005				
270	BCS 0000 1006				
275	BCS 0000 1007	Unit changes color to pale purple-grey (5RP 6/2 to 5R 6/2)			
280	BCS 0000 1008				
285	BCS 0000 1009				
290	BCS 0000 1010				
295	BCS 0000 1011				
300					

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-1DX 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 1012	Welded Tuff, as above		Twt	
305	BCS 1013				
310	BCS 1014	Tuff, ash fall, green, clay-altered. Very soft, strongly clay altered aphyric aphanitic ash unit. Color varies from greyish yellow green (5GY 7/2) to dusky yellow green (5GY 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 competant rock beyond ~360', where the color become greyish yellow green (5GY 7/2) to pale greenish yellow (10Y 8/2)		Taf	
315	BCS 1015				
320	BCS 1016				
325	BCS 1017				
330	BCS 1018				
335	BCS 1019				
340	BCS 1020				
345	BCS 1021				
350	BCS 1022				
355	BCS 1023				
360					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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 T685DHH Sampling Equip./Method CYCLONE/SPLITTER

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
360 BCS 0000 1024 365 BCS 0000 1025 370 BCS 0000 1026 375 BCS 0000 1027 380 BCS 0000 1028 385 BCS 0000 1029 390 BCS 0000 1030 395 BCS 0000 1031 400		Green clay-altered ash, as above gradational contact 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.			
BCS 0000 1032 405 BCS 0000 1033 410		TUFF, ASHFALL, PALE YELLOWISH BROWN, MOSTLY PUMICE, DEVITRIFIED TUFF, ASHFLOW, DARK YELLOWISH ORANGE 10YR 6/6, MODERATELY WELDED, PHENOCRYSTS ~10% QUARTZ, 5% SANIDINE, 1% BIOTITE			
BCS 0000 1034 415 BCS 0000 1035 420		SILTSTONE, MED. DARK GRAY (N4) (50% LIGHT OLIVE GRAY 5Y 5/2 410-420) MINOR (1-10%) TUFF, ASHFLOW, GRAYISH BROWN 5YR 3/2 FRAGEMENTS THROUGHOUT (LACUSTRINE/PLAYA)			

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NL-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/SPLITTER

Depth (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	Graphic Log	Lithologic Unit	Notes
420		SILTSTONE, AS ABOVE			
BCS 0000 1036					
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		1% LIGHT GRAY SILTSTONE IN ROCK			
BCS 0000 1047					
480					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 480 To 540 Page 9 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
480		SILTSTONE, AS ABOVE			
BCS 0000 1048					
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 NC-EWDP-1DX 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 SPLITTER

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 (5Y 7/2)			
545					
	BCS 0000 1061	545' TO 555' OLIVE GRAY (5Y 3/2)			
550					
	BCS 0000 1062				
555					
	BCS 0000 1063	555' TO 560' YELLOWISH GRAY (5Y 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 AARUIST Date 12-13-96 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 600' To 660' Page 11 of 42

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

Drilling Equip./Method SCHRAHM 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
	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.			
605	BCS 0000 1073				
610	BCS 0000 1074				
615	BCS 0000 1075				
620	BCS 0000 1076				
625	BCS 0000 1077				
630	BCS 0000 1078				
635	BCS 0000 1079				
640	BCS 0000 1080				
645	BCS 0000 1081				648' END OF DAYSHIFT 12-13-98
650	BCS 0000 1082				slow drilling - bit is "mudding up", very soft clay-rich rock.
655	BCS 0000 1083				
660					

Prepared By JAMIE WALKER Date 12-13-98 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 660' To 720' Page 12 of 42

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

Drilling Equip./Method SCHRAMM T685 DHH Sampling Equip./Method WET/CYCLONE/SPLITTER/BUCKETS/OLFEN 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 competant, generally light blueish grey (5B 7/1)			
665	BCS 0000 1085				
670	BCS 0000 1086				
675	BCS 0000 1087				
680	BCS 0000 1088				Drilling speed increasing but still slow.
685	BCS 0000 1089				
690	BCS 0000 1090				
695	BCS 0000 1091				
700	BCS 0000 1092				
705	BCS 0000 1093	1% TUFF, AS BELOW			
710	BCS 0000 1094	50% TUFF, ASH FALL/REWORKED, WHITE 9N, MOSTY VITRIC PUMICE			
715	BCS 0000 1095	10% TUFF, AS ABOVE			
720					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 720 To 780 Page 13 of 42

Driller _____ 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
720	BCS 0000 1096	SILTSTONE, AS ABOVE, MEDIUM BLUISH GRAY 5B 5/1 VARIES FROM POORLY TO MODERATELY CONSOLIDATED			
725	BCS 0000 1097				
730	BCS 0000 1098				
735	BCS 0000 1099				
740	BCS 0000 1100				
745	BCS 0000 1101				
750	BCS 0000 1102	750'-755' SILTSTONE WITH CLAY, YELLOWISH GRAY 5Y 7/2			
755	BCS 0000 1103	SILTSTONE AS ABOVE 750', BLUISH GRAY 5B 5/1			
760	BCS 0000 1104				
765	BCS 0000 1105				
770	BCS 0000 1106				DRILLING RATE INCREASED
775	BCS 0000 1107				
780					

Prepared By ARTHUR J. MENDENHALL Date 12/13/99 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 780 To 840 Page 14 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
780	BCS 0000 1108	SILTSTONE, LACUSTRINE/PLAYA, MEDIUM BLUISH GRAY 5B 5/1, AS ABOVE			
785		WHEN DRY - LIGHT GRAY N7			
	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				
840					

Prepared By ARTHUR J. MENDENHALL Date 12/13/98 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-IDX Drill Depth From 840' To 900 Page 15 of 42

Driller EARL MANGUM 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
845'	BCS 0000 1120	SILTSTONE AS ABOVE BECOMES LIGHT GRAY N7 WHEN DRY			
850'	BCS 0000 1121				
855'	BCS 0000 1122				
860'	BCS 0000 1123				
865'	BCS 0000 1124	CLAY RICH SILTSTONE, COARSE FRAGMENTS ARE LIGHT GRAY N7 TO YELLOWISH GRAY 5Y 8/1			CLAY RICH ZONE - RODS BINDING - ONLY MINOR COARSE RETURN
870	BCS 0000 1125	SILTSTONE AS ABOVE 860'			
875	BCS 0000 1126				
880'	BCS 0000 1127				
885'	BCS 0000 1128				
890	BCS 0000 1129				
895	BCS 0000 1130				
900	BCS 0000 1131	MINOR FRAGMENTS OF WELDED TUFF WITH SILTSTONE			

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

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

Drilling Equip./Method SCHRAHM 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
	BCS 0000 1132	SILTSTONE, as above, bluish-grey (5B5/1).			
905'	BCS 0000 1133				905'-908' DRILL WATER WAS RUSTY BROWN AT 908' IT BECAME GRAY AGAIN
910'	BCS 0000 1134				
915'	BCS 0000 1135				
920'	BCS 0000 1136	Soft, clay-rich section			
925'	BCS 0000 1137				
930'	BCS 0000 1138				
935'	BCS 0000 1139				
940'	BCS 0000 1140				
945'	BCS 0000 1141	Soft, clay-rich section 945-960'			
950'	BCS 0000 1142				
955'	BCS 0000 1143				end of day Sheet 12-14-98
960'					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX 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
	BCS 0000 1144	SILTSTONE, as above, bluish-grey (5B 5/1)			Start of night shift 12-14-98 - 960'
965'					
	BCS 0000 1145				consistent drilling speed.
970'					
	BCS 0000 1146				
975'					
	BCS 0000 1147				
980'					
	BCS 0000 1148				
985'					
	BCS 0000 1149				
990'					
	BCS 0000 1150				
995'					
	BCS 0000 1151				
1000'					
	BCS 0000 1152				
1005'					
	BCS 0000 1153				
1010'					
	BCS 0000 1154				
1015'					
	BCS 0000 1155				
1020'					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1020 To 1080 Page 18 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
	BCS 0000 1156	SILTSTONE, AS ABOVE, MEDIUM BLUISH GRAY 5B 5/1 10% SILTSTONE, LACUSTRINE/PLAYA, DUSKY YELLOW GREEN 5GY 5/2			
1025'	BCS 0000 1157				
1030'	BCS 0000 1158				
1035'	BCS 0000 1159				
1040'	BCS 0000 1160	90% SILTSTONE, AS ABOVE, MEDIUM BLUISH GRAY 5B 5/1 10% SILTSTONE, LACUSTRINE/PLAYA, DUSKY YELLOW GREEN 5GY 5/2			
1045'	BCS 0000 1161				
1050'	BCS 0000 1162				
1055'	BCS 0000 1163				
1060'	BCS 0000 1164				
1065'	BCS 0000 1165				
1070'	BCS 0000 1166				
1075'	BCS 0000 1167				
1080'					

Prepared By ARTHUR J. MENDEZ Date 12/14/90 (NIGHT) Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1080 To 1140 Page 19 of 42

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

Drilling Equip./Method SCHRAMM 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
	BCS 0000 1168	SILTSTONE, AS ABOVE, MEDIUM BLUISH GRAY 5B 5/1			
1085		10% SILTSTONE, LACUSTRINE/PLAYA, DUSKY YELLOW GREEN 5GY 5/2			
	BCS 0000 1169				
1090		SILTSTONE, AS ABOVE, MEDIUM DARK GRAY N4			
	BCS 0000 1170				
1095					
	BCS 0000 1171				
1100		FROM 1100-1165 1 TO 30% SILTSTONE, AS ABOVE, DUSKY YELLOW GREEN 5GY 5/2 TO MODERATE YELLOW GREEN 5GY 7/4.			
	BCS 0000 1172				
1105					
	BCS 0000 1173				
1110					
	BCS 0000 1174				
1115					
	BCS 0000 1175				
1120					
	BCS 0000 1176				
1125					
	BCS 0000 1177				
1130					
	BCS 0000 1178				
1135					
	BCS 0000 1179				
1140					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX 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 REVERSE CIRCULATION Sampling Equip./Method CYCLONE / SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1145	BCS 0000 1180	SILTSTONE, AS ABOVE, MEDIUM GRAY N5 TO MEDIUM BLUISH GRAY 5B 5/1.			
1150	BCS 0000 1181				
1155	BCS 0000 1182				
1160	BCS 0000 1183				
1165	BCS 0000 1184	clay rich area			1165 TO 1180 SAMPLES VERY MUCH CLAY
1170	BCS 0000 1185				
1175	BCS 0000 1186				
1180	BCS 0000 1187				
1185	BCS 0000 1188				
1190	BCS 0000 1189				
1195	BCS 0000 1190				
1200	BCS 0000 1191	TUFF, ASH FLOWS OR ASH FLOW GRAVELS, ASH FALL, OR RE-WORKED ASH FALL, GRAYISH BROWN 5YR 3/2, VERY PALE ORANGE 10YR 8/2, DARK YELLOWISH ORANGE 10YR, PALE REDDISH BROWN 10R 5/4	+ + + + +		1197 TO 1259 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 MAINGUM Start Date/Time _____ End Date/Time _____

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

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 1192	TUFF, AS ABOVE, CONTINUED; PUMICE, WHITE; PENOCAYSTS, 1% SANIDINE, 1% BIOTITE.			FROM 1200' TO 1260' DRILL WATER VARIED FROM YELLOW TO BROWN TO RUSTY RED
1205	BCS 0000 1193				
1210	BCS 0000 1194	↑ VERY PALE ORANGE 10YR 8/2 TO PALE YELLOWISH ORANGE 10YR 8/6			
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-1DA Drill Depth From 1260 To 1320 Page 22 of 42

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

Drilling Equip./Method SCHRAMM 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.
1270	BCS 0000 1955				
1275	BCS 0000 1956				ASH FLOW FRAGEMENTS
1280	BCS 0000 2050				
1285	BCS 0000 1957	SILTSTONE, LACUSTRINE/PLAYA, MEDIUM BLUISH GRAY 5B 5/1, OLIVE GRAY 5Y 3/2, DARK GREENISH GRAY 5GY 4/1 LAMINAE EVIDENT IN SOME CHIPS			SOFTER SILTSTONE
1290	BCS 0000 1958				ASH FLOW FRAGEMENTS
1295	BCS 0000 1959				
1300	BCS 0000 1960				
1305	BCS 0000 1961				
1310	BCS 0001 1962				
1315	BCS 0000 1963				
1320	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 (NIGHT) 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 SCHRAMM T685DHH/REVERS CIRCULATION Sampling Equip./Method CYCLONE/SPLITTER

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. 5BG 8/6			
1330	BCS 0000 1966				
1335	BCS 0000 1967				
1340	BCS 0000 1968				
1345	BCS 0000 1969				
1350	BCS 0000 1970				
1355	BCS 0000 1971				
1360	BCS 0000 1979	Trace py.			
1365	BCS 0000 1980	Vitrophyric Tuff, brownish grey (5YR 4/1), homogeneous. <1% fine brassy pyrite as druzy linings on fractures. LOCALLY 1-2% PY AS A CEMENT IN MICROBRECCIAS, LOCAL v.f.g. GRAINY TEXTURE - MAY BE A SILICEOUS SILTSTONE			
1370	BCS 0000 1981				
1375	BCS 0000 1982				
1380	BCS 0000 1983				

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

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

Drilling Equip./Method SCHAMM T685 DHH REVERSE CIRC. Sampling Equip./Method CYCLONE/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.			
1385	BCS 0000 1985				
1390	BCS 0000 1986	Tuff, reworked ash fall, very light grey (N8) to white N9.			
1395	BCS 0000 1987	INTERBEDDED FINE SANDSTONE VERY LIGHT GRAY (N8) TO MED. LIGHT GRAY (N6), WITH GREENISH GRAY (5G 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/GENT HARVIST Date 12-16-98 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DY Drill Depth From 1440 To 1500 Page 25 of 42

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

Drilling Equip./Method SCHRAMM T685DHH Sampling Equip./Method CYCLONE/SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 1996	SANDSTONE, SILTSTONE & CLAY AS ABOVE			
1445	BCS 0000 1997	Clay is usually Dark greenish Gray (5G4)			
1450	BCS 0000 1998	siltstone is usually Dark Grey (N3)			
1455	BCS 0000 1999	Sandstone is usually Medium light Grey (N6)			
1460	BCS 0000 2000				
1465	BCS 0000 2001				
1470	BCS 0000 2002				
1475	BCS 0000 2003				
1480	BCS 0000 2004				
1485	BCS 0000 2005				
1490	BCS 0000 2006				
1495	BCS 0000 2007				
1500					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1500' To 1560' Page 26 of 42

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

Drilling Equip./Method SCHRAMM T685DHH Sampling Equip./Method _____

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 2008	SANDSTONE, SILTSTONE & CLAY Dark Greenish Gray (5G 4/1)			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	1523'-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
	BCS 0000 2020	SANDSTONE, SILTSTONE & CLAY AS ABOVE			
1565					RETURN WATER 39.5°C
	BCS 0000 2021				
1570					
	BCS 0000 2022				
1575					
	BCS 0000 2023				
1580					
	BCS 0000 2024				
1585					
	BCS 0000 2025				
1590					
	BCS 0000 2026	Medium Grey (N5)			
1595		1595'-1600' MOSTLY CLAY			
	BCS 0000 2027				
1600					
	BCS 0000 2028				
1605					
	BCS 0000 2029				
1610					
	BCS 0000 2030				
1615					
	BCS 0000 2031				
1620					

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1620' To 1680' Page 28 of 42

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

Drilling Equip./Method SCHRAMM 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
	BCS 0000 2032	SANDSTONE, SILTSTONE & CLAY AS ABOVE LOCAL WHITE TUFF FRAGMENTS 1620'-1630'			
1625	BCS 0000 2033				
1630	BCS 0000 2034				
1635	BCS 0000 2035				
1640	BCS 0000 2036				
1645	BCS 0000 2037				
1650	BCS 0000 2038				
1655	BCS 0000 2039	SANDSTONE, VOLCANIC SOURCE, PALE YELLOWISH BROWN 10YR 6/2 (1665 TO 1710), 1-10% SILTSTONE, LACUSTRINE/PLAYA, MEDIUM DARK GRAY N4			
1660	BCS 0000 2040				
1665	BCS 0000 2041				
1670	BCS 0000 2042				
1675	BCS 0000 2043				
1680					

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1680' To 1740' Page 29 of 342

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

Drilling Equip./Method SCHAAMM 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
1685	BCS 0000 2044	SANDSTONE, YELLOWISH BROWN 10YR 6/2, 1-10% SILTSTONE MEDIUM DARK GRAY N4 AS ABOVE.			
1690	BCS 0000 2045				
1695	BCS 0000 2046				
1700	BCS 0000 2047				
1705	BCS 0000 2051				
1710	BCS 0000 2052				
1715	BCS 0000 2053	1710-1790 SANDSTONE, VOLCANIC SOURCE, MEDIUM GRAY N5 TO DARK GRAY N3, POORLY SORTED, 10-4% SILTSTONE, LACUSTRINE/PLAYA, MEDIUM DARK GRAY N4.			
1720	BCS 0000 2054				
1725	BCS 0000 2055				
1730	BCS 0000 2056				
1735	BCS 0000 2057				
1740	BCS 0000 2058				

Prepared By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

Driller EARL 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 N5 TO DARK GRAY N3, 10-40% SILTSTONE MEDIUM DARK GRAY N4 AS ABOVE			
1750	BCS 0000 2060				
1755	BCS 0000 2061				
1760	BCS 0000 2062				
1765	BCS 0000 2063				
1770	BCS 0000 2064				SOMEWHAT CLAYISH
1775	BCS 0000 2065				MODERATELY CLAYISH
1780	BCS 0000 2066				
1785	BCS 0000 2067				
1790	BCS 0000 2068				
1795	BCS 0000 2069	SANDSTONE, VOLCANIC SOURCE, MEDIUM GRAY N5, POORLY SORTED BIOTITE, SANIDINE, AND QUARTZ			
1800	BCS 0000 2070	50% SILTSTONE, LACUSTRINE/PLAYA, DARK GRAY N3, 50% SANDSTONE, MEDIUM GRAY N5 AS ABOVE			

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	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)			
1825	BCS 0000 2076				
1830	BCS 0000 2077				
1835	BCS 0000 2078				clay beds are washed into fines in return water.
1840	BCS 0000 2079				
1845	BCS 0000 2080				
1850	BCS 0000 2081				
1855	BCS 0000 2082				
1860					

Prepared By Jamie Walker Date 12-18-98 Checked By Mike Cline 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/Ziplock bags

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1860	BCS 0000 2083	Siltstone, as above			
1865	BCS 0000 2084	Sandstone, lacustrine, volcaniclastic, med. to dark grey (N3-N4). Generally fine grained mottled textures. Approx. 40% quartz, 50% feldspar and 10% dark minerals ? biotite.			
1870	BCS 0000 2085				
1875	BCS 0000 2086				
1880	BCS 0000 2087	Sandstone, yellowish-grey (5Y 7/2) Sandstone/Siltstone, interbedded, as described above. Clay evident in upper 5'. Approximately 30% siltstone. Med to dark grey (N3-N4)			Clay beds - mostly washed out in fines.
1885	BCS 0000 2088				
1890	BCS 0000 2089				
1895	BCS 0000 2090				
1900	BCS 0000 2091				
1905	BCS 0000 2092				
1910	BCS 0000 2093				mainly sandstone >90% .5 - 1mm grains
1915	BCS 0000 2094				
1920					

Prepared By Jamie Walker Date 12-18-98 Checked By Mike Chun Date 1-23-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 1920 To 1980 Page 33 of 42

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

Drilling Equip./Method SCHRAHM 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				
1930'	BCS 0000 2096				>50% siltstone 1925-1930
1935'	BCS 0000 2097				
1940'	BCS 0000 2098				>80% Sandstone
1945'	BCS 0000 2099				
1950'	BCS 0000 2100	Dark Grey to Grayish black (wet) (N3-N2) SILTSTONE, LACUSTRINE			
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 1.13.99 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
	BCS 0000 2107				50% CLAY
1985					
	BCS 0000 2108				
1990					
	BCS 0000 2109				
1995		BROWNISH GRAY 5YR 4/1			
	BCS 0000 2110	SANDSTONE, LACUSTRINE			silty Sandstone
2000'					
	BCS 0000 2111				
2005					
	BCS 0000 2112				
2010		Sandstone LACUSTRINE Light Gray to Med light Gray (N7-N6)			<20% siltstone
	BCS 0000 2113				>95% sandstone med Gray N5
2015					
	BCS 0000 2114				
2020					
	BCS 0000 2115				
2025					
	BCS 0000 2116	Poorly Sorted Sandstone, siltstone, clay			
2030					
	BCS 0000 2117				ABUNDANT CLAY
2035					
	BCS 0000 2118	Siltstone LACUSTRINE with Fine <1m lamenae Brownish Gray 5YR 4/1 Some Sandstone			
2040					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1DX Drill Depth From 2040 To 2100 Page 35 of 42

Driller MIKE BOYD 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
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			
2055	BCS 0000 2121				TRACE GYPSUM
2060	BCS 0000 2122				
2065	BCS 0000 2123				TRACE GYPSUM
2070	BCS 0000 2124				
2075	BCS 0000 2125				TRACE GYPSUM
2080	BCS 0000 2126				
2085	BCS 0000 2127	SILTY SANDSTONE BECOMMING DARKER (GRAYISH BLACK N2) WITH DEPTH			
2090	BCS 0000 2128				TRACE GYPSUM
2095	BCS 0000 2129				TRACE PYRITE
2100	BCS 0000 2130				

Prepared By ARTHUR J. MENDENHALL Date 1-13-99 Checked By Mike Cline 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 - BOYD Start Date/Time _____ End Date/Time _____

Drilling Equip./Method SCHRAMM T685 RH Sampling Equip./Method 11-5' CYCLONE / OLSEN BAG

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 2131	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) 2100-2105 obvious contamination with "pink" volcanic chips <5%.			
2105	BCS 0000 2132				
2110	BCS 0000 2133				
2115	BCS 0000 2134				
2120	BCS 0000 2135	Fine silty bed, medium grey (N5)			
2125	BCS 0000 2136				
2130	BCS 0000 2137	as above			
2135	BCS 0000 2138				
2140	BCS 0000 2139	Silty sandstone, greenish grey (5G4 6/1)			
2145	BCS 0000 2140				
2150	BCS 0000 2141	as above			
2155	BCS 0000 2142				
2160					

Prepared By JAMIE WALKER Date 1-19-99 Checked By Mike Cline 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 DHH 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			
2165		Sandstone, fine, med. lightgrey (N6) homogeneous, incoherent. Possible fine reworked top to unit below.			
	BCS 0000 2144				
2170					
	BCS 0000 2145	Sandstone, fine feldspathic (arkosic), lightgrey (N7). homogeneous. Local ?beds of dark grey siltstone. Unit appears to coarsen down-hole. Incoherent. Volcaniclastic, predominantly fine white and grey feldspar with poss. clay cement. Compositionally immature terrestrially sourced.			
2175					
	BCS 0000 2146				
2180					
	RCS 0000 2147				
2185					
	BCS 0000 2148				
2190					
	BCS 0000 2149				
2195					
	BCS 0000 2150				
2200					
	BCS 0000 2151	10% dark grey siltstone			
2205					
	BCS 0000 2152				
2210					
	BCS 0000 2153				
2215					
	BCS 0000 2154				
2220					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

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
	BCS	Sandstone, as above, arkosic			
	0000				
2225	2155				
	BCS				
	0000				
2230	2156				
	BCS				
	0000				
2235	2157				
	BCS				
	0000				
2240	2158				
	BCS				
	0000				
2245	2159				
	BCS				
	0000				
2250	2160				
	BCS				
	0000				
2255	2161				
	BCS				
	0000				
2260	2162				
	BCS				
	0000				
2265	2163				
	BCS				
	0000				
2270	2164				
	BCS				
	0000				
2275	2165				
	BCS				
	0000				
2280	2166				

Prepared By JAMIE WALKER Date 1-19-99 Checked By Mike Clim 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
	BCS 0000	Sandstone, as above, fine feldspathic.			
2285	2167	Siltstone, greyish-black (N2), cherty. Unit marks contact			
	BCS 0000	Sandstone, as 2172-2283, fine feldspathic, lightgrey (N7) to mediumgrey (N5). Local sections with clay beds, lightgrey (N7)			
2290	2168				
	BCS 0000				
2295	2169				
	BCS 0000	Clay in returns			
2300	2170				
	BCS 0000				
2305	2171				
	BCS 0000				
2310	2172				
	BCS 0000				
2315	2173	Clay-rich zone, difficult drilling			
	BCS 0000				Gypsum in cutting
2320	2174				finished drilling 1125 on 1-14-99
	BCS 0000	Siltstone, finely laminated (0.5-2mm) to unlaminated local < 1' thick sandstone beds as above. Generally light brownish grey (5YR 6/1) to brownish grey			started drilling 2320 on 1-19-99
2325	2249				
	BCS 0000				- drill shift change 2328'
2330	2250				
	BCS 0000				
2335	2175				
	BCS 0000	Clay rich zone			
2340	2176				

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-FWDP 1Dx Drill Depth From 2280 To 2340 Page 40 of 42

Driller 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
	BCS 0000 2177	Siltstone varies in color from Pale yellowish orange (10YR 6/6) to Moderate greenish Yellow (10Y 7/4)			
2345	BCS 0000 2178	Clay rich zone			
2350	BCS 0000 2179				
2355	BCS 0000 2180				
2360	BCS 0000 2181	more Homogeneous color. Dark gray (N3)			
2365	BCS 0000 2182				
2370	BCS 0000 2183	≈20% Dusky yellow (5Y 5/4) siltstone fragments in dark gray (N3) Siltstone			
2375	BCS 0000 2184				
2380	BCS 0000 2185				
2385	BCS 0000 2186				
2390	BCS 0000 2187	Sandstone, tuffaceous. Med. gray (N5) to med Dark gray (N4). Similar to 2285-2320; [illegible]			
2395	BCS 0000 2188				
2400					

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

Drilling Equip./Method CHRAMM 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			
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 2320-2391.			
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

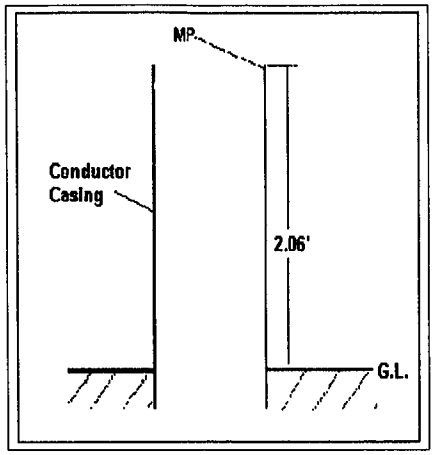
Borehole ID NC-EWDP-1DX Drill Depth From 2460' To 2500' (T.D.) Page 42 of 42

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

Drilling Equip./Method RC-Schramm T685DHH-#450 Sampling Equip./Method _____

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

Prepared By Michael Clive Date 1.23.99 Checked By _____ Date _____



Water Level Data

Well: NC-EWDP-1D

Location:

UTM: North	UTM: East	Latitude	Longitude	Elevation ft.	Elevation m
4062502.83	536768.35	36°42'33.526"N	116°35'18.003"W	2635.24	803.23

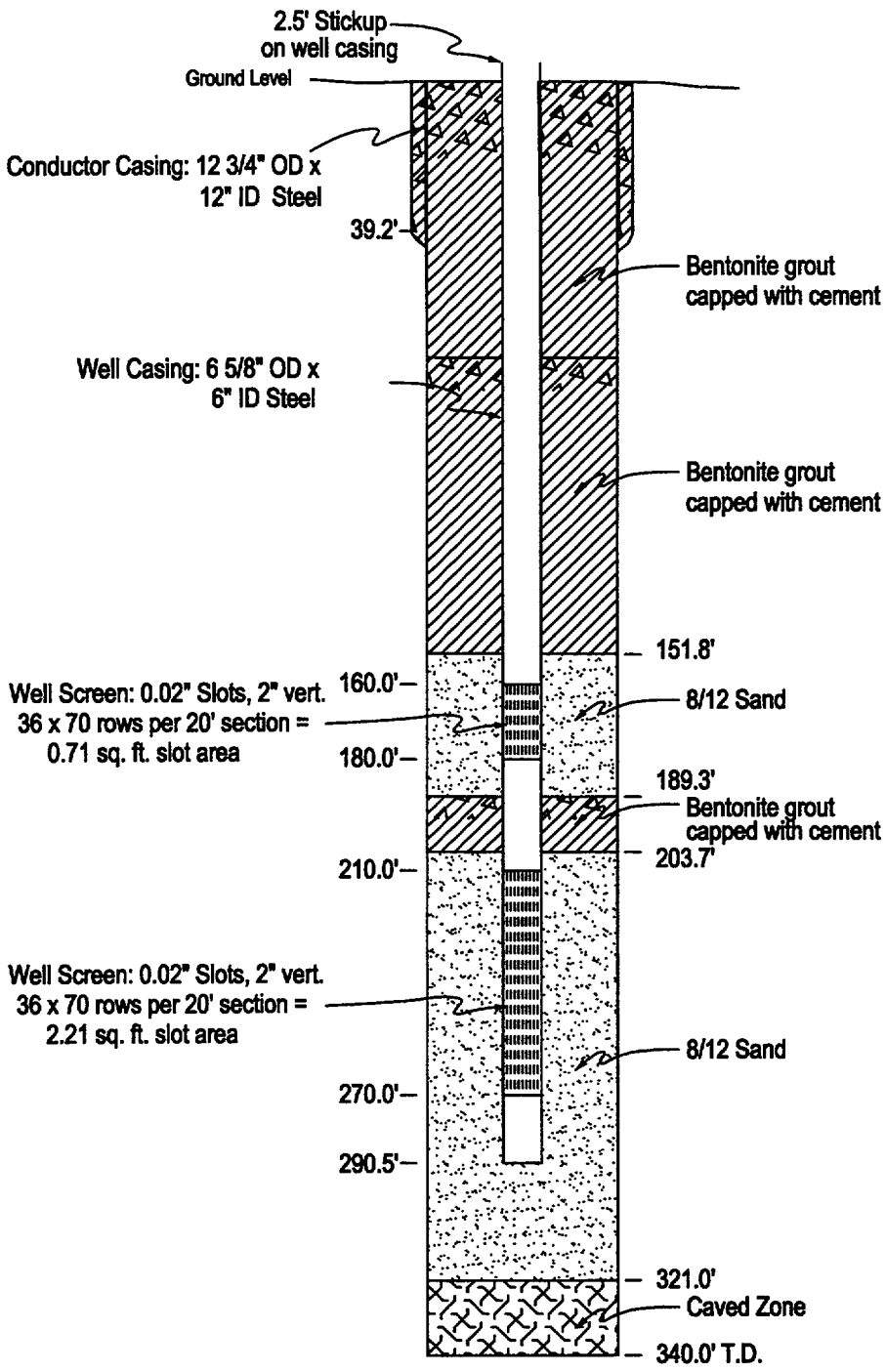
Access: From Lathrop Wells (Junction of Highways 95 and SR373) west 11.0 miles to gate on north side of Highway. Take gravel road 0.2 miles to turnaround on white colored spring deposits.

Measuring Point: Top of conductor casing.

Measuring Point Correction:

Feet	Meters
2.06	0.628

Date	Zone Measured	Depth to Water below M.P. Ft.	Depth to Water below M.P. m	Elevation of Water Ft.	Elevation of Water m	Method	Personnel	Comments
10-Dec-1999	n/a	52.6	16.04	2580.6	786.56	NWRPO 2000'	AJM	05:20; 50 min. after stopping for "first water" at 04:30
11-Dec-1998	n/a	72.4	22.07	2560.8	780.54	NWRPO 2000'	BA	13:35, stopped to sample water, bit at 103'
7-Jan-1999	n/a	52.3	15.94	2580.9	786.67	Powers	JSW	14:30, after Christmas break, before drilling.
11-Jan-1999	n/a	51.4	15.68	2581.8	786.93	Powers	JSW	13:10, hole stabilized for 24 hrs., prior to reaming.
4-Mar-1999	n/a	55.7	16.98	2577.5	785.63	NWRPO 500'	JSW	
10-Mar-1999	n/a	54.8	16.71	2578.4	785.90	NWRPO 500'	MCC	
12-Mar-1999	n/a	54.9	16.72	2578.3	785.88	NWRPO 500'	MCC	



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

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

****

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9906100166-01

DRP-08

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:

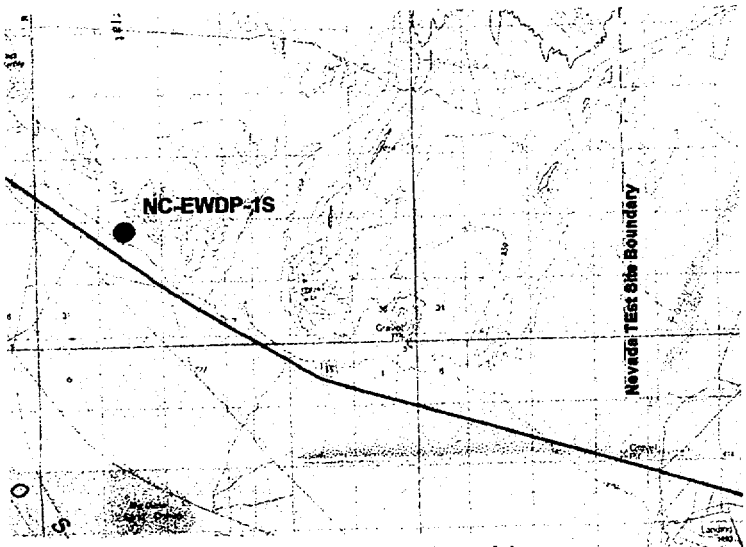
NONE

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.

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.



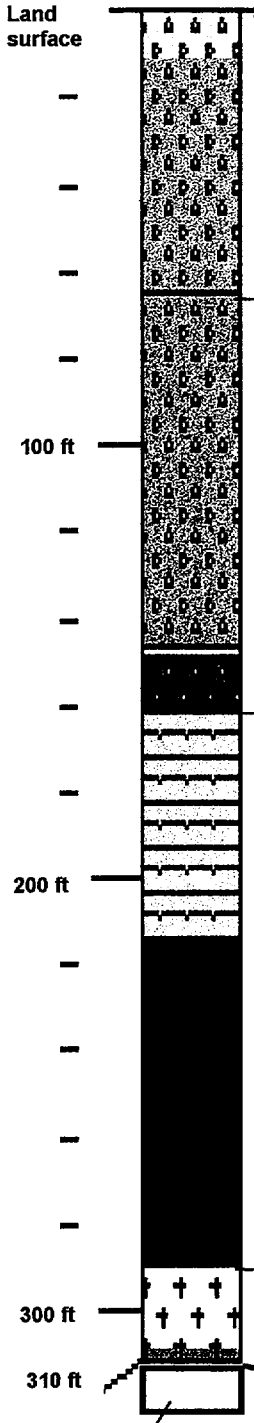
Base: USGS 1:100,000 Beatty Sheet (not to scale)

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 monitoing. 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



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' gravelley 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'.

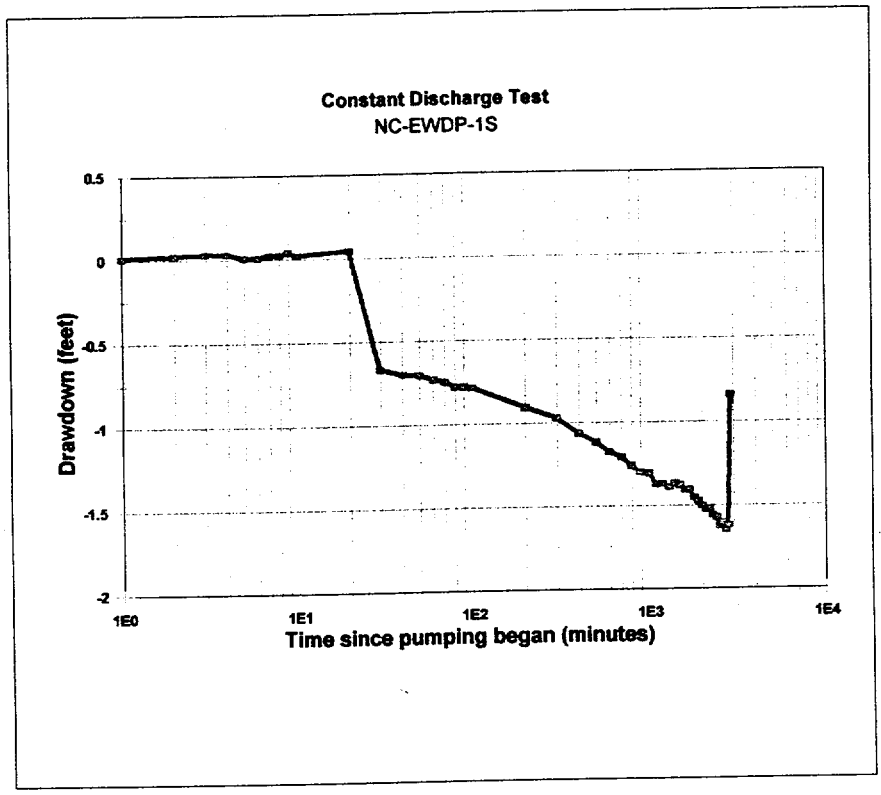
NC-EWDP-1S

SUMMARY LITHOLOGIC LOG

NC-EWDP-1S
Constant Discharge Tests
Date: February 21-23 1999

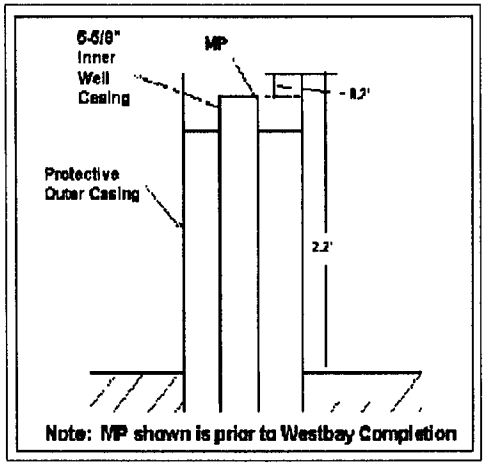
Static Depth To Water (ft below mp) 56.69

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



Water Level Data

Well: NC-EWDP-1S

Location:

UTM: North	UTM: East	Latitude	Longitude	Elevation ft.	Elevation m
4062498.49	536771.42	36°42' 33.385"N	116°35'17.880"W	2635.37	803.27

Access: From Lathrop Wells (Junction of Highways 95 and SR373) west 11.0 miles to gate on north side of Highway. Take gravel road 0.2 miles to turnaround on white colored spring deposits.

Measuring Point: Top of steel well casing (not protective casing).

Measuring Point Correction:

Feet	Meters
1.96	0.597

Date	Zone Measured	Depth to Water below M.P. Ft.	Depth to Water below M.P. m	Elevation of Water Ft.	Elevation of Water m	Method	Personnel	Comments
27-Jan-1999	n/a	102.0	31.09	2531.4	771.58	NWRPO Powers	KDD	16:20; 42 minutes after hitting at water @~127'
27-Jan-1999	n/a	85.5	26.06	2547.9	776.61	NWRPO Powers	KDD	16:50
27-Jan-1999	n/a	73.8	22.49	2559.6	780.18	NWRPO Powers	KDD	17:20
27-Jan-1999	n/a	69.3	21.12	2564.1	781.55	NWRPO Powers	JSW	17:50
27-Jan-1999	n/a	64.2	19.57	2569.2	783.10	NWRPO Powers	JSW	18:20
27-Jan-1999	n/a	60.5	18.44	2572.9	784.23	NWRPO Powers	JSW	18:50
27-Jan-1999	n/a	59.0	17.98	2574.4	784.69	NWRPO Powers	JSW	19:20
27-Jan-1999	n/a	57.2	17.43	2576.2	785.24	NWRPO Powers	JSW	19:50
27-Jan-1999	n/a	54.1	16.49	2579.3	786.18	NWRPO Powers	JSW	20:20
28-Jan-1999	n/a	52.7	16.06	2580.7	786.61	NWRPO Powers	KDD	06:46
28-Jan-1999	n/a	157.2	47.90	2476.3	754.77	NWRPO Powers	KDD	13:41 with 159.3' of 11" DWDP in hole, sealing aquifer
2-Feb-1999	n/a	130.6	39.81	2502.8	762.87	NWRPO Powers	KDD	06:18 with 159.3' of 11" DWDP in hole, sealing aquifer
3-Feb-1999	n/a	52.5	16.00	2580.9	786.67	NWRPO Powers	KDD	07:55, 1 hr after drilling
5-Feb-1999	n/a	52.3	15.94	2581.1	786.73	NWRPO Powers	KDD	07:04 after hole stabilized for ~36 hours

Westbay Multiport installation precludes further water level measurements

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-1S 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
	BCS 0000 2851 (1 MIN)	SPRING DEPOSIT SANDY SILT; very Pale orange (10YR 8/2), very fine sand, dry.			WEAK REACTION TO 10% HCL
5	BCS 0000 2852 (2 MIN)				WEAK REACTION TO 10% HCL
10	BCS 0000 2853 (1 MIN)	SILTY SAND: trace - some fine subrnd gravel, very fine - fine sand, Pale yel brn (10YR 6/2) moist			NO REACTION TO 10% HCl
15	BCS 0000 2854 (1 MIN)	Moist			NO REACTION TO 10% HCl NO REACTION TO 10% HCl
20	BCS 0000 2855 (2 MIN)	Moist			STRONG REACTION TO 10% HCl
25	BCS 0000 2856 (2 MIN)	Moist			STRONG REACTION TO 10% HCL
30	BCS 0000 2857 (9 MIN)	GRAVELLY SILTY SAND: Trace clay, some coarse ang gravel, Pale yel brn (10YR 6/2) Some thin Dk yel brn (10YR 4/2) - Mod brn (5YR 3/4) clayey layers, moist			Hard @ 32' MODERATE REACTION TO 10% HCL
35	BCS 0000 2858 (10MIN)	VERY hard cemented with glassy frags & ang welded tuff frags Cuttings coarse & angular - tabular cobbles.			MODERATE REACTION TO 10% HCl
40	BCS 0000 2859 (17 MIN)	Caliche or silicified frags			STRONG REACTION TO 10% HCl
45	BCS 0000 2860 (9 MIN)	Cobble sized fragments Moist			STRONG REACTION TO 10% HCL
50	BCS 0000 2861 (19 MIN)	Predom angular coarse gravel & cobbles, moist Lt pink orange (10YR 8/2) - Pink gray (5YR 8/1) ▼ 52.7, 0646, 1-28-99 52.5', 0755, 2-3-99			STRONG REACTION TO 10% HCl
55	BCS 0000 2862 (28 MIN)				STRONG REACTION TO 10% HCl
60					

NOTE TIME FOR 5' 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-1S Drill Depth From 60 To 120 Page 2 of 6

Driller BRYAN MORRIS / 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
	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
65	BCS 0000 2864 (5 MIN)	ALLUVIUM VERY MOIST			STRONG REACTION TO 10% HCl
70	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
75	BCS 0000 2866 (8 MIN)	DECREASE IN AMOUNT OF GRAVEL			WEAK REACTION TO 10% HCl
80	BCS 0000 2867 (4 MIN)	INCREASE IN AMOUNT OF COARSE SAND			NO REACTION TO 10% HCl
85	BCS 0000 2868 (11 MIN)	CLAYEY SAND: Some fine gravel, coarse sand low plasticity. Pale Yel brn (10YR 6/2)			WEAK REACTION TO 10% HCl
90	BCS 0000 2869 (7 MIN)				WEAK REACTION TO 10% HCl
95	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
100	BCS 0000 2871 (9 MIN)	Increased amount of clay			MODERATE REACTION TO 10% HCl
105	BCS 0000 2872 (5 MIN)				MODERATE REACTION TO 10% HCl
110	BCS 0000 2873 (6 MIN)	Decreased amount of clay Some cobbles.			MODERATE REACTION TO 10% HC
115	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
120					

NOTE: TIME FOR 5' 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-1S Drill Depth From 60 To 180 Page 3 of 5

Driller BRYAN MORRIS/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, 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
	BCS 0000 2875	CLAYEY GRAVEL: Coarse sand, predom fine angular gravel, some cobbles, low plasticity			MODERATE REACTION TO 10% HCL
125	(5 MIN)				
	BCS 0000 2876	No cobbles			WEAK REACTION TO 10% HCL Hit water @ 127! @ 1538, 1-27-99 1540, 1-27-99
130	(7 MIN)				
	BCS 0000 2877	SANDY GRAVEL: Coarse sand, trace clay. Gravels consist of silicified? Pale yel brn (10YR 6/1) rock with glassy frag's.			0729, 1-28-99 MODERATE REACTION TO 10% HCl
135	(29 MIN)				
	BCS 0000 2878	Increased amount of clay, fine subang gravel some cobbles			NO REATION TO 10% HCl
140	(9 MIN)				
	BCS 0000 2879				NO REACTION TO 10% HCl
145	(8 MIN)				
	BCS 0000 2880	NO RECOVERY	?		
150	(9 MIN)				
	BCS 0000 2881	GRAVELLY CLAY: Predom fine ang gravel, coarse sand, med-high plasticity. Dk yel brn (10YR 5/2)			NO REACTION TO 10% HCl
155	(6 MIN)				
	BCS 0000 2882	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
160	(25 MIN)				
	BCS 0000 2883	WELDED TUFF: Densely welded, very hard. 1-3mm Sanidine 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
165	(7 MIN)		W W W		
	BCS 0000 2884		W W W		
170	(7 MIN)		W W W		
	BCS 0000 2885		W W W		
175	(6 MIN)		W W W		
	BCS 0000 2886		W W W		
180	(7 MIN)		W W W		

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-1S Drill Depth From 180 To 240 Page 4 of 6

Driller BRYAN MORRIS/BOYLES 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 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
	BCS 0000 2887				
185	(9 MIN)				
	BCS 0000 2888				
190	(7 MIN)				COARSE CUTTINGS FROM 185-190
	BCS 0000 2889	Lt brownish gray (5YR 6/1) Increase in calcite fragments from 190-215'			
195	(6 MIN)				
	BCS 0000 2890				RETURN WATER BECOMES "MILKY" FROM 195-205'
200	(4 MIN)				
	BCS 0000 2891				
205	(6 MIN)				
	BCS 0000 2892				
210	(7 MIN)				
	BCS 0000 2893				
215	(7 MIN)				
	BCS 0000 2894	Predominantly Gry red (10R 4/2) - Dark reddish brn (10R 3/4) from 215-280'			
220	(22 MIN)				
	BCS 0000 2895				
225	(19 MIN)				≈ 200 GPM YIELD @ 225'
	BCS 0000 2896				
230	(15 MIN)				
	BCS 0000 2897				MAY BE SOME CAVITIES FROM 230-235'
235	(9 MIN)				COARSE CUTTINGS FROM 235'-245'. DRILL RODS JERKING. FRACTURED.
	BCS 0000 2898	Considerable white calcite from 235-245'			
240	(10 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-1S Drill Depth From 240 To 300 Page 5 of 6

Driller BRYAN MORRIS/BOYLES 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 T685DHH WITH 6 3/4" TRICONE BELOW 160'

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 2899		W W		
245	(27 MIN)		W W		
	BCS 0000 2900		W W		
250	(12 MIN)		W W		NO WATER RETURN AT DRILL COLLAR FROM 251 - 260'
	BCS 0000 2901		W W		
255	(14 MIN)		W W		
	BCS 0000 2902		W W		
260	(15 MIN)		W		
	BCS 0000 2903		W		
265	(8 MIN)		W		
	BCS 0000 2904		W W		
270	(8 MIN)		W		
	BCS 0000 2905		W W		
275	(8 MIN)		W W		
	BCS 0000 2906		W W		
280	(7 MIN)	Pale brn (5YR 5/2) FROM 280 - 284'			
	BCS 0000 2907		W W		
285	(4 MIN)				
	BCS 0000 2908		W W		
290	(4 MIN)	TUFF: Ashfall, Pale greenish yellow (10Y 8/2) - Grayish yellow green (5GY 7/2), Clayey, very soft with thin layers or frag's of gray brn (5YR 4/2) welded tuff	+ + + +		
	BCS 0000 2909		+ + + +		
295	(7 MIN)		+ + + +		
	BCS 0000 2910		+ + + +		NO WATER RETURN AT COLLAR FROM 290 - 300'
300	(15 MIN)		+ + + +		1738, 2-2-99

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-1S 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
	BCS 0000 2911 (10 MIN)	TUFF: Ashfall, Pale greenish yellow (10Y 8/2) - Grayish yellow green (5GY 7/2), clayey, very soft, with thin layers or small frag's of gray brown (5YR 4/2) welded tuff.	+ + + + + + + + + + + + + + + + + + + +		2-3-99, 0627 WEAK REACTION TO 10% HCl NO WATER RETURN AT COLLAR BELOW 301'.
305	BCS 0000 2912 (7 MIN)	TUFF: Ashfall, Greenish gray (5GY 6/1), very silty, soft.	+ + + + + + + + + + + + + + + + + + + +		WEAK REACTION TO 10% HCl 2-3-99, 0644
310		T.D. = 310'			

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

Westbay Instruments Inc.

