



NNWSI HOLE HISTORIES

USW H-1
USW H-3
USW H-4
USW H-5
USW H-6

JUNE, 1987

HYDROLOGY DOCUMENT NUMBER 275

FENIX & SCISSON, INC.

6450 SO. LEWIS STREET
BRIDGEPORT III
TULSA, OKLAHOMA 74136

FENIX & SCISSON, INC.

P. O. BOX 498
MERCURY, NEVADA 89023

DISCLAIMER

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Department of Energy, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Printed in the United States of America
Available from:

National Technical Information Service
U. S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

Price: Printed Copy _____
Microfiche A01

**NNWSI
HOLE HISTORIES**

USW H-1

USW H-3

USW H-4

USW H-5

USW H-6

BY

FENIX & SCISSON, INC.

**PREPARED FOR
U. S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE
UNDER CONTRACT DE-AC08-84NV10322**

JUNE, 1987

Prepared by Nevada Nuclear Waste Storage Investigations (NNWSI) Project Participants as part of the Civilian Radioactive Waste Management Program. The NNWSI Project is managed by the Waste Management Project Office of the U. S. Department of Energy, Nevada Operations Office. NNWSI Project work is sponsored by the U. S. Department of Energy, Office of Civilian Radioactive Waste Management, Washington D.C.

Contents

	<u>Page</u>
Abstract-----	1
USW H-1 Hole History-----	3
USW H-3 Hole History-----	21
USW H-4 Hole History-----	39
USW H-5 Hole History-----	51
USW H-6 Hole History-----	63
Appendix A-----	81
Geophysical log listing:	
USW H-1-----	81
USW H-3-----	86
USW H-4-----	90
USW H-5-----	93
USW H-6-----	96
Video tape listing:	
USW H-3-----	99
USW H-4-----	99
USW H-5-----	99
USW H-6-----	99
Microfiche copies of the geophysical logs run by F&S subcontractors:	

**NNWSI
HOLE HISTORIES**

**USW H-1
USW H-3
USW H-4
USW H-5
USW H-6**

by

Reports and CEP Section

Abstract

This report is a compilation of data from five boreholes drilled within the Bureau of Land Management (BLM) lands adjacent to the Nevada Test Site (NTS). The boreholes were drilled to obtain hydrologic, geologic, and geophysical data. The information presented in this report include locations, daily activities, reviews of hole condition, geophysical log listings, video tape listings, and microfiche copies of all geophysical logs run by the Fenix & Scisson (F&S) subcontractors.

FENIX & SCISSON, INC.
HOLE HISTORY DATA
NNWSI

Approved: *Jimmy J. McCorrington*
Date: *June 12, 1987*

Hole No.: USW H-1		Type Hole: Hydrologic Test Hole	
User: USGS	Area: Off Site	Site Prep. W.O. #: None	
Location: NTS	County: Nye	W.O. #: 3404-114	
Surface Coordinates: N 770,254.32' E 562,387.96'			
Ground Elev.: 4274.4'	Pad Elev.:	Top