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

#115 - 949 West Third Street, North Vancouver, BC Canada V7P 3P7 (800) 663 8770 (604) 984 4215 FAX (604) 984 3538 info@westbay.com
www.westbay.com

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2. Personnel 1
3. Installation 1
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3.2 Preparation of Monitoring Well Design 1
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3.5 Hydraulic Integrity Testing 3
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3.7 Inflation of MP System Packers 3
4. Fluid Pressure Measurements 4

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 Larssen 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 Completon 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 tthe 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

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APPENDIX 1

Monitoring Well EWDP 1S

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Westbay

MOSDAX Data Report

WESTBAY 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

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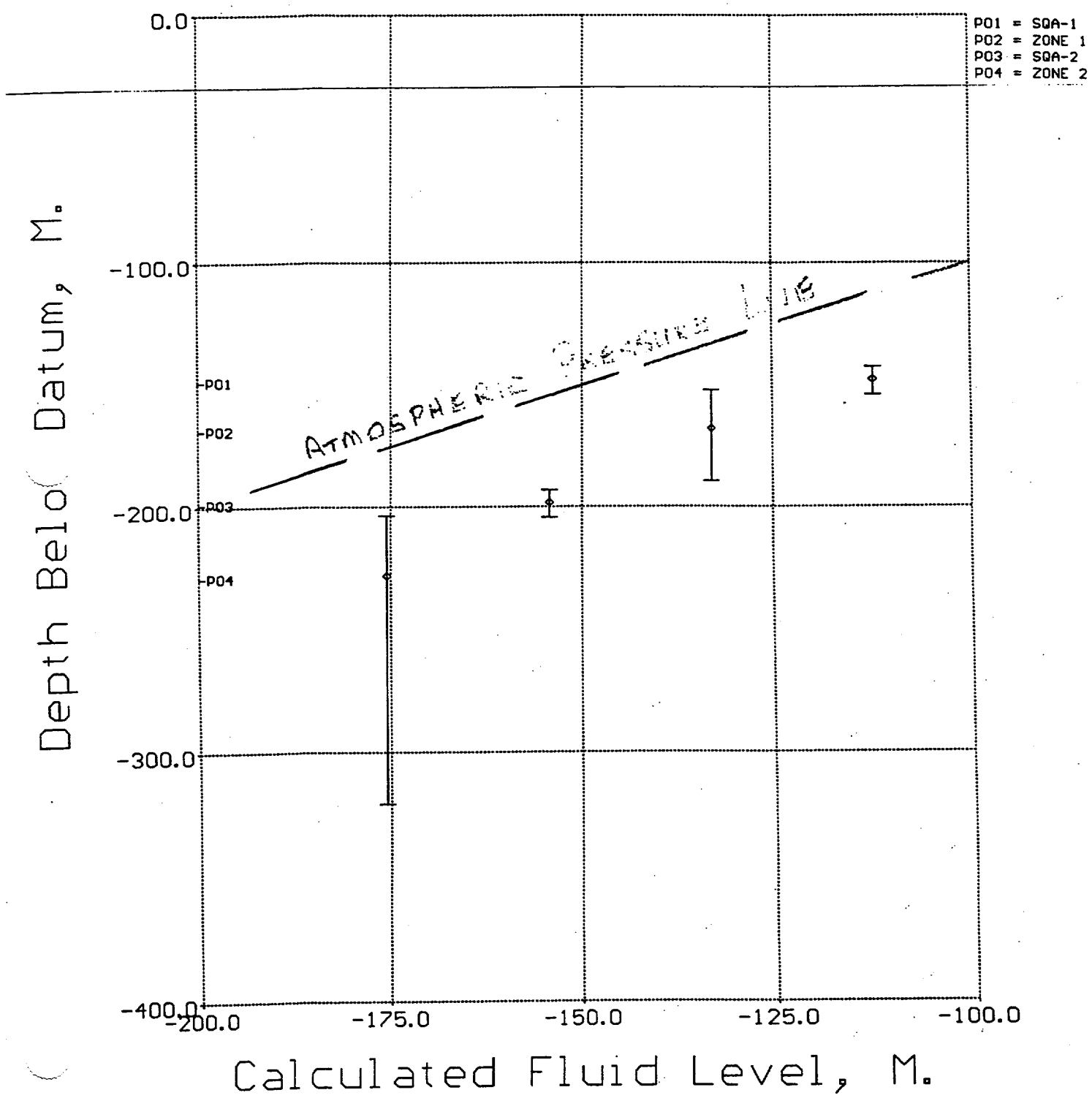
PIEZOMETRIC PROFILE WELL: EWDP-1S

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

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



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

DIRECT-P
Date: 15 MAR99
Date: _____
FIGURE: 1

Westbay Instruments Inc.

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.

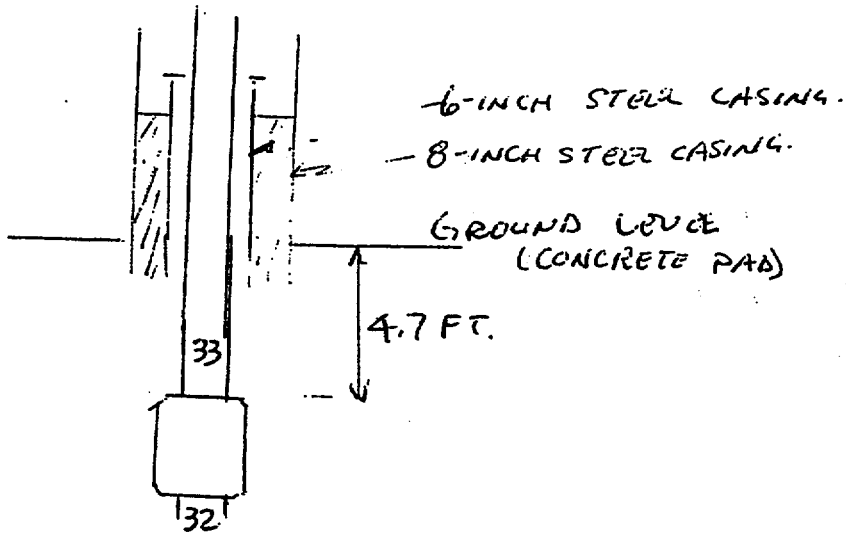
Well Description:
Plastic MP55 System
Other References:
In 6.0 inch steel well casing
Based on Nye County 2-19-99

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



#115 - 949 West Third Street, North Vancouver, BC Canada V7P 3P7 (800) 663 8770 (604) 984 4215 FAX (604) 984 3538 info@westbay.com
www.westbay.com

Summary MP Casing Log
Nye County

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

Legend

(Qty) MP Components

(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) 0302 - MP55 Regular Coupling

(4) 0605 - MP55 Measurement Port

(2) 0607 - MP55 Hydraulic Pumping Port

(2) 0608 - MP55 Magnetic Location Collar

Geology

Backfill/Casing

Grout

Bentonite

Sand Coarse

Native / Cave

Mild Steel

Well Screen

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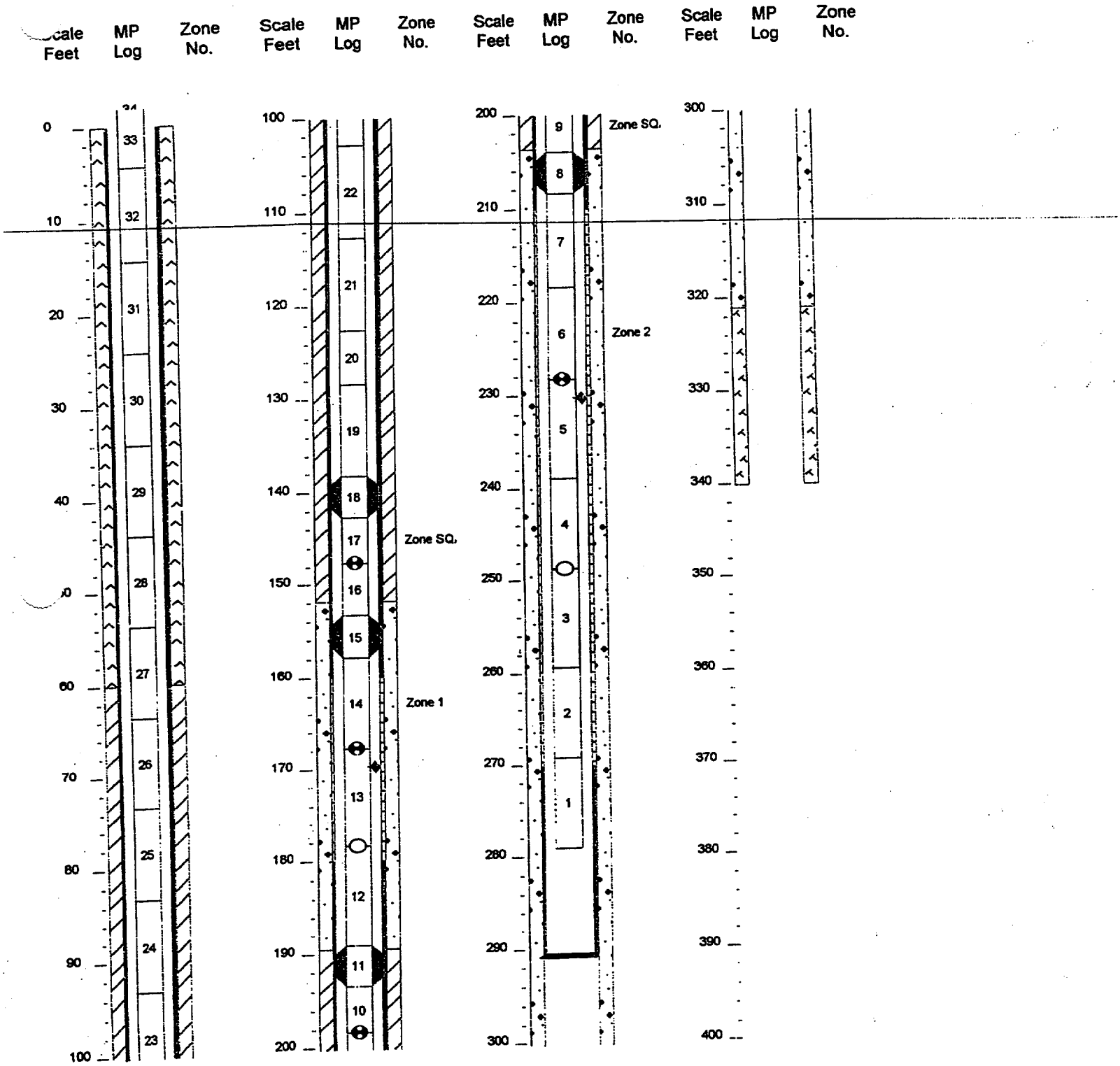
Summary MP Casing Log
Nye County

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



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Tue Mar 09 20:31:48 1999

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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.	(method) Sounder, inspection	Date: 08 MAR 99.
MP well design & preparation.	By: DL/CM	Date: 08 MAR 99
MP well design checked.	By: MC/MH	Date: 08 MAR 99.
MP well and borehole approved to install.	By: CM for Nye Cty	Date: 08 MAR 99.

MP Casing Installation Log
Nye County

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

Legend

(Qty) MP Components	Geology	Backfill/Casing
(2) 0603 - MP55 End Plug		Grout
(13) 0301M30 - MP55 Casing, PVC, 3.0m		Bentonite
(1) 0601M15A - MP55 Adapter Casing 06_03		Sand Coarse
(11) 0601M30 - MP55 Casing, PVC, 3.0m		Native / Cave
(4) 0612M15 - MP55 Packer with stiffeners		Mild Steel
(4) 0601M15 - MP55 Casing, PVC, 1.5m		Well Screen
(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
					MP55 CASING, PVC 3.0m.
0		33			
					0302A - MP55 Regular Coupling
		32			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
20		31			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
30		30			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
		29			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
50		28			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
60		27			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
70		26			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
80		25			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
90		24			0301M30 - MP55 Casing, PVC, 3.0m
					0302A - MP55 Regular Coupling
100		23			0301M30 - MP55 Casing, PVC, 3.0m

4.7 FT BGL

1530HR FINISH LOWERING.

1545HR DTW = 19.245 FT. BELOW MP

MP = 4.46 FT AGL.

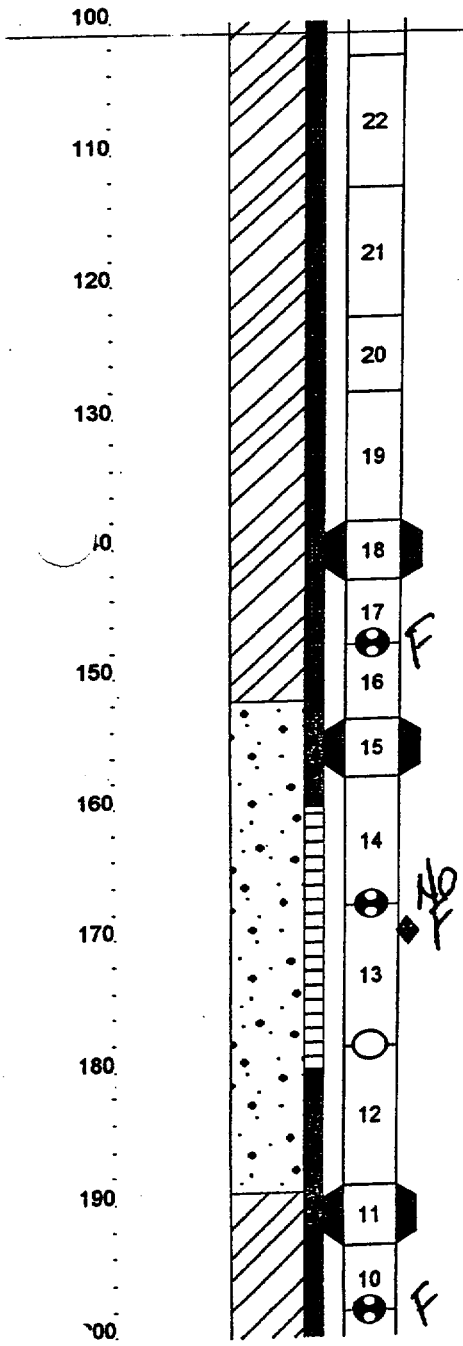
0815HR 09MAR99
DTW = ~~19.245~~ FT.
19.245 FT. OK DL

∴ MP IS WATER TIGHT.

MP FLOATS.
ADD 5 GAL. TAP WATER.

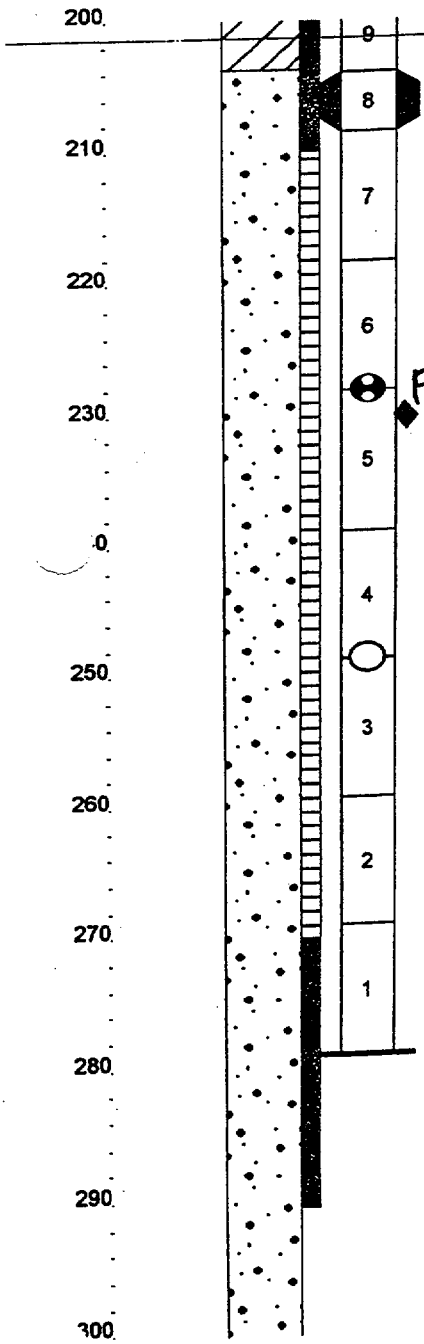
MP Casing Installation Log
Nye County

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



MP Casing Installation Log
Nye County

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



start lowering 1308 hr 08MAR99.

OPEN HOLE DTW= 54.52 FT BELOW 6" steel.

SOUNDED DEPTH =293.05 FT BELOW 6" STEEL.

TJT TEST P= 300 psi TOTAL. 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
300					
310					
320					
330					
0					
350					
360					
370					
380					
390					
400					

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Tue Mar 09 20:26:10 1999

Westbay Instruments Inc.

MP55 Packer Inflation Field Record

Project: WB 740 Client: NYE COUNTY	By: DL Date: 09 MARCH 99
Location: AMARGOSA NV Well No. EWDP-1S	Borehole Diameter: EWDP-1S
Packer No. 0612-032 Depth: 137	Computer Data File: 0612-032 .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: 11.3 Vol Returned 0.3
H-B Valve: (P_H) Ø Offset (P_V). Ø	Confirm Venting (Vent Tool Data) (Y/N) ____
Vent Tool Pressure (Shoe Out, P_O) —	Final Inf'n Vol: 11.0 Final Press: 296 (P_F)
Comments: EST HEAD ABOVE PKR = 59 PSI PACKER P = 296 − 13.8 − 59 =	Calc'd Element Pressure (~~$P_F + P_V - P_O$~~) 223.2 psi Confirm Pkr Valve Closed (Yes/No): Yes.

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
0	0	13.80	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?	1408:32	2	TIE → INFLATE
						PKR VALVE OPENED (460)
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	~~22~~ 250	233		1431:32	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.

Form MP55inf3.xsm Dec 18, 1998

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MP55 Packer Inflation Field Record, Part 2

Project: WB740 Well No. EWDP-1S Packer No. 0612-032 Date: 09 MAR 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
11.0	300	221.0	–	1453	1	RESUME AFTER POWER FAIL
11.0	300	219.9	–	1454:30		TIE LINE, PUMP
11.2	350	318	–	1455:30		– STOP, TIE = OFF.
11.2	300	302	–	1459:30		–
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		1504.50	6	TIE SHOE IN
11.0	0	13.75	13.88	1506:00	7	END.
						NOTE: VENT TOOL DID NOT ~~ACTUATED THE PORT~~ OPEN THE M-PORT VALVE BELOW PACKER.
						– LATER P-PROFILE DID NOT SHOW SQUEEZE PRESSURE ∴ PACKER INFLATION IS OK.

Form MP55Inf3.sam Dec 18, 1998

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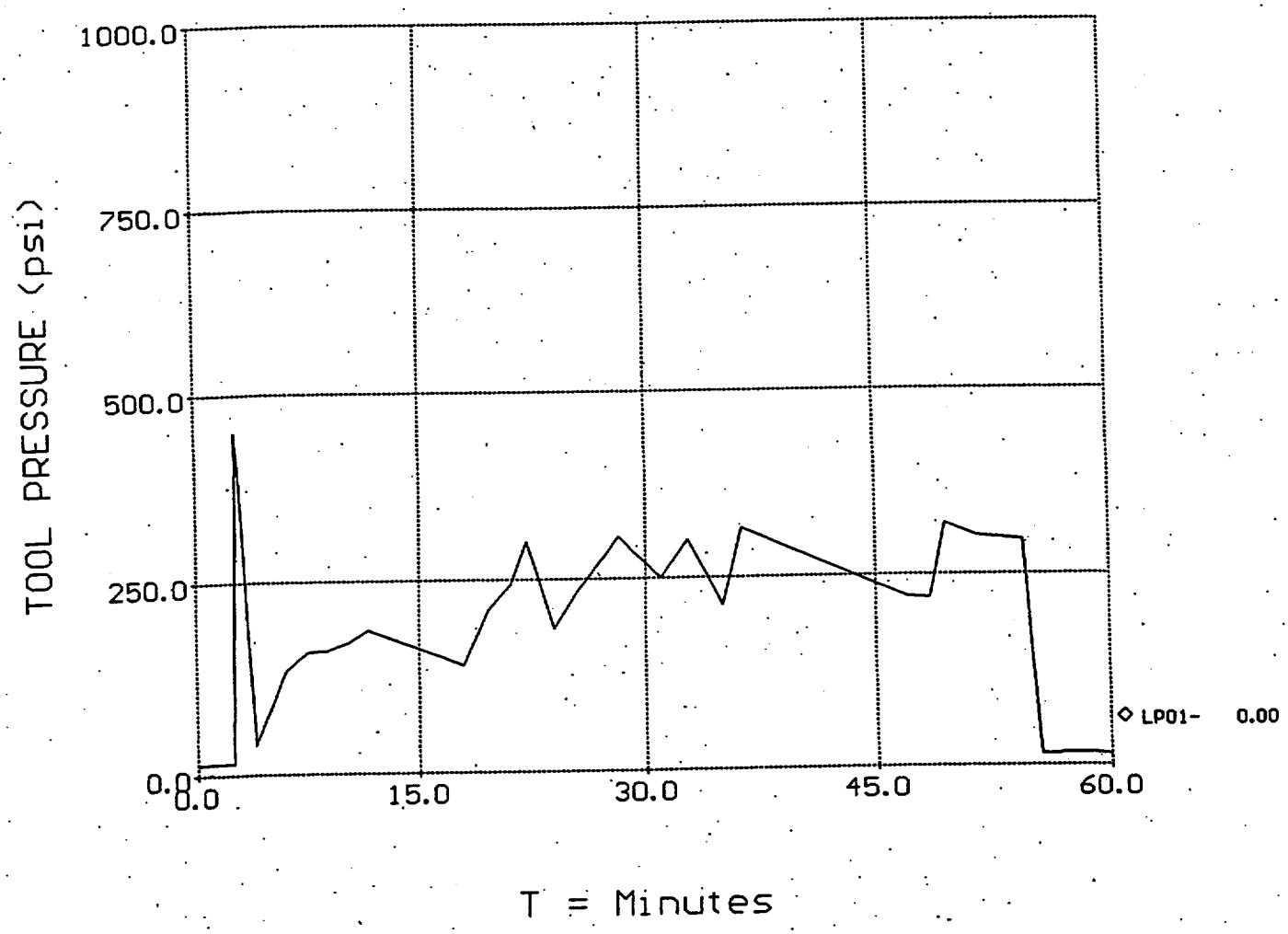
Page ___ of ___

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 MAR99.
Checked By: _____ Date: _____
Comment:



Westbay Instruments Inc.

MP55 Packer Inflation Field Record

Project: WB740 Client: NYE COUNTY	By: DL Date: 09 MAR99
Location: AMARGOSA NV Well No. EWDP-15	Borehole Diameter: 6-INCH
Packer No 0612-045 Depth: 153 ft.	Computer Data File: 0612-045 .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: 11.4 Vol Returned 04
H-B Valve: (P_H) 0 Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N) ____
Vent Tool Pressure (Shoe Out, P_O) ____	Final Inf'n Vol: 11.0 l Final Press: 246 (P_F)
Comments: EMS NOT ACTIVATED & SQUEEZE RELIEF NOT REQUIRED	Calc'd Element Pressure ($P_F+P_V-P_O$) 166psi Confirm Pkr Valve Closed (Yes/No): YES

HEAD ABOVE PKR = 66PSI PKR P = 246 - 66 - 138 = 166

Software Reminder
I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
0	0	13.77	13.42	1321:30	—	START. TIE = OFF.
0	0	13.77	13.5	1322:00	—	TIE SHOE OUT.
0	0	17.58	13.5	1325	1	START PUMP
0.4	~~600~~ 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	~~16~~	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

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MP55 Packer Inflation Field Record, Part 2

Project: WB 740 Well No. EWDD-1S Packer No. 0602-645 Date: 09 MARCH 99.

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
11.0	0	15.0	—	1350:00	—	
11.0	0	17.3	—	1352:00	—	
11.0	0	18.8	—	1354:00	—	
11.0	0	19.9		1356:00	-18-	TIE SHOE IN
11.0	0	13.7	13.2	1357:00	-19-	END

Form MP55inf3.som Dec 18, 1998

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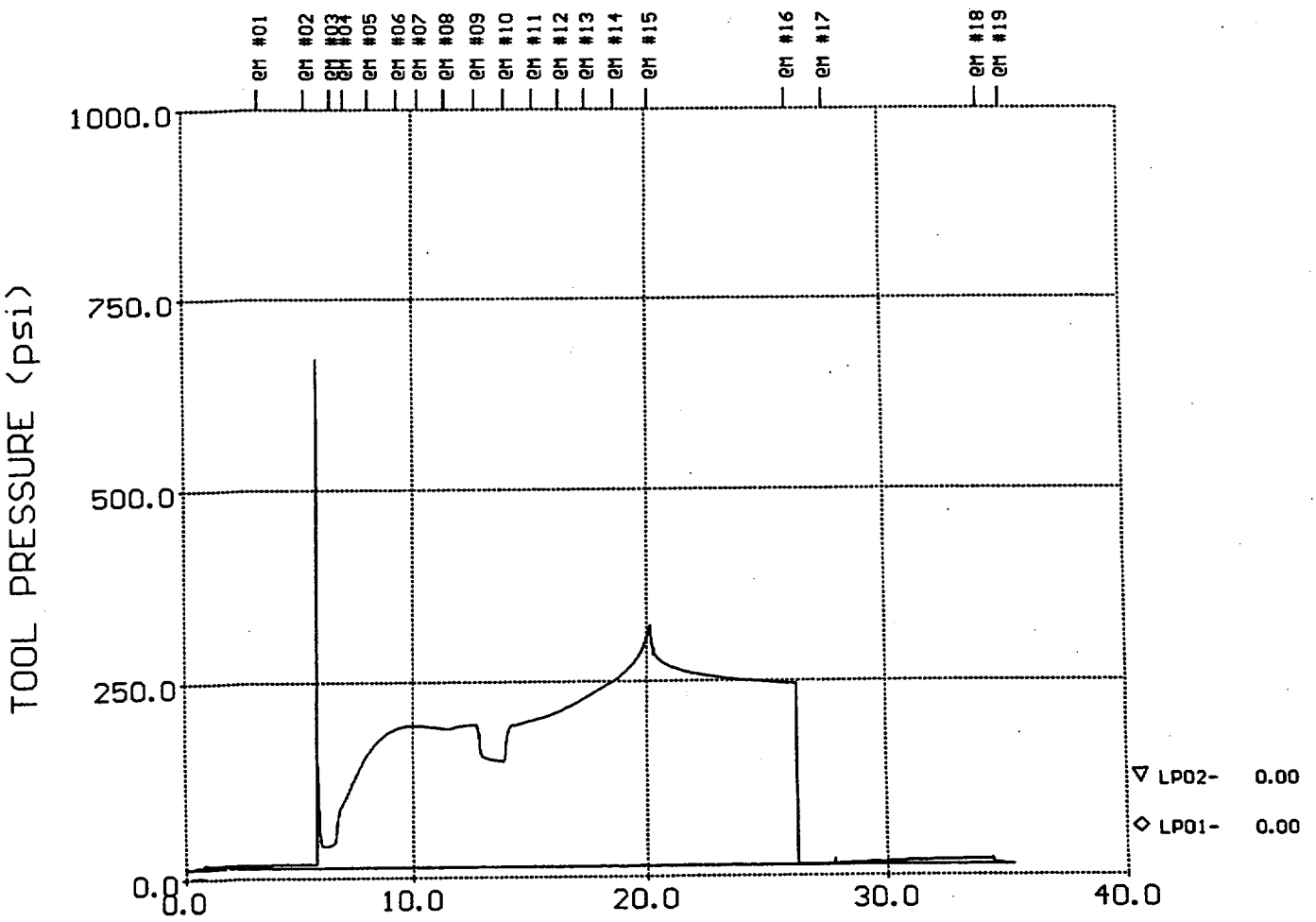
PACKER INFLATION RECORD

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 MAR99
Checked By: _____ Date: _____
Comment:



T = Minutes

Westbay Instruments Inc.

MP55 Packer Inflation Field Record

Project: WB740 Client: NYE COUNTY	By: DL Date: 09 MAR 99
Location: AMARGOSA NV Well No. EWDP-1S	Borehole Diameter: 6-inch
Packer No. 0012-052 Depth: 190	Computer Data File: 0012-052 .WDF
Inf-Tool No. TIE 2321 Vent Tool No. 2215	Volume Pumped: 10.1 Vol Returned 0.3
H-B Valve: (P_H) 0 Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N) ____
Vent Tool Pressure (Shoe Out, P_O) —	Final Inf'n Vol: 9.8l Final Press: 250 (P_F)
Comments: EST HEAD WATER ABOVE PKR = 82PSI.	Calc'd Element Pressure (P_F+P_V- P_O) 154psi
	Confirm Pkr Valve Closed (Yes/No): YES

PACKER P = 250 - 82 - 13.8 = 154

Software Reminder

I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure: Line (psig)	Pressure: Inf. Tool (psia)	Pressure: Vent Tool (psia)	Clock	Comments: Tag No.	Comments: 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
						VALVE 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	1239:50	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~~ 12	STOP PUMPING.
9.82	250	250	17.5	1249:30	~~14~~ 13	START PUMP.
9.83	400	345	17.5	~~1250~~ 1250:40	13	SHUT VALVE, STOP PUMP
9.8	250	200	17.5	1253	14	OPEN VALVE, PUMP UP
9.8	300	345	17.5	1255:40	15	SHUT VALVE, STOP.
9.8	280	254	17.5	1305:40	16	- PUMP UP

Form MP55Inf3.som Dec 18, 1998

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MP55 Packer Inflation Field Record, Part 2

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

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

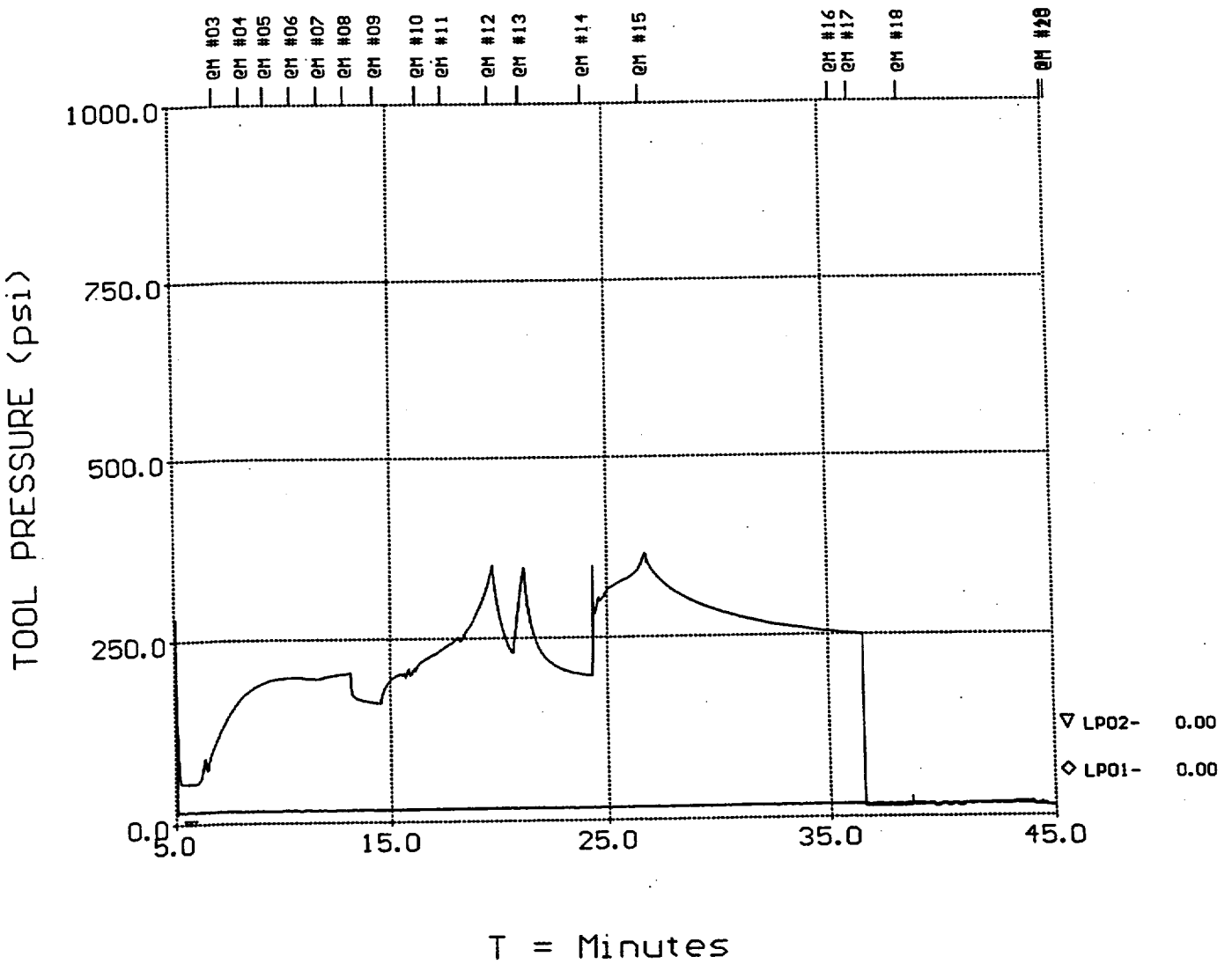
Volume (litres)	Pressure			Clock	Comments	
	Line (psig)	Inf. Tool (psia)	Vent Tool (psia)		Tag No.	Text
10.1	800	250	17.0	1305:30	17	- TIE VALVE CLOSE
10.1	~~14.4~~ 750	14.4	17.0	1306:30	~~18~~	- VENT LINE
9.8	0	14.4	17	1307:30	18	- TIE VALVE OFF
9.8	0	14.8	17	1308:00	—	OBSERVE
9.8	0	16.8	17	1310	—	
9.8	0	18.6	17	1313	19	-TIE SHOE IN
						- EMS SHOE IN
9.8	0	13.8	13.9	1314	20	- END

Westbay

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:



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MP55 Packer Inflation Field Record

Project: EWDP - 7H0 Client: NYE COUNTY	By: DL Date: 09 MAR 99.
Location: AMARGOSA NV Well No. EWDP-1S	Borehole Diameter: 4612-035
Packer No. 0d2-035 Depth: 202 FT.	Computer Data File: 1S 050 .WDF
Inf-Tool No. TIE 2321 Vent Tool No. EMS 2215	Volume Pumped: 11.2 l Vol Returned 0.6 l
H-B Valve: (P_H) — Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N) ____
Vent Tool Pressure (Shoe Out, P_O) —	Final Inf'n Vol: 10.6 l Final Press: 261 (P_F)
Comments: NOT ACTUATE EMS - Squeeze relief not required.	Calc'd Element Pressure (P_F+P_V- P_O) 182psi Confirm Pkr Valve Closed (Yes/No): Yes

P_O=65
TARGET = 300

PKR P = 261 - 65 - 13.8 = 182psi

Pumping Information

Software Reminder
I = Inflate, O = Off, C = Close

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
0	0	17.42	21.23	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 MP55inf3.som Dec 18, 1998

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MP55 Packer Inflation Field Record, Part 2

Project: WB790 Well No. EWDP-15 Packer No. 042-035 Date: 09 MAR 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments 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

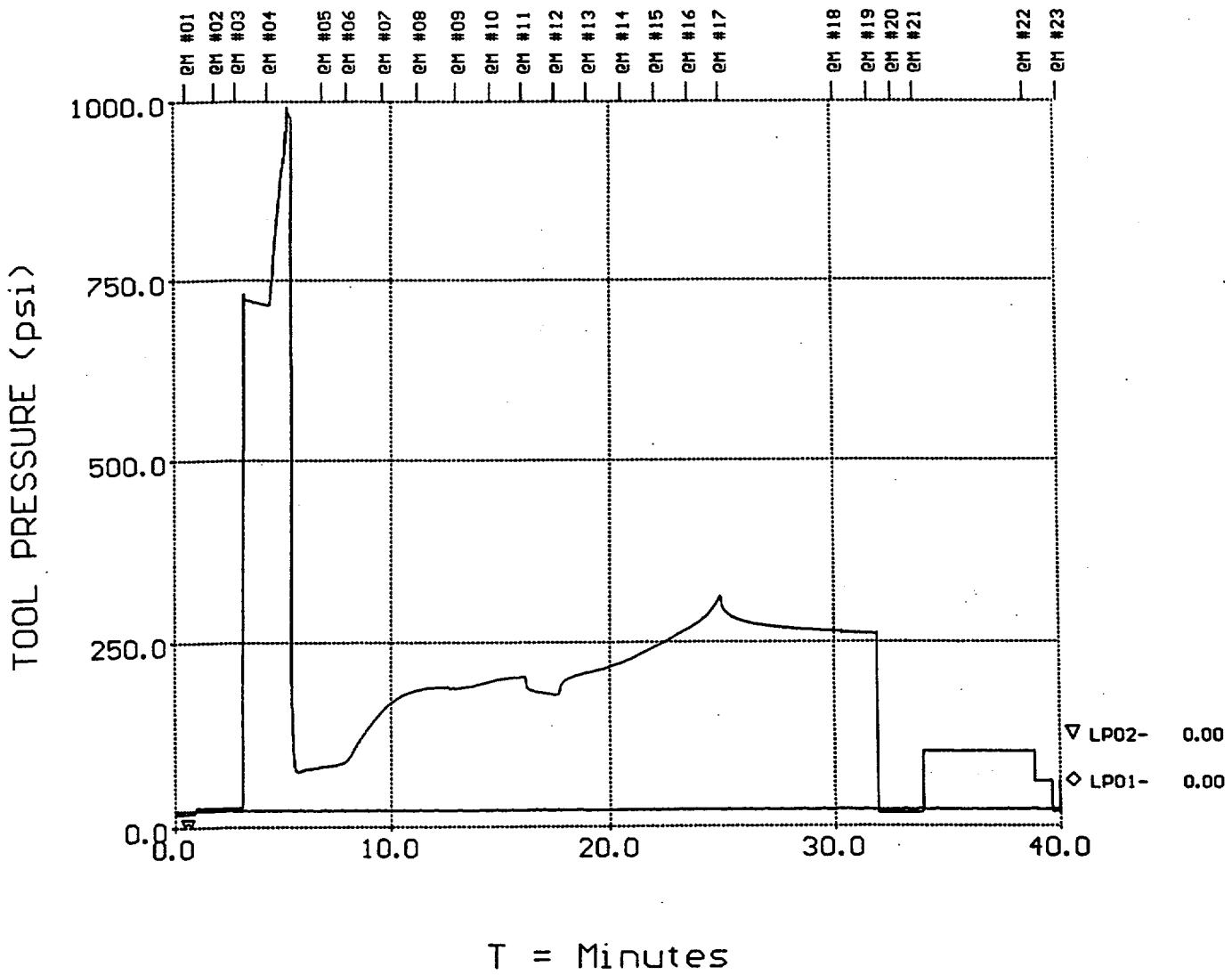
Form MP55Inf3.sam Dec 18, 1998

Westbay

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 MAR99
Checked By: _____ Date: _____
Comment:



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Page ____ of ____

MP55 Packer Inflation Field Record

Project: EWDP Client: NYC COUNTY	By: DL Date: 09 MAR99.
Location: AMARGOSA N Well No. EWDP-1S	Borehole Diameter: 6"
Packer No. – Depth: 0	Computer Data File: 1S_BT1.WDF.WDF
Inf-Tool No. TIW 2321 Vent Tool No. 2215	Volume Pumped: ____ Vol Returned ____
H-B Valve: (P_H) 0 Offset (P_V). 0	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, AIR 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

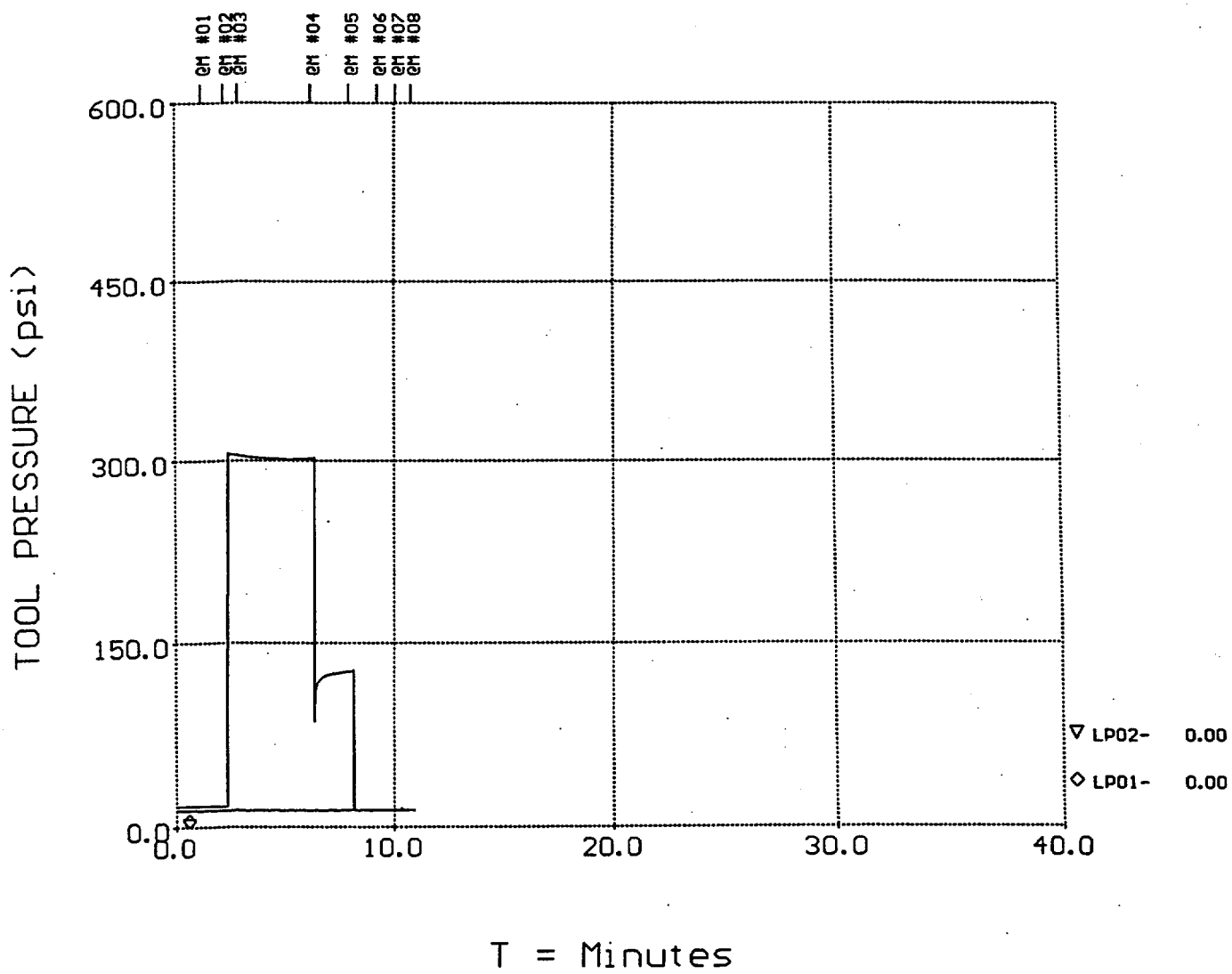
Form MP55Inf3.som Dec 18, 1998

#115 - 949 West Third Street, North Vancouver, BC Canada V7P 3P7 (800) 663 8770 (604) 984 4215 FAX (604) 984 3538 info@westbay.com
www.westbay.com

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

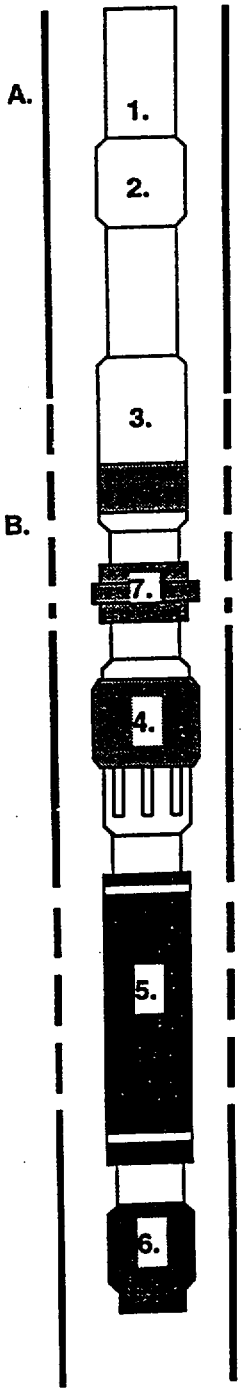
Packer:
Packer Depth: surface
FILE: 1S_BT1
Plot By: _____ Date: _____
Checked By: _____ Date: _____
Comment:



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 MAR99.



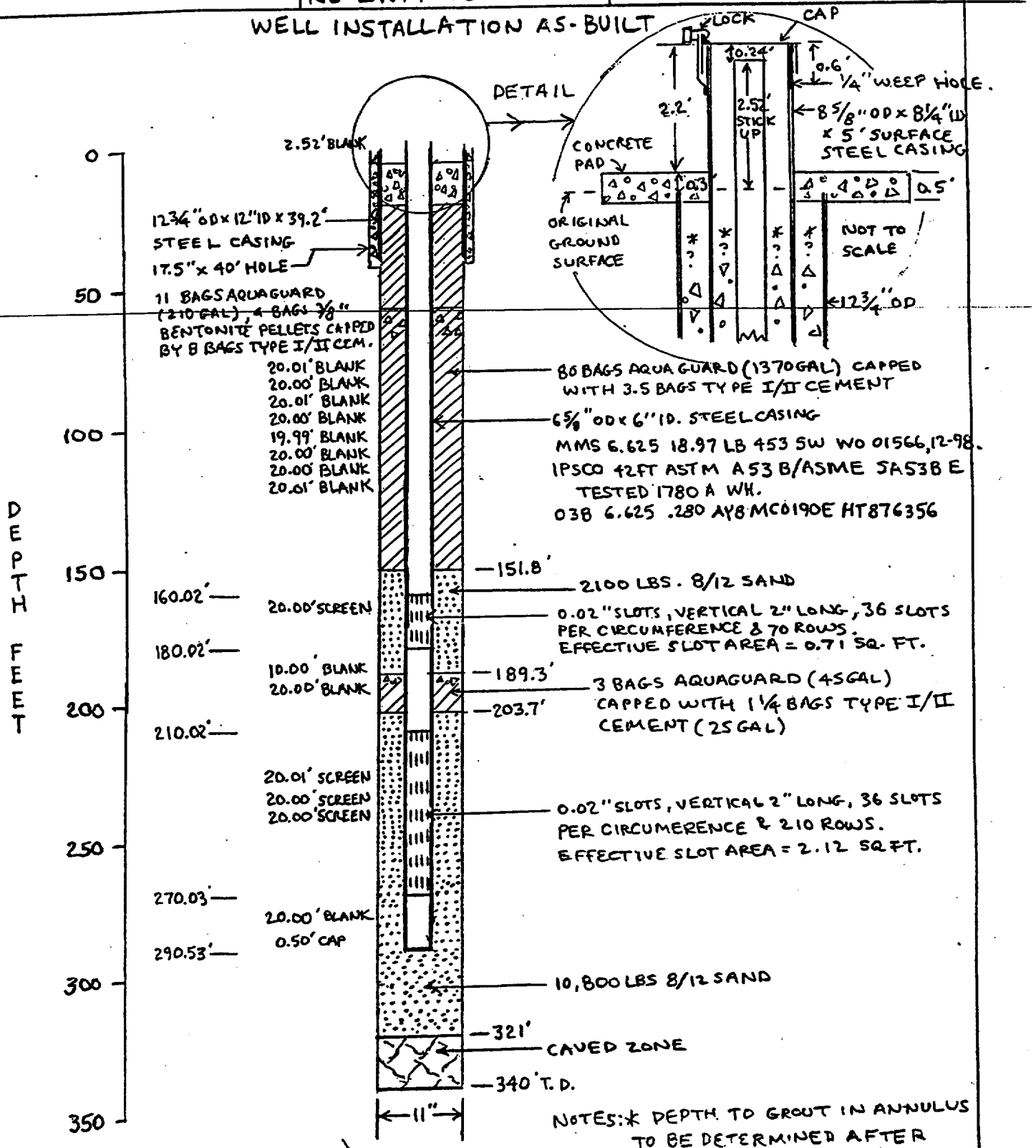
MP System Casing Components				
Item	Model No.	Description	I.D. (in)	O.D. (in)
1.	0301	MP55 Casing	2.25	2.75
2.	0302A	MP55 Regular Coupling	2.25	3.4
3.	0305B	MP55 Measurement Port Coupling	2.25	3.4
4.	0307	MP55 Hydraulic Pumping Port	2.25	3.5
5.	0315B	MP55 Reinforced Packer	2.25	4.3
6.	0303	End Plug	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

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

DL Westbay Instruments Inc. 1999
#115 - 949 West Third Street, North Vancouver, BC Canada V7P 3P7 (800) 663 8770 (604) 984 4215 FAX (604) 984 3538 info@westbay.com
www.westbay.com

NC-EWDP-1S

WELL INSTALLATION AS-BUILT



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
AMPAD

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9906100166-02

DRP-08

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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:

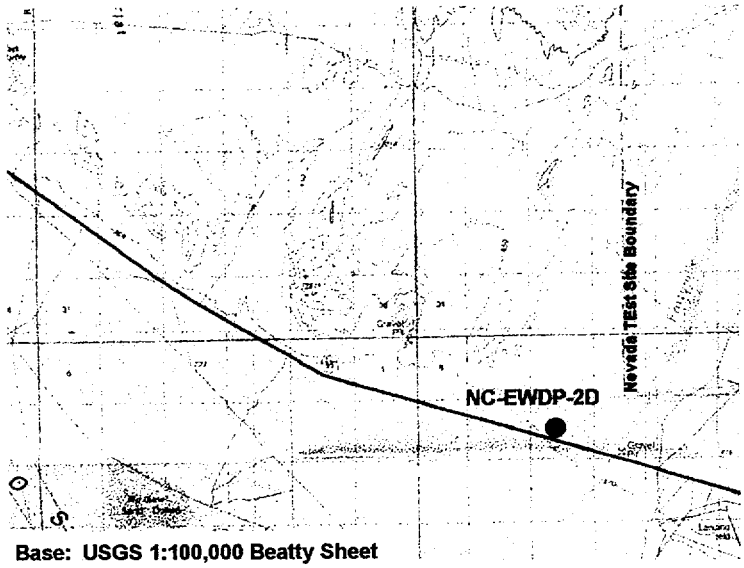
NONE

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.

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.



Base: USGS 1:100,000 Beatty Sheet

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 monotoring well in Fiscal Year 2000.

NC-EWDP-2D
SITE SUMMARY

Land surface

500 ft

1000 ft

1500

1618 ft (TD)

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 fragmentss;
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, interfingered 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, gravelley 1475-1485', 1535-1540', 1580-1600', tuffaceous 1575-1580', 1585-1590';
1605-1618.4' silt, calcareous, well indurated, pale brown (5YR 5/2)

NC-EWDP-2D
SUMMARY LITHOLOGIC LOG

Water Level Data

Well: NC-EWDP-2D

Location:

UTM: North	UTM: East	Latitude	Longitude	Elevation ft.	Elevation m
4057164.44	547743.87	36°39'38.521"N	116°27'56.834"W	2628.65	801.22

Access: From Lathrop Wells (Junction of Highways 95 and SR373) west 4.1 miles to gate on north side of Highway. Take gravel road 0.1 miles east.

Measuring Point: Ground level.

Measuring Point Correction:

Feet	Meters
0.00	0.000

Date	Zone Measured	Depth to Water below M.P. Ft.	Depth to Water below M.P. m	Elevation of Water Ft.	Elevation of Water m	Method	Personnel	Comments
14-Jan-1999	n/a	312.1	95.13	2316.6	706.09	NWRPO 500'	KDD	15:02, after stopping for "first water" for 30 min., bit at 347'
15-Mar-1999	n/a	311.6	94.98	2317.1	706.25	NWRPO 500'	KDD	06:20, hole stabilized for 16 hrs.
4-Mar-1999	n/a					NWRPO 500'	JSW	unable to sound below 440'.
10-Mar-1999	n/a					NWRPO 500'	KDD	unable to sound below 80'

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 0.0 To 60.0 Page 1 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
	BCS 0000 1451 (2MIN)	VALLEY FILL SILTY SAND: Pale yellow brn (10YR 6/2), some fine sub-ang volc gravel with thin carbonate rind, fine sand Pale brn (5YR 5/2) when wet			INJECTED WATER FOR CUTTINGS RETURN DRILLED WITH 14" BIT FROM 0-20'
5	BCS 0000 1452 (4MIN)	Gravels and cobbles increasing with depth subrounded gravels & cobbles			
10	BCS 0000 1453 (8MIN)				
15	BCS 0000 1454 (17MIN)				Hole caving
20	BCS 000 1455 (2MIN)	Decrease in amount cobbles predom fine subang gravel. fine-med sand.			PUT ON 11" BIT AT 20' STOPPED INJECTING WATER
25	BCS 000 1456 (3MIN)	INCREASE IN AMOUNT OF FINE GRAVEL			
30	BCS 000 1457 (3MIN)				
35	BCS 000 1458 (2MIN)				
40	BCS 000 1459 (1MIN)	SANDY GRAVEL, f-c subrnd gravel, f-med sand.			1-12-99 1706 40' 1-13-99, 0709
45	BCS 000 1460 (2MIN)				
50	BCS 000 1461 (2MIN)	SILTY SAND with f subrnd gravel, f sand			
55	BCS 000 1462 (5MIN)	SANDY GRAVEL, f-c subrnd gravel, fine-med sand			
60					

Prepared By KEN DONNELSON 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 DRILLED WITH AIR Sampling Equip./Method CYCLONE / CUTTINGS

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

Prepared By K. DONNELSON 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 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
	BCS 000 1475 (4MIN)	GRAVELLY SAND, f-med sand, some silt, predom f subrnd gravel			
125	BCS 000 1476 (2MIN)				
130	BCS 000 1477 (3MIN)	INCREASED SILT very pale orange (10YR 8/2)			
135	BCS 000 1478 (4 MIN)	INCREASED FINE-COARSE GRAVEL w/ SOME CEMENTATION			
140	BCS 000 1479 (4MIN)	SANDY GRAVEL, poorly sorted sand, poorly sorted subrnd gravel			
145	BCS 000 1480 (3MIN)				
150	BCS 000 1481 (3MIN)	Decrease in amount of gravel			
155	BCS 000 1482 (2MIN)	Some silt			
160	BCS 000 1483 (2MIN)	INCREASE IN AMOUNT OF GRAVEL & DECREASE IN SILT. SOME CEMENTATION OF FINE SAND			
165	BCS 000 1484 (3MIN)				
170	BCS 000 1485 (3MIN)	Predom fine gravel with coarse sand Moderate Brown (5YR 4/4 WET)			INJECT WATER AT 170' FOR DUST CONTROL SAMPLES DAMP
175	BCS 1486 (3MIN)	Predom coarse subrnd gravel with f-med sand			
180					

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 BROS Start Date/Time 1-12-99, 1333 End Date/Time

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

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 000 1487 (3MIN)	GRAVELLY SAND, coarse subrnd gravel, med sand some silt.			
185	BCS 000 1488 (2MIN)				
190	BCS 000 1489 (4MIN)	Predom fine subrnd gravel			
195	BCS 000 1490 (2MIN)	Predom coarse subrnd gravel			
200	BCS 000 1491 (6MIN)	Predom fine subrnd gravel Some clay from 202-203'			Increased hardness at 202.5'
205	BCS 000 1492 (3MIN)				
210	BCS 000 1493 (3MIN)	Predom coarse sand, some gravel			
215	BCS 000 1494 (2MIN)	Sand, med grained well sorted, trace clay & gravel			
220	BCS 000 1495 (4MIN)	Sand, coarse grained, trace clay, some fine gravel			
225	BCS 000 1496 (4MIN)	SANDY GRAVEL, coarse sand, fine angular-subrnd gravel			
230	BCS 000 1497 (4MIN)	INCREASED SAND & DECREASED GRAVEL			
235	BCS 000 1498 (6MIN)	Increased fine-med subang-subrnd gravel, trace-some clay			
240					

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 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 / 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
	BCS 000 1499 (4 MIN)	GRAVELLY SAND, fine subang - subrnd gravel, coarse sand, trace - some clay			
245	BCS 000 1500 (4 MIN)	CLAYEY SAND, fine - coarse sand, consid fine subang gravel, med plasticity			
250	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
255	BCS 000 1502 (4 MIN)	DAMP			
260	BCS 000 1503 (5 MIN)	GRAVEL, Gry Red (10R 4/2) - Dk yel brn (10YR 4/2) subang - angular volcanic, fine gravels, Some coarse ang sand			Dry
265	BCS 000 1504 (17 MIN)	Increased amount of coarse gravel. Some subrnd gravel, Some cobble.			Poor recovery
270	BCS 000 1505 (8 MIN)	Increased multi-colored gravel			
275	BCS 000 1506 (15 MIN)	Predom. fine subang gravel. Some cobbles			
280	BCS 000 1507 (21 MIN)				Had to inject water @ 280' because hole was tight
285	BCS 000 1508 (6 MIN)	Some subrnd medium gravel with clay coating			
290	BCS 000 1509 (8 MIN)				
295	BCS 000 1510 (12 MIN)				
300					

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

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 360 To 420 Page 7 of 27

Driller BRYAN 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
	BCS 000 1523 (13MIN)	SANDY GRAVEL, some silt, predom coarse ang sand, subang - subrnd multi-colored gravel			
365	BCS 000 1524 (12MIN				
370	BCS 000 1525 (3MIN)	Predominantly fine angular gravel			
375	BCS 000 1526 (3MIN)				
380	BCS 000 1527 (10MIN)	Increased coarse gravel silt & fine sand			
385	BCS 000 1528 (2MIN)				
390	BCS 000 1529 (2MIN)	Predom fine sand coarse subrnd gravel & cobbles. Silty			
395	BCS 000 1530 (5MIN)				
400	BCS 000 1531 (7MIN)				Increased water yield @ 405; becoming clearer.
405	BCS 000 1532 (14 MIN)	Decreare in silt & increase in coarse sand			
410	BCS 000 1533 (7MIN)	Increased angular gravel			
415	BCS 000 1534 (15MIN	Subrnd & subang gravel & cobbles			
420					

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-2D Drill Depth From 420 To 480 Page 8 of 27

Driller BRYAN MORRIS/BOYLES BROS. Start Date/Time 1-12-99, 1323 End Date/Time

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
	BCS 000 1535 (17 MIN)	SANDY GRAVEL & COBBLES, coarse sand, coarse subang-subrnd multi-colored gravels.			
425	BCS 000 1536 (25 MIN)				
430	BCS 000 1537 (9 MIN)				Not enough pressure @ 433' to bring up cuttings. Injected QUIK-FOAM WITH WATER. 25' PLUG IN PIPE. 1-19-99, 1449. 1-20-99, 1557
435	BCS 000 1538 (20 MIN)				
440	BCS 000 1539 (8 MIN)	DECREASE IN AMOUNT OF COBBLES			
445	BCS 000 1540 (20 MIN)				
450	BCS 000 1541 (8 MIN)	INCREASED COARSE SAND			
455	BCS 000 1542 (14 MIN)				1-20-99, 1731
460	BCS 000 1543 (5 MIN)	Predom. fine subrnd gravel			1-21-99, 0643
465	BCS 000 1544 (22 MIN)	INCREASED AMOUNT OF COARSE SUBRND GRAVEL & COBBLES			
470	BCS 000 1545 (4 MIN)	INCREASED AMOUNT OF COARSE SAN			
475	BCS 000 1546 (8 MIN)				
480					

Prepared By KEN DONNELSON 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 BRYAN MORRIS / BOYLES BROS Start Date/Time 1-12-99, 1333 End Date/Time _____

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
	BCS 000 1547 (13 MIN)	Some silt (MUDDY)			
485					
	BCS 000 1548 (10 MIN)				
490					
	BCS 000 1549 (6 MIN)	Increased amount of coarse sand			
495					
	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
500					

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 HARRIS / 0-500 HOLQUIN/CLEAVER / 500- / LAYNE Start Date/Time 2-10-99 End Date/Time 2-18-99

Drilling Equip./Method AP-1000/11" 0-500' IR TH75E - 500' - 1618.28' Sampling Equip./Method Cyclone/cuttings

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	ALLUVIUM - GRAVEL, POLYMICTIC, LOCALLY COARSE VARIOUS COLOR TYPES, ALSO COARSE SAND			STARTS DRILLING AT 500' 2-11-99 WITH IR-TH75E
	ECS 0000 2352				
510	ECS 0000 2353				
515	ECS 0000 2354				
520	ECS 0000 2355				RETURN WATER WARM AT 524' WATER WAS RED
525	ECS 0000 2356				
530	ECS 0000 2357	532'-537' CLAY RICH ZONE, PALE ORANGE 10YR 7/2 MINOR SAND WITH THE CLAY			
535	ECS 0000 2358	537' GRAVEL AS TO 500'			
540					

Prepared By Bert Amquist Date 2-16-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 540 To 600 Page 10 of 27

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

Drilling Equip./Method IR 7H 75E 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 2359	ALLUVIUM - COARSE GRAVEL, POLYMICTIC, WITH LOCAL COARSE SAND			
545	BCS 0000 2360	HOLE CAVING, LOTS OF GRAVEL RETURN			
550	BCS 0000 2361				
555	BCS 0000 2362	AT 556 PENETRATION ALMOST STOPPED AS IF DRILLING THROUGH A BOULDER			
560	BCS 0000 2363				
	BCS 0000 2364	AT 565 PENETRATION VERY SLOW ABUNDANT CUTTINGS RETURN, CAVING			
570	BCS 0000 2365	SLOW ROUGH DRILLING, BOULDER			
575	BCS 0000 2366				
580	BCS 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 1200 HRS. Hole is washing out due to unconsolidated granular material
585	BCS 0000 2368				
590	BCS 0000 2369				
595	BCS 0000 2370				
600					

ared By BENT ARQUIST 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	BCS 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	BCS 0000 2372				
610	BCS 0000 2373	Similar sandy coarse alluvium w/ ~30% yellow-grey (5Y7/2) clay			
615	BCS 0000 2374	Alluvium, as above, coarse sand, gravels and cobbles section with obvious fine brown sand; return water is brown and gritty			problems re-establishing return after rod add 14:03 return becomes very brown due to fine sand
620	BCS 0000 2375	return "clears"; no fine sand			
630	BCS 0000 2376				
625	BCS 0000 2377				
640	BCS 0000 2378	Thin clay layer			
645	BCS 0000 2379				
650	BCS 0000 2380	20% light brownish grey clay (5YR 6/1)			
655	BCS 0000 2381				
660	BCS 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 NC-EWDP-2D 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	BCS 0000 2383	Alluvium, as above, coarse sand, gravel and cobbles. local thin (<1') beds of clay			
665	BCS 0000 2384				
670	BCS 0000 2385				
675	BCS 0000 2386	15% light brownish grey clay			
680	BCS 0000 2387				
685	BCS 0000 2388	Clay, light brownish grey, local gravel beds (<5%)			
690	BCS 0000 2389				
695	BCS 0000 2390				
700	BCS 0000 2391	Gravel Beds: [illegible] pebbles and coarse sand ~50%			
705	BCS 0000 2392				
710	BCS 0000 2393				
715	BCS 0000 2394				
720					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

Driller CLEAVER/LAYNE to 757.5' Start Date/Time _____ End Date/Time _____

Drilling Equip./Method IR TH75E/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 2395	Alluvium, Sandy Clay; Light brown (5YR 6/2), med-coarse sand mixed with Clay (Fanglomerate). Generally less than 50% sand.			
725	BCS 0000 2396				
730	BCS 0000 2397				
735	BCS 0000 2398				
740	BCS 0000 2399				
	BCS 0000 2400				
750	BCS 0000 2401				
755	BCS 0000 2402				end of shift 2-11-99/19:18 Δ to button bit 757.5' 2-16-99 first shift
760	BCS 0000 2403	SANDY CLAY WITH MINOR GRAVEL OF MIXED LITHOLOGY CLAY PALE YELLOWISH ORANGE 10YR 8/2 GRAVEL FRAGMENTS ANGULAR			[illegible]
765	BCS 0000 2404				
770	BCS 0000 2405				
775	BCS 0000 2406				
780					

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 TH75E / 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			
785	BCS 0000 2408				
790	BCS 0000 2409				
795	BCS 0000 2410	LOCAL MINOR COARSE GRAVEL			NATIVE YELLOWISH BROWN
800	BCS 0000 2411				
	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					

ared By Brent Anderson Date 2-16-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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 7/175E / 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 4/1) 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. Brown hard dry clay and sand, gravel			
	BCS 0000 2424	Coarse sand & gravel.			
870	BCS 0000 2425				
875	BCS 0000 2426				
880	BCS 0000 2427	becomes finer; mostly coarse-med. sand			
885	BCS 0000 2428	coarse sand, gravel			
890	BCS 0000 2429				
895	BCS 0000 2430				
900					

Prepared By Bent Arquist / Jamie Walker Date 2-16-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

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

Drilling Equip./Method IR TH75E/ 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 2431	Alluvium, as above, coarse sand and gravel; well washed/sorted, very little fine material.			
905	BCS 0000 2432	obvious brown silty sand in return water; mostly coarse sand in sample.			
910	BCS 0000 2433				
915	BCS 0000 2434	clear return			
920	BCS 0000 2435				
925	BCS 0000 2436				hole producing ~50 gpm consistently
	BCS 0000 2437	finer sand, section	gradual color change		
935	BCS 0000 2438	coarse gravel			
940	BCS 0000 2439	Alluvium, sand and gravel, yellowish-brown (10YR 5/4); different source than sands above.			sl. increase in water flow after +/- 48 added ~60 gpm return hose is kicking but only slight increase in flow.
945	BCS 0000 2440	occasional lava rock, mostly brown volcanic			
950	BCS 0000 2441				
955	BCS 0000 2442				
960					

ured By _____ Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 960 To 1020 Page 17 of 27

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

Drilling Equip./Method IR TH75E 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 2443	Alluvium, as above, sand and gravel, yellowish/brown. Weak to moderate reaction to 10% HCl as cement coatings?			
965	BCS 0000 2444				
970	BCS 0000 2445				
975	BCS 0000 2446	coarse sand, gravel, cobbles			
980	BCS 0000 2447				
	BCS 0000 2448				
990	BCS 0000 2449				
995	BCS 0000 2450				
1000	BCS 0000 2451				
1005	BCS 0000 2452				
1010	BCS 0000 2453				
1015	BCS 0000 2454	hard brown clay observed			
1020					

Prepared By Jamie Walker Date _____ Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole 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/Tricone RC Sampling Equip./Method Cyclone/cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 2455	Alluvium, as above, yellow-brown sand and gravel.			
1025					
	BCS 0000 2456				
1030					
	BCS 0000 2457				
1035		— — — — — — — Gradation Contact			
	BCS 0000 2458	Alluvium, ?older?, greyish pink (5R 8/2) to pinkish-grey (5YR 8/1), 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
1040					
	BCS 0000 2459				
1045					
	BCS 0000 2460				
1050					
	BCS 0000 2461	coarse polymictic gravel bed			
1055					
	BCS 0000 2462				
1060					
	BCS 0000 2463				Drilling rate increases
1065					
	BCS 0000 2464				
1070					
	BCS 0000 2465	coarse polymictic gravels			
1075					
	BCS 0000 2466				
1080					

Prepared By JAMIE WALKER Date 2.17.99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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	BCS 0000 2467	ALLUVIUM AS ABOVE, GRAYISH YELLOW 5Y 8/2 MINOR PINK CLASTS 5R 7/2, INCREASE TO 5% AT 1095' COARSE SAND INCREASE TO FINE GRAVEL AT 1095'			
1090	BCS 0000 2468				2-16-99 Second shift 2-17-99 First shift WATER VOLUME 85 g.p.m
1095	BCS 0000 2469				
1100	BCS 0000 2470	ALLUVIUM - GRAVEL, COARSE, POORLY SORTED, OVERALL UNIT YELLOWISH GRAY 5Y 6/2, ANGULAR CLASTS WITH MODERATE SPHERICITY. RHYOLITE TUFF CLASTS OF VARYING COLOR AND TEXTURE			
1105	BCS 0000 2471	ALLUVIUM - MOSTLY FINE SANDY MATERIAL, 5% FINE GRAVEL UNIT GRAYISH RED 10R 5/2 GRAVEL PORTION POLYMICTIC RHYOLITIC CLASTS, SUB ANGULAR WITH MODERATE SPHERICITY			
1110	BCS 0000 2472				
1115	BCS 0000 2473				
1120	BCS 0000 2474	ALLUVIUM - GRAVEL GRAYISH YELLOW 5Y 7/4 WITH 10% PALE BROWN 5YR 6/2 PEBBLES AND COBBLES			WATER VOLUME INCREASE TO 100-120 g.p.m. AT 1119'
1125	BCS 0000 2475	ALLUVIUM GRAVEL WITH ABUNDANT CLAY YELLOWISH ORANGE 10YR 7/6			
1130	BCS 0000 2476	BECOMING GRAYISH ORANGE PINK 5YR 7/2			
1135	BCS 0000 2477				
1140	BCS 0000 2478	COARSE GRAVEL 1135 TO 1140' WITH CLAY			AT 1139' WATER TURNED REDDISH BROWN

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 1140 To 1200 Page 20 of 27

Driller _____ 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
1140	BCS 0000 2479	SILTSTONE RED 5R 5/6, MINOR WHITE AND GRAY GRAVEL			
1145		CONTACT GRADATIONAL			
	BCS 0000 2480	SANDSTONE PINKISH RED 5R 6/4 DOWN TO 1150' 50% PALE YELLOWISH BROWN 10YR 6/2 FRAGMENTS			
1150					
	BCS 0000 2481				
1155					
	BCS 0000 2482	GRAVEL, PINK 5R 8/4, SUBANGULAR TO ROUNDED MODERATE SPHERICITY, POLYMICTIC RHYOLITE			
1160					
	BCS 0000 2483	REWORKED ASH FLOW PINK 5R 8/4, GRAVEL OF VERY FINE GRAINED ASH CLASTS AND CLASTS OF FINE CRYSTALLINE TEXTURE MINOR CLASTS OF QUARTZ CRYSTALS AND SANDSTONE			
1165		1165 TO 1190 RED 5R 5/6			
	BCS 0000 2484				
1170					
	BCS 0000 2485				
1175					
	BCS 0000 2486				
1180					
	BCS 0000 2487				
1185					
	BCS 0000 2488				
1190		1190-1195 MODERATE PINK 5R 7/4			
	BCS 0000 2489				
1195					
	BCS 0000 2490	GRAVEL MODERATE PINK 5R 7/4 TO RED 5R 5/6 POORLY SORTED POLYMICTIC, 60% FRAGMENTS OF ABOVE UNIT			
1200					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NCEWDP 2D Drill Depth From 1200 To 1260 Page 21 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
1200	BCS 0000 2491	REWORKED ASH FLOW AS TO 1160-1195 RED 5R 5/6 WITH < 10% YELLOW AND BROWN CLASTS			
1205	BCS 0000 2492				
1210	BCS 0000 2493				
1215	BCS 0000 2494				
1220	BCS 0000 195				
1225	BCS 0000 2496				
1230	BCS 0000 2497				RETURN WATER 39.6°C
1235	BCS 0000 2498	GRAVEL, COURSE ROUNDED PEBBLES AND COBBLES 50% OF FRAGMENTS ARE SAME AS ABOVE UNIT			
1240	BCS 0000 2499	CLAY WITH MINOR GRAVEL, RED 5R 5/6			
1245	BCS 0000 2500	GRAVEL MOSTLY RED 5R 5/6 RHYOLITE PEBBLES WITH 10% QUARTZ PHENOCRYSTS. SOME QUARTZ ALSO OCCURS AS SAND GRAINS 10% MODERATE YELLOW 5Y 7/6 RHYOLITE GRAINS, ALSO WITH QUARTZ PHENOCRYSTS MINOR GRAYISH BLACK N2 CLASTS			
1250	BCS 0000 2501				
1255	BCS 0000 2502				
1260					

Prepared By Bent Anquist Date 2-18-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 1260 To 1320 Page 22 of 27

Driller _____ 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
1260	BCS 0000 2503	REWORKED ASH FLOW, DUSKY RED 5R 3/4, RHYOLITE WITH >10% QUARTZ PHENOCRYSTS			
1265	BCS 0000 2504	GRAVEL, LIGHT RED 5R 6/6 TUFFACEOUS CLASTS SUBANGULAR WITH LOW SPHERICITY COMPOSE 50% - 70%. CLASTS ARE MASSIVE VERY FINE GRAINED			DRILL PENETRATION RATE SLOWED TO 1/2 OF WHAT IT WAS ABOVE 1265'
1270	BCS 0000 2505				
1275	BCS 0000 2506				
1280	BCS 0000 2507				
1285	BCS 0000 2508				
1290	BCS 0000 2509				
1295	BCS 0000 2510	GRAVEL POLYMICTIC, MULTICOLORED, WELL ROUNDED CLASTS			
1300	BCS 0000 2511				
1305	BCS 0000 2512				
1310	BCS 0000 2513				
1315	BCS 0000 2514				2-17-99 First shift 2-17-99 Second shift
1320					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

Driller _____ 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
1320	BCS 0000 2515	Alluvium, gravel			distinct color change
1325	BCS 0000 2516	Alluvium, fine sands or reworked tuffs, well cemented (Calcite); interfingered red (5R5/4) hematitic beds with dominantly yellow-orange (10YR6/6) limonitic beds. Local gravel beds (1-3') suggest unit is sand and not reworked tuffs.			
1330	BCS 0000 2517				
1335	BCS 0000 2518	polymictic gravel bed			
1340	BCS 0000 2519				
1345	BCS 0000 2520				
1350	BCS 0000 2521				
1355	BCS 0000 2522	course sand polymictic gravels			
1360	BCS 0000 2523				
1365	BCS 0000 2524				
1370	BCS 0000 2525				
1375	BCS 0000 2526	Alluvium, interbedded sand, gravel and clay, unconsolidated, light brown (5YR6/4) to greyish red (5R4/2). Very slow drilling. Minor beds of yellow sandy material as above.			distinct color change
1380					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

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

Drilling Equip./Method IR TH75E/Tricone 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 2527	Alluvium, as above, interbedded sand, gravel & clay.			
1385	BCS 0000 2528	clay-rich zone			
1390	BCS 0000 2529				
1395	BCS 0000 2530	coarse gravel zone			waterflow 1120 gpm
1400	BCS 0000 2531	sandy clay			
1405	BCS 0000 2532	clay-rich zone			
1410	BCS 0000 2533	sand, gravel, less clay			
1415	BCS 0000 2534	sand and gravel			
1420	BCS 0000 2535	sand and fine gravel, local dark purple clay layers			
1425	BCS 0000 2536				
1430	BCS 0000 2537				
1435	BCS 0000 2538				
1440					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 1440 To 1500 Page 25 of 27

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

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

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
1440	BCS 0000 2539	Alluvium, as above, interbedded sand, gravel and clay, unit generally greyish-red (5R 4/2)			
1445	BCS 0000 2540				return water 41.2°C
1450	BCS 0000 2541	Coarse sandy gravel unit			
1455	BCS 0000 2542				2-17-99 Second shift 2-18-99 First shift
1460	BCS 0000 2543				
1465	BCS 0000 2544	TUFF, ASH FALL, LIGHT GRAY, MOSTLY PUMICE, 10% ADDED BIOTITE FLAKES			NOTE: FROM 1465 TO 1618 NO ROCK COLOR CHART WAS AVAILBLE ON 3-12-99 CALCAREOUS
1470	BCS 0000 2545	SILTSTONE, LACUSTRINE, BROWN OR GRAY; GRAVEL, VOLCANIC GRAY, BROWN, OR RED. GRAVEL USUALLY 10-20% OF SAMPLE, LOCALLY PREDOMINATES.			CALCAREOUS
1475	BCS 0000 2546	MOSTLY GRAVEL			NOT CALCAREOUS
1480	BCS 0000 2547	MOSTLY GRAVEL			NOT CALCAREOUS
1485	BCS 0000 2548				WEAKLY CALCAREOUS
1490	BCS 0000 2549				WEAKLY CALCAREOUS
1495	BCS 0000 2550				WEAKLY CALCAREOUS
1500					

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 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
1500	BCS 0000	SILTSTONE AND GRAVEL, AS ABOVE			WEAKLY CALCAREOUS
1505	BCS 0000				WEAKLY CALCAREOU
1510	BCS 0000				WEAKLY CALCAREOUS
1515	BCS 0000				WEAKLY CALCAREOUS
1520	BCS 0000				CALCAREOUS
1525	BCS 0000				CALCAREOUS
1530	BCS 0000				CALCAREOU
1535	BCS 0000	MOSTLY GRAVEL			CALCAREOUS
1540	BCS 0000				CALCAREOUS
1545	BCS 0000				CALCAREOUS
1550	BCS 0000				CALCAREOUS
1555	BCS 0000				CALCAREOUS
1560					

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 1560 To 1620 Page 27 of 27

Driller _____ 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
1560	BCS 0000	SILTSTONE AND GRAVEL, AS ABOVE.			WEAKLY CALCAREOUS
1565	BCS 0000				WEAKLY CALCAREOUS
1570	BCS 0000				WEAKLY CALCAREOUS
1575	BCS 0000	40% GRAVEL, 20% SILTSTONE 40% TUFF, REWORKED, GRAY, ABRADED BIOTITE PHENOCRYSTS			WEAKLY CALCAREOUS
1580	BCS 0000	MOSTLY GRAVEL			WEAKLY CALCAREOUS
1585	BCS 0000	10% TUFF, REWORKED, AS ABOVE			WEAKLY CALCAREOUS
1590	BCS 0000				WEAKLY CALCAREOUS
1595	BCS 0000	MOSTLY GRAVEL			WEAKLY CALCAREOUS
1600	BCS 0000				CALCAREOUS TO WEAKLY CALCAREOUS
1605	BCS 0000	SILTSTONE, LACUSTRINE, BROWN			CALCAREOUS
1610	BCS 0000				CALCAREOUS
1615	BCS 0000				CALCAREOUS
1620		HOLE TD'd at 1618.38' due to casing problems.			Plugged off - tied 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

SEE APERTURE CARD FILES

APERTURE CARD/PAPER COPY AVAILABLE THROUGH NRC FILE CENTER

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9906100166-03

DRP-08

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BOREHOLE: NC-2D

LOGS: NEUTRON DENSITY GAMMA

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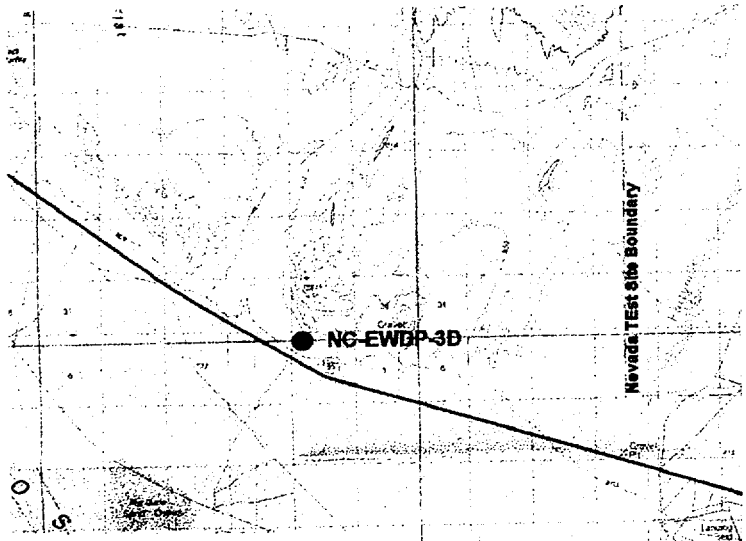
9906100166-03

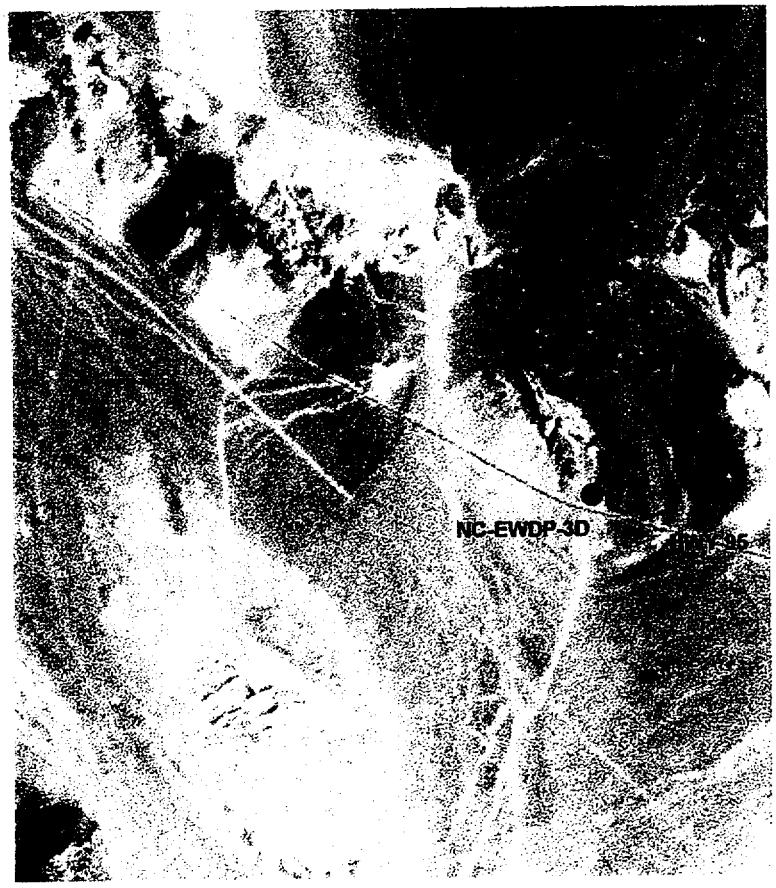
Well No. NC-EWDP-3D

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.



Base: USGS 1:100,000 Beatty Sheet

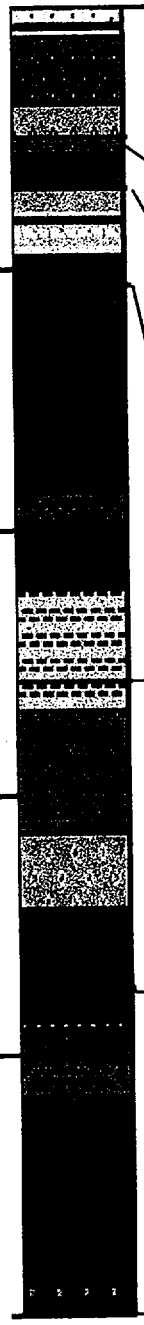
Purpose: 1) provide lithologic samples of deposits; 2) define valley-fill stratigraphic sequence and groundwater flow paths down gradient of proposed repository; and 3) provide water level and water chemistry data.



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 Westbay 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



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

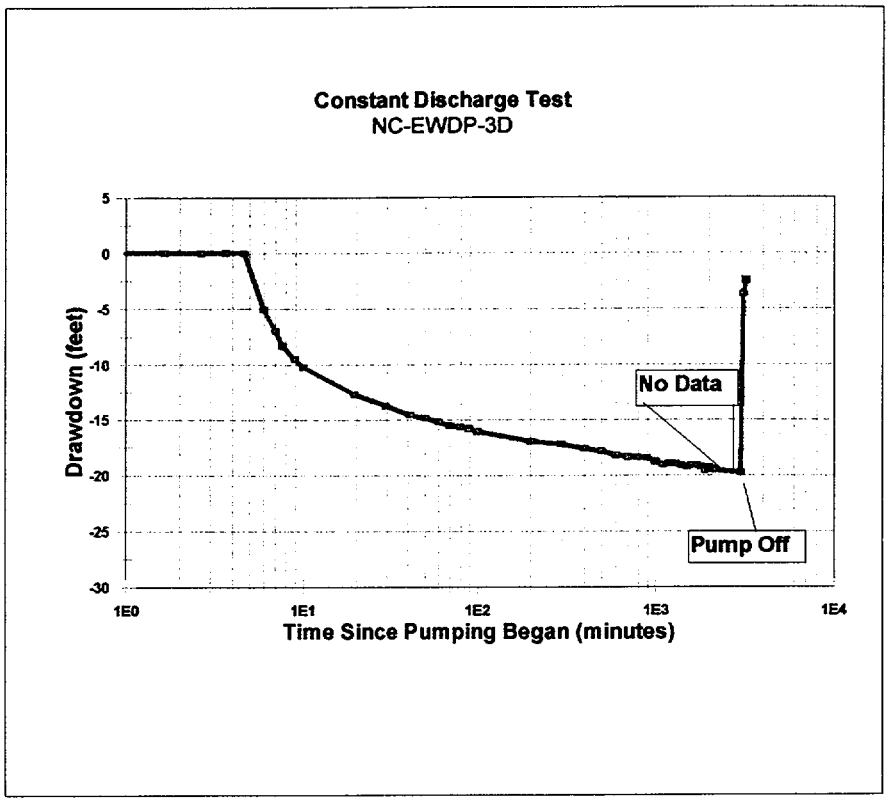
1870-2500' Tertiary Sedimentary rocks -1870-1925' siltstone, sandy, lacustrine, brownish black (5YR 2/1) to yellow brown (10YR 5/4); 1925-1932' silstone as 1870-1925', clay-rich, light gray (N8); 1932-1945' siltstone, black (N1) to yell-brn (10YR 5/2);1950-2000' siltstones, fine dark yell-brn (10YR 3/2) 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

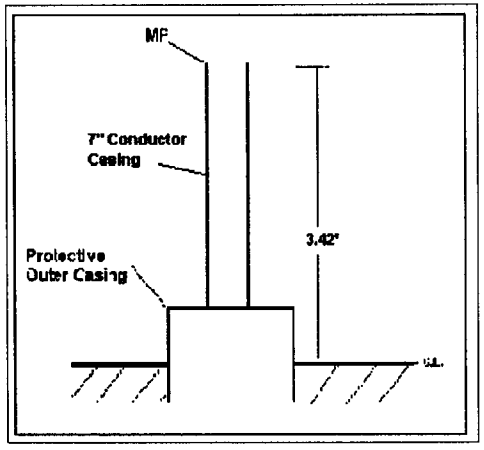
Static Depth To Water (ft below mp) 259.04

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



Water Level Data

Well: NC-EWDP-3D

Location:

UTM: North	UTM: East	Latitude	Longitude	Elevation ft.	Elevation m
4059444.20	541272.68	36°40' 53.597"N	116°32'17.049"W	2619.19	798.34

Access: From Lathrop Wells (Junction of Highways 95 and SR373) west 7.5 miles to gate on north side of Highway. Take gravel road 0.15 north; turn east and follow tire tracks.

Measuring Point: Top of 7" conductor casing.

Measuring Point Correction:

Feet	Meters
3.42	1.042

Date	Zone Measured	Depth to Water below M.P. Ft.	Depth to Water below M.P. m	Elevation of Water Ft.	Elevation of Water m	Method	Personnel	Comments
20-Jan-1999	n/a	155.0	47.24	2460.8	750.05	NWRPO Powers	BA	09:25; 90 minutes after hitting at water @ 240'; bit @ 240'
6-Mar-1998	n/a	265.5	80.91	2350.3	716.39	Buqo 500'	TSB	16:55
10-Mar-1999	n/a	259.7	79.14	2356.1	718.15	NWRPO 500'	MCC	
12-Mar-1999	n/a	259.6	79.13	2356.2	718.17	NWRPO 500'	MCC	
16-Mar-1999	n/a	264.8	80.70	2351.0	264.76	NWRPO 500'	MCC	
17-Mar-1999	n/a	264.8	80.70	2351.0	716.60	NWRPO 500'	MCC	
18-Mar-1999	n/a	264.8	80.70	2351.0	716.60	NWRPO 500'	MCC	

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

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

Drilling Equip./Method INGERSOLL-RAND TH75E SN 6249 REVERSE CIRCULATION Sampling Equip./Method CYCLONE/SPLITTER

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
5	BCS 0000 1204	ALLUVIUM, ALLUVIAL FAN, CALCHIE 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				12" CASING TO 20'
30	BCS 0000 1206		NO SAMPLE		NO RETURN 25'-30'
35	BCS 0000 1207	ALLUVIUM, AS ABOVE, MUCH LESS CALCHIE COVERING CLASTS, GRAYISH RED 10R 4/2, VERY DUSKY RED 10R 2/2, OR LIGHT BROWN 5YR 6/4 (MOST ABUNDANT)			
40	BCS 0000 1208				
45	BCS 0000 1209		NO SAMPLE		NO RETURN STARTED INJECTING WATER TO GET BETTER RETURN
50	BCS 0000 1210				
55	BCS 0000 1211				
60	BCS 0000 1212		NO SAMPLE		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 NC-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		NO SAMPLE		NO CUTTINGS, NO RETURN
70	BCS 0000 1214	ALLUVIUM, AS ABOVE			
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				
115	BCS 0000 1223				ABUNDANT FINE CUTTINGS
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-EWDP-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		NO SAMPLE		CUTTINGS WASHED THROUGH SEIVE
135	BCS 0000 1227				
140	BCS 0000 1228				
145	BCS 0000 1229				
150	BCS 0000 1230				
155	BCS 0000 1231		NO SAMPLE		CUTTINGS WASHED THROUGH SEIVE
160	BCS 0000 1232				
165	BCS 0000 1233				
170	BCS 0000 1234				
175	BCS 0000 1235				170-180 5% CLAST, VOLCANIC, VERY PALE ORANGE 10YR 8/2
180	BCS 0000 1236	ALLUVIUM, TRANSIONAL BETWEEN ALLUVAL FAN AND SAND			

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-EWDP-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
	BCS 0000 1237	ALLUVIUM, AS ABOVE			
185	BCS 0000 1238	ALLUVIUM, SAND, POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
190	BCS 0000 1239				
195	BCS 0000 1240				
200	BCS 0000 1241	ALLUVIUM, ALLUVIAL FAN, COMMONLY CALCHIE COVERED VOLCANIC CLASTS, VERY PALE ORANGE 10YR 8/2 (DRY)			200'-220' ONLY MINIMAL CUTTINGS IN RETURN
205	BCS 0000 1242		NO SAMPLE		CUTTINGS WASHED THROUGH SEIVE
210	BCS 0000 1243	ALLUVIUM, ALLUVIAL FAN AND SAND, VOLCANIC CLASTS GRAYISH RED 10R 4/2, VERY DUSKY RED 10R 2/2, OR LIGHT BROWN 5YR 6/4, SAND POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
215	BCS 0000 1244				
220	BCS 0000 1245		NO SAMPLE		CUTTINGS WASHED THROUGH SEIVE
225	BCS 0000 1246	ALLUVIUM, SAND, POORLY SORTED, PALE YELLOWISH BROWN 10YR 6/2			
230	BCS 0000 1247				
235	BCS 0000 1248				FIRST INDICATION OF GROUNDWATER
240					

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-EWDP-3D Drill Depth From 240 To 300 Page 5 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 1249	ALLUVIUM, AS ABOVE, RARE VOLCANIC CLASTS			
245	BCS 0000 1250				
250	BCS 0000 1251	SANDSTONE LACUSTRINE/FLUVIAL, POORLY SORTED, PALE RED 10R 6/2, 10-20% MAFICS, TRACE FeO_x			WATER LEVEL 249'-255' 1-22-99 1042 HRS TEMP 48°C GEOPHYSICAL PROBE
255	BCS 0000 1252				POSSIBLE WEATHERING SURFACE 10% DARK REDDISH BROWN 10R 3/4
260	BCS 0000 1253				
265	BCS 0000 1254				
270	BCS 0000 1255				
275	BCS 0000 1256	SANDSTONE, LACUSTRINE/FLUVIAL, POORLY SORTED, GRAYISH ORANGE 10YR 7/4, 5-10% ABRADED MAFICS, 1% VOLCANIC CLASTS			
280	BCS 0000 1257				
285	BCS 0000 1258				
290	BCS 0000 1259				10% VOLCANIC CLASTS
295	BCS 0000 1260	SILTSTONE, LACUSTRINE, MEDIUM DARK GRAY N4, SOMEWHAT CALCAREOUS			
300					

Prepared By ARTHUR J. MENDENHALL Date 1-22-99 1-23-99 Checked By ____ Date ____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 300 To 360 Page 6 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 1261	SILTSTONE, AS ABOVE			RARE VOLCANIC CLASTS
305					
	BCS 0000 1262				CLAYEY
310					
	BCS 0000 1263				CLAYEY
315					
	BCS 0000 1264				
320					
	BCS 0000 1265				
325					
	BCS 0000 1266				TUFF, ASH FALL, YELLOWISH GRAY 5GY 8/1
330					
	BCS 0000 1267				CLAYEY
335					
	BCS 0000 1268				CLAYEY
340					
	BCS 0000 1269	TUFF, ASH, REWORKED, GRAYISH ORANGE PINK 5YR 7/2 TO GRAYISH ORANGE 10YR 7/4, UP TO 5% QUARTZ/SANIDINE PHENOCRYSTS, 1% MAFICS, UP TO 20% VOLCANIC CLASTS.			
345					
	BCS 0000 1270				
350					
	BCS 0000 1271				CLAYEY
355					
	BCS 0000 1272	COLOR BECOMING VERY PALE ORANGE 10YR 8/2			
360					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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				
375	BCS 0000 1275	0-5% VOLCANIC CLASTS			
380	BCS 0000 1276				
385	BCS 0000 1277				
390	BCS 0000 1278				
395	BCS 0000 1279	YELLOWISH GRAY 5Y 7/2			
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 PHENOCRYSTS, 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 NC-EWDP-3D Drill Depth From 420 To 480 Page 8 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
425	BCS 0000 1285	TUFF, ASH, REWORKED, VERY PALE ORANGE 10YR 8/2, 5-10% ABRAIDED BIOTITE AND MAFICS, 1-5% QUARTZ/SANIDINE, 1-20% VOLCANIC CLASTS			
430	BCS 0000 1286				
435	BCS 0000 1287				
440	BCS 0000 1288				
445	BCS 0000 1289				
450	BCS 0000 1290	BECOMMING GRAYISH YELLOW GREEN 5GY 7/2			
455	BCS 0000 1291				
460	BCS 0000 1292				
465	BCS 0000 1293	BECOMMING YELLOWISH GRAY 5Y 7/2			
470	BCS 0000 1294				DENDRITIC MnOx
475	BCS 0000 1295				
480	BCS 0000 1296	TUFF, ASH FLOW, BLACK N1; 20-30% PUMICE, VERY PALE ORANGE 10YR 8/2, 0-50% QUARTZ/SANIDINE PHENOCRYSTS, 0-10% MAFICS			PUMICE SHOWS NO FLATTENING

Prepared By Arthur J. Mendenhall Date 1-23-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-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
	BCS 0000 1297	TUFF, ASH FLOW, AS ABOVE			
485					
	BCS 0000 1298				
490					
	BCS 0000 1299				
495					
	BCS 0000 1300				1% VOLCANIC LITHICS
500					
	BCS 0000 1301				POSSIBLE WEATHERING SURFACE PUMICE DARK YELLOWISH ORANGE 10YR 6/6
505					
	BCS 0000 1302	PUMICE BECOMMING MODERATE GREENISH YELLOW 10Y 7/4			
510					
	BCS 0000 1303				
515					
	BCS 0000 1304	PUMICE BECOMMING PALE GREENISH YELLOW 10Y 8/2			
520					
	BCS 0000 1305				
525					
	BCS 0000 1306				
530					
	BCS 0000 1307	SILTSTONE, LACUSTRAINE, BROWNISH GRAY 5YR 4/1, CALCAREOUS			
535					
	BCS 0000 1308				
540					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-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
	BCS 0000 1309	SILTSTONE, AS ABOVE, MED DARK GRAY N4, CALCAREOUS LOCALLY CLAY RICH			
545	BCS 0000 1310				
550	BCS 0000 1311				
555	BCS 0000 1312				
560	BCS 0000 1313				
565	BCS 0000 1314				
570	BCS 0000 1315				
575	BCS 0000 1316	575-585 MINOR FRAGMENTS OF WHITE CRYSTAL TUFF			
580	BCS 0000 1317				
585	BCS 0000 1318				
590	BCS 0000 1319				
595	BCS 0000 1320				
600					

Prepared By BENT AAQUIST 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 600 To 660 Page 11 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
605	BCS 0000 1321	SILTSTONE AS ABOVE			
610	BCS 0000 1322				
615	BCS 0000 1323				
620	BCS 0000 1324				
625	BCS 0000 1325				
630	BCS 0000 1326				
635	BCS 0000 1327				
640	BCS 0000 1328				
645	BCS 0000 1329				
650	BCS 0000 1330				
655	BCS 0000 1331				
660	BCS 0000 1332				

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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
	BCS 0000 1333	SILTSTONE AS ABOVE, MINOR CRYSTAL TUFF FRAGMENTS - MAY HAVE FALLEN FROM HIGHER UP IN HOLE			
665					
	BCS 0000 1334				
670					
	BCS 0000 1335				
675					
	BCS 0000 1336				
680					
	BCS 0000 1337				
685					
	BCS 0000 1338				
690					
	BCS 0000 1339				
695					
	BCS 0000 1340				
700					
	BCS 0000 1341				
705		705-710 50% GRAY CLAY WITH SILTSTONE			
	BCS 0000 1342				
710					
	BCS 0000 1343				
715					
	BCS 0000 1344				
720					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D 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
	BCS 0000 1345	SILTSTONE, AS ABOVE WITH MUCH CLAY, SMALL SAMPLE IN BUCKETS, CLAY RICH TO 765'			SILTSTONES STILL CALCAREOUS
725	BCS 0000 1346	TRACE VOLCANIC CLASTS			
730	BCS 0000 1347				
735	BCS 0000 1348				
740	BCS 0000 1349	CLAYEY			
745	BCS 0000 1350	CLAYEY			
750	BCS 0000 1351	TRACE VOLCANIC CLASTS			
755	BCS 0000 1352	TRACE VOLCANIC CLASTS			
760	BCS 0000 1353				
765	BCS 0000 1354	765'-775' MORE COARSE MATERIAL IN BUCKET SAMPLES, LESS CLAY			
770	BCS 0000 1355				
775	BCS 0000 1356	775 TO 805 CLAY RICH SILTSTONE			
780					

Prepared By Arthur J. Mennenhall 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 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
	BCS 0000 1357	SILTSTONE AS ABOVE			SILTSTONE STILL CALCAREOUS
785					
	BCS 0000 1358				
790					
	BCS 0000 1359				
795					
	BCS 0000 1360				
800					
	BCS 0000 1361	CLAYEY			
805					
	BCS 0000 1362	DUSKY BROWN 5YR 2/2, LATER RETURN TURNED GREENISH GRAY THEN BROWN, MORE COARSE RETURN IN BUCKETS			
810					
	BCS 0000 1363	MED. DARK GRAY N4			
815					
	BCS 0000 1364				
820					
	BCS 0000 1365				
825					
	BCS 0000 1366	DUSKY BROWN 5YR 2/2			
830					
	BCS 0000 1367	MED. DARK GRAY N4			
835					
	BCS 0000 1368				
840					

Prepared By ARTHUR J. MENDENHALL 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 840 To 900 Page 15 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 1369	SILTSTONE, LACUSTRINE, GRAYISH BLACK N2, NONCALCAREOUS			
845					
	BCS 0000 1370	SILTSTONE, LACUSTRINE, GRAYISH OLIVE 5Y 4/2, CALCAREOUS			
850					
	BCS 0000 1371	SILTSTONE, LACUSTRINE, GRAYISH BLACK N2, NONCALCAREOUS			
855					
	BCS 0000 1372	SILTSTONE, LACUSTRINE, GRAYISH OLIVE 5Y 4/2, CALCAREOUS			
860					
	BCS 0000 1373				
865					
	BCS 0000 1374	CLAY RICH			
870					
	BCS 0000 1375				
875					
	BCS 0000 1376				
880					
	BCS 0000 1377	TRACE VOLCANIC CLASTS			
885					
	BCS 0000 1378				
890					
	BCS 0000 1379				
895					
	BCS 0000 1380				
900					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-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 BECOMMING NONCALCAREOUS			
930	BCS 0000 1386				
935	BCS 0000 1387				
940	BCS 0000 1388				
945	BCS 0000 1389	COMMON CLAY			
950	BCS 0000 1390	SILTSTONE, LACUSTRINE, LIGHT OLIVE GRAY 5Y 5/2 OR GRAYISH BLACK N2, NONCALCAREOUS			
955	BCS 0000 1391	COMMON CLAY			
960	BCS 0000 1392	MINOR CLAY			

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID ~~NC-EWDP-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				

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1020 To 1080 Page 18 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 1405	SILTSTONE, AS ABOVE			
1025					
	BCS 0000 1406				
1030					
	BCS 0000 1407				
1035		AT 1035' DRILLER REPORTED HE HIT MORE WATER AND THE HAMMER BIT IS DROWNING OUT.			
	BCS 0000 1408				
1040		AT 1040' TRIPPING OUT TO SWITCH TO TRICONE BIT			
	BCS 0000 1409				
1045					
	BCS 0000 1410				
1050		CLAY			
	BCS 0000 1411				
1055					
	BCS 0000 1412				
1060					
	BCS 0000 1413				
1065					
	BCS 0000 1414				
1070					
	BCS 0000 1415				
1075		20% VOLCANIC CLASTS, PALE REDDISH BROWN 10R 5/4			
	BCS 0000 1416				
1080					

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 2N, 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 5YR 6/4			
1110	BCS 0000 1423				
1115	BCS 0000 1424	SILTSTONE, DARK GRAY N3, NONCALCAREOUS, 5-8% TUFF FRAGMENTS LIGHT BROWN 5YR 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 AAGUIST 1-26-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1140 To 1200 Page 20 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 1429	SILTSTONE, GRAYISH BLACK N2 TO OLIVE BLACK 5Y 2/1, TRACE TUFF FRAGMENTS AS ABOVE NONCALCAREOUS			
1145					
	BCS 0000 1430				
1150					
	BCS 0000 1431				
1155					
	BCS 0000 1432	1155'-1160' - 40% OF SILTSTONE MEDIUM OLIVE GRAY 5Y 5/1			
1160					
	BCS 0000 1433	SILTSTONE AS ABOVE 1155'			
1165					
	BCS 0000 1434				
1170					
	BCS 0000 1435				
1175					
	BCS 0000 1436				
1180					
	BCS 0000 1437				
1185					
	BCS 0000 1438				
1190					
	BCS 0000 1439				
1195					
	BCS 0000 1440				
1200					

Prepared By BENT AAQUIST 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 1200' To 1260' Page 21 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 1441	SILTSTONE AS ABOVE, DARK GRAY N3 TO N4			
1205	BCS 0000 1442				
1210	BCS 0000 1443	SILTSTONE TO VERY FINE GRAINED SANDSTONE MEDIUM GRAY N5			
1215	BCS 0000 1444	SILTSTONE, OLIVE GRAY 5Y 5/1, NONCALCAREOUS			
1220	BCS 0000 1445				
1225	BCS 0000 1446	5Y 4/1			
1230	BCS 0000 1447	SILTSTONE TO VERY FINE GRAINED SANDSTONE, MEDIUM GRAY N5			
1235	BCS 0000 1448	SILTSTONE, COARSE GRAINED, OLIVE GRAY 5Y 5/1 NONCALCAREOUS			
1240	BCS 0000 1449	SILTSTONE, DARK GRAY N3, WITH 5% TUFF FRAGMENTS ORANGE BROWN 5YR 6/2 NONCALCAREOUS			
1245	BCS 0000 1450	SILTSTONE, OLIVE GRAY 5Y 5/1 & MED. DARK GRAY N4			WATER ERUPTED OUT OF THE GROUND OUTSIDE THE CASING CEMENT L.C.M. PUMPED DOWN ANNULUS TO STOP RETURN WATER OUTSIDE RODS.
1250	BCS 0000 2551	MED DARK GRAY N4 WATER VOLUME INCREASED TO ~50 GAL/MIN			
1255	BCS 0000 2552				GEOPHYSICAL PROBE INDICATED WATER TEMP DOWN HOLE 63°C
1260					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-30 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 5YR 5/1, ~35% RETURN WATER TEMP 29.5°C			
1265	BCS 0000 2554	SILTSTONE DARK GRAY N3 TO OLIVE GRAY 5Y 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					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1320' To 1380' Page 23 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
1325	BCS 0000 2565	SILTSTONE, REWORKED CRYSTAL TUFF AS ABOVE			
1330	BCS 0000 2566				
1335	BCS 0000 2567				
1340	BCS 0000 2568				
1345	BCS 0000 2569	COARSE SILTSTONE AND FINE GRAINED SANDSTONE, POSSIBLE REWORKED TUFF GRAINS OF QUARTZ, FELDSPAR AND MAFIC MINERALS, TRACE OF PYRITE LOCALLY MEDIUM GRAY N5 TO MEDIUM DARK GRAY N4 WITH LOCAL GRAYISH BLACK N2 FRAGMENTS			
1350	BCS 0000 2570				
1355	BCS 0000 2571				
1360	BCS 0000 2572				
1365	BCS 0000 2573				
1370	BCS 0000 2574				
1375	BCS 0000 2575				
1380	BCS 0000 2576				

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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 N2 FRAGMENTS ARE NOT PRESENT BELOW 1390'			
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				

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-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 N2 FRAGMENTS			
1485					
	BCS 0000 2598				
1490					
	BCS 0000 2599				
1495					
	BCS 0000 2600				
1500					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1500' To 1560' Page 26 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 2601	COARSE SILTSTONE AND SANDSTONE AS ABOVE			
1505					
	BCS 0000 2602				
1510					
	BCS 0000 2603				
1515					
	BCS 0000 2604	1515 TO 1520 MOSTLY SILTSTONE, FINE MATERIAL ONLY			
1520					
	BCS 0000 2605	AS ABOVE WITH 5-7% VERY FINE GRAINED CHERTY SILTSTONE DARK GRAY N3 UNIT IS MEDIUM GRAY N5 OVER ALL			
1525					
	BCS 0000 2606				
1530					
	BCS 0000 2607				
1535					
	BCS 0000 2608				
1540					
	BCS 0000 2609	MINOR FRAGMENTS OF GRAYISH YELLOW 5Y 8/4 TUFF WITH 10% QUARTZ PHENOCRYSTS AND 1-3% BLACK MAFIC MINERALS			
1545					
	BCS 0000 2610				
1550					
	BCS 0000 2611				
1555					
	BCS 0000 2612	8-10% CHERTY SILTSTONE AS ABOVE			
1560					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1560' To 1620' Page 27 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 2613	COARSE SILTSTONE AND FINE SANDSTONE AS ABOVE			
1565	BCS 0000 2614	1565 - 1625 TUFF ASH FLOW - COMPOSITIONALLY SIMILAR TO ABOVE UNIT IS LIGHT GRAY N7 WITH LOCAL GRAYISH BLACK N2 CHERTY MASSES WITH VERY FINE GRAINED PYRITE CHERTY MASSES COMPOSE 5-7% AND ARE PART OF TUFFACEOUS MATRIX			
1570	BCS 0000 2615				
1575	BCS 0000 2616				
1580	BCS 0000 2617				
1585	BCS 0000 2618				
1590	BCS 0000 2619				
1595	BCS 0000 2620				
1600	BCS 0000 2621				
1605	BCS 0000 2622				
1610	BCS 0000 2623				
1615	BCS 0000 2624				RETURN WATER 31.4°C
1620					

Prepared By BENT AARQUIST 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 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
	BCS 0000 2625	TUFF, ASH FLOW, AS ABOVE LITHICS INCREASING TOWARD BOTTOM OF UNIT A 1625 FT.			
1625	BCS 0000 2626	TUFF, ASH FLOW, MEDIUM LIGHT GRAY N6, 15% QUARTZ/SANIDINE PHENOCRYSTS, 5% BIOTITE AND OTHER MAFIC PHENOCRYSTS, 20-30% LITHICS, BLACK N1, DUSKY YELLOWISH BROWN 10YR 2/2, OR GRAYISH BROWN 5YR 3/2, TRACE PYRITE			
1630	BCS 0000 2627				
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				RETURN WATER 31.9°C
1660	BCS 0000 2633				
1665	BCS 0000 2634				
1670	BCS 0000 2635				
1675	BCS 0000 2636	1675-1700 30-40% LITHICS			
1680					

Prepared By ARTHUR J. MENDENHALL 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 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	TUFF, ASH FLOW, AS ABOVE			
1690	BCS 0000 2638				
1695	BCS 0000 2639				
1700	BCS 0000 2640				
1705	BCS 0000 2641	10-20% LITHICS			
1710	BCS 0000 2642				
1715	BCS 0000 2643				
1720	BCS 0000 2644	SILTSTONE, SANDY, DUSKY YELLOWISH BROWN 10YR 2/2 OR DARK YELLOWISH BROWN 10YR 4/2, LAMINATED, UP TO 1% MOSTLY DISSEMINATED PYRITE.			
1725	BCS 0000 2645	5% TUFF, ASH FALL, VERY LIGHT GRAY N8			
1730	BCS 0000 2646				
1735	BCS 0000 2647				
1740	BCS 0000 2648				

Prepared By ARTHUR J. MENDENHAL 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 1740 To 1800 Page 30 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
1745	BCS 0000 2649	TUFF, ASH FLOW, MEDIUM GRAY N5, 10% HORNBLENDE AND BIOTITE PHENOCRYSTS, 5-20% QUARTZ/SANIDINE PHENOCRYSTS			
1750	BCS 0000 2650				
1755	BCS 0000 2651				
1760	BCS 0000 2652	10% SILTSTONE, SANDY, OLIVE BLACK 5Y 2/1 10% " " " " " "			
1765	BCS 0000 2653	TRACE LITHICS			
1770	BCS 0000 2654	10% LITHICS			
1775	BCS 0000 2655				
1780	BCS 0000 2656				
1785	BCS 0000 2657				
1790	BCS 0000 2658	SILTSTONE, SANDY, BROWNISH BLACK 5YR 2/1, 1% DISSEMINATED PYRITE. ?LACUSTRINE,			
1795	BCS 0000 2659				
1800	BCS 0000 2660				

Prepared By Arthur J. Mendenhall 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 1800 To 1860 Page 31 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			
1805	BCS 0000 2261	TUFF, ASH FLOW, MEDIUM GRAY N5, 10-50% QUARTZ/SANDINE PHENOCRYSTS, 10% HORNBLENDE PHENOCRYSTS			
1810	BCS 0000 2262				
1815	BCS 0000 2263				
1820	BCS 0000 2264				
1825	BCS 0000 2265				
1830	BCS 0000 2266				
1835	BCS 0000 2267				
1840	BCS 0000 2268	SILTSTONE, SANDY, LACUSTRINE, BROWNISH GRAY 5YR 4/1 OR BROWNISH BLACK 5YR 2/1			
1845	BCS 0000 2269	TUFF, ASH FLOW, MEDIUM GRAY N5, 10-50% QUARTZ/SANIDINE PHENOCRYSTS, 10% HORNBLENDE PHENOCRYSTS			
1850	BCS 0000 2270				
1855	BCS 0000 2271				
1860	BCS 0000 2272	SILTSTONE, SANDY, LACUSTRINE, GRAYISH BROWN 5YR 3/2, 1% PYRITE			

Prepared By ARTHUR J. MENDENHALL 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 1860 To 1920 Page 32 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 2673	SILTSTONE, AS ABOVE			
1865	BCS 0000 2674	TUFF, ASH FLOW, MEDIUM GRAY N5, 10-20% QUARTZ/SANIDINE PHENOCRYSTS, 5% MAFIC PHENOCRYSTS			
1870	BCS 0000 2675	SILTSTONE, SANDY, LACUSTRINE, BROWNISH BLACK 5YR 2/1 OR MEDIUM DARK GRAY N4			
1875	BCS 0000 2676				
1880	BCS 0000 2677	20% MODERATE YELLOWISH BROWN 10YR 5/4			
1885	BCS 0000 2678				
1890	BCS 0000 2679				
1895	BCS 0000 2680				
1900	BCS 0000 2681				
1905	BCS 0000 2682				
1910	BCS 0000 2683				
1915	BCS 0000 2684	20% GRAYISH BLACK N2 MINOR WHITE N9 FRAGMENTS OF UNDERLYING UNIT			
1920					

Prepared By ARTHUR J. MENDENHALL Date 1-26-99 Checked By _____ Date _____
BENT AAQUIST 1-27-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1920' To 1980' Page 33 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
1925	BCS 0000 2685	SILTSTONE YELLOWISH BROWN 10YR 5/2 AND BROWNISH GRAY 5YR 3/1 AND QUARTZ SANDSTONE GRAINS VERY LIGHT GRAY N8, LOCAL FINE PYRITE IN SILTSTONE AND MINOR PYRITE NODULES			
1930	BCS 0000 2686	SILTSTONES AS ABOVE IN A VERY LIGHT GRAY CLAY N8 UNIT >50% CLAY SLOW DRILLING			SLOW DRILLING
1935	BCS 0000 2687	SILTSTONE BLACK N1, FINE GRAINED, MINOR MIXING OF ABOVE UNIT TO 1940'			
1940	BCS 0000 2688				
1945	BCS 0000 2689	10-15% COARSE SILTSTONE YELLOWISH BROWN 10YR 5/2			
1950	BCS 0000 2690	SILTSTONE 60% OLIVE GRAY, FINE GRAINED, 40% YELLOW GRAY 5Y 7/1			
1955	BCS 0000 2691	SILTSTONE VERY SHADES FROM DARK YELLOW BROWN 10YR 3/2 TO PALE YELLOW BROWN 10YR 7/2 DARKER COLORED CHIPS ARE FINER GRAINED THAN LIGHTER COLORED CHIPS			
1960	BCS 0000 2692				
1965	BCS 0000 2693				
1970	BCS 0000 2694				
1975	BCS 0000 2695				
1980	BCS 0000 2696				

Prepared By BENT AAQUIST Date 1-27-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 1980 To 2040 Page 34 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
1985	BCS 0000 2697	SILTSTONE, AS ABOVE			
1990	BCS 0000 2698				
1995	BCS 0000 2699	SILTSTONE, SANDY, LACUSTRINE, GRAYISH BROWN 5YR 3/2			
2000	BCS 0000 2700	TUFF, ASH FALL OR REWORKED, LIGHT GRAY, 10% MAFIC PHENOCRYSTS.			
2005	BCS 0000 2701	SILTSTONE, SANDY, LACUSTRINE, PALE BROWN 5YR 5/2 OR DARK GRAY N3, PARTLY CALCAREOUS			FREE SAND IN CHIP TRAYS, 2000-2065 INTERVAL, IS SURFACE BLOW SAND.
2010	BCS 0000 2702				
2015	BCS 0000 2703				
2020	BCS 0000 2704				
2025	BCS 0000 2705	20% PALE BROWN SILTY MARL			
2030	BCS 0000 2706				
2035	BCS 0000 2707				
2040	BCS 0000 2708				

Prepared By Arthur J. Mendenhall Date 1-27-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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
	BCS 0000 2709	SILTSTONE, AS ABOVE			
2045	BCS 0000 2710				
2050	BCS 0000 2711				
2055	BCS 0000 2712				
2060	BCS 0000 2713				
2065	BCS 0000 2714	SILTSTONE LIGHT OLIVE GRAY 5Y 6/1 WITH THIN BLACK LAMINAE			
2070	BCS 0000 2715	SILTSTONE AS ABOVE 2065'			
2075	BCS 0000 2716				RETURN WATER TEMP 30.6°C
2080	BCS 0000 2717				
2085	BCS 0000 2718	SILTSTONE AS ABOVE, WITH CLAY LAYERS CLAY IS CALCAREOUS, MEDIUM GRAY N4 SLOW DRILL PENETRATION			
2090	BCS 0000 2719	AT 2089.5 WATER WAS BROWN 2090 WATER GRAY			
2095	BCS 0000 2720	2097' WATER DARK GRAY FOR 1'			
2100					

Prepared By Arthur J. Mendenhall Date 1-27-99 Checked By _____ Date _____
Bent Aarquist 1-28-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-2D Drill Depth From 2100 To 2160 Page 36 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
2105	BCS 0000 2721	APPROXIMATELY 60% SILTSTONE, LACUSTRINE, BROWNISH BLACK 5YR 2/1 NONCALCAREOUS TO VERY WEAKLY CALCAREOUS AND APPROXIMATELY 40% MARL, SILTY, PALE BROWN 5YR 5/2 LIKELY INTERBEDDED WITH SILTSTONE			
2110	BCS 0000 2722				
2115	BCS 0000 2723				
2120	BCS 0000 2724	MOSTLY SILTSTONE			
2125	BCS 0000 2725	MOSTLY SILTSTONE			
130	BCS 0000 2726				
2135	BCS 0000 2727				
140	BCS 0000 2728				
145	BCS 0000 2729	MOSTLY SILTSTONE			
150	BCS 0000 2730				
155	BCS 0000 2731				
160	BCS 0000 2732				

Prepared By ARTHUR J. MENDENHALL Date 1-28-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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
2165	BCS 0000 2733	SILTSTONE AND MARL, AS ABOVE.			
2170	BCS 0000 2734				
2175	BCS 0000 2735	MOSTLY SILTSTONE			
2180	BCS 0000 2736				
2185	BCS 0000 2737	TRACE GYPSUM			
2190	BCS 0000 2738				
2195	BCS 0000 2739				
2200	BCS 0000 2740				
2205	BCS 0000 2741				
2210	BCS 0000 2742				
2215	BCS 0000 2743				BIT GRINDING ROCK TO SAND SIZE WATER 35.3°C
2220	BCS 0000 2744				SAME AS ABOVE WATER 39°C

Prepared By Arthur J. Mendenhall Date 1-28-99 2-2-99 Checked By _____ Date _____

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
	BCS 0000 2745	SILTSTONE AND MARL, AS ABOVE			BIT GRINDING ROCK TO MOSTLY SAND SIZE
2225	BCS 0000 2746	AS ABOVE MED LIGHT GRAY N6 TO LIGHT GRAY N7			
2230	BCS 0000 2747				
2235	BCS 0000 2748	AS ABOVE BUT WITH 10% FRAGMENTS YELLOWISH GRAY 5Y 8/1 TRACE PY MASSES			
2240	BCS 0000 2749	SILTSTONE AND MARL 90% DARK GRAY N3, 10% GRAYISH-YELLOW 5Y 7/4			
2245	BCS 0000 2750	SILTSTONE AND MARL, 20% DARK GRAY N3, 70% OLIVE GRAY 5Y 4/2 10% GRAYISH YELLOW 5Y 7/4			
2250	BCS 0000 2751				
2255	BCS 0000 2752				
2260	BCS 0000 2753	SILTSTONE AND MARL, DARK GRAY N3			
2265	BCS 0000 2754	AS ABOVE BUT WITH 15% LIGHT OLIVE GRAY 5Y 5/2			
2270	BCS 0000 2755				
2275	BCS 0000 2756				AT 2299' WATER 35.5°C
2280					

Prepared By ARTHUR J. MENDENHAL Date 2-2-99 Checked By _____ Date _____
BENT AAQUIST 2-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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
	BCS 0000 2757	SILTSTONE AND MARL, LIGHT OLIVE GRAY 5Y 5/2			
2285					
	BCS 0000 2758				
2296					
	BCS 0000 2759				
2295					
	BCS 0000 2760	SILTSTONE AND MARL, DARK GRAY N3			
2300					WATER 35.5°C
	BCS 0000 2761				
2305					
	BCS 0000 2762				
2310					WATER 37.0°C
	BCS 0000 2763				
2315					AT 2316 PENETRATION RATE DROPPED TO 1/2 OF ABOVE
	BCS 0000 2764				
2320					
	BCS 0000 2765	SILTSTONE, LACUSTRINE, DARK GRAY N3 OR PALE YELLOWISH BROWN 10YR 6/2, WEAKLY CALCAREOUS			
2325					
	BCS 0000 2766				
2330					
	BCS 0000 2767	SILTSTONE, LACUSTRINE, DARK GRAY N3			
2335					
	BCS 0000 2768				
2340					

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

Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 2340 To 2400 Page 40 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
2345	BCS 0000 2769	SILTSTONE, LACUSTRINE, DARK GRAY N3 OR PALE YELLOWISH BROWN 10YR 6/2, WEAKLY CALCAREOUS			SAMPLE IN BUCKETS IS LAYERED, UPPER PART BLACK, LOWER PART BROWN
2350	BCS 0000 2770				AS ABOVE
2355	BCS 0000 2771				
2360	BCS 0000 2772	SILTSTONE, LACUSTRINE, DARK GRAY N3			WATER 34.7°C WATER 37.9°C
2365	BCS 0000 2773				
2370	BCS 0000 2774	SILTSTONE, LACUSTRINE, DARK GRAY N3 OR GRAYISH RED 10R 4/2			
2375	BCS 0000 2775	ALMOST NO CALCAREOUS REACTION			
2380	BCS 0000 2776				
2385	BCS 0000 2777				
2390	BCS 0000 2778	SILTSTONE, LACUSTRINE, GRAYISH BLACK N2 OR PALE BROWN 5YR 5/2 TRACE PYRITE			
2395	BCS 0000 2779				
2400	BCS 0000 2780	1% SANDSTONE, GRAYISH OLIVE GREEN 5GY 3/2.			

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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			
2410	BCS 0000 2782	WEAKLY CALCAREOUS			
2415	BCS 0000 2783				
2420	BCS 0000 2784	SILTSTONE, LACUSTRINE, DARK GRAY N3, MINOR SANDSTONE, LIGHT GRAY N7			
2425	BCS 0000 2785				
2430	BCS 0000 2786				
2435	BCS 0000 2787	SILTSTONE, LACUSTRINE, DARK GRAY N3, SANDSTONE, MEDIUM GRAY N5, CLAY, MEDIUM GRAY IN THIS INTERVAL ONLY			GRADATIONAL CONTACT BETWEEN OVERLYING SILTSTONE AND SANDSTONE
2440	BCS 0000 2788				
2445	BCS 0000 2789				
2450	BCS 0000 2790				
2455	BCS 0000 2791				
2460	BCS 0000 2792				

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3D Drill Depth From 2460 To 2500 Page 42 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
2465	BCS 0000 2793	SANDSTONE, LACUSTRINE, MEDIUM GRAY N5			
2470	BCS 0000 2794	SILTSTONE, LACUSTRINE, DARK GRAY N3			
2475	BCS 0000 2795	SANDSTONE, LACUSTRINE, MEDIUM GRAY N5, VERY FINE GRAINED			
2480	BCS 0000 2796				
2485	BCS 0000 2797				
2490	BCS 0000 2798				
		BECOMMING MEDIUM DARK GRAY N4			
2495	BCS 0000 2799				
		5% SILTSTONE, DARK GRAY N3			
2500	BCS 0000 2800				

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

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APERTURE CARD/PAPER COPY AVAILABLE THROUGH NRC FILE CENTER

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9906100166-04

DRP-08

THIS PAGE IS AN OVERSIZED DRAWING

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:

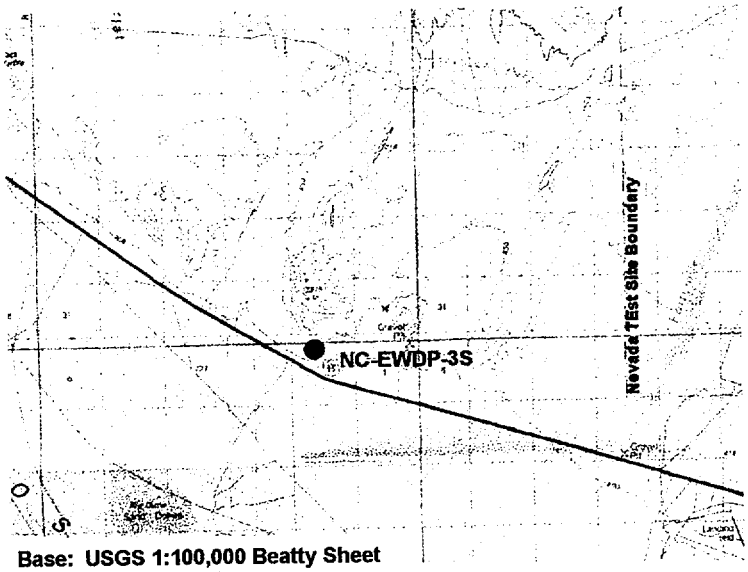
NONE

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.

9906100166-04

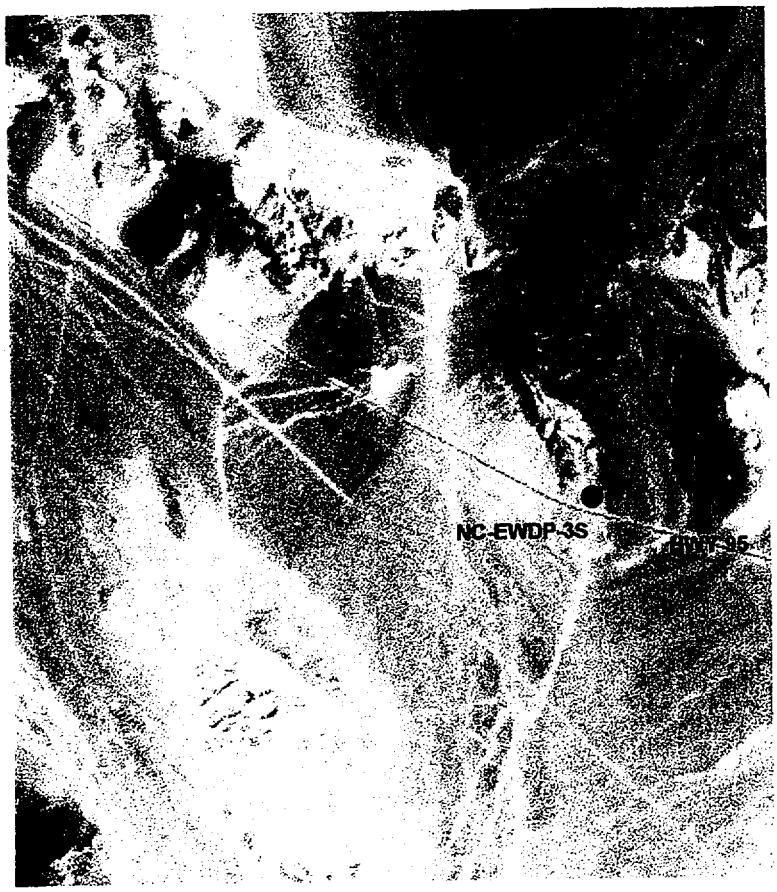
Well No. NC-EWDP-3S

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.



Base: USGS 1:100,000 Beatty Sheet

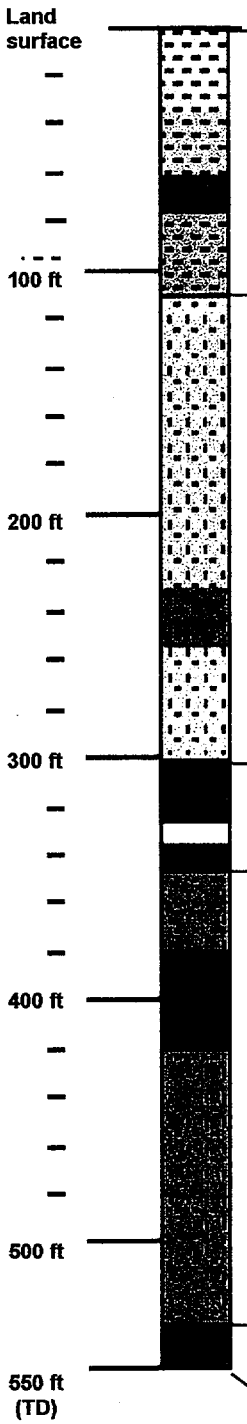
Purpose: 1) provide lithologic samples of deposits; 2) define valley-fill stratigraphic sequence and groundwater flow paths down gradient of proposed repository; and 3) provide water level and water chemistry data.



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



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

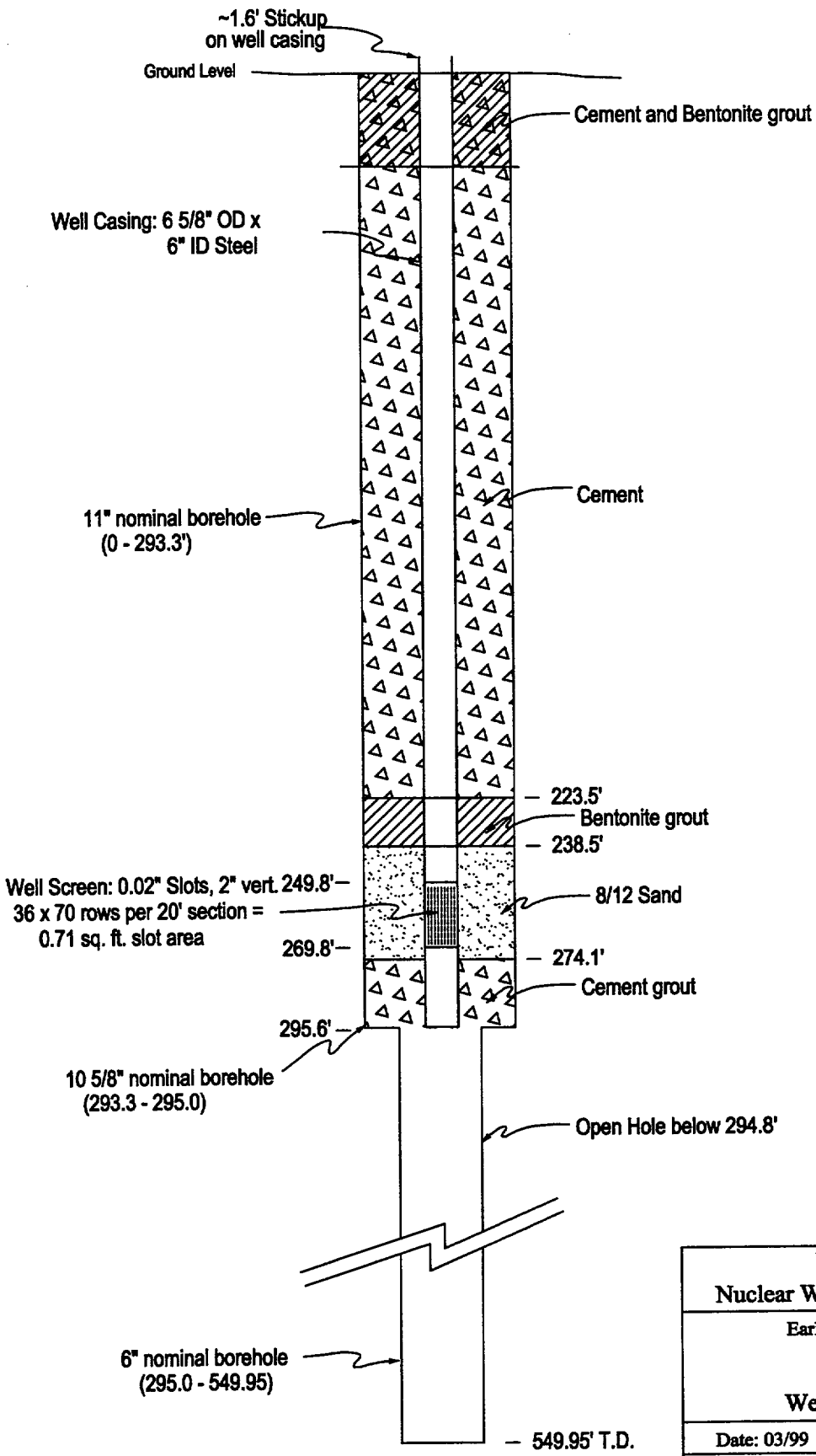
298-346' Tertiary Sedimentary rocks- 298-346' siltstones, lacustrine, dk. gray (N4), calcareous; 300-320 no sample; 325-345 no sample

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

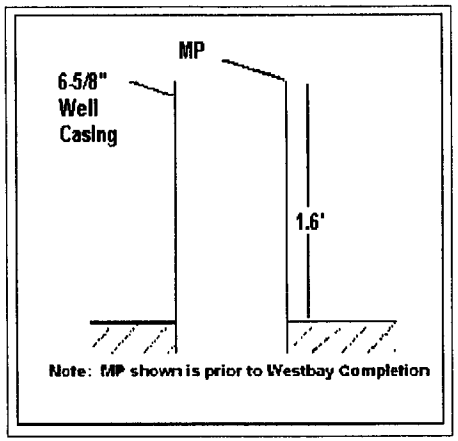
SUMMARY LITHOLOGIC LOG



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.

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



Water Level Data

Well: NC-EWDP-3S

Location:

UTM: North	UTM: East	Latitude	Longitude	Elevation ft.	Elevation m
4059444.70	541269.43	36°40' 53.614"N	116°32'17.180"W	2619.03	798.29

Access: From Lathrop Wells (Junction of Highways 95 and SR373) west 7.5 miles to gate on north side of Highway. Take gravel road 0.15 miles north; turn east and follow tire tracks.

Measuring Point: Top of steel well casing.

Measuring Point Correction:

Feet	Meters
1.60	0.488

Date	Zone Measured	Depth to Water below M.P. Ft.	Depth to Water below M.P. m	Elevation of Water Ft.	Elevation of Water m	Method	Personnel	Comments
8-Feb-1999	n/a	280.3	85.42	2337.2	712.38	NWRPO 500'	KDD	08:27 after leaving hole overnight.
6-Mar-1999	n/a	259.7	79.16	2357.7	718.64	Buqo 500'	TSB	16:52
10-Mar-1999	n/a	259.7	79.14	2357.8	718.66	NWRPO 500'	KDD	09:23
12-Mar-1999	n/a	259.6	79.13	2357.8	718.68	NWRPO 500'	KDD	07:45

Westbay Multiport installation precludes further water level measurements

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3S Drill Depth From 0 To 60 Page 1 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
	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% HC
5	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
	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
25	BCS 0000 1756 (1 MIN)				Moderate reaction to 10% HCl
30	BCS 0000 1757 (2 MIN)				Moderate reaction to 10% HCl
35	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
40	BCS 0000 1759 (3 MIN)				Moderate-weak reaction to 10% HCl
45	BCS 0000 1760 (4 MIN)				Moderate reaction to 10% HCl
50	BCS 0000 1761 (3 MIN)				Strong reaction to 10% HCl
55	BCS 0000 1762 (5 MIN)	Decrease in amount of silt. Some coarse angular gravel.			Moderate reaction to 10% HCl
60					

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

Prepared By KEN 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 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
	BCS 0000 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
65	BCS 0000 1764 (6 MIN)				Strong reaction to 10% HCl
70	BCS 0000 1765 (3 MIN)	Decrease in amount of silt Increase in amount of coarse sand			Moderate reaction to 10% HCl
75	BCS 0000 1766 (5 MIN)	Pale Red (10R 6/2)			Weak reaction to 10% HCl
80	BCS 0000 1767 (4 MIN)	Decrease in amount of silt			No reaction to 10% HCl
85	BCS 0000 1768 (4 MIN)	Some coarse gravel			No reaction to 10% HCl
90	BCS 0000 1769 (4 MIN)				No reaction to 10% HCl
95	BCS 0000 1770 (4 MIN)				Weak reaction to 10% HCl
100	BCS 0000 1771 (5 MIN)	Increased amount of coarse angular gravel			No reaction to 10% HCl
105	BCS 0000 1772 (47 MIN)	Boulder, may be 3' thick, consist of welded tuff (Bullfrog), Gray orange pink (10R 5/2)			No reaction to 10% HCl
110	BCS 0000 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.
115	BCS 0000 1774 (9 MIN)	Some fine welded tuff fragments.			No reaction to 10% HCl Moist
120					

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

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

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

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

Drilling Equip./Method AP-1000/11" CROWD-OUTRIT 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
	BCS 0000 1775	BEDDED TUFF: Tuffaceous sandstone, very fine-fine grained, weakly cemented, vitric, very light gray (N8)			No reaction to 10% HCl from 120-180'
125	(5 MIN)				INJECTED H_2O from 125-180' TO STABILIZE HOLE
	BCS 0000 1776				
130	(13 MIN)				
	BCS 0000 1777				
135	(4 MIN)				
	BCS 0000 1778	Some fine grayish yellow (5Y 8/4) grains			
140	(6 MIN)				
	BCS 0000 1779				
145	(7 MIN)				
	BCS 0000 1780				
150	(7 MIN)				
	BCS 0000 1781				
155	(7 MIN)				
	BCS 0000 1782				
160	(6 MIN)				
	BCS 0000 1783				
165	(6 MIN)				
	BCS 0000 1784	Increased cementation			
170	(7 MIN)				
	BCS 0000 1785				
175	(6 MIN)				
	BCS 0000 1786				
180	(9 MIN)				

Note: 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-3S 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
	BCS 0000 1787 (6 MIN)				No reaction to 10% HCl from 180-200'
185	BCS 0000 1788 (7 MIN)				INJECTED H_2O FROM 185-190'
190	BCS 0000 1789 (7 MIN)				
195	BCS 0000 1790 (7 MIN)				INJECTED H_2O FROM 195-200'
200	BCS 0000 1791 (19 MIN)	Slightly gray orange (10YR 6/4) high plasticity sandy clay. Increased cementation			2-6-99, 1604 2-7-99, 0654 NO REACTION TO 10% HCl FROM 200-240' INJECTED WATER FROM 200-210'
205	BCS 0000 1792 (11 MIN)				
210	BCS 0000 1793 (6 MIN)	"Lumpy" cuttings, becoming more "lumpy" with depth			
215	BCS 0000 1794 (7 MIN)				
220	BCS 0000 1795 (9 MIN)				
225	BCS 0000 1796 (12 MIN)				INJECTED WATER INTERMITTENTLY FROM 225-235'
230	BCS 0000 1797 (5 MIN)	Color changes to Gray orange (10YR 6/4)			
235	BCS 0000 1798 (9 MIN)	Color change due to limonitic mottling. May be approaching groundwater.			
240					

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

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-3S Drill Depth From 240 To 300 Page 5 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
	BCS 0000 1799				NO REACTION 10% HCl FROM 240 - 290'
245	(4 MIN)				
	BCS 0000 1800	Some hard silica layers or nodules, cryptocrystalline (opaline?) Pale yellowbrn (10YR 6/2) & white			
250	(8 MIN)				
	BCS 0000 1801	Decrease in amount of limonite			
255	(8 MIN)				
	BCS 0000 1802	Decrease in amount of limonite & increase in amount of silica cement Yel gry (5Y 7/2) - Very light gray (N8).			
260	(9 MIN)				
	BCS 0000 1803	Increase in amount of silica cement			
265	(9 MIN)				
	BCS 0000 1804	Strong limonitic haloes (6mm) around siliceous nodules? Very fine grained sandstone			
270	(13 MIN)				
	BCS 0000 1805	Softer. No limonite.			
275	(4 MIN)				
	BCS 0000 1806	Very hard, silicified, resembles quartzite			
280	(29 MIN)				
	BCS 0000 1807	Yellow gray (5Y 8/1). Very silty			
285	(26 MIN)				
	BCS 0000 1808	Pale yellow orange (10YR 8/6) - Gray yellow (5Y 7/4) & yellow gray (5Y 8/1). Silty			
290	(21 MIN)				2-7-99, 1222
	BSC 0000 1808 (68 MIN)	Some "cherty" & silicified v. fine-grained sandstone with bentonitic clay layers & trace of calcite veins. Sandstone is very thin bedded.			2-12-99, 0930 SAMPLES WET - NOT INJECTING WATER. START INJECTING WATER @ 293' REFUSED @ 293.29' 1038 2-12-99
295	NO SAMPLE				
	BCS 0000 1810	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 FELDSPARS/QUARTZ.	W W W W W W W		ZERO TO STRONG REACTION TO 10% HCl WELD ASH FLOW TUFF MAY BE GRAVELS DUE TO THEIR COARSE NATURE.
300	(MIN)	SILTSTONE, LACUSTRINE, MEDIUM DARK GRAY N4, CALCAREOUS 40%	= = = = = = = =		

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

Prepared By KEN DONNE (SOI) 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-3S 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 INGERSOL-RAND TH75E/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
	BCS 0000 1811				NO SAMPLE 300-320
305	(MIN)				
	BCS 0000 1812				
310	(MIN)				
	BCS 0000 1813				
315	(MIN)				
	BCS 0000 1814				
320	(MIN)				
	BCS 0000 1815	SILT, LACUSTRINE, MEDIUM DARK GRAY N4, CALCAREOUS			STRONG REACTION TO 10% HCL
	(MIN)				
	BCS 0000 1816				NO SAMPLE 325-345
330	(MIN)				
	BCS 0000 1817				
335	(MIN)				
	BCS 0000 1818				
340	(MIN)				
	BCS 0000 1819				
345	(MIN)				
	BCS 0000 1820	20% SILTSTONE, LACUSTRINE DARK GRAY N3, CALCAREOUS			STRONG REACTION TO 10% HCL
		80% TUFF, ASH FALL, MEDIUM LIGHT GRAY N6 OR VERY LIGHT GRAY N8, 0-5% SMALL BIOTITE PHENOCRYSTS			NO REACTION TO 10% HCL 20% LIGHT BROWN 5YR 6/4 TUFF IN 345-350 INTERVAL SUGGEST A WEATHERING SURFACE AT CONTACT.
350	(MIN)				
	BCS 0000 1821				
355	(MIN)				
	BCS 0000 1822				
360	(MIN)				

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

Prepared By ARTHUR 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 360 To 420 Page 7 of 10

Driller DAVE HOLQUIN/STEVE CLEVER Start Date/Time 2-6-99/0942 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
	BCS 0000 1823 (MIN)	TUFF, ASH FALL, AS ABOVE.			
365	BCS 0000 1824 (MIN)				
370	BCS 0000 1825 (MIN)				
375	BCS 0000 1826 (MIN)	TUFF, ASH FALL, PINKISH GRAY 5R 8/2, 0-5% BIOTITE AND QUARTZ PHENOCRYSTS.			VERY FINE CUTTINGS (NOT WASHED ?)
380	BCS 0000 1827 (MIN)				VERY FINE CUTTINGS (NOT WASHED ?)
	BCS 0000 1828 (MIN)				
390	BCS 0000 1829 (MIN)				
395	BCS 0000 1830 (MIN)	10% SILTSTONE, LACUSTRINE, DARK GRAY N3, CALCAREOUS, 397' INCREASE IN WATER RETURN			10% SILTSTONE IN 390-395 AND 395-400 INTERVALS
400	BCS 0000 1831 (MIN)	10% SILTSTONE, LACUSTRINE, DARK GRAY N3, CALCAREOUS			
405	BCS 0000 1832 (MIN)				
410	BCS 0000 1833 (MIN)				
415	BCS 0000 1834 (MIN)				
420					

Prepared By ARTHUR J. MENDENHALL Date 2-2-99 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 2-6-99/0942 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
	BCS 0000 1835 (MIN)	ASH FLOW TUFF, MED LIGHT GRAY N6, 1% BIOTITE PHENOCRYSTS 2-4% QUARTZ PHENOCRYSTS 10% FRAGMENTS OF ABOVE UNIT POSSIBLE REWORKED ASH FLOW			
425					
	BCS 0000 1836 (MIN)				
430					
	BCS 0000 1837 (MIN)				
435					
	BCS 0000 1838 (MIN)				
440					
	BCS 0000 1839 (MIN)				
	BCS 0000 1840 (MIN)	445-450 FINE GRAINED UNIT OF ABOVE WITH 10% QUARTZ CRYSTALS			
450					
	BCS 0000 1841 (MIN)				
455					
	BCS 0000 1842 (MIN)				
460					
	BCS 0000 1843 (MIN)	460-465 10% PORPHYRITIC CLASTS GRAYISH ORANGE PINK 10R 8/2			
465					
	BCS 0000 1844 (MIN)				
470					
	BCS 0000 1845 (MIN)				
475					
	BCS 0000 1846 (MIN)	475-480 PINKISH GRAY 5YR 7/1			
480					

Prepared By BENT ANDERSON Date 3-9-99 Checked By _____ Date _____

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-35 Drill Depth From 480 To 540 Page 9 of 10

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
	BCS 0000 1848	ASH FLOW TUFF - REWORKED, AS ABOVE			
485	(MIN)				
	BCS 0000 1848				
490	(MIN)	490-495 HAS 10% MODERATE ORANGE PINK CLASTS 5YR 8/4			
	BCS 0000 1849				
495	(MIN)				
	BCS 0000 1850				
500	(MIN)				
	BCS 0000 3351				
	(MIN)				
	BCS 0000 3352				
510	(MIN)	510-515 - 5% TUFF W/ CLAY ALTERATION			
	BCS 0000 3353				
515	(MIN)				
	BCS 0000 3354				
520	(MIN)				
	BCS 0000 3355	523-530 HAS 5-10% MODERATE PINK 5R7/4 TO LIGHT RED 5R 6/6 TUFF CLASTS			
525	(MIN)				
	BCS 0000 3356				
530	(MIN)				
	BCS 0000 3357	SILTSTONE MED DARK GRAY N4 TO FINE GRAINED SANDSTONE, COMPOSITIONALLY SIMILAR TO ABOVE ASH FLOW UNIT			
535	(MIN)	535-540 MINOR CALCAREOUS CLAY			
	BCS 0000 3358				
540	(MIN)				

Prepared By BENT ARQUIST Date 3-3-99 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 3359 (MD)	CLAY DARK GRAY N3, VERY CALCAREOUS			
550	BCS 0000 3360 (MD)	SANDSTONE, FINE TO MED GRAINED, MEDIUM GRAY N5 WITH CALCAREOUS CLAY 10% WHITE N9 TO YELLOWISH GRAY 5Y 9/1 GRAINS			
	T.D. 3-2-99				

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

Westbay Instruments Inc.

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

#115 - 949 West Third Street, North Vancouver, BC Canada V7P 3P7 (800) 663 8770 (604) 984 4215 FAX (604) 984 3538 info@westbay.com
www.westbay.com

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2. Personnel 1
3. Installation 1
3.1 Previous Activities 1
3.2 Preparation of Monitoring Well Design 1
3.3 Layout of MP Casing Components 2
3.4 Lowering of MP Components 3
3.5 Hydraulic Integrity Testing 3
3.6 Positioning of MP Components 3
3.7 Inflation of MP System Packers 3
4. Fluid Pressure Measurements 4

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 Larssen 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 Completon 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 tthe 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, March10, 1999	- 1 page

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MOSDAX Data Report

(C ESTBAY 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

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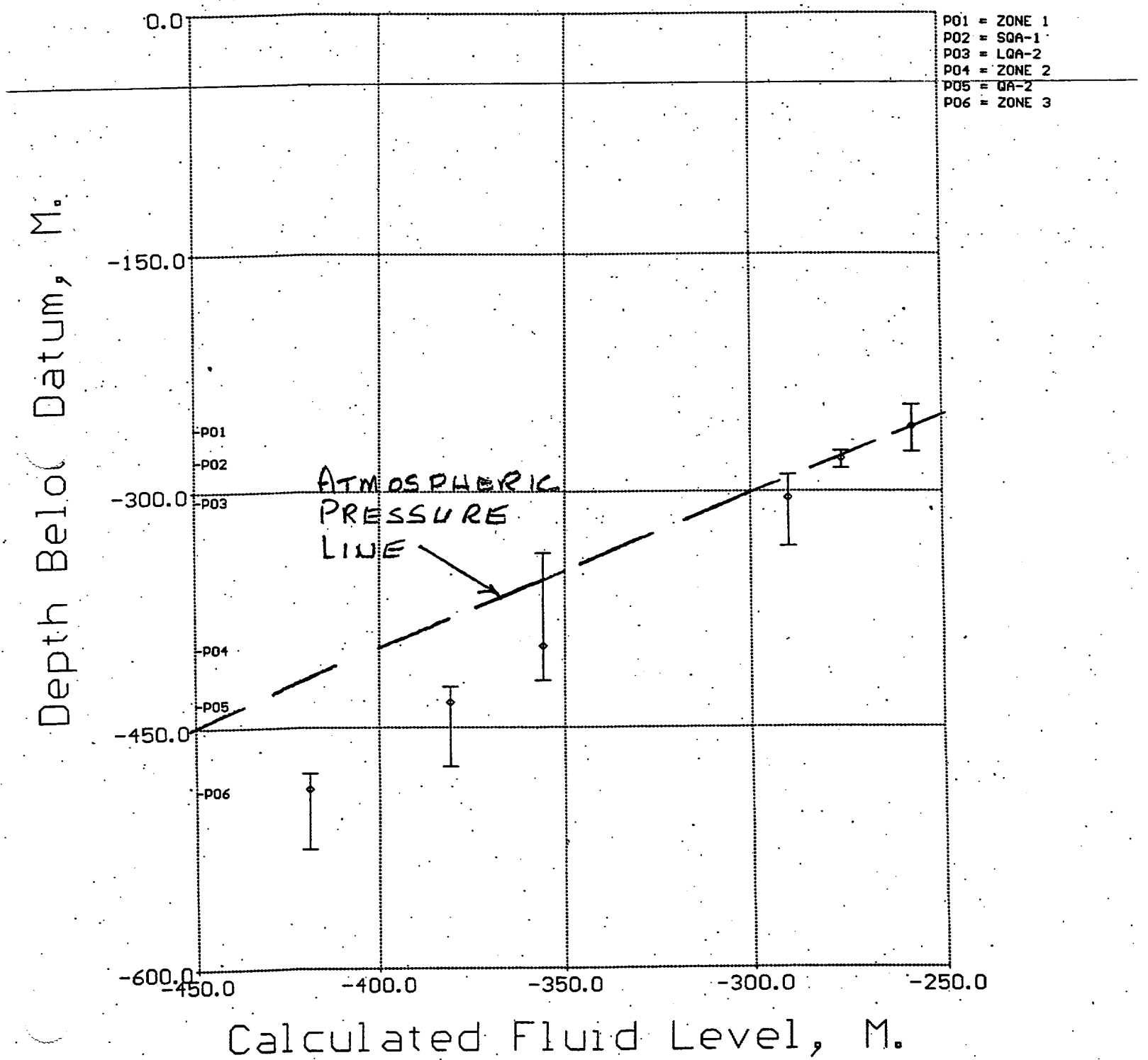
PIEZOMETRIC PROFILE WELL: EWDP-3S

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

Site: EWDP - Amargosa NV
Description: Plastic MP55
Datum: Ground level



FILE: 3S130399
Plot By: DL
Checked By:
Project: WB740

DIRECT-P
Date: 17 MAR99
Date:
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.

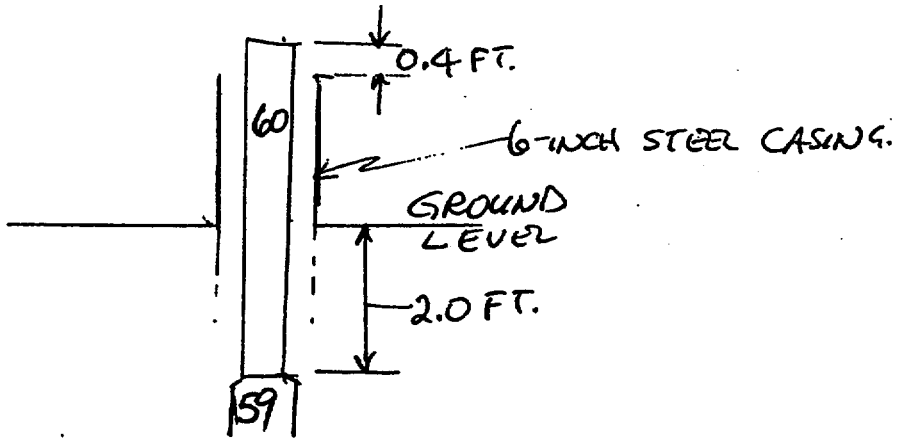
Well Description:
Plastic MP55 System
Other References:
In 6.0 inch steel well casing
Based on Nye County sketch 2/12/99

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



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www.westbay.com

Summary Casing Log
Nye County

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

Legend

(Qty) MP Components

(2) 0603 - MP55 End Plug

(23) 0601M30 - MP55 Casing, PVC, 3.0m

(24) 0301M30 - MP55 Casing, PVC, 3.0m

(1) 0601M15A - MP55 Adapter Casing 06_03

(6) 0612M15 - MP55 Packer with stiffeners

(6) 0601M15 - MP55 Casing, PVC, 1.5m

(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

Geology

Backfill/Casing

Grout

Bentonite

Sand Coarse

Mild Steel

Well Screen

(c) Westbay Instruments Inc. 1998

Tue Mar 16 05:10:35 1999

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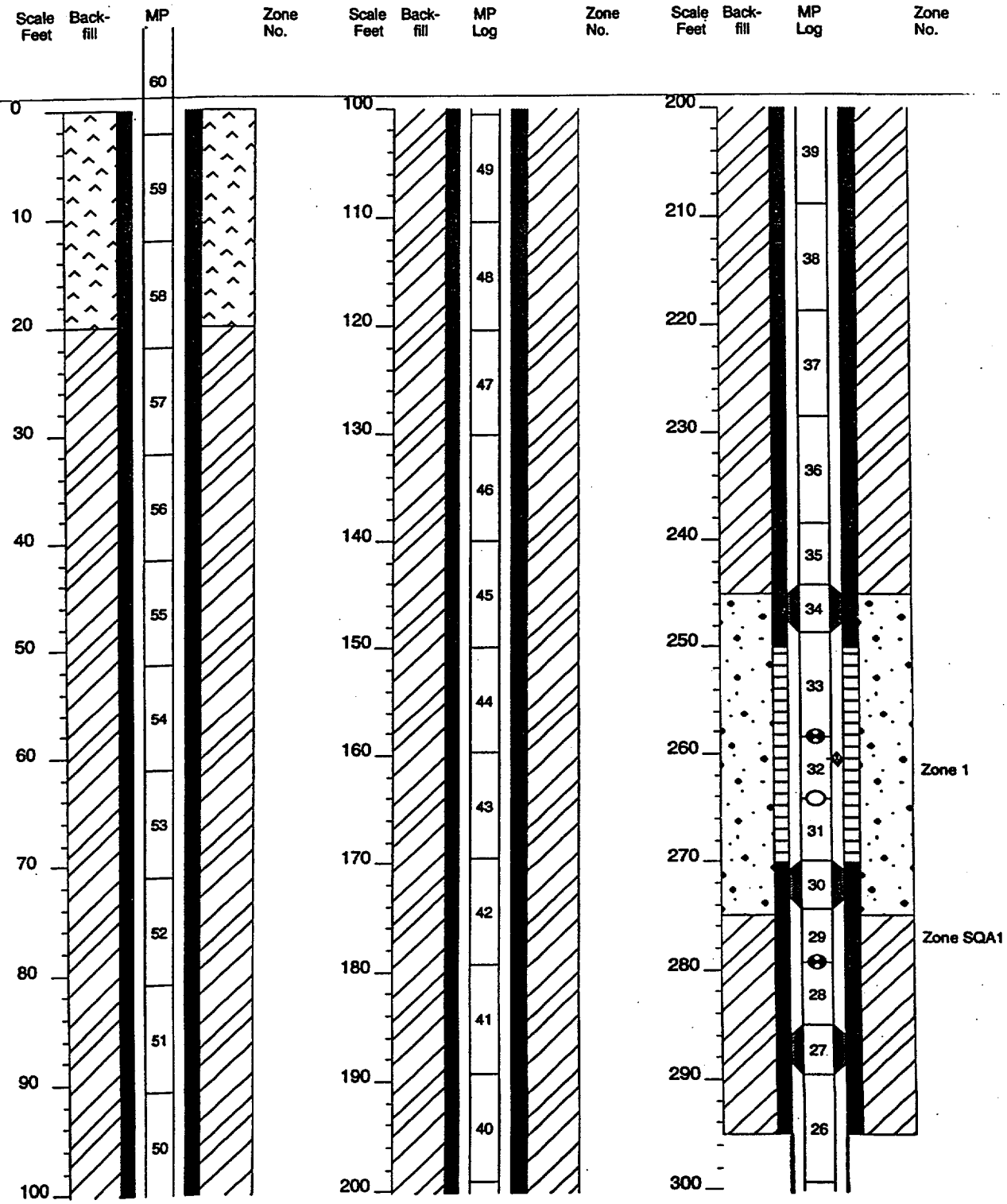
Summary Casing Log
Nye County

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



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Tue Mar 16 05:14:26 1999

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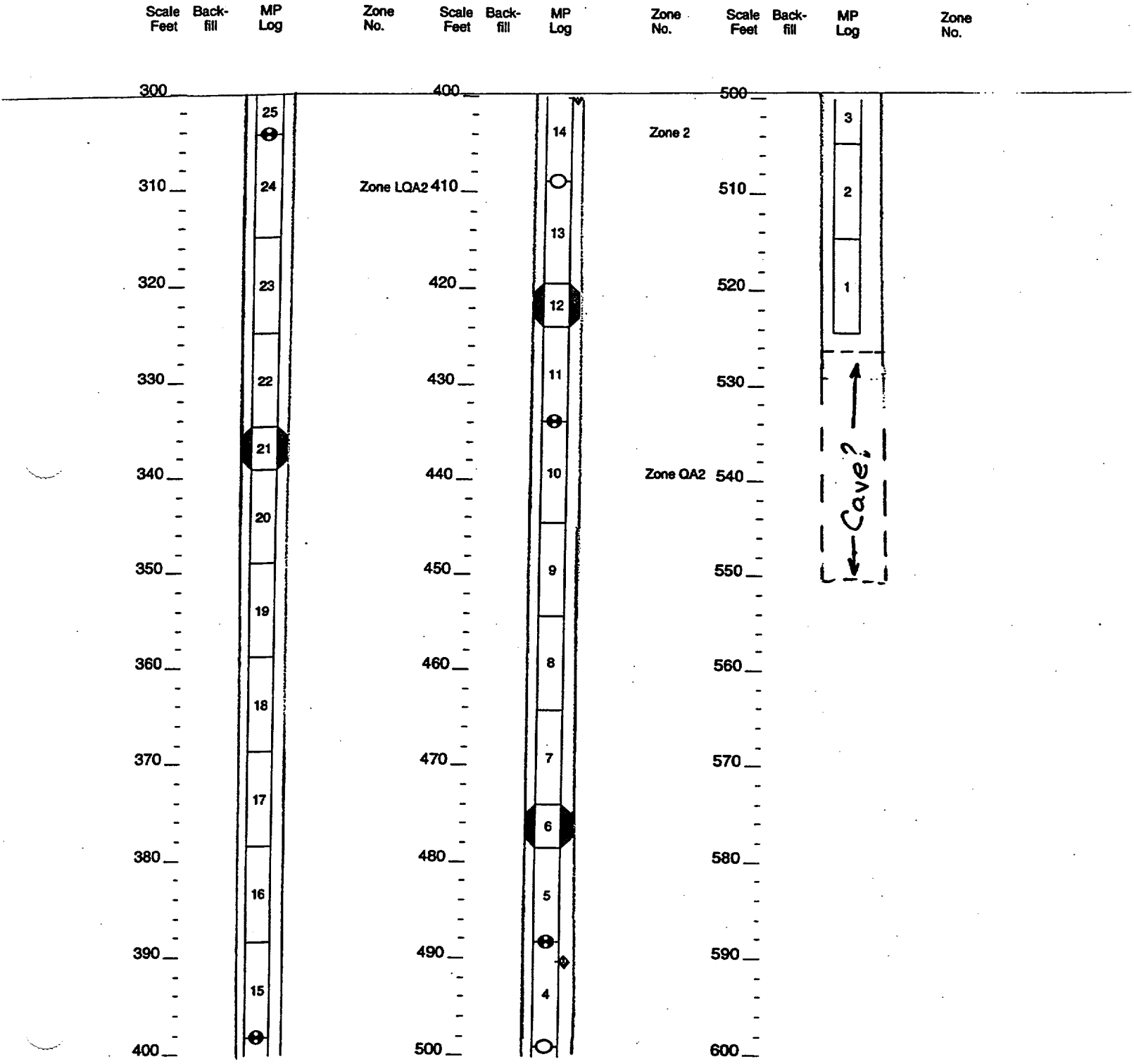
Summary Casing Log
Nye County

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



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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. (method) CALIPER. Date: 11 MAR 99.
MP well design & preparation. By: NS/DL Date: 11 MAR 99.
MP well design checked. By: DL/CM Date: 12 MAR 99.
MP well and borehole approved to install. By: NS Date: 11 MAR 99.

MP Casing Installation Log
Nye County

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

Legend

(Qty) MP Components

(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

Geology

Backfill/Casing

Grout

Bentonite

Sand Coarse

Mild Steel

Well Screen

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
					0301M30 MP55 CASING, PVC, 3.0m.
0		60			
			202ft. 45		0302A - MP55 Regular Coupling
		59			0301M30 - MP55 Casing, PVC, 3.0m
10			33		0302A - MP55 Regular Coupling
		58			0301M30 - MP55 Casing, PVC, 3.0m
20			55		0302A - MP55 Regular Coupling
		57			0301M30 - MP55 Casing, PVC, 3.0m
30			17		0302A - MP55 Regular Coupling
		56			0301M30 - MP55 Casing, PVC, 3.0m
			45		0302A - MP55 Regular Coupling
		55			0301M30 - MP55 Casing, PVC, 3.0m
50			15		0302A - MP55 Regular Coupling
		54			0301M30 - MP55 Casing, PVC, 3.0m
60			35		0302A - MP55 Regular Coupling
		53			0301M30 - MP55 Casing, PVC, 3.0m
70			55		0302A - MP55 Regular Coupling
		52			0301M30 - MP55 Casing, PVC, 3.0m
80			55		0302A - MP55 Regular Coupling
		51			0301M30 - MP55 Casing, PVC, 3.0m
90			38		0302A - MP55 Regular Coupling
		50			0301M30 - MP55 Casing, PVC, 3.0m
100					

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

0845 hr
DTW IN MP = 472.88'
below ~~stack~~ MP
STICKUP = 0.60'
cut off 5.62'
∴ = 478.5' ∞ YESTERDAY'S RET
∴ MP IS WATER TIGHT

472.35
5.62
478.56

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			13		0302A - MP55 Regular Coupling
		49			0301M30 - MP55 Casing, PVC, 3.0m
110			46		0302A - MP55 Regular Coupling
		48			0301M30 - MP55 Casing, PVC, 3.0m
120			19		0302A - MP55 Regular Coupling
		47			0301M30 - MP55 Casing, PVC, 3.0m
130			06		0302A - MP55 Regular Coupling
		46			0301M30 - MP55 Casing, PVC, 3.0m
0			55		0302A - MP55 Regular Coupling
		45			0301M30 - MP55 Casing, PVC, 3.0m
150			50		0302A - MP55 Regular Coupling
		44			0301M30 - MP55 Casing, PVC, 3.0m
160			35		0302A - MP55 Regular Coupling
		43			0301M30 - MP55 Casing, PVC, 3.0m
170			18		0302A - MP55 Regular Coupling
		42			0301M30 - MP55 Casing, PVC, 3.0m
180			50		0302A - MP55 Regular Coupling
		41			0301M30 - MP55 Casing, PVC, 3.0m
190			17		0302A - MP55 Regular Coupling
		40			0301M30 - MP55 Casing, PVC, 3.0m
200			02		0302A - MP55 Regular Coupling

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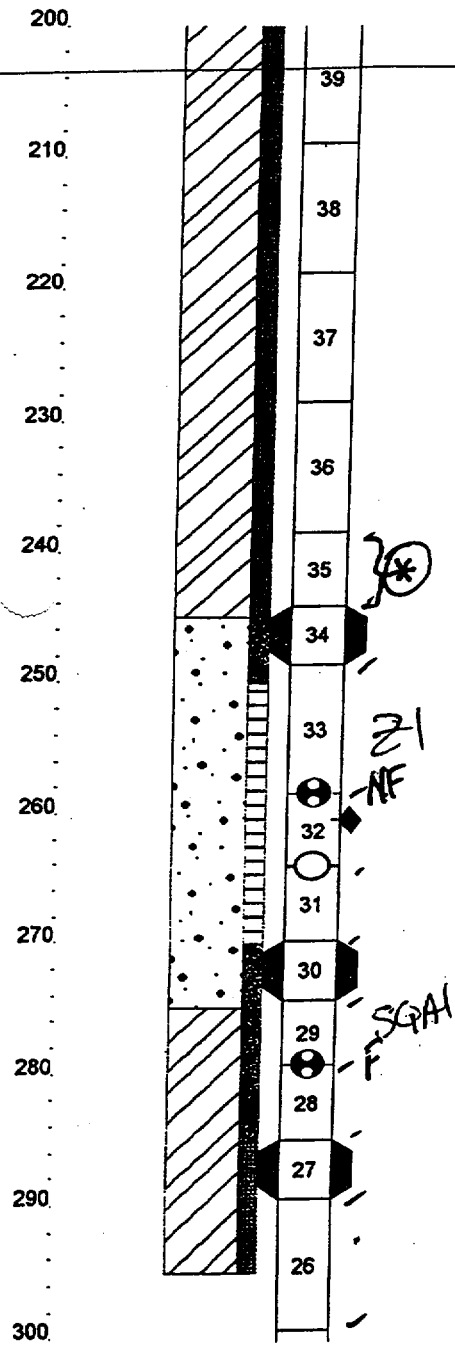
Fri Mar 12 00:23:14 1999

MP Casing Installation Log
Nye County

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



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Fri Mar 12 00:23:14 1999

(*) 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	LQA1		~~0601M15 - MP55 Casing, PVC, 1.5m~~
			26 F	0605-059	0605 - MP55 Measurement Port
310		24		Zone LQA2	0601M30 - MP55 Casing, PVC, 3.0m
			50		0602 - MP55 Regular Coupling
320		23			0601M30 - MP55 Casing, PVC, 3.0m
			16		0602 - MP55 Regular Coupling
330		22			0601M30 - MP55 Casing, PVC, 3.0m
			40		0602 - MP55 Regular Coupling
		21		0612-044	0612M15 - MP55 Packer with stiffeners
340			24		0602 - MP55 Regular Coupling
		20			0601M30 - MP55 Casing, PVC, 3.0m
350			13		0602 - MP55 Regular Coupling
		19			0601M30 - MP55 Casing, PVC, 3.0m
360			20		0602 - MP55 Regular Coupling
		18			0601M30 - MP55 Casing, PVC, 3.0m
370			10		0602 - MP55 Regular Coupling
		17			0601M30 - MP55 Casing, PVC, 3.0m
380			03		0602 - MP55 Regular Coupling
		16			0601M30 - MP55 Casing, PVC, 3.0m
390			44		0602 - MP55 Regular Coupling
		15	LZ		0601M30 - MP55 Casing, PVC, 3.0m
400			NF 05	0605-038	0605 - MP55 Measurement Port

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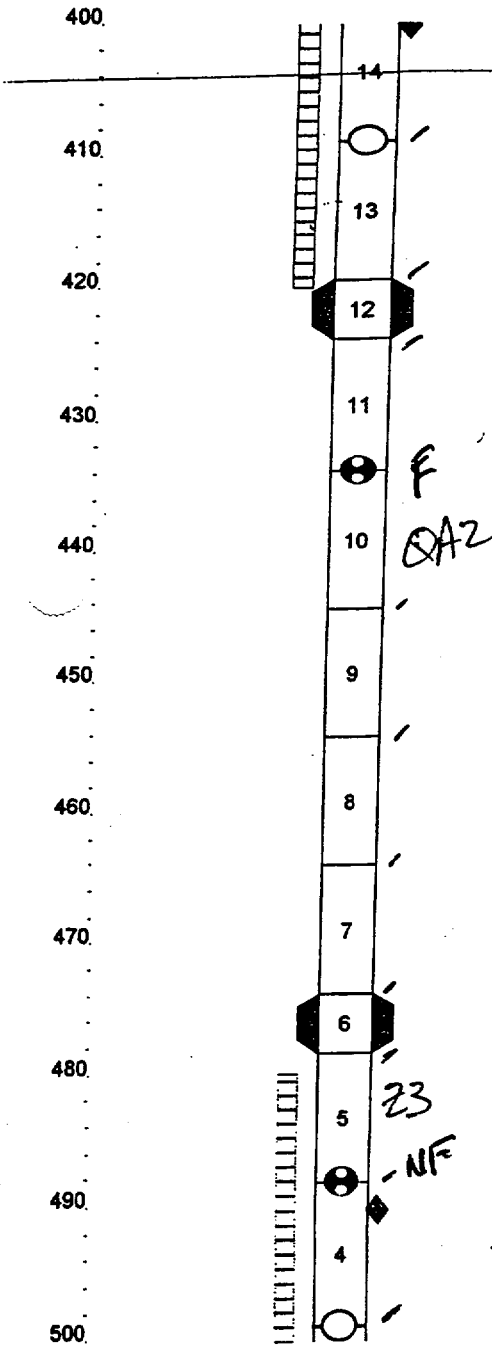
Fri Mar 12 00:23:15 1999

MP Casing Installation Log
Nye County

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



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
		524.3	✓		0603 - MP55 End Plug Coupling
530.					
540.					
550.					
560.					
570.					
580.					
590.					
600.					

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.

Westbay Instruments Inc.

MP55 Packer Inflation Field Record

Project: WB 740 Client: NYE COUNTY	By: DL Date: 13MAR99
Location: AMARGOSA NV Well No. EWDP-3S	Borehole Diameter: 6"Φ
Packer No. BT-1 Depth:	Computer Data File: 3S-BT1. .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: Vol Returned
H-B Valve: (P_H) Θ Offset (P_V). Θ	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 Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
0	0	13.70	13.34	0943		START, TIE = OFF
0	0	13.73	13.39	0943:30	1	TIE SHOE OUT
0	400	13.74	13.32	0944:30	2	PUMP UP TO 400PSI, STOP
0.1	400	13.74	13.32	0946:30	3	NO LEAKS, TIE ⇒ INFL.
0.1	400	402	13.31	0947:30	—	OBSERVE
0.1	400	404	13.31	0950:30	4	TIE → CLOSE
0.1	400	13.87	13.41	0953:30	5	NO LEAKS, VENT LINE
0.0	0	13.9	13.38	0954:00	6	END

Form MP55inf3.xcm Dec 18, 1998

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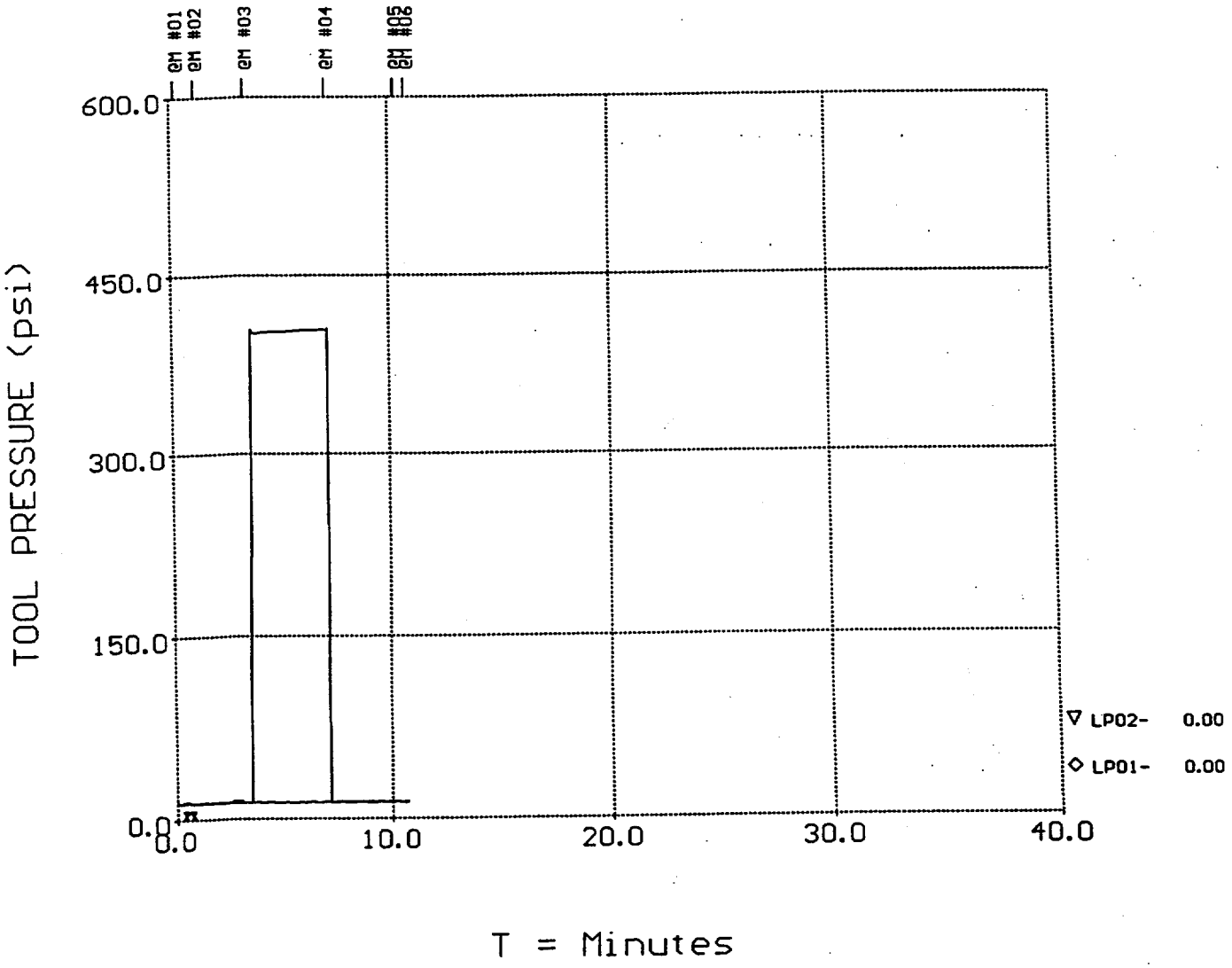
BLANK TEST RECORD

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:



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MP55 Packer Inflation Field Record

Project: WB740 Client: NYE COUNTY.	By: DL Date: 13 MAR 99
Location: AMARGOSA NV Well No. EWDP-3S	Borehole Diameter: 6 inch, in steel.
Packer No. 0612-038 Depth: 284	Computer Data File: 0612-038 .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: 11.7 Vol Returned 0.3
H-B Valve: (P_H) 0 Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N)
Vent Tool Pressure (Shoe Out, P_O) —	Final Inf'n Vol: 11.4 Final Press: 275 (P_F)
Comments: OPEN HOLE DTW = ~260 FT. EST. HEAD ABOVE PKR = ~24 FT.	Calc'd Element Pressure ($P_F + P_V - P_O$) 251 psi Confirm Pkr Valve Closed (Yes/No): YES.

PKR P = 275 − 10.4 − 13.8 = 250.7

Software Reminder
I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure: Line (psig)	Pressure: Inf. Tool (psia)	Pressure: Vent Tool (psia)	Clock	Comments: Tag No.	Comments: 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	1301:30	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	—	missed tag.
8.0	350	201		1312:05	11	
9.0	375	223		1313:13	12	
10.0	375	248		1314:23	13	
11.0	450	302		1315:35	14	TIE → OFF STOP PUMP
11.0	120	264		1316:30	—	
11.0	120	257		1317:30	—	
11.0	120	253		1318:30	—	
11.0	120	248		1320:30	—	PUMP TO 600 PSI.
	OOPS - DISCOVER TIE VALVE STILL INFL.					

Form MP55inf3.som Dec 18, 1998

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www.westbay.com

MP55 Packer Inflation Field Record, Part 2

Project: WB740 Well No. EWDP-3S Packer No. 0612-038 Date: 13 MAR 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure: Line (psig)	Pressure: Inf. Tool (psia)	Pressure: Vent Tool (psia)	Clock	Comments: Tag No.	Comments: Text
11.3	450	450	—	1321	—	STOP PUMPING
						TIE → OFF, CONFIRMED
11.3	300	371	—	1324	—	VENT LINE
11.1	0	369	—	1324:40	15	— CLOSE VALVE —
						VENT PKR.
				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

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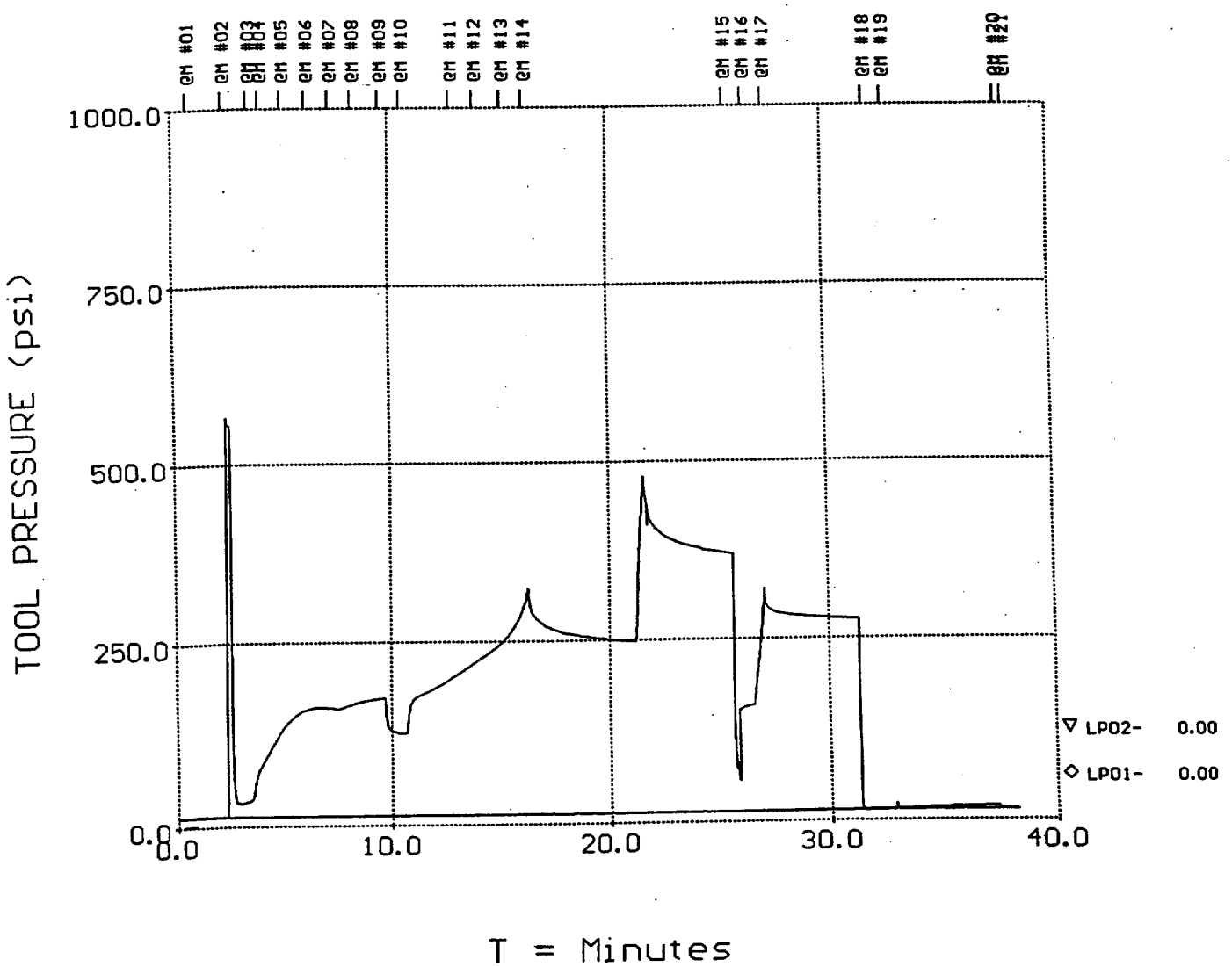
Page ___ of ___

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 12:59:11 1999

Packer: 0612_038
Packer Depth: 286 ft
FILE: 0612_038
Plot By: DC Date: 15MAR99
Checked By: _____ Date: _____
Comment:



Westbay Instruments Inc.

MP55 Packer Inflation Field Record

Project: WB 740 Client: NYE COUNTY	By: DL Date: 13 MAR 99
Location: AMARGOSA NV Well No. EWDP-3S	Borehole Diameter: 6-INCH STEEL
Packer No. 0612-037 Depth: 244	Computer Data File: 0612-037 .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: 11.4 Vol Returned 0.4
H-B Valve: (P_H) Ø Offset (P_V). Ø	Confirm Venting (Vent Tool Data) (Y/N) ____
Vent Tool Pressure (Shoe Out, P_O) —	Final Inf'n Vol: 11.0 Final Press: 236 (P_F)
Comments: OPEN HOLE BTW = 260FT. EST HEAD ABOVE PKR = 0 FT	Calc'd Element Pressure (P_F+P_V- P_O) 222 psi Confirm Pkr Valve Closed (Yes/No): YES.

PKR P = 236 - 13.7 = 222

Software Reminder

I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure: Line (psig)	Pressure: Inf. Tool (psia)	Pressure: Vent Tool (psia)	Clock	Comments: Tag No.	Comments: 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	1449:35	2	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. (2.1)
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	LOTS 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	

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MP55 Packer Inflation Field Record, Part 2

Project: WB 740 Well No. EWDP-3S Packer No. 0612-037 Date: 13 MAR 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure: Line (psig)	Pressure: Inf. Tool (psia)	Pressure: Vent Tool (psia)	Clock	Comments: Tag No.	Comments: 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	—	
12 11.3	470	253	13.2	1514	—	
6.4 11.3	470	246.6	13.2	1515	—	
4 11.3	470	242.6	13.2	1516	—	
3 11.3	470	239.6	13.2	1517	—	
2.4 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	16	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

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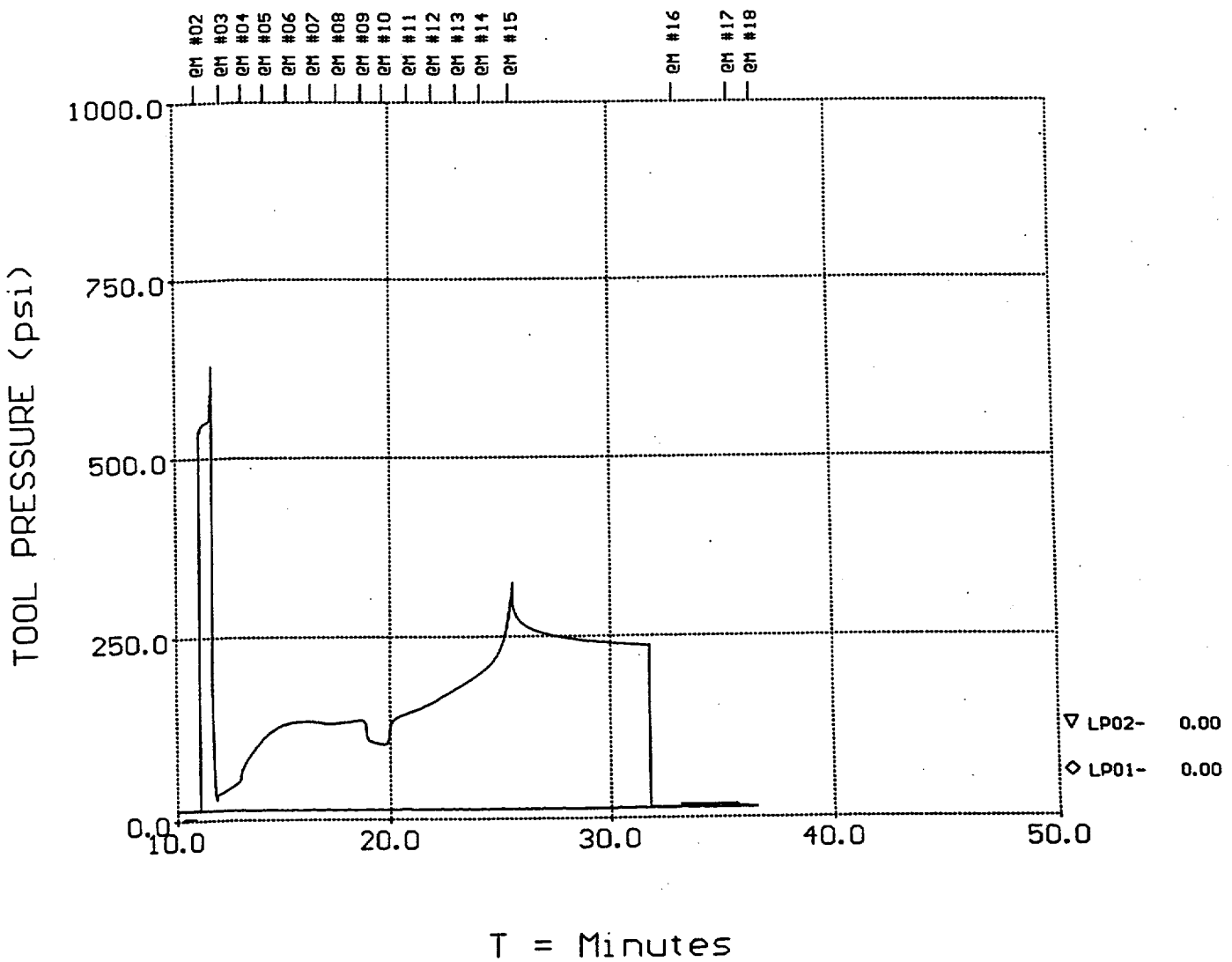
PACKER INFLATION RECORD

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: 15MAR99
Checked By: _____ Date: _____
Comment:



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MP55 Packer Inflation Field Record

Project: WB740 Client: NYE COUNTY	By: DL Date: 13 MAR 99
Location: AMARGOSA NV Well No. DWDD-3S	Borehole Diameter: 6 1/4
Packer No. 0612-048 Depth: 474 ft	Computer Data File: 0612-048 .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: 11.9 Vol Returned 0.3
H-B Valve: (P_H) -0 Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N) ____
Vent Tool Pressure (Shoe Out, P_O) —	Final Inf'n Vol: 11.6l Final Press: 298 (P_F)
Comments: OPEN HOLE DTW ~260' est'd head above pkr = 214ft = 93psi	Calc'd Element Pressure ($P_F + P_V - P_O$) 191.3psi
	Confirm Pkr Valve Closed (Yes/No): YES.

PKR P= 298-93-13.7=

Software Reminder

I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure: Line (psig)	Pressure: Inf. Tool (psia)	Pressure: Vent Tool (psia)	Clock	Comments: Tag No.	Comments: Text
0	0	19.46	23.77	1040:45	—	START, TIE VALVE OFF
0	0	19.58	23.77	1042:20	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	~200	450		1049:40	—	VALVE OPENED
1.0	0	126	24	1050:30	5	START PUMPING.
2.0	100	197	24	1052:35	6	
3.0	150	185	24	1054:35	7	increase pumping rate
4.0	230	211.8	24	1056:40	8	- pumping variable - vapour lock?
5.0	250	213	24	1058:00	9	
6.0	250	222	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~~ 19	TIE CLOSE
11.9	600	2.03	24	1115:00	~~21~~	VENT LINE

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MP55 Packer Inflation Field Record, Part 2

Project: WB740 Well No. EWDP-3S Packer No. 0612-048 Date: 13 MAR 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
11.6	0	20.06	24	1116:00	20	TIE → OFF, OBSERVE
11.6	0	21.18	24	1116:40	—	
11.6	0	23.3	24	1117:40		MISSED TAG, DID IT AT 1118
11.6	0	24.8	24	1118:40		
11.6	0	25.8	24	1119:40		
11.6	0	26.8	24	1120:40		
11.6	0	27.0	24	1121:00	21	TIE SHOE IN (20)
11.6	0	20.05	24	1121:45	22	END

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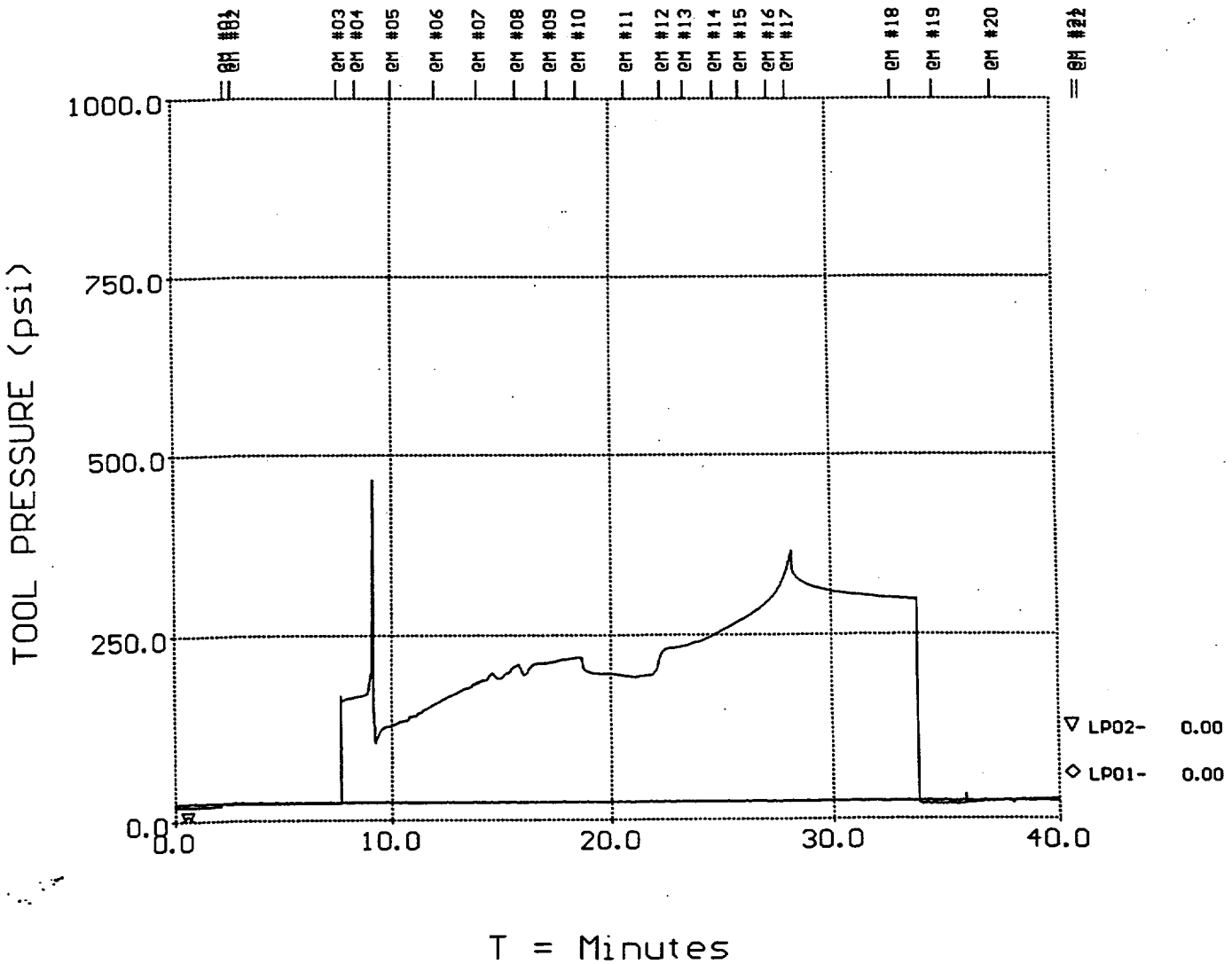
PACKER INFLATION RECORD

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:



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MP55 Packer Inflation Field Record

Project: W13740 Client: NYE COUNTY	By: DL Date: 13 MARCH 1999
Location: AMARGOSA NV Well No. EWDP-3S	Borehole Diameter: 6"
Packer No. 0612-054 Depth: 420 ft	Computer Data File: 0612-054 .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: 11.7 Vol Returned 0.2
H-B Valve: (P_H) -0- Offset (P_V). -0-	Confirm Venting (Vent Tool Data) (Y/N) ____
Vent Tool Pressure (Shoe Out, P_O) ____	Final Inf'n Vol: 11.5 Final Press: 319 (P_F)
Comments: OPEN HOLE DTW = ≈260 FT. EST. HEAD ABOVE PKR = 160 FT. ≈ 69 psi	Calc'd Element Pressure (P_F+P_V- P_O) 236 psi Confirm Pkr Valve Closed (Yes/No): YES.

PKR P = 319 − 139 − 69 = 236 psi

Software Reminder

I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure: Line (psig)	Pressure: Inf. Tool (psia)	Pressure: Vent Tool (psia)	Clock	Comments: Tag No.	Comments: 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	160	13.5	1136:30	2	TIE → INFLATE
						PKR VALVE OPENED (350)
0.2	0	86	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	1153:00	16	- PUMP UP, TIE INFL.
11.6	350	380	13.5	1154:20	17	TIE → OFF, STOP PUMP.
11.6	380	341	13.5	1155:00	—	
11.6	270	333	13.5	1156:00	—	

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MP55 Packer Inflation Field Record, Part 2

Project: WB740 Well No. EW DP-3S Packer No. 0612-054 Date: 13 MARCH 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
11.6	270	328	13.5	1157:00	–	
11.6	270	324	13.5	1158:00	–	
11.6	270	321	13.5	1159		PUMP TO 600, STOP
11.7	600	319	13.5	1200:00	18	TIE → CLOSE (MISSED TAG)
11.7	590	14.65	13.5	1201:00		VENT LINE
11.5	0	14.6	13.5	1201:30	19	TIE → OFF.
11.5	0	20.9	13.5	1201:50	–	
11.5	0	21.3	13.5	1203	–	
11.5	0	21.4	13.5	1204	–	
11.5	0	21.5	13.5	1205	20	TIE SHOE IN (20)
11.5	0	13.9	13.5	1205:40	21	END

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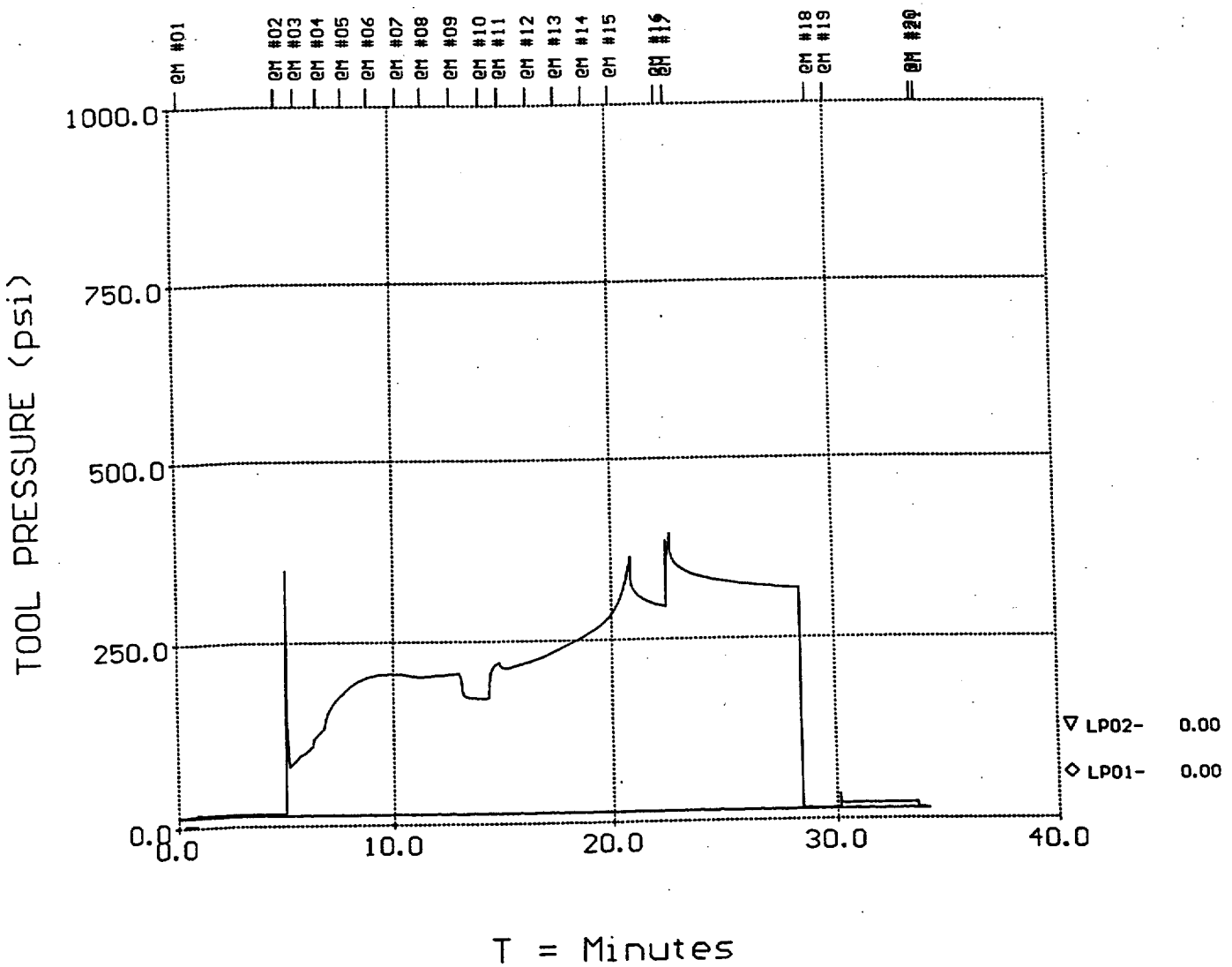
Page ___ of ___

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 MAR99
Checked By: _____ Date: _____
Comment:



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MP55 Packer Inflation Field Record

Project: WB740 Client: NYE COUNTY	By: DL Date: 13 MARCH 99
Location: AMARGOSA NV Well No. EWDP-3S	Borehole Diameter: 6-inch
Packer No: 0612-044 Depth: 335 FT.	Computer Data File: 0612-044 .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: 11.4 Vol Returned 0.2 l
H-B Valve: (P_H) Ø Offset (P_V). Ø	Confirm Venting (Vent Tool Data) (Y/N)
Vent Tool Pressure (Shoe Out, P_O) —	Final Inf'n Vol: 11.2 l Final Press: 237 (P_F)
Comments: OPEN HOLE DTW = ~260FT EST. HEAD ABOVE PACKER 75 ft. = 32 psi	Calc'd Element Pressure ($P_F + P_V - P_O$) 191 psi Confirm Pkr Valve Closed (Yes/No): YES.

PKR P = 237 − 32 − 13.9 = 191.1

Software Reminder

I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure: Line (psig)	Pressure: Inf. Tool (psia)	Pressure: Vent Tool (psia)	Clock	Comments: Tag No.	Comments: 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	~~13.9~~ 14.4	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 (745)
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	=	
11.3	350	238	13.2	1241:00	17	PUMP LINE → 600

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MP55 Packer Inflation Field Record, Part 2

Project: WB 740 Well No. EWDP-35 Packer No. 0612-044 Date: 13 MARS 99

Software Reminder

Pumping Information

I = Inflate, O = Off, C = Close

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
11.4	6000	23.7	13.2	1242	17	TIE → CLOSE
11.4	590	14.14	13.2	1243	-	VENT LINE
11.2	0	14.2	13.2	1243:30	18	TIE → OFF
11.2	0	18.06	13.2	1244	—	
11.2	0	18.07	13.2	1245	-	
11.2	0	18.18	13.2	1246	19	TIE SHOE IN (20)
11.2	0	13.94	13.2	1246:30	20	END

Form MP55inf3.sam Dec 18, 1998

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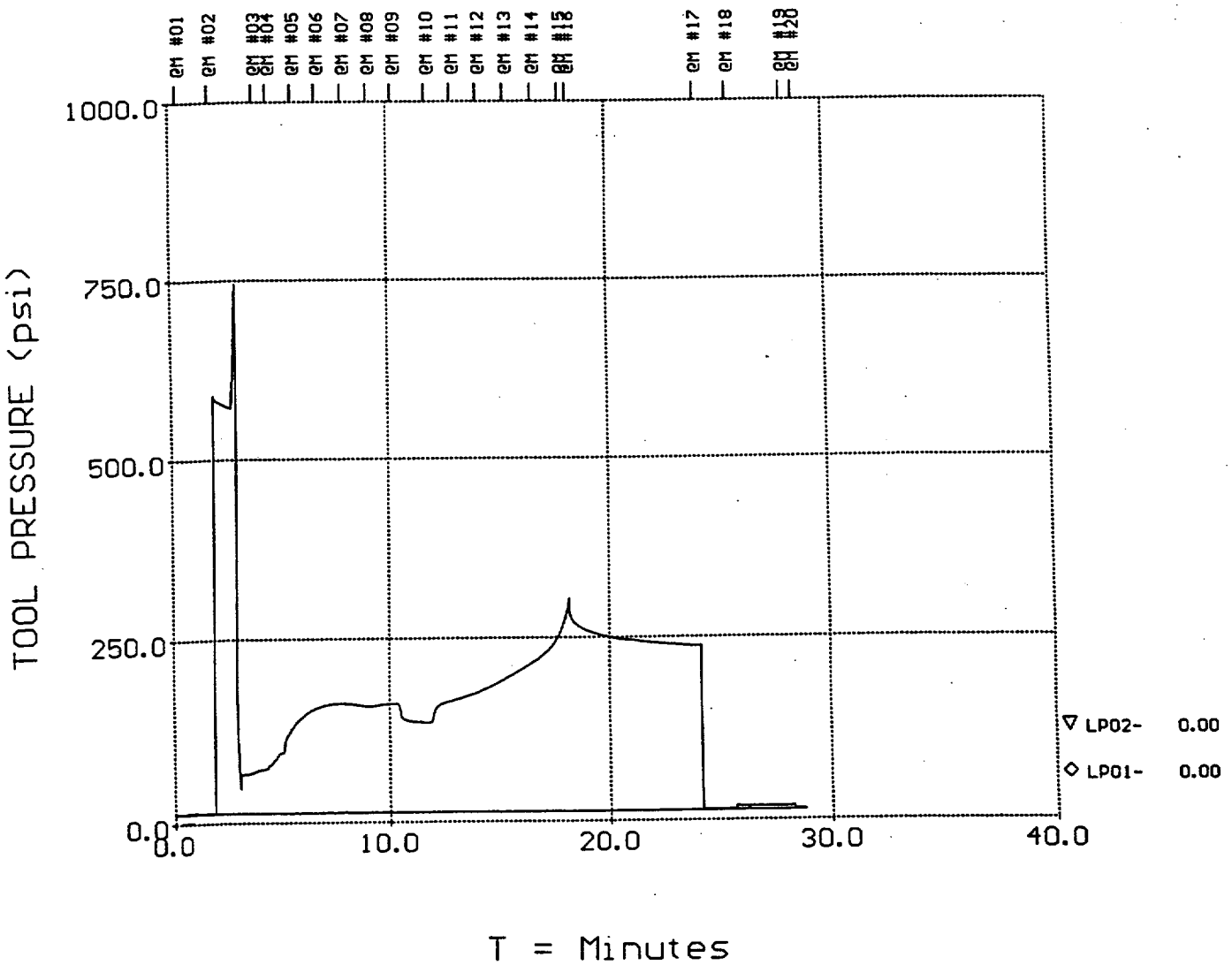
PACKER INFLATION RECORD

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: _____ Date: 15 MAR 99.
Checked By: _____ Date: _____
Comment:



Westbay Instruments Inc.

MP55 Packer Inflation Field Record

Project: WB 740 Client: NYE COUNTY	By: DL Date: 13 MAR 99
Location: AMARGOSA NV Well No. EWDP - 3S	Borehole Diameter: 6-inch steel
Packer No. 2612-042 Depth: 269	Computer Data File: 0612_042 .WDF
Inf-Tool No. 2321 Vent Tool No. 2215	Volume Pumped: 11.3 Vol Returned 0.3l
H-B Valve: (P_H) 0 Offset (P_V). 0	Confirm Venting (Vent Tool Data) (Y/N)
Vent Tool Pressure (Shoe Out, P_O) —	Final Inf'n Vol: 11.0l Final Press: 259 (P_F)
Comments: OPEN HOLE DTW = 260FT EST HEAD ABOVE PKR = 9FT = 4PSI	Calc'd Element Pressure ($P_F + P_V - P_O$) 241 psi Confirm Pkr Valve Closed (Yes/No): YES

PKR P = 259 − 4 − 13.9 = 241 psi

Software Reminder
I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments 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	23	1347:30	–	~~PUMP~~ PK VALVE OPENED
0.1	0	27.9	23	1348:00	3	START PUMPING.
1.0	290	79	23	1348:50	4	
2.0	300	129	23	1349:55	5	
3.0	310	149	23	1350:50	6	
4.0	320	150	23	1352:00	7	
5.0	320	161	37	1353:05	~~8~~	MISS TAG.
6.0	330	178	56	1354:10	8	STOP PUMPING, TOP UP.
6.0	0	135	50	1356:10	~~10~~ 9	RESUME → SQUEEZE OK.
6.5	350	196	78	1357:00	10	OPEN EMS VALVE
7.0	350	197	48	1357:45	11	
8.0	350	208	51	1358:45	12	
9.0	375	223	54	1359:50	13	
10.0	410	256	56	1401:00	14	
10.8	450	303	60	1402:10	15	– STOP PUMP, TIE = OFF
10.8	160	195	12	1403:00	16	– TIE → INFL, ~~or~~ PUMP.
11.1	350	304	25	1403:30	17	– STOP PUMP, TIE = OFF
11.1	150	286	12.8	1404:00	18	EMS VALVE ~~CLOSE~~ OFF

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MP55 Packer Inflation Field Record, Part 2

Project: KB740 Well No. EWDP-35 Packer No. 0612-042 Date: 13 MAR 99

Software Reminder
I = Inflate, O = Off, C = Close

Pumping Information

Volume (litres)	Pressure Line (psig)	Pressure Inf. Tool (psia)	Pressure Vent Tool (psia)	Clock	Comments Tag No.	Comments Text
11.1	150	270	15.04	1406:00		—
11.1	150	269	15.0	1407		—
11.1	150	266	15.2	1408		— NOTE SQUEEZE → SLOW BUILD
11.1	150	262	15.4	1409	16	SO DKR SEALS OK.
						~~Pump to 600 psi.~~
						Repeat TIE VALVE OFF
11.1	150	260	15.4	1410		— PUMP TO 600 PSI.
11.3	600	259	15.5	1410:30	17	TIE → CLOSE
11.3	600	14.12	15.5	1411:30		— VENT LINE
11.0	0	14.1	15.5	1412:00	18	TIE → OFF
11.0	0	17.9	15.4	1412:30		—
11.0	0	17.9	15.5	1413:30		—
11.0	0	18.0	15.5	1414:30		—
11.0	0	18.0	15.5	1415:00	19	TIE SHOE IN (21)
11.0	0	13.8	15.5	1415:30		— EMS SHOE IN
11.0	0	13.8	13.2	1416:00	20	END

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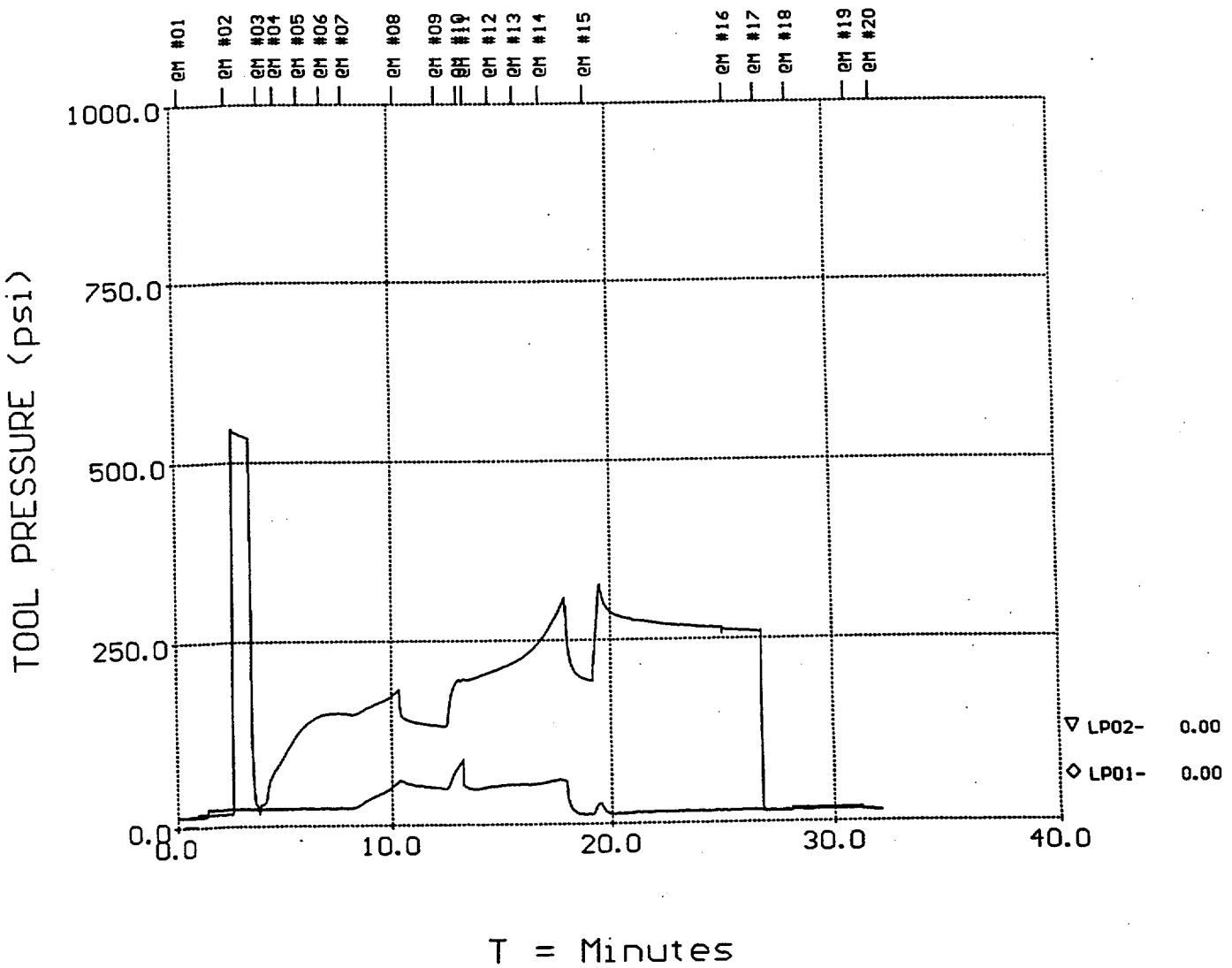
PACKER INFLATION RECORD

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:



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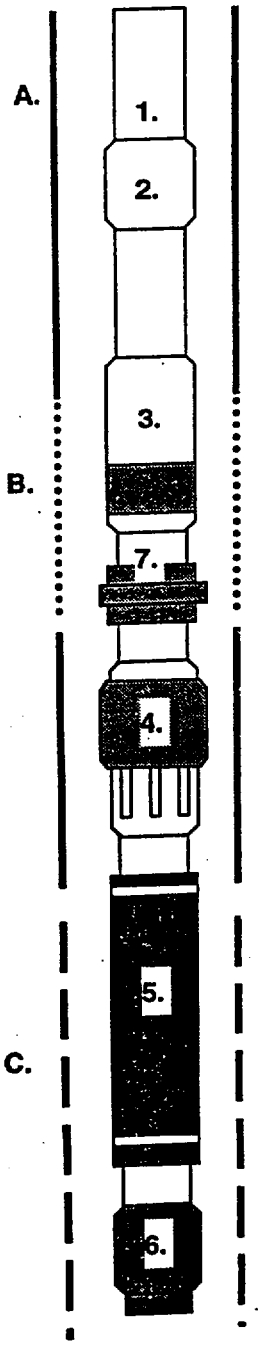
MP Drift Diagram

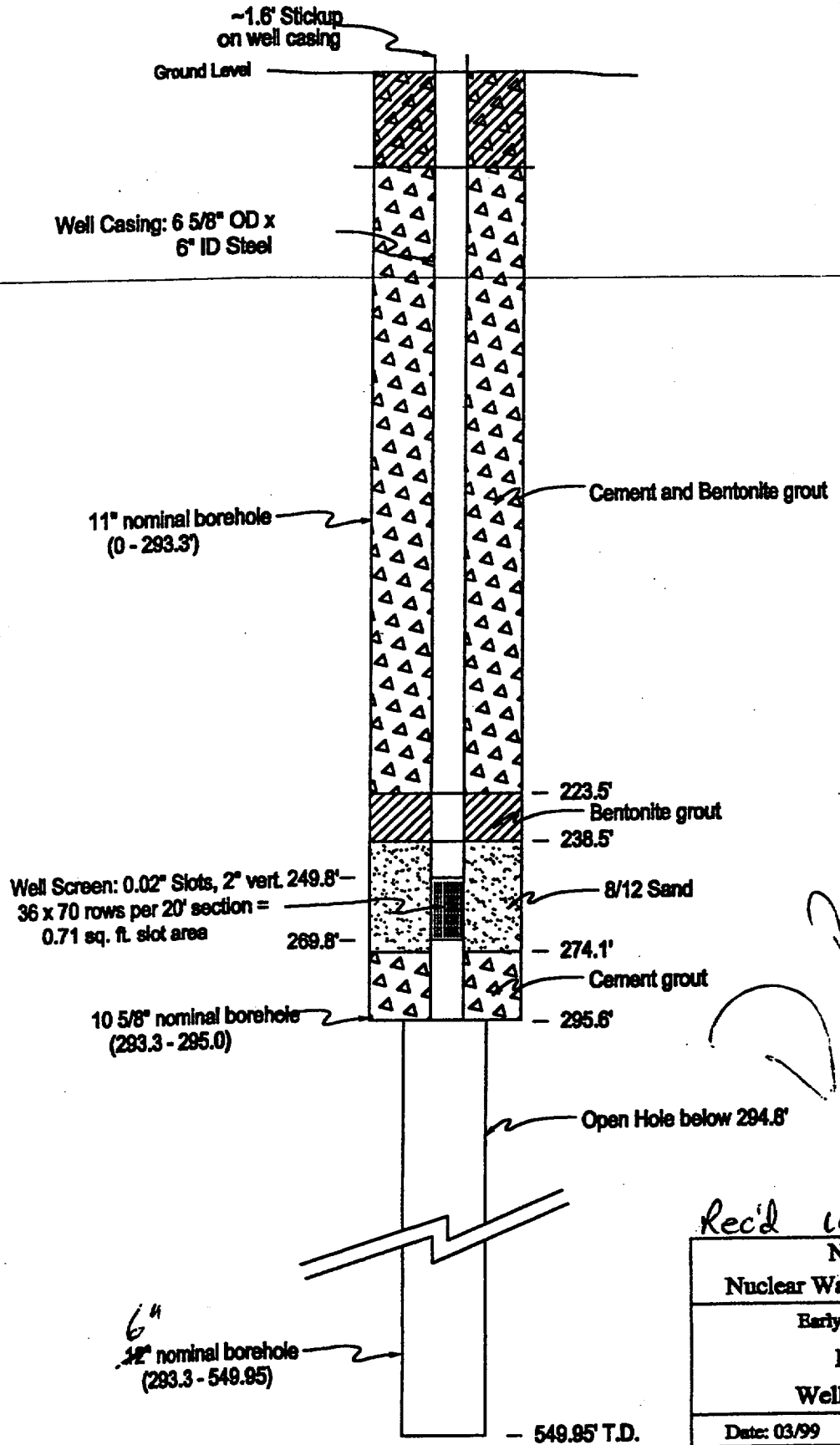
Job No. WB740	Monitoring Well No. 3S	Drawn By: DL
Client: Nye County	Project: EWDP	Date: Mar 11 1999
Drift Approval	Borehole Items:	NS. 11 MAR99.
	MP Casing Items:	DL 12 MAR99



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.

#115 - 949 West Third Street, North Vancouver, BC Canada V7P 3P7 (800) 663 8770 (604) 984 4215 FAX (604) 984 3538 info@westbay.com
www.westbay.com
DL Westbay Instruments Inc. 1999



NOTES

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

DRAFT

Rec'd 10 MAR 99 DL. WB740

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

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ACCESSION NUMBERS OF OVERSIZE PAGES:

9906100166-05

DRP-08

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:

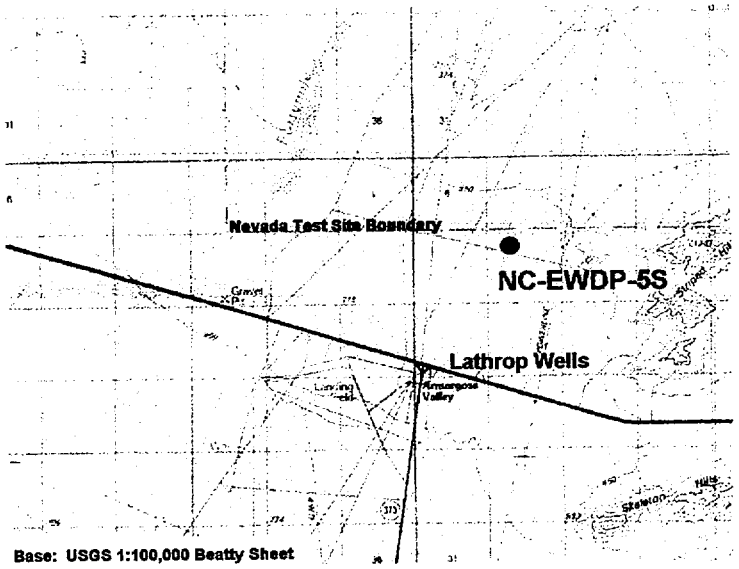
NONE

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.

9906190016 6-05

Well No. NC-EWDP-5S

Status:
Completed
Latitude\Longitude:
36° 40' 11.529" 116° 22' 37.071"
Legal Description:
Township15 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.



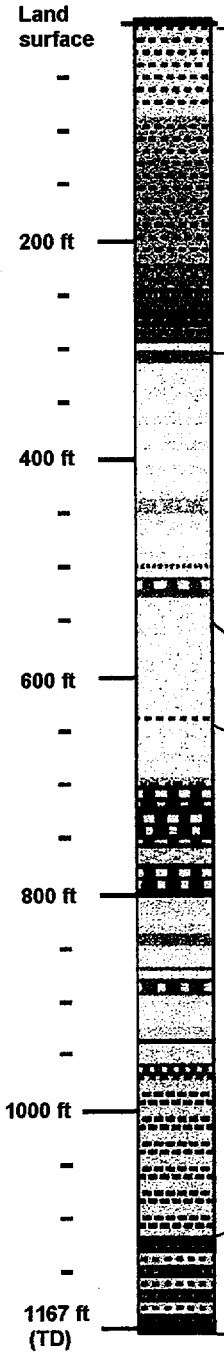
Base: USGS 1:100,000 Beatty Sheet

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



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 virtric 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 gravelley 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

Form - COPY

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S Drill Depth From 0 To 60 Page 1 of ~~8~~ 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
	BCS 0000 1651 (2MIN)	VALLEY FILL GRAVELLY SAND: Coarse subrnd, carbonate coated volcanic gravel, fine silty sand, gray orange (10YR 7/4)			
	BCS 0000 1652 (5MIN	Increased amount of gravel & cobbles. Pale yel brn (10YR 6/2) Moist			HARD @ 6'
	BCS 0000 1653 (4MIN)	SANDY GRAVEL: Fine-coarse sand, coarse subang-subrnd, carbonate coated gravels & cobbles (10YR 7/4) silty.			
	BCS 0000 1654 (4min)	Very silty with fine sand & subrnd cobbles No carbonate coating			
0	BCS 0000 1655 (3MIN)	Increased amount of fine gravels			HARD @ 22'
5	BCS 0000 1656 (4MIN)	Increased amount of fine gravel & coarse sand Decreased amount of silt.			
0	BCS 0000 1657 (4MIN)				
5	BCS 000 1658 (8MIN)	INCREASED AMOUNT OF GRAVEL & COBBLES			
10	BCS 0000 1659 (4MIN)	INCREASED AMOUNT OF SAND			
5	BCS 0000 1660 (6MIN)	INCREASED AMOUNT OF GRAVEL			
50	BCS 0000 1661 (2MIN)	INCREASED AMOUNT OF SILT			
55	BCS 0000 1662 (5MIN)	INCREASED AMOUNT OF FINE GRAVEL			
60					

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

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-55 Drill Depth From 60 To 120 Page 2 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
65	BCS 0000 1663 (3 MIN)	GRAVELLY SAND: fine-med sand, silty, predom fine subrnd volcanic gravel, Gry 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 Gry orange (10YR 7/4) - Dk Yel org (10YR 6/6). 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. Same color as as above. Cemented grains			
90	BCS 0000 1668 (9 MIN)	GRAVELLY SAND: tr - some silt, some cobbles, fine - med sand, subang - subrnd gravel. Gry 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, subrnd 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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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S 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" CROWD OUT BIT DRILLED WITH AIR Sampling Equip./Method CYCLONE/CUTTINGS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 1675 (5MIN)	GRAVELLY SAND: fine subang - subrnd gravel, fine sand, silty. Gry orange (10YR 7/4) - Dk yel org (10YR 6/6)			
25	BCS 0000 1676 (7MIN)	Color changes to dk yel orange (10YR 6/6) slightly moist. Increased amount of silt			
30	BCS 0000 1677 (3MIN)	INCREASED AMOUNT OF GRAVEL			
35	BCS 0000 1678 (5MIN)	INCREASED AMOUNT OF COARSE SAND & DECREASE IN AMOUNT OF SILT			
40	BCS 0000 1679 (3MIN)	SANDY GRAVEL: coarse sand, fine subrnd gravel			
45	BCS 0000 1680 (6MIN)	INCREASED AMOUNT OF coarse gravel & silt			
50	BCS 0000 1681 (4MIN)	GRAVELLY SAND: fine silty sand, fine subrnd gravel, Dk Yel Orange (10YR 6/6)			
55	BCS 0000 1682 (5MIN)	SANDY GRAVEL: fine silty sand, some cobbles Dk yel orange (10YR 6/6)			
60	BCS 0000 1683 (5MIN)	Coarse gravel, no silt, coarse sand			
65	BCS 0000 1684 (6min)	Trace - some silt. Gry orange pink (5YR 7/2)			DRAFT
70	BCS 0000 1685 (3MIN	fine subangular gravel with coarse sand Dk yel orange (10YR 6/6) Sand.			POOR RECOVERY LOSING CIRCULATION
175	BCS 0000 1686 (13MIN)	INCREASE IN AMOUNT OF COARSE GRAVEL			POOR RECOVERY LOSING CIRCULATION
180					

NOTE: DRILL TIME FOR [illegible]) IN 2ND COLUMN.

CUTTINGS SAMPLE LOG

Borehole ID NC-ENDP-5S Drill Depth From 180 To 240 Page 4 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 DRILLED WITH AIR Sampling Equip./Method CYCLONE / CUTTINGS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 1687 (4MIN)	SANDY GRAVEL; coarse avg sand, poorly sorted subrnd gravel, no silt (clean sand & gravel)			POOR RECOVERY
185	BCS 0000 1688 (6MIN)				POOR RECOVERY
190	BCS 0000 1689 (2MIN)	INCREASED AMOUNT OF SILT Dk yel orange (10YR 6/6)			
195	BCS 0000 1690 (3MIN)	Decreased amount of silt (fairly clean gravels)			
200	BCS 000 1691 (5MIN)	SAND; tr - some gravel, medium sand, no silt, clean avg sand, well sorted sand Gry orange pink (5YR 7/2)			
205	BCS 000 1692 (7MIN)	SANDY GRAVEL; f-med sand, subrnd coarse gravel, tr - some silt.			
210	BCS 0000 1693 (3MIN)	Predom. fine subrounded gravel & poorly sorted sand. No silt.			
215	BCS 0000 1694 (7MIN)	poorly sorted sand & gravel. No silt.			
220	BCS 0000 1695 (17MIN)	MULTICOLORED VOLCANIC GRAVEL & COBBLES, very few fines.			
225	BCS 0000 1696 (14MIN)				
230	BCS 0000 1697 (18MIN)				
235	BCS 0000 1698 (16MIN)				
240					

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

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S Drill Depth From 240 To 300 Page 5 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" CROWN OUT BIT DRILLED WITH AIR Sampling Equip./Method CYCLONE / CUTTINGS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 1699 (25 MIN)	GRAVEL & COBBLES; subrnd, multicolored, volcanic			INJECTED WATER DUE TO TIGHT FORMATION
245	BCS 0000 1700 (7 MIN)	CLAYEY GRAVEL & COBBLES; some fine sand, subrnd gravel & cobbles, muddy, Mod yel brn (10YR 5/4)			
250	BCS 0000 1701 (32 MIN)	"			
255	BCS 0000 1702 (14 MIN)	SANDY GRAVEL: Fine - med silty sand, coarse - - fine subrnd gravel, some cobbles.			
260	BCS 0000 1703 (17 MIN)	Increased amount of fine gravel			
265	BCS 0000 1704 (13 MIN)	SANDY CLAY: Mod yel brn (10YR 5/4) f-med sand, med plasticity, some fine gravel			
270	BCS 0000 1705 (9 MIN)	Increased amount of fine gravel & sand			
275	BCS 0000 1706 (9 MIN)	Decreased amount of gravel			
280	BCS 0000 1707 (9 MIN)				1-23-99, 1710
285	BCS 0000 1708 (18 MIN)				1-24-99, 0646
290	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 frag's & blk vitric ang frag's			
295	BCS 0000 1710 (12 MIN)				
300					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S Drill Depth From 300 To 360 Page 6 of 20

Driller BRYAN MORRIS/BOYLES BROS Start Date/Time 1-22-99, 1526 End Date/Time 1-24-99

Drilling Equip./Method AP-1000/11" GROUND-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
	BCS 0000 1711 (9MIN)	SANDY CLAY: fine sand, trace - some fine gravel, high plasticity. Gry orange brn (10YR 7/4).			
305		BEDDED TUFF?: Gry orange brn (10YR 7/4) fine sandstone with thin clayey layers & dk rd brn (10R 3/4) welded tuff & blk vitric ang frag's			
	BCS 0000 1717 (18MIN)	SAME AS 300-302.5			
310					
	BCS 0000 1713 (9MIN)	CLAYEY GRAVEL?: Gray orange brn (10YR 7/4) fine poorly sorted, angular to subrnd gravels. Predom bedded tuff. Hi plasticity - mod plasticity.			
315	BCS 0000 1714 (10MIN)	Decreased amount of gravel & increased amount of sand & silt (mud)			
320					
	BCS 0000 1715 (6MIN)	SANDY CLAY; Fine sand, some gravel			
325					
	BCS 0000 1716 (8MIN)	Decreased amount of gravel			
330					
	BCS 0000 1717 (7MIN)				
335					
	BCS 000 1718 (8MIN)	INCRESASED AMOUNT OF GRAVEL			
340					
	BCS 000 1719 (5MIN)	DECREASS AMOUNT OF GRAVEL			
345					
	BCS 0000 1720 (8MIN)	Increased AMOUNT OF GRAVEL			COTTINGS BELOW 350' RETURNING AS CLAY "BALLS" INSTEAD OF MUD (STOPPED INJECTING WATER)
350					
	BCS 0000 1721 (3MIN)				MOISTURE INCREASING WITH DEPTH
355					
	BCS [illegible] 1722 (6MIN)	CLAYEY & SILTY SAND: COLOR CHANGES TO LT BRN (5YR 6/4) Med - low plasticity			
360					

[illegible] FOR 5' [illegible] IN 2ND COLUMN

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CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S 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
	BCS 0000 1723 (4 MIN)	BEDDED TUFF ? : VERY PALE ORANGE (10YR 8/2) Alternating mod hrd sandstone & sandy clay.			
365	BCS 0000 1724 (10 MIN)	Pale yel brn (10YR 6/2) Increased amount of clay			
370	BCS 0000 1725 (4 MIN)	Lt brn (5YR 6/4)			
375	BCS 0000 1726 (8 MIN)				SOUNDED WATER 375'-380' 2-8-99 0130HRS
380	BCS 0000 1727 (4 MIN)				
385	BCS 0000 1728 (8 MIN)				
390	BCS 0000 1729 (5 MIN)	Increased amount of angular gravel			
395	BCS 0000 1730 (8 MIN)				
400	BCS 0000 1731 (5 MIN)				
405	BCS 0000 1732 (10 MIN)	INCREASED AMOUNT OF SAND			
410	BCS 0000 1733 (5 MIN)	Trace coarse ang. gravel			
415	BCS 0000 1734 (10 MIN)				
420					

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

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CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S 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, 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
	BCS 0000 1735 (6 MIN)				
425	BCS 0000 1736 (9 MIN)	CLAYEY SAND, med-coarse ang sand, fine ang & tabular gravel. Pale yel brn (10YR 6/2). Low-medium plasticity.			
430	BCS 0000 1737 (4 MIN)				
435	BCS 0000 1738 (10 MIN)	Some coarse angular gravel & cobbles			
440	BCS 0000 1739 (6 MIN)	Increased amount of gravel some subrnd gravel			
445	BCS 0000 1740 (14 MIN)				
450	BCS 0000 1741 (7 MIN)	Decrease in amount of clay low plasticity			
455	BCS 0000 1742 (17 MIN)				
460	BCS 0000 1743 (8 MIN	CLAYEY GRAVEL, Multicolored volcanic, fine subrnd gravel, some coarse sand, low plasticity Predom very pale orange (10YR 8/2) sandy bedded tuff.			START INJECTING WATER AT 460- HOLE TIGHT
465	BCS 0000 1744 (9 MIN)	Increased amount of coarse subrnd gravel.			
470	BCS 0000 1745 (4 MIN)	MUDDY Decrease in amount of gravel			DRAFT
475	BCS 0000 1746 (8 MIN)				
480					

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

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S Drill Depth From 480 To 540 Page 9 of 20

Driller BRIAN MORRIS HOLQUIN / LAYNE Start Date/Time 1-22-99/1526 2-8-99/0825 End Date/Time 1-24-99 (0-500') 1717 2-10-99 (500-1200') 083

Drilling Equip./Method AP-1000/11" - 0-500' IR TH75E - Hammer/Tricone 500-1200 Sampling Equip./Method Cyclone/Cuttings

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 0000 1747 (3 min)	Gravelly Sandy Clay; Mod. Yellow-brown (10YR 5/4), fine subround gravel, coarse sand, medium-high plasticity			Stopped Injecting water at 480'
485	BCS 0000 1748 (11 min)				
490	BCS 0000 1749 (4 min)	Clayey Sand; Fine subround gravel, coarse sand, low-med. plasticity.			
495	BCS 0000 1750 (8 min)	Silty Sand; Trace coarse gravel and clay; poorly sorted sand, pale brown (5YR 5/2)			
500	BCS 0000 2951 NC	No chipsample			T.D w/ AP-1000 1-24-99 1717 Start w/ IR TH 75E 2-8-99 1st shift
505	BCS 0000 2952 N/S	No sample 505-510 NO RETURN			
510	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 PREVEN CROSS-OVER SUB FROM PLUGGING UP
515	BCS 0000 2954				
520	BCS 0000 2955				
525	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			
530	BCS 0000 2957				
535	BCS 0000 2958				
540					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S 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 TUFFS			
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	increasing clay content			
595	BCS 0000 2970				
600					

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NCEWDP-5S Drill Depth From 600 To 660 Page 11 of 20

Driller HOLQUIN/LAUNE Start Date/Time 2·8·99 End Date/Time 2·10·99

Drilling Equip./Method 1R 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
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	COARSE SAND AND GRAVEL SIMILAR CLAST TYPES AS ABOVE			
635	BCS 0000 2978	637' GROUND WATER NOTICED IN RETURN, DRILL MUD IS BEING DILUTED			
640	BCS 0000 2979				
645	BCS 0000 2980	CLAY, SAND AND GRAVEL LOCALLY VERY SAND RICH ANGULAR CLASTS OF YELLOWISH BROWN 10YR 7/2 TO GRAYISH YELLOW 5Y 7/4 MAKE UP ABOUT 10% - CLASTS ARE FINE GRAINED TO VERY FINE GRAINED RHYOLITE TUFF			
650	BCS 0000 2981				
655	BCS 0000 2982				
660					

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S Drill Depth From 660 To 720 Page 12 of 13

Driller Holquin/Cleaver/Layne 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	10% ANGULAR CLASTS MODERATE GREENISH YELLOW 10Y 7/4			2·8·99 first shift 2·8·99 second shift
685	BCS 0000 2988				
690	BCS 0000 2989				
695	BCS 0000 2990	SAND PALE YELLOWISH BROWN 10YR 6/2			2·8·99 Plugged off
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			2·9·99 1700
705	BCS 0000 2992				
710	BCS 0000 2993				DRAFT
715	BCS 0000 2994				
720					

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S 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 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
720	BCS 0000 2995	ALLUVIUM, AS ABOVE, SAND AN GRAVEL			
725	BCS 0000 2996	SAND PALE RED 10R 6/2 TO PALE YELLOWISH BROWN 10YR 6/2 GRADES DOWN INTO GRAVEL			
730	BCS 0000 2997				
735	BCS 0000 2998	GRAVEL CONTENT INCREASES DOWN TO 740'			
740	BCS 0000 2999	SAND AS ABOVE 756 - 755 MOSTLY GRAVEL			
745	BCS 0000 3000				
750	BCS 0000 3001				
755	BCS 0000 3002	SAND PALE YELLOWISH BROWN 10YR 6/2			
760	BCS 0000 3003				
765	BCS 0000 3004				
770	BCS 0000 3005	GRADATIONAL CONTACT GRAVEL WITH MINOR AMOUNTS OF SAND MOSTLY GRAYISH RED 5R 4/2			
775	BCS 0000 3006				
780					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S Drill Depth From 780 To 840 Page 14 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
780	BCS 0000 3007	ALLUVIUM, SAND AND GRAVEL, AS ABOVE			
785	BCS 0000 3008				
790	BCS 0000 3009				
795	BCS 0000 301[illegible]	CLAYEY SAND, CLAY; PALE ORANGE 10YR 7/2			
800	BCS 0000 3011				
805	BCS 0000 3012				
810	BCS 0000 3013	GRAVEL RICH 810-820'; 10-20% clay			
815	BCS 0000 3014				
820	BCS 0000 3015	CLAY RICH SAND GRADING INTO GRAVEL AS ABOVE			
825	BCS 0000 3016				
830	BCS 0000 3017	10-20% clay			DRAFT
835	BCS 0000 3018	CLAY RICH SAND GRADING DOWN TO SANDY GRAVEL W/CLAY MODERATE REDDISH ORANGE 10R 6/6 GRADING INTO PALE RED 10R 6/2 DOWN HOLE			
840					

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S 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 1R 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	BCS 0000 3019	ALLUVIUM, GRAVELLY SAND, AS ABOVE			
845	BCS 0000 3020	SANDY CLAY AND CLAY. PALE YELLOWISH ORANGE 10YR 7/2			
850	BCS 0000 3021				
855	BCS 0000 3022				
860	BCS 0000 3023				
865	BCS 0000 3024	GRAVELLY SAND WITH CLAY BEDS. PALE REDDISH BROWN (10R 5/4)			
870	BCS 0000 3025				
875	BCS 0000 3026				
880	BCS 0000 3027				2·09·99 SECOND SHIFT 2·10·99 FIRST SHIFT
885	BCS 0000 3028				
890	BCS 0000 3029				
895	BCS 0000 3030	SANDY CLAY: PALE YELLOWISH ORANGE 10YR 7/2 TO GRAYISH ORANGE 10YR 7/4			
900					

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

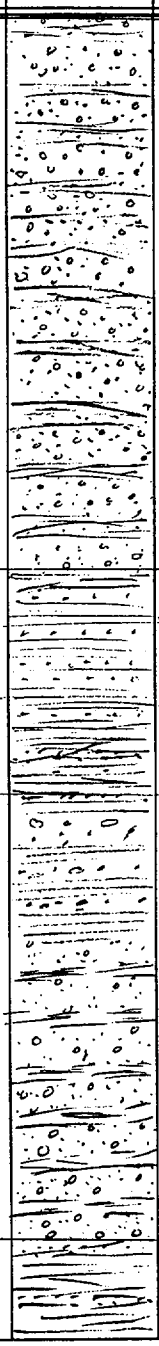
CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S Drill Depth From 900 To 960 Page 16 of 20

Driller S. CLEAVER / LAUNE 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
900	BCS 0000 3031	GRAVELLY SAND AND CLAY YELLOWISH GRAY 5Y 8/1			
905	BCS 0000 3032				
910	BCS 0000 3033				
915	BCS 0000 3034				
920	BCS 0000 3035				
925	BCS 0000 3036	SANDY CLAY AND CLAY GRAYISH ORANGE 10YR 7/4			
930	BCS 0000 3037				
935	BCS 0000 3038	GRAVELLY SAND AND CLAY			
940	BCS 0000 3039				
945	BCS 0000 3040				
950	BCS 0000 3041				
955	BCS 0000 3042	SANDY CLAY AND CLAY MODERATE YELLOWISH BROWN 10YR 5/4			
960					



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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S 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 3044	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 2.10.99 first shift
985	BCS 0000 3048				
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-EWDP-5S 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 10YR 7/4			
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	Gravelly interbed			
1065	BCS 0000 3064				
1070	BCS 0000 3065				
1075	BCS 0000 3066				
1080					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-5S 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 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
1080	BCS 0000 3067	ALLUVIUM, SANDY CLAY/CLAY, AS ABOVE			
		gravelly interbed			
1085	BCS 0000 3068				
1090	BCS 0000 3069				
1095	BCS 0000 3070				
1100	BCS 0000 3071				
1105	BCS 0000 3072				
1110	BCS 0000 3073				
1115	BCS 0000 3074	SAND (COARSE) AND GRAVEL WITH INTERBEDDED CLAYS LIGHT BROWN (5YR 5/6) TO PALE REDDISH BROWN (10R 5/4). Gravel clasts are subround.			
1120	BCS 0000 3075	Clayey zone			
1125	BCS 0000 3076				
1130	BCS 0000 3077				
1135	BCS 0000 3078				
1140					

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NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-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 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
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	Clayey zone			
1165	BCS 0000 3084				
1170	BCS 0000 3085				
1175	BCS 0000 3086				
1180	BCS 0000 3087	COARSE SAND AND GRAVELS WITH MINOR CLAYS			
1185	BCS 0000 3088				
1190	BCS 0000 3089				
1195	BCS 0000 3090				
1200					T.D. = 1200' AT 0835 2-10-99

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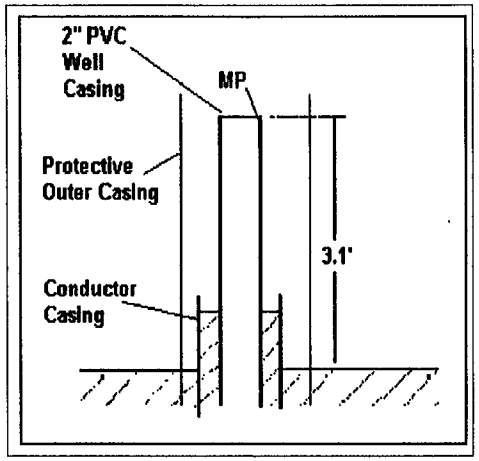

Water Level Data

Well: NC-EWDP-5S

Location:

UTM: North	UTM: East	Latitude	Longitude	Elevation ft.	Elevation m
4058229.38	555675.68	36°40' 11.529"N	116°22'37.071"W	2753.78	839.36

Access: Highway 95N to NTS Gate 510 access road; turn north. Go north about 1.8 miles to gravel road just south of NTS boundary; turn east and go 1.4miles.

Measuring Point: Top of PVC well casing (not protective casing).

Measuring Point Correction:

Feet	Meters
3.10	0.945

Date	Zone Measured	Depth to Water below M.P. Ft.	Depth to Water below M.P. m	Elevation of Water Ft.	Elevation of Water m	Method	Personnel	Comments
8-Feb-1999	n/a	377.5	115.06	2373.2	723.35	NWRPO 500'	BA	01:30
4-Mar-1999	n/a	374.7	114.21	2376.0	724.21	NWRPO 500'	JSW	
7-Mar-1999	n/a	375.4	114.42	2375.3	723.99	Buqo 500'	TSB	
8-Mar-1999	n/a	375.1	114.33	2375.6	724.09	NWRPO 500'	KDD	14:17
9-Mar-1999	n/a	375.1	114.33	2375.6	724.09	NWRPO 500'	KDD	08:48
10-Mar-1999	n/a	375.0	114.30	2375.7	724.12	NWRPO 500'	KDD	07:23
11-Mar-1999	n/a	375.0	114.31	2375.7	724.11	NWRPO 500'	KDD	07:35
12-Mar-1999	n/a	375.1	114.32	2375.6	724.09	NWRPO 500'	KDD	06:51
16-Mar-1999	n/a	375.1	114.33	2375.6	724.09	NWRPO 500'	MCC	
17-Mar-1999	n/a	375.3	114.39	2375.4	724.03	NWRPO 500'	MCC	
18-Mar-1999	n/a	375.2	114.36	2375.5	724.06	NWRPO 500'	MCC	
19-Mar-1999	n/a	375.2	114.36	2375.5	724.06	NWRPO 500'	MCC	
22-Mar-1999	n/a	375.2	114.37	2375.5	724.05	NWRPO 500'	MCC	
23-Mar-1999	n/a	375.1	114.33	2375.6	724.09	NWRPO 500'	MCC	
24-Mar-1999	n/a	375.2	114.36	2375.5	724.06	NWRPO 500'	MCC	
25-Mar-1999	n/a	375.2	114.36	2375.5	724.06	NWRPO 500'	MCC	
26-Mar-1999	n/a	375.2	114.36	2375.5	724.06	NWRPO 500'	MCC	

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APERTURE CARD/PAPER COPY AVAILABLE THROUGH NRC FILE CENTER

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THAT CAN BE VIEWED AT THE RECORD TITLED:

NONE:

BOREHOLE: NC-5S

LOGS: E-LOGS CALIPHER NEUTRON DENSITY DEVIATION GAMMA

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

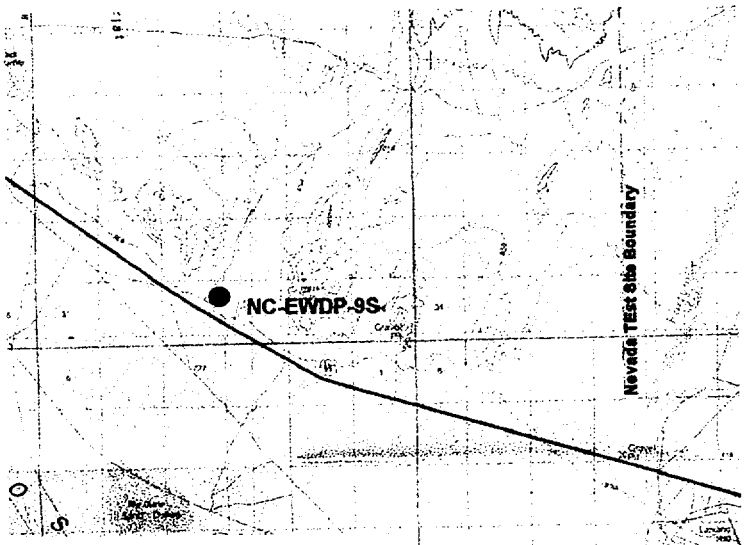
NONE

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.

99061001166-06

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.



Base: USGS 1:100,000 Beatty Sheet

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

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 (?)

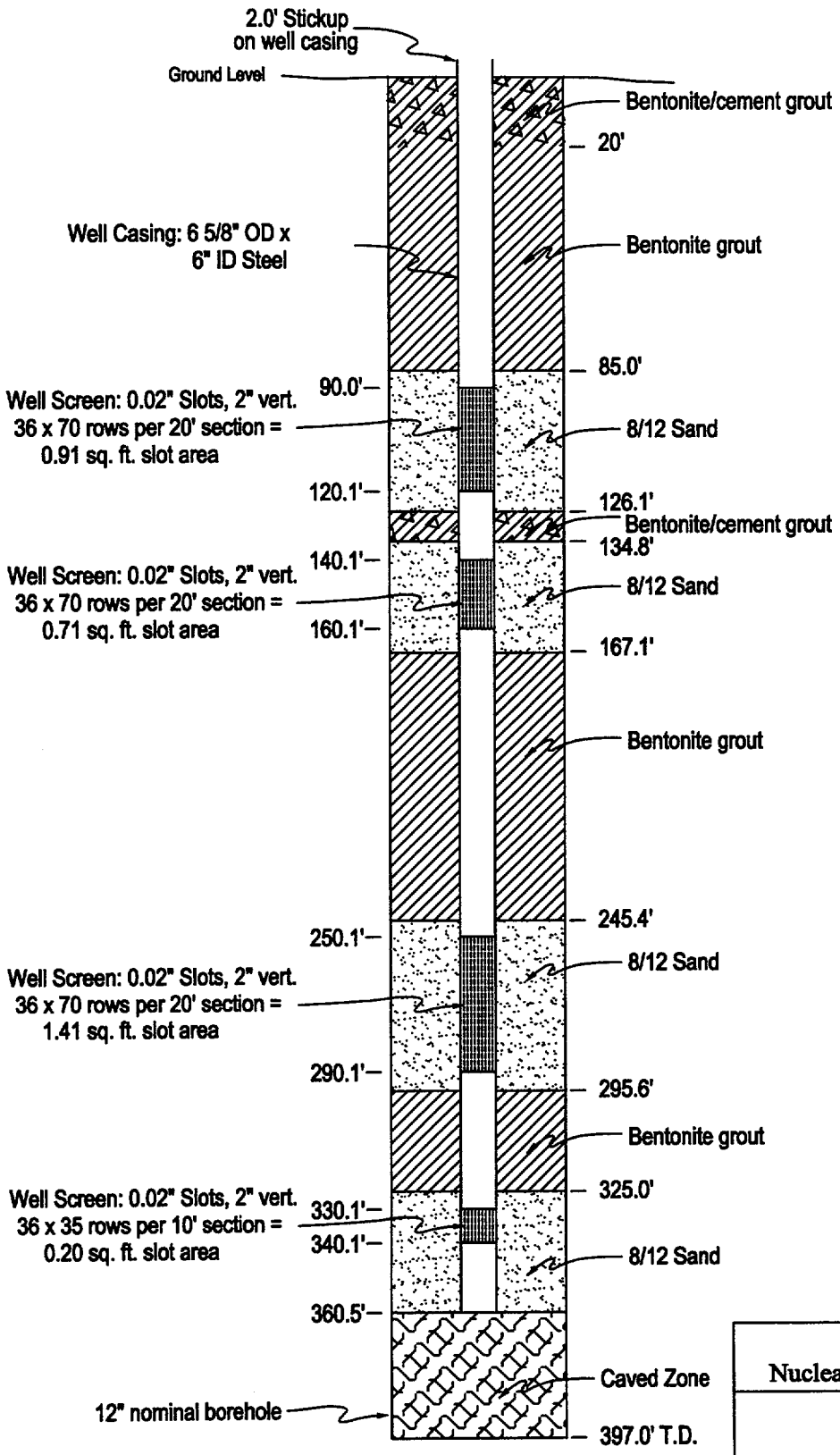
285-337' Tertiary Volcanics - 285-321' welded tuff, gray red (10R 4/2) devitrified, crystal rich, some black dendrites, very hard, some thin soft "waxy" light brown (5YR 5/6) claystone layers; 321-337' brecciated tuff, gray red (10R 4/2) welded tuff, brecciated with white calcite veining, some limestone 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

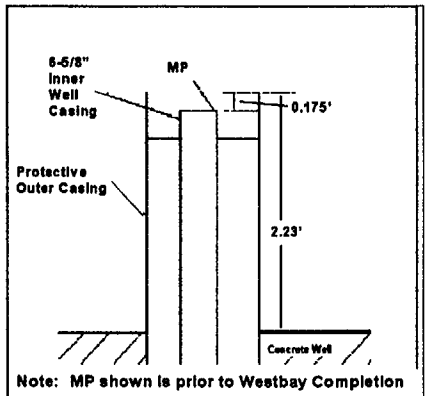
SUMMARY LITHOLOGIC LOG



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



Note: MP shown is prior to Westbay Completion

Water Level Data

Well: NC-EWDP-9S

Location:

UTM: North	UTM: East	Latitude	Longitude	Elevation ft.	Elevation m
4061004.25	539038.75	36°41' 44.566"N	116°33'46.769"W	2615.86	797.32

Access: From Lathrop Wells (Junction of Highways 95 and SR373) west 9.4 miles to gate on north side of Highway. Take gravel road 0.3 miles; turn east and follow tracks to a clearing on white colored spring deposits.

Measuring Point: Top of steel well casing (not protective casing).

Measuring Point Correction:

Feet	Meters
2.02	0.616

Date	Zone Measured	Depth to Water below M.P. Ft.	Depth to Water below M.P. m	Elevation of Water Ft.	Elevation of Water m	Method	Personnel	Comments
9-Dec-1999	n/a	195.5	59.58	2418.4	737.13	NWRPO 500'	KDD	11:23 in casing while drilling
9-Dec-1999	n/a	179.8	54.79	2434.1	741.92	NWRPO 500'	KDD	12:01 in casing while drilling
9-Dec-1999	n/a	162.9	49.64	2451.0	747.07	NWRPO 500'	KDD	12:35 in casing while drilling
9-Dec-1999	n/a	152.0	46.32	2461.9	750.39	NWRPO 500'	KDD	13:03 in casing while drilling
9-Dec-1999	n/a	136.9	41.72	2477.0	754.99	NWRPO 500'	KDD	13:55 in casing while drilling
9-Dec-1999	n/a	114.4	34.86	2499.5	761.85	NWRPO 500'	KDD	15:42 in casing while drilling
10-Dec-1999	n/a	100.6	30.65	2513.3	766.06	NWRPO 500'	KDD	06:45 in casing (240') before drilling
12-Dec-1999	n/a	148.6	45.28	2465.3	751.43	NWRPO 500'	KDD	06:37 in casing (390') before drilling
12-Dec-1999	n/a	311.4	94.90	2302.5	701.80	NWRPO 500'	KDD	10:38 in casing 400') while drilling
12-Dec-1999	n/a	100.9	30.74	2513.0	765.97	NWRPO 500'	KDD	13:33 in casing (400') while drilling
12-Dec-1999	n/a	101.0	30.77	2512.9	765.94	NWRPO 500'	KDD	16:03 in casing (400'),5 hrs. after drilling
13-Dec-1999	n/a	101.2	30.83	2512.7	765.87	NWRPO 500'	KDD	16:03 in casing (400'),21 hrs. after drilling
14-Jan-1999	n/a	100.8	30.72	2513.0	765.98	Buqo sounder	TSB	
15-Jan-1999	n/a	100.7	30.70	2513.1	766.01	Buqo sounder	JSW	Before 48 hr. pump test
17-Jan-1999	n/a	100.8	30.73	2513.0	765.97	Buqo sounder	MCC	10 min after 48 hr. pump test
19-Jan-1999	n/a	100.6	30.66	2513.3	766.05	Buqo sounder	TSB	
21-Jan-1999	n/a	100.6	30.65	2513.3	766.05	Buqo sounder	TSB	

Westbay Multiport installation precludes further water level measurements

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE — CORE SAMPLE LOG — TP-8.0

Borehole ID: NC-EWDP-9SX 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: 10 3/4" 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 (BLOWS/6" INTERVAL)	CORE DESCRIPTION
		1.0/67			19-31-33	SPRING DEPOSIT
		0.9/60			32-28-19	MUDSTONE: Yellow Gray (5Y 8/1) Very soft-soft, dry, very fine-grained.
		1.1/73			18-20-26	
	5	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	SAND: Yellow Gray (5Y 8/1), uncemented, fine, dry.
		1.5/100			10-24-70	
	15	1.1/73			37-112-89	MUDSTONE: Yellow Gray (5Y 8/1), very soft-soft, very fine-grained, dry
		1.3/87			78-103-96	CLAYSTONE: Yel Gry (5Y 7/2), Mod soft, high plasticity, slightly moist
		1.2/80			39-80-95	
		1.1/73			59-134-128	SILTSTONE: Yel Gray (5Y 7/2), sandy, soft-very soft.
	20	1.5/100			43-31-151	SANDY SILT: Yel Gray (5Y 7/2) fine-med grained sand, trace fine angular gravel (5B 5/1).
	22.5	1.5/100			43-98-112	GRAVELLY SAND: Yel gray (5Y 7/2) fine-med sand, fine angular volcanic gravel.
						STOPPED CORING AT 22.5'

Logged By: K. DONNELSON Date: 12-8-98 Checked By: BENT ANQUIST Date: 1-4-99

Clare / Parris

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE | **CORE SAMPLE I** | TP-8.0

Borehole ID NC-EWDP-9S 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
		0/0 (10 MIN)	0.0			SPRING DEPOSIT 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)
	5	0/0 (7 MIN)	Box 1			
	10	1.8/120				Same as above but very soft. Obtained sample by raising & dropping core barrel to jam in tube.
		0/0 (1 MIN.)				
	15	0/0 (11 MIN)	17.3			
		1.4/140 (3 MIN)				Same as above. Obtained sample by raising & dropping core barrel to jam in tube.
	20	0/0 (9 MIN.)				
	25	0/0 (9 MIN.)				Loosing circulation below 30'
	30	0/0 (11 MIN)				
	35	0/0 (12 MIN)				
	40	0/0 (17 MIN)				
	45	0/0				

Logged By KEN DONNELSON Date 12-3-98 Checked By Bent Anquist Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE | **CORE SAMPLE LOG** | TP-8.0

Borehole ID NC-EWDP-9S

ELEVATION (Feet)	DEPTH (Feet)	RECOVERY Feet/Feet/%	TOP/BOTTOM Of Core in Box	FIELD BOREHOLE ANALYTICAL SAMPLE NUMBER	GRAPHIC LOG	CORE DESCRIPTION
		(13 MIN)				
	50	0/0				Hole cased to 52.4'
		(27 MIN)				
	55	0/0				
		(13 MIN)				
	60	0/0				
		(12 MIN)				
	65	0/0				
		(14 MIN)				END OF SHIFT
	70	0.2/4				0.2' section of hard volcanics; likely a clast in a softer matrix. Rhyolite, reddish-brn (5R 6/2); aphanitic ground mass, hard, <1% fine (<1mm) broken quartz phenocrysts, ~2% light colored <1mm ? K-spar phenocrysts. No volcanic textures, likely a welded tuff clast in spring deposit.
		0/0				
	75	(1:11 MIN)				Drilling is slower; driller saying that rods are "booting" or binding with cuttings End of Hole 77.7' Hole shut down due to drilling difficulties and lack of recovery

COPY

Logged By JAMIE WALKER Date 12-3-98 (NIGHT) Checked By BENT AHQUIST Date 1-4-99

Tom B

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) 10 3/4" 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
		0.0 - 22.5' SAMPLES TAKEN BY 2" CALIFORNIA SAMPLER (TREATED AS CORE)			
	BCS 00000 850	VALLEY FILL SILTY SAND: Yell gray (5Y 7/2), fine sand, fine ang gravel			12-8-98
25	BCS 00000 849	Increased fine ang vole. gravel			
30	BCS 00000 848				
35	BCS 00000 847	Considerable subrnd gravel & cobbles (subang dk vole gravels)			
40	BCS 00000 846				
45	BCS 00000 845	GRAVELLY SAND: Lt brn (5YR - 6/4 - 5/6) - (5YR 5/6) fine subang gravel, f-med 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 0000 840	Considerable coarse subang gravel			
75	BCS 00000 839				
80					

Prepared By K. DONNELSON Date 12-8-98 Checked By BENT AMQUIST 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 / 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
	BCS 00000 838	GRAVELLY SAND: Lt brn (5YR 5/6) - Pale rd brn (10R 5/4), fine - coarse subang gravel med - coarse sand, moist, trace silt			
85	BCS 00000 837				
90	BCS 00000 836	Hard from 91-92' Increased coarse, v. moist sand			
95	BCS 00000 835	Trace of clay ▽ 98.5 Sand less dense from 95-97' 12-10-98, 0645			12-8-98 START DRILLING (98.0639)
100	BCS 00000 834	VERY MOIST TRACE - some clay			
105	BCS 00000 833	Increased coarse gravel			
110	BCS 00000 832	▽ 112.3', 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			
125	BCS 00000 829				
130	BCS 00000 828	CLAYEY GRAVEL: Pale rd brn (10R 5/4), coarse subang - ang gravel, hi plasticity clay. wet ▽ 134.8, 12-9-98, 1355			POOR RECOV.
135	BCS 00000 827				Plugged cyclone
140					

Prepared By K. DONNECSON Date 12-9-98 Checked By BENT AUGUST Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-09SX Drill Depth From 140.0 To 200.0 Page 3 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
	BCS 00000 826	CLAYEY GRAVEL: Pale Red brn (10R 5/4) coarse subang-ang grave, hi plasticity. Increased clay & f sand. wet			12-9-98
145	BCS 00000 825	▽ 146.5', 12-12-98, 0637 WITH CASING AT 396' Increased gravel ▽ 149.4, 12-9-98, 1303			
150	BCS 00000 824	SANDY GRAVEL & COBBLES. Pale Red brn (10R 5/4) coarse, angular gravel. May be reworked. Increasing gravel			WATER AT 155'
155	BCS 00000 822				
160	BCS 00000 822	▽ 160.8, 12-9-98, 1235 Increased clay			
165	BCS 00000 821	Increased sand & silt			
170	BCS 00000 820	Increased clay & cobbles (MUD)			
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'			
200					

Prepared By KEN DONNELSON 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-09SX Drill Depth From 200.0 To 260.0 Page 4 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
	BCS 00000 812	WELDED TUFF: Grayish Red (10R 4/2), devitrified Some blk dendrites, hard			12-9-98 Hard drilling @ 202.5'
205	BCS 00000 811	some clay coating			
210	BCS 00000 810				
215	BCS 00000 809	some clay some dk gry vitric? rock (brecciated?) May be out of tuff & into alluvium			
220	BCS 00000 808	Clayey			Hard drilling @ 221'
225	BCS 00000 807				
230	BCS 00000 806	Clayey			
235	BCS 00000 805	SANDY GRAVEL: Coarse sand, coarse subangular gravel. Grayish red (10R 4/2) welded tuff & med lt gry (N6) - Pale blue (5B 6/2) Limestone. some cobbles. (conglomeritic)			12-9-98 AdC 12-10-98
240	BCS 00000 804				
245	BCS 00000 803				
250	BCS 00000 802				Hard drilling at 255'
255	BCS 00000 801	GRAVELLY SAND: Coarse sand, fine - coarse subang gravel. Color same as above. Trace of clay (conglomeritic)			
260					

Prepared By KEN DONNELSON Date 12-10-98 Checked By BENT ANQUIST Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-09SX Drill Depth From 260.0 To 320.0 Page 5 of 7

Driller BRYAN MORRIS / BOYLES BROS Start Date/Time 12-8-98, 1358 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
	BCS 00000	SAND. coarse, some coarse subang gravel, white and brown sand grains (conglomeritic)			12-10-98
265	799	SAND & GRAVEL: coarse white & brn sand, coarse subang mixed gravel (conglomeritic)			
270	BCS 00000 798	Lt brn sandy matrix with limestone clasts ang-subang clasts. Some limestone cobble clasts. Healed breccia			
275	BCS 00000 797				
280	BCS 00000 796	Increased gravel, trace clay, some silt			Hard drilling at 283'
285	BCS 00000 795	WELDED TUFF: Grayish red (10R 4/2), devitrified, crystal rich, some blk dendrites. Very hard			
290	BCS 00000 794	Some thin layers (10mm) of Lt brn (5YR 5/6) "waxy" soft claystone w/ some blk grains			Hard drilling @ 290'
295	BCS 00000 793				30 min to drill from 295-300'
300	BCS 0000 792	fractured?			10 min to drill from 300-305'
305	BCS 00000 791				7 min to drill 305-310'
310	BCS 00000 790	muddy			
315	BCS 000 789	cuttings decrease from gravel to sand size			
320					

Prepared By K. DONNELSON Date 12-10-98 Checked By BRENT ANGUIST Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-19SX 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
	BCS 00000 788	WELDED TUFF: Grayish Red (10R 4/2) devitrified			Hard drilling from 320 - 325' (200 min)
		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.			
325	BCS 00000 787	Some gry rd (10R 5/2) brecciated matrix			12-10-98
330	BCS 00000 786	Increased Lt brn (5YR 5/6) matrix with some clay.			12-11-98, DAY SHIFT Changed bit
335	BCS 00000 785	BEDDED TUFF: Lt brn (5YR 5/6) - (5YR 6/4) Considerable hi plasticity clay, soft. Increased clay with depth.			Increased water @ 339
340	BCS 00000 784	BENTONITIC: CLAY			
345	BCS 00000 783				
350	BCS 00000 782				
355	BCS 00000 781	softer becoming med orange pink (5YR 8/4) mottled with Lt brn (5YR 5/6)			
360	BCS 00000 780				
365	BCS 00000 779				
370	BCS 00000 778				
375	BCS 00000 777				Harder at 379'
380		TUFF BRECCIA: Grayish orange pink (10R 8/2)			

Prepared By K. DONNELSON Date 12-11-98 Checked By BENT ANDERSON Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-EWDP-09SX Drill Depth From 380.0 To 397.8 Page 7 of 7

Driller BRYAN MARSH / BOYLES BROS Start Date/Time 12-8-98, 1358 End Date/Time 12-12-98, 1032

Drilling Equip./Method AP-100C (BECKER) DRILLED WITH AIR Sampling Equip./Method CYCLONE/CUTTINGS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 00000 776	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			
385	BCS 00000 775	gryrd (10R 4/2) w. plastic soft clay			
390	BCS 0000 779	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	BCS 00000 773				12-11-98 12-12-98
400					T.D. = 397' @ 12-12-98 1032
405					
410					
415					
420					
425					
430					
435					
440					

Prepared By KEN DONNELSON Date 12-12-98 Checked By BENT AHQUIST Date 1-4-99

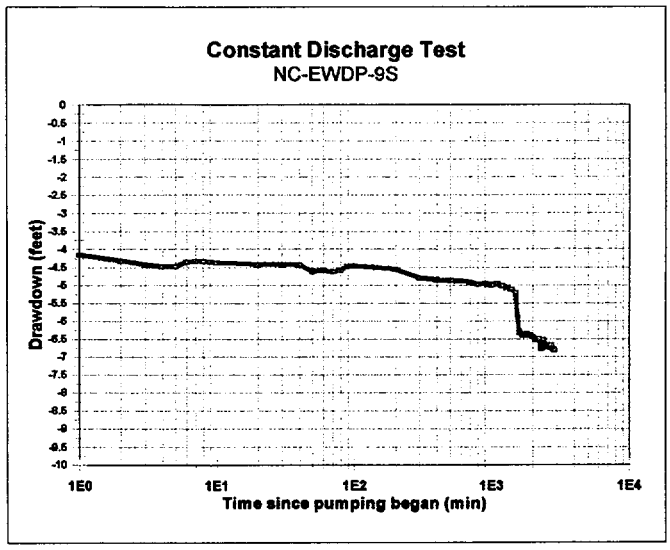
COPY

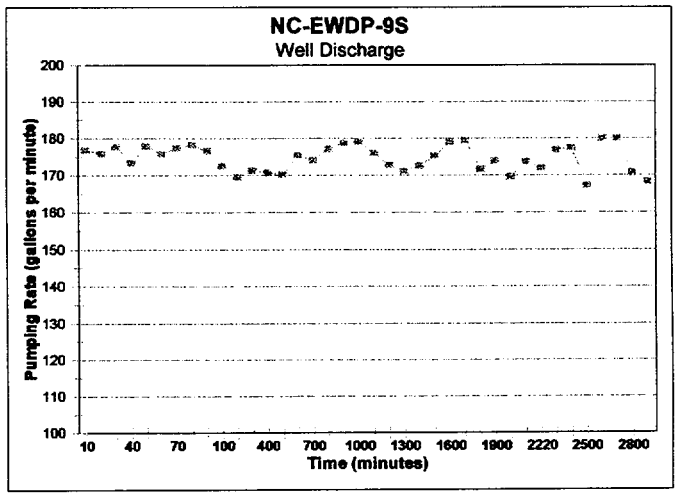
NC-EWDP-9S
Constant Discharge Test
Date: January 15-17 1999

Static Depth To Water (ft below mp) 100.9

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 permeabilites 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

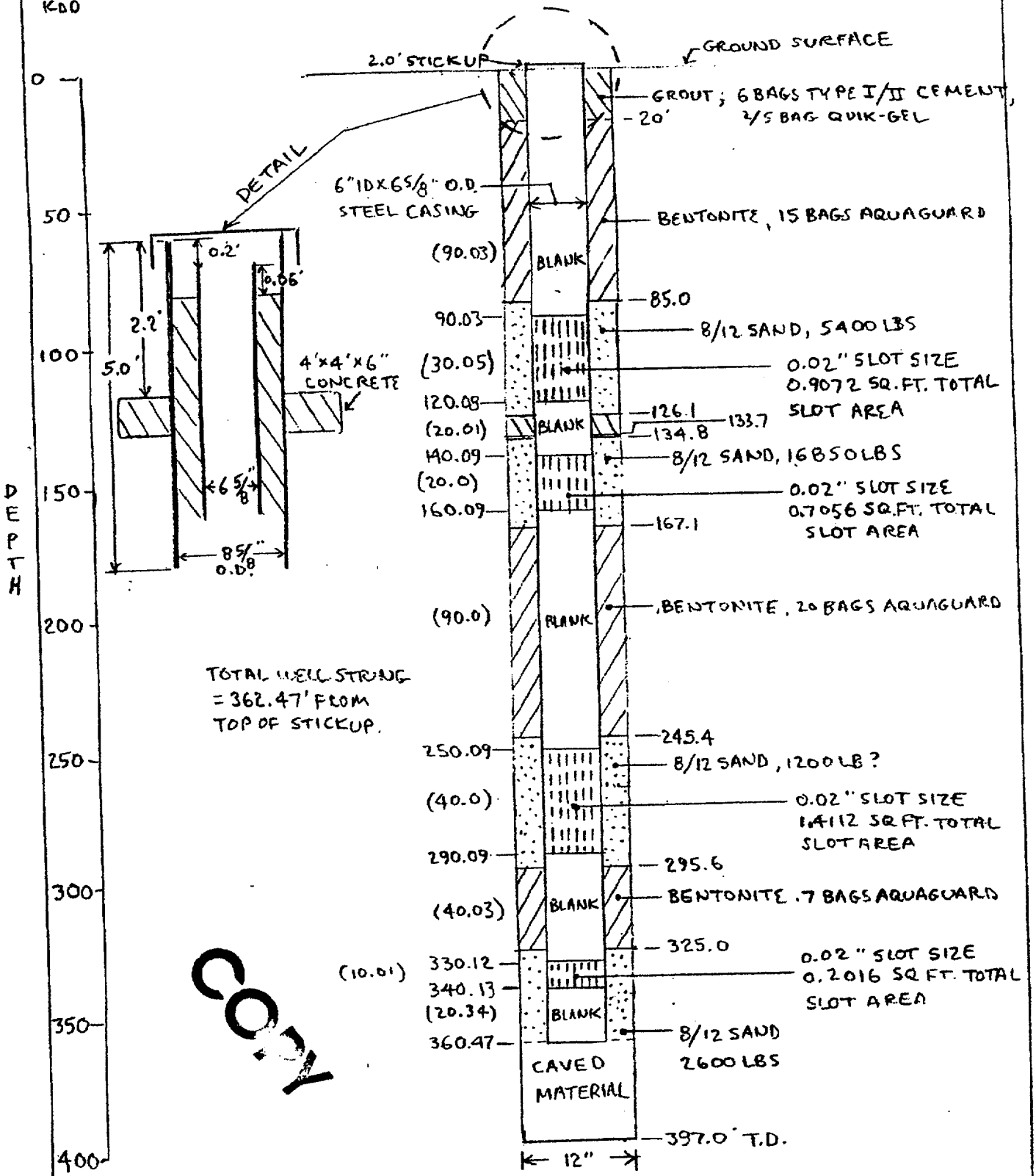
1. Lefkovits, H. C., Hazebroek, P., Allen, E. E., Mathews, C. S.: "A Study of the Behavior of Bounded Reservoirs Composed of Stratified Layers", *Soc. of Pet. Eng. J.* (March 1961) 43-58; *Transactions*, AIME, **222**.
2. Chow, V. T. , 1964, *Handbook of Applied Hydrology*, McGraw-Hill Book Company, 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.

K. DONNELSON
1-8-99
REVISED 1-9-99
KDD

NC-EWDP-9SX WELL INSTALLATION
AS-BUILT SCHEMATIC



NOTES:
1. 133.7 - 134.8' BENTONITE SEAL: 4 BAGS AQUAGUARD, 4 SHOVELS CaCl.
2. 134.8 - 126.1' GROUT SEAL: 4 BAGS TYPE I/II CEMENT, 3 SHOVELS QUIK-GEL, 7 SHOVELS CaCl.
3. NUMBERS IN ( ) INDICATE LENGTH OF SCREEN OR BLANK SECTION.
4. HORIZONTAL SCALE EXAGGERATED.
5. 5' SCREEN SECTION HAS 10 ROWS OF 36 SLOTS. 2" LONG SLOTS. 7/8"-1" BETWEEN ROWS.
6. 20' SCREEN SECTION HAS 70 ROWS OF 36 SLOTS.

COPY

QEC Document Ref. 99SS002.DOC
Figure 1

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

Nye County EWDP 9SX
Pressure @ 290' Datum
Drawdown and Build-Up
January 15-17, 1999

Strip Chart

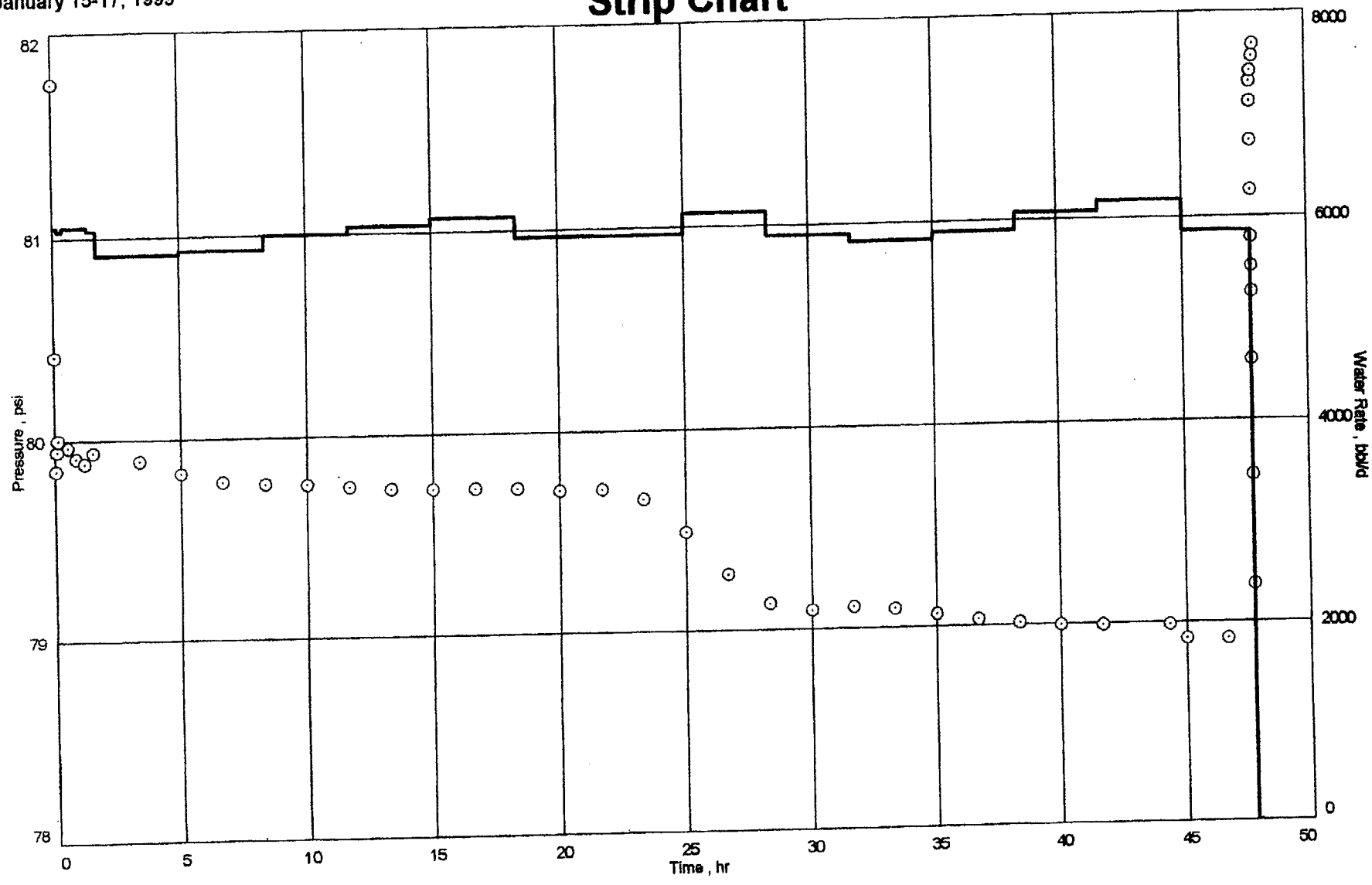


Figure 2

QEC Document Ref. 99SS002.DOC

FAST\NYECO\ewdp9sx.fwt 23-Feb-99 Ver 2.234

Nye County- EWDP 9-S
Post Spinner Aquifer Test
January 15-17, 1999
Adjusted Pressure @ 290' Datum

Strip Chart

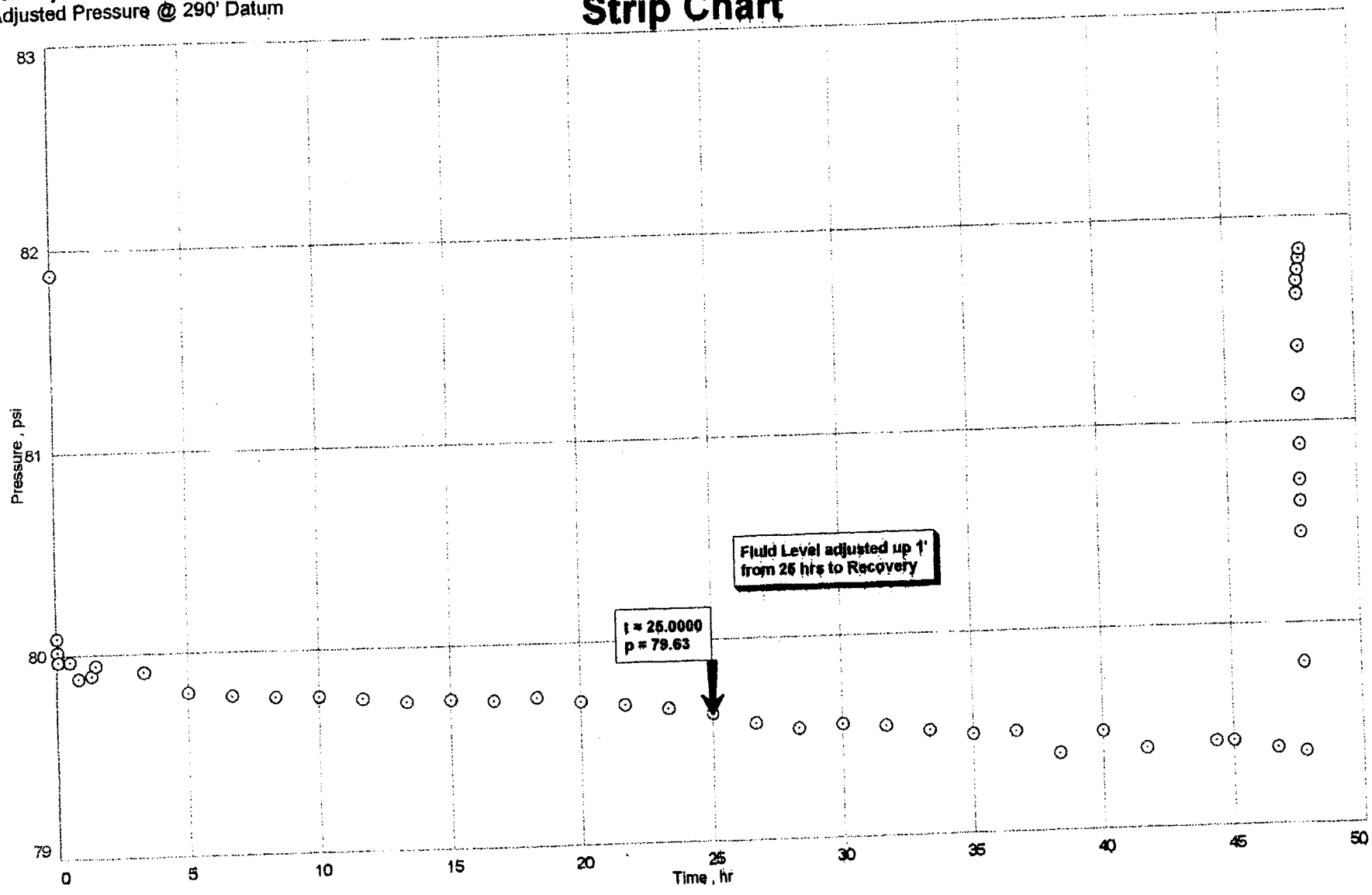
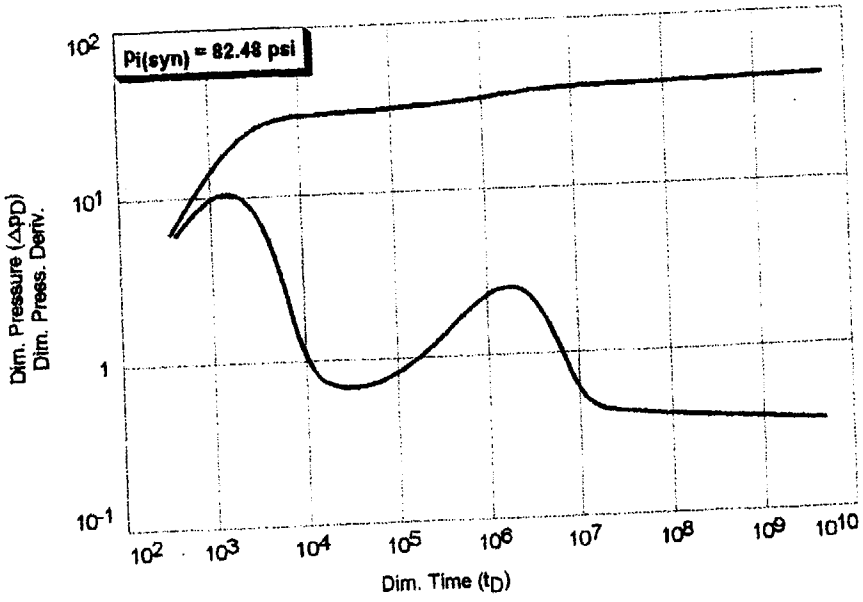


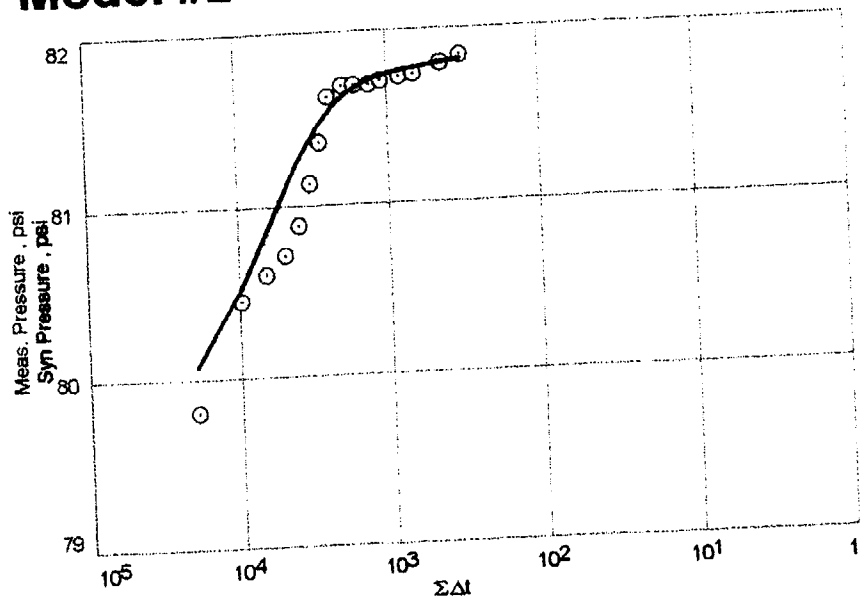
Figure 3

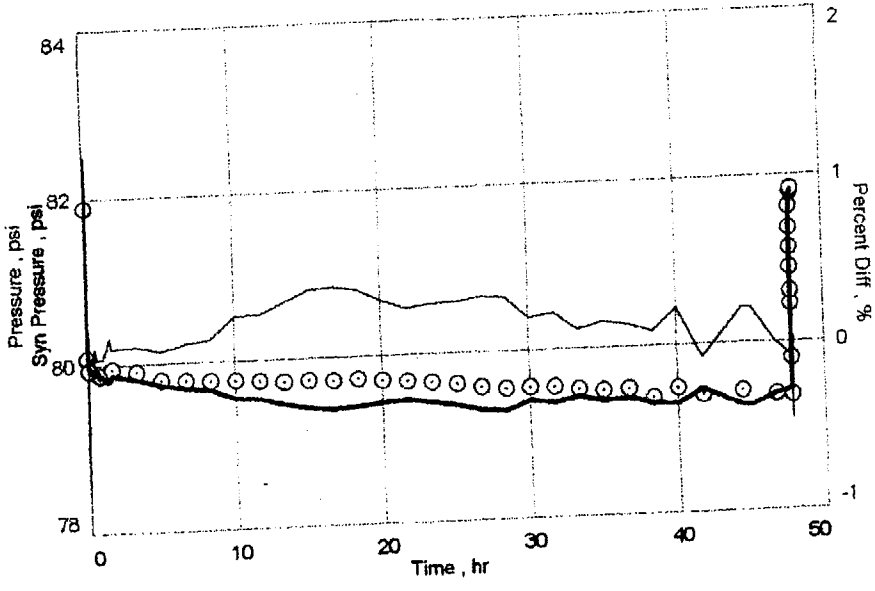
QEC Document Ref. 99SS002.DOC

FAST\NYECO\EWDP 9-S Adj.fwt 23-Feb-99 Ver 2.234

Multi Layer Model #2







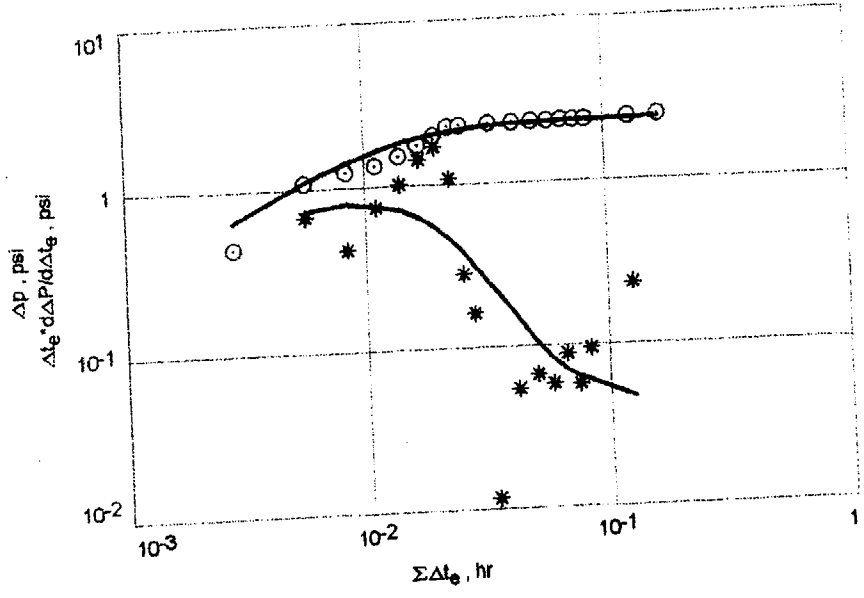


Figure 4

QEC Document Ref. 99SS002.DOC

Fasf

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	$(k/\mu)_{t1}$=	148955.30 md/cp	$(k/\mu)_{t2}$=	32629.28 md/cp	$(k/\mu)_{t3}$=	116533.13 md/cp
Permeability	k_1=	127822.271 md	k_2=	28000.000 md	k_3=	100000.000 md
Net Pay	h_1=	70.00 ft	h_2=	50.00 ft	h_3=	42.00 ft
Skin	s_1=	53.853	s_2=	5.000	s_3=	100.000
Outer Radius	r_{e1}=	923.703 ft	r_{e2}=	1000000.000 ft	r_{e3}=	1536.816 ft
Total Porosity	Φ_{t1}=	30.00 %	Φ_{t2}=	30.00 %	Φ_{t3}=	30.00 %
Total Compressibility	c_{t1}=	1.19000e-2 psi^{-1}	c_{t2}=	6.32778e-6 psi^{-1}	c_{t3}=	6.32779e-6 psi^{-1}
Viscosity	μ_1=	0.858 cp	μ_2=	0.858 cp	μ_3=	0.858 cp

Wellbore Storage Constant Dim. (C_D) 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 (p_{PVT})	50.00 psi
Specific Gravity (G)	1.000
Solution Gas Ratio (R_{sw})	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 psi^{-1}
Water Compressibility (c_w)	3.24576e-6 psi^{-1}

Production and Pressure

Q_tB_t	5768.532 bbl/d
Final Water Rate	5760.000 bbl/d
Final Gas Rate	0.000 MMCF/D
Final Flowing Pressure (p_{wfo})	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)	5.266

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 / II (Actual)	1809.796 bbl/d/p
Forecast Constant Rate @ Skin=0	30571.304 bbl/d
PI / II (Ideal)	9818.765 bbl/d/p
Forecast Constant Rate @ Skin=-4	56167.714 bbl/d

9955002.Doc

C:\FAST\NYECO\EWDP 9-S Adj.fwt 25-Jan-99 Ver 2.234

Figure 49

Fa

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^{-6}	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

Final Flowing Pressure: 79.80 psi, (105.70')
Extrapolated Reservoir Pressure: _ 82.48 psi (98.82')
Radius of Investigation: 35,000'
Other: _____
Other: _____

Remarks: Extrapolated pressure is probably too high, see report for discussion.

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

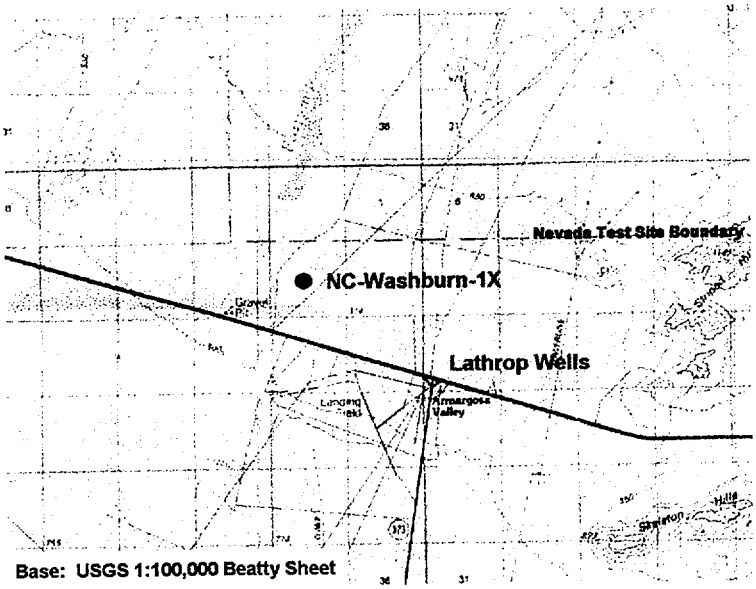
WITHIN THIS PACKAGE...OR, BY SEARCHING USING THE DRAWING NUMBER:

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.

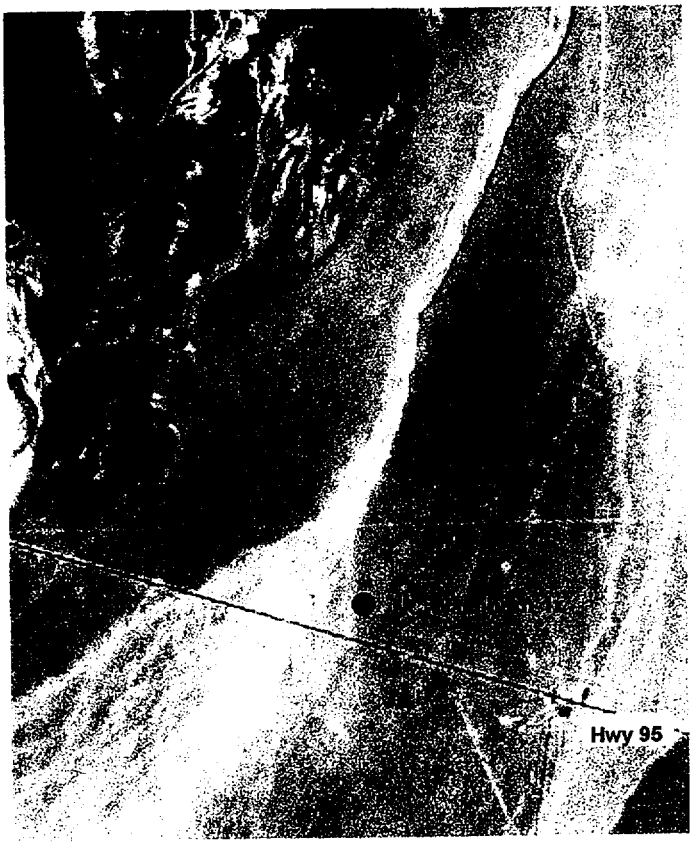
Well No. NC-Washburn-1X

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.



Base: USGS 1:100,000 Beatty Sheet

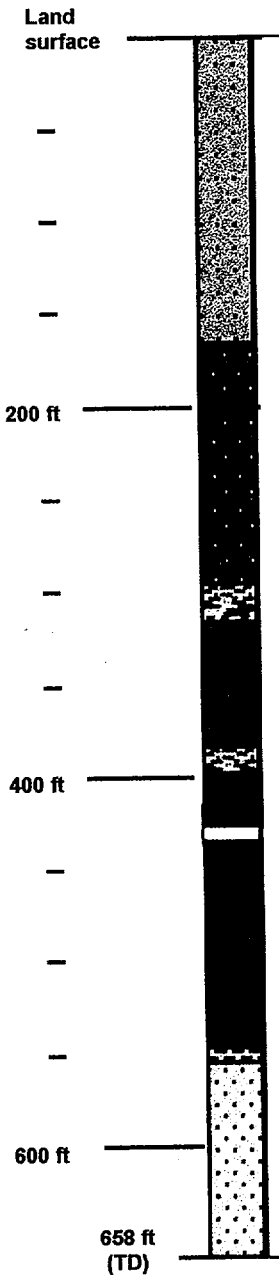
Purpose: 1) investigate reported anomalous water level; 2) determine thickness and depth of clay layer in area west of Lathrop Wells; 3) provide water level and water chemistry data; and 4) investigate reported occurrence of gas and oil shows.



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



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'

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

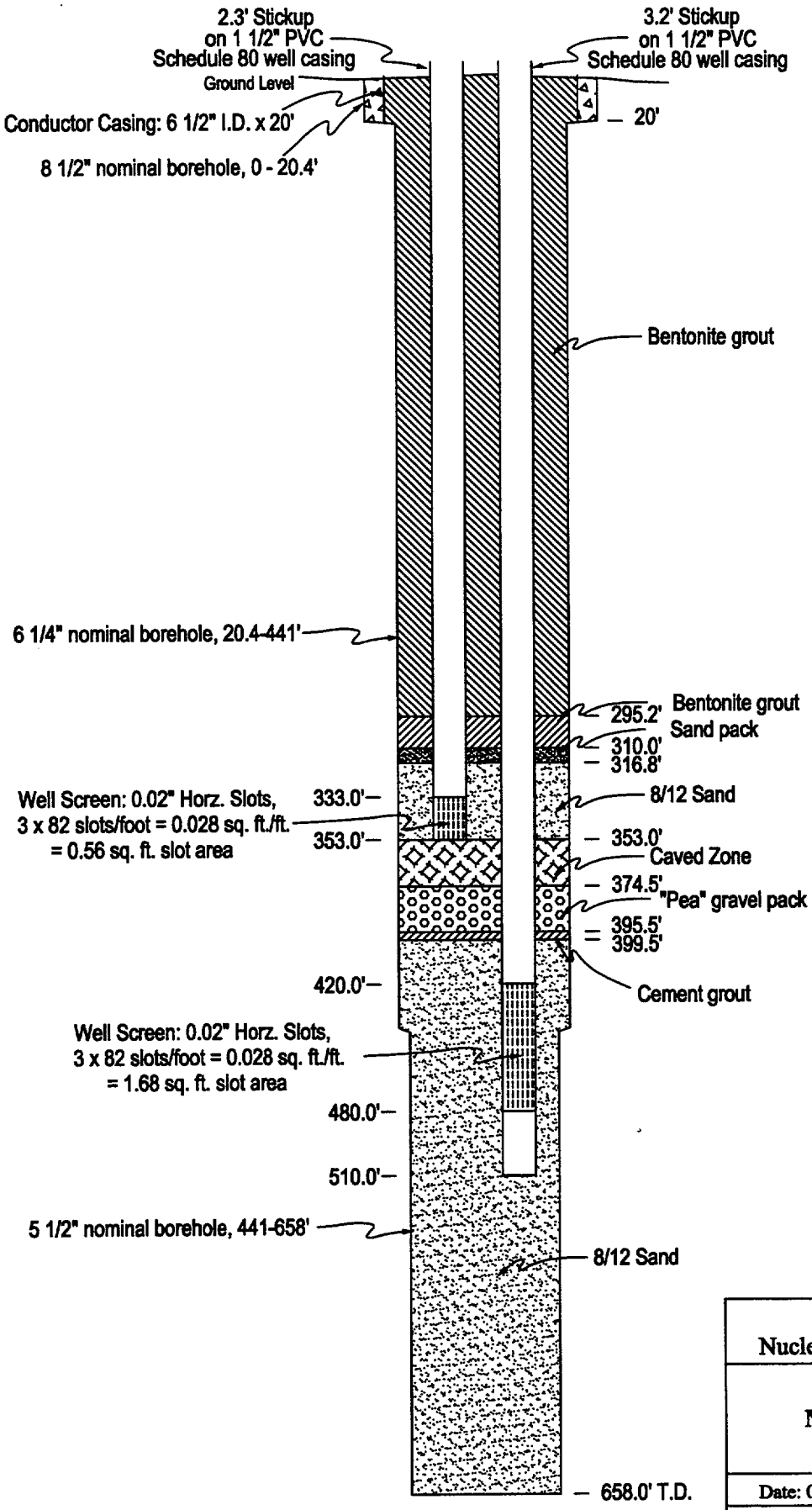
315-382' pebble gravels, locally sandy

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

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

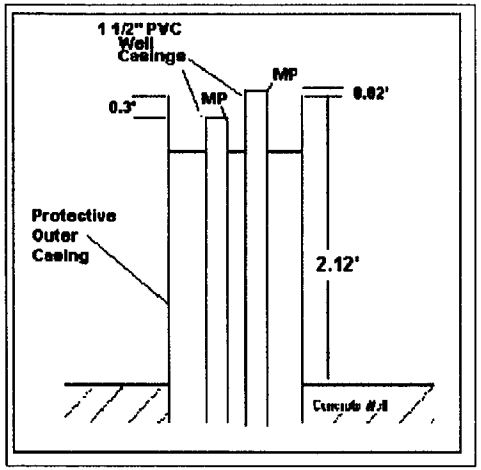
NC-Washburn-1X
SUMMARY LITHOLOGIC LOG



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	Geologist: MC/JSW
Scale: 1" = 75'	Drawn by: JSW



Water Level Data

Well: NC-EWDP-Washburn-1x

Location:

UTM: North	UTM: East	Latitude	Longitude	Elevation ft.	Elevation m
4057563.47	551465.47	36°39'50.772" N	116°25'26.835" W	2703.84	824.14

Access: From Lathrop Wells (Junction of Highways 95 and SR373) west 2.2 miles, north on gravel road 1.0 miles; site is located on west side of road.

Measuring Point: Top of PVC well casings (not protective casing).

Measuring Point Correction:

	Feet	Meters
Shallow	1.82	0.555
Deep	2.14	0.652

Date	Zone Measured	Depth to Water below M.P. Ft.	Depth to Water below M.P. m	Elevation of Water Ft.	Elevation of Water m	Method	Personnel	Comments
3-Dec-1998	n/a	400.0	121.92	2301.7	701.57	NWRPO 2000'	BA	First water; bit @ 638', 12:22.
5-Dec-1998	n/a	600.0	182.88	2101.7	640.61	NWRPO 2000'	KDD	Bit @ 638', 12:22.
5-Dec-1998	n/a	327.37	99.78	2374.3	723.70	NWRPO 2000'	KDD	16:29; 1:30 after air lifting.
4-Mar-1999	deep	359.20	109.49	2344.6	714.65	NWRPO 500'	JSW	
10-Mar-1999	deep	359.18	109.48	2344.7	714.66	NWRPO 500'	KDD	08:29
11-Mar-1999	deep	359.38	109.54	2344.5	714.60	NWRPO 500'	KDD	07:23
12-Mar-1999	deep	359.38	109.54	2344.5	714.60	NWRPO 500'	MCC	
16-Mar-1999	deep	359.40	109.55	2344.4	714.59	NWRPO 500'	MCC	
17-Mar-1999	deep	359.15	109.47	2344.7	714.67	NWRPO 500'	MCC	
18-Mar-1999	deep	359.50	109.58	2344.3	714.56	NWRPO 500'	MCC	
19-Mar-1999	deep	359.42	109.55	2344.4	714.59	NWRPO 500'	MCC	
20-Mar-1999	deep	359.42	109.55	2344.4	714.59	NWRPO 500'	MCC	
22-Mar-1999	deep	359.42	109.55	2344.4	714.59	NWRPO 500'	MCC	
23-Mar-1999	deep	359.40	109.55	2344.4	714.59	NWRPO 500'	MCC	
24-Mar-1999	deep	359.17	109.48	2344.7	714.66	NWRPO 500'	MCC	
25-Mar-1999	deep	359.22	109.49	2344.6	714.65	NWRPO 500'	MCC	
26-Mar-1999	deep	359.42	109.55	2344.4	714.59	NWRPO 500'	MCC	
4-Mar-1999	shallow	dry					JSW	Bottoms at ~355'
10-Mar-1999	shallow	dry					KDD	

1: Tom Buqo

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN-1X 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
	BCS 00000 251	VALLEY FILL 0.0 - 658.0			Samples wet from 0 - 20' due to injected water
5	BCS 00000 252	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.			
10	BCS 00000 253	Some cobbles from 3.0 - 5.0'. Occasional boulders below 5.0'.			
15	BCS 00000 254	Some cobbles from 17.5 - 20.0'			
20	BCS 00000 255	COBBLES COMMON, WITH SILT & SAND. MIXED LITHOLOGY, WELDED TUFFS AND TUFFACEOUS UNITS			B. AARQUIST WELDING SLAG IN SAMPLE WHILE FIXING SAMPLE SPLITTER
25	BCS 00000 256			1½" SCHED 80 PVC	
30	BCS 00000 257			HOLE FILLED WITH AQUAGUARD	
35	BCS 00000 258				
40	BCS 00000 259				
45	BCS 00000 260				
50	BCS 00000 261				AT 50' DRILLER STARTED DRILLING WET
55	BCS 00000 262				
60					

COPY

LOGGED BY K. DONNELSON 0 - 20'

Prepared By BENT AARQUIST Date 12-2-98 Checked By ARTHUR J. MENDONCA 1/4/99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN -1X Drill Depth From 60 To 120 Page 2 of 11

Driller ERIC WHIGUM Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DHH Sampling Equip./Method CUTTINGS COLLECTED IN BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 00000 263	VALLEY FILL MIXED LITHOLOGY - MOSTLY TUFFS AND WELDED TUFFS			
65	BCS 00000 264				
70	BCS 00000 265				
75	BCS 00000 266				
80	BCS 00000 267	BASALT FRAGMENTS COMMON BELOW 80'			
85	BCS 00000 268	CALICHE PRESENT ON 5% OF ROCK FRAGMENTS			1½" SCHED 80 PVC HOLE FILLED WITH AQUAGUARD
90	BCS 00000 269				
95	BCS 00000 270				LARGE PEBBLES & COBBLES CLOGGING X-OVER BLOCKING RETURN. DRILLER TRIPPED OUT TO WELD BARS ON X-OVER. WHEN HE GOT TO 100'
100	BCS 00000 271				
105	BCS 00000 272	BASALT FRAGMENTS COMMON, MINOR FLOW BANDED RHYOLITE MOSTLY TUFF FRAGMENTS			
110	BCS 00000 273				COARSE ANGULAR GRAVEL PLUGGING RETURN AT TIMES
115	BCS 00000 274				
120					

Prepared By BENT BROWIST Date 12-2-98 Checked By ARTHUR J. MENDENHALL Date 1-4-99

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 EARLING-GOW/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
	BCS 00000 275	VALLEY FILL MIXED LITHOLOGY MOSTLY TUFFS			
125	BCS 00000 276				
130	BCS 00000 277	COARSE GRAVEL			
135	BCS 00000 278				
140	BCS 00000 279	MOSTLY COARSE SAND/GRIT			
145	BCS 00000 280	COARSE GRAVEL			1½" SCHED 80 PVC HOLE FILLED WITH AQUAGUARD
150	BCS 00000 281				
155	BCS 00000 282				
160	BCS 00000 283	--- SHIFT CHANGE - NIGHT SHIFT ON (A. MENDENHALL, J. WALKER) logging by Jamie Walker			
165	BCS 00000 284	Coarse Gravels 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.			
180					

Prepared By BENT ALLEN / JAMIE WALKER Date 12-2-98 Checked By ARTHUR J. MENDENHALL Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC- WASHBURN - 1X Drill Depth From 180 To 240 Page 4 of 11

Driller NEIL HALE / EARL MARGNOTT Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DEH Sampling Equip./Method WET / BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 00000 287	Coarse gravels w/ volcanic clasts (as above)			
185	BCS 00000 288				
190	BCS 00000 289	Reddish (10R 4/2) volcanic boulder (~2')			
195	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 —			
200	BCS 00000 291	COURSE GRAVEL - ANGULAR TO ROUND, VOLCANIC CLASTS PEBBLE SIZE			12-3-98 DAY SHIFT
205	BCS 00000 292				1½" SCHED 80 PVC
210	BCS 00000 293				HOLE FILLED WITH AQUAGUARD
215	BCS 00000 294				
220	BCS 00000 295	GRAVEL MOSTLY ROUNDED			
225	BCS 00000 296				
230	BCS 00000 297				
235	BCS 00000 298				
240					

Prepared By J. WALKER/BENT GEOLOGIST Date 12-2-98 Checked By ARTHUR J. MENDENHALL Date 1/4/99

OPY

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN-1X Drill Depth From 240 To 300 Page 5 of 11

Driller [illegible] Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DH14 Sampling Equip./Method WET BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	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
245	BCS 00000 300				
250	BCS 00000 301				
255	BCS 00000 302				
260	BCS 00000 303				
265	BCS 00000 304				1 1/2" SCHED 80 PVC
270	BCS 00000 305				
275	BCS 00000 306				
280	BCS 00000 307				
285	BCS 00000 308				
290	BCS 00000 309				FROM HERE TO SURFACE HOLE FILLED WITH AQUAGUARD
295	BCS 00000 310	VERY COARSE SAND			BENTONITE HOLE PLUG
300					

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Prepared By BRIT AAQUIST Date 12-2-98 Checked By ARTHUR J. MENDENHALL Date 1/4/99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN-1X Drill Depth From 300 To 360 Page 6 of 11

Driller [illegible] 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
	BCS 00000 311	MOSTLY COARSE SAND			
305	BCS 00000 312				ZONE FILLED WITH BENTONITE HOLE PLUG
310	BCS 00000 313				ZONE FILLED WITH 10-20 SAND
315	BCS 00000 314	COARSE PEBBLE WITH MINOR SAND			ZONE FILLED WITH 30 SAND; SCHED 80 1½" PVC PIPE
320	BCS 00000 315				ZONE FILLED WITH 8-12 SAND
325	BCS 00000 316	▽ 327.37' @ 1630, 12-5-98 - WATER LEVEL			
330	BCS 00000 317	MIX OF COARSE SAND AND PEBBLES, POSSIBLE BROKEN COBBLES 'sandy gravel			ZONE FILLED WITH 8-12 SAND
335	BCS 00000 318				0.020" SLOT SCHED 80, 1½" PVC SCREEN 20'
340	BCS 00000 319	COARSE PEBBLES MOSTLY			DRILLING WITH MORE POLYMER MUD TO STABILIZE HOLE
345	BCS 00000 320				
350	BCS 00000 321	FINER PEBBLE GRAVEL			ZONE FILLED WITH CAVE MATERIAL
355	BCS 00000 322				DRILL DOWN FROM 1230 TO 1515 HRS. TRIPPED OUT TO PUT ADAPTOR ON ABOVE X-OVER TO PREVENT SAND FROM PLUGGING PORTS
360					

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Prepared By SCOTT ARQUILT Date 12-3-98 Checked By ARTHUR J. MENDENHALL Date 1/4/99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN-1X Drill Depth From 360 To 420 Page 7 of 11

Driller EARL INC. / NEIL HALE Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DHA Sampling Equip./Method WET BUCKET

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 00000 323	VALLEY FILL COARSE PEBBLE GRAVEL			ZONE FILLED WITH CAVED MATERIAL AFTER GRAVEL WAS ADDED
365	BCS 00000 324				
370	BCS 00000 325				
375	BCS 00000 326				ZONE FILLED WITH 10 - 5 GALLON BUCKETS OF PEA GRAVEL
380	BCS 00000 327	COARSE SAND TO FINE PEBBLE			
385	BCS 00000 328				1½" SCHED 80 PVC
392	BCS 00000 329	COARSE PEBBLY GRAVEL COARSE SAND			ZONE REQUIRED 7150 POUNDS OF 8-12 SAND AND 34 - 5 GALLON BUCKETS OF PEA GRAVEL TO FILL
395	BCS 00000 330	COARSE PEBBLY GRAVEL STARTED BETWEEN 397' AND 398'			395.8' CEMENT PLUG
400	BCS 00000 331	- HOLE MAKING A LITTLE WATER - APPARENT AT 401.5'			400' 8/12 SAND PACK PACK
405	BCS 00000 332				DAY SHIFT STOPPED DRILLING AT 404' 12-3-98
410	BCS 00000 333				
415	BCS 00000 334				
420					

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Prepared By BENT ANDLIST Date 12-3-98 Checked By ARTHUR J. MENDENHALL 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 / NEIL HALE Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DMH Sampling Equip./Method WET BUCKET

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 00000 335	VALLEY FILL			8/12 SAND PACK
425	BCS 00000 336	COARSE SAND, similar to coarse sand at 193' with similar lost return.			
430	BCS 00000 337	NO CUTTINGS RECOVERED	No SAMPLE		0.020" SLOT SCHED 80 1½" PVC SCREEN
435	BCS 00000 338	NO CUTTINGS RECOVERED			
440	BCS 00000 339	POOR RECOVERY Primarilly multicolored gravels.			FROM 0600 - 1410 12-4-98 SPENT RECONDITIONING HOLE
445	BSC 00000 340	NO CUTTINGS RECOVERED	No SAMPLE		
450	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
455	BCS 00000 342				
460	BCS 00000 343				
465	BCS 00000 344				
470	BCS 00000 345				
475	BCS 00000 346				
480					

12-4-98

Prepared By BENT HOLMQUIST / SHANE WALKER Date 12-5-98 Checked By ARTHUR J. MENDENHALL 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 DAM Sampling Equip./Method WET BUCKET

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 00000 347	Sandy gravels as above 1' boulder 480-481			
485	BCS 00000 348				1½" PVC BLANK SECTION
490	BCS 00000 349				8/12 SAND PACK
495	BCS 00000 350				
500	BCS 00000 351				
505	BCS 00000 352				
510	BCS 00000 353				510'
515	BCS 00000 354				
520	BCS 00000 355				
525	BCS 00000 356				
530	BCS 00000 357	530-540 Coarser gravels			
535	BCS 00000 358				
540					

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Prepared By JAMIE WALKER Date 12-4-98 NIGHT SHIFT Checked By ANDRIA J. MENDENHALL Date 1-4-99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-WASHBURN-IX Drill Depth From 540 To 600 Page 10 of 11

Driller NEIL HALF / EARL MANGUM Start Date/Time N/A End Date/Time N/A

Drilling Equip./Method SCHRAMM 685 DHH Sampling Equip./Method WET BUCKET

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BCS 00000 359	SANDY GRAVELS, AS ABOVE			
545	BCS 00000 360	Clay with fine pebbles and sand, light brown (5YR 5/6)			
550	BCS 00000 361	Coarse sands and gravels.			
555	BSC 00000 362				
560	BSC 0000 363				END OF NIGHT SHIFT @ 558' DAY 12-5-98
565	BSC 00000 364	SAND, Pale yel brn (10YR 6/2), fine-grained, some gravels, trace clay.			POOR SAMPLE RECOVERY 565 - 570'
570	BSC 00000 365	COARSE ANG SAND WITH FINE GRAVELS, Brn gry (5YR 4/1) OVERALL COLOR, COMPOSED OF MULTICOLOR GRAINS			
575	BSC 00000 366				CLEANED HOLE DOWN TO 575' FROM 0655 TO
580	BSC 00000 367				
585	BSC 00000 368				
590	BSC 00000 369				
595	BSC 00000 370				
600					

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Prepared By JAMIE WALKER / KEN DONNELSON Date 12-4-98 NIGHT / 12/5/98 DAY Checked By ARTHUR J. MENDENHALL Date 1/4/99

NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

CUTTINGS SAMPLE LOG

Borehole ID NC-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 DHH Sampling Equip./Method WET BUCKETS

DEPTH (Feet)	Top/Bottom of Cuttings Sample Interval	Description of Lithology - Petrology	GRAPHIC LOG	Lithologic Unit	Notes
	BSC 00000 371	COARSE ANGULAR SAND WITH FINE GRAVELS, MULTICOLORED GRAINS			
605	BSC 00000 372	Increased orange grains from 605-610'			
610	BSC 00000 373	Increased white, soft, opaque gravel (zeolite?) below 610			
615	BSC 00000 374				
620	BSC 00000 375				
625	BSC 00000 376				
630	BSC 00000 377				Stopped drilling at 638 Started producing water at 1222, 12-5-98 ≈ 40gpm. 76-80°F STOPPED PUMPING @ 1450
635	BCS 00000 378	12/5/98 DAY SHIFT NIGHT SHIFT			
640	BCS 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'.			Resumed drilling after hydrological tests while awaiting arrival of geophysical logging
645	BCS 00000 380				
650	BCS 00000 381				
655	NO SAMPLE	hole stopped @ 658' for geophysical logging	NO SAMPLE		
			T.D.		

Prepared By KEN DONNELLON/JAMIE WALKER Date 12/5/98 Checked By ARTHUR J. MENDENHALL Date 1-4-99

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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.

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 / Temperture	0	238
	1S309R	. EBO	E-Logs / Temperture	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 / Temperture	326	516
	WASHBURN	. AD1	Density, Gamma, Neutron	0	657.5
	DEVO1D	. CMP	Deviation	0	640
	"	. ANG	Deviation	0	640
	"	. XYZ	Deviation	0	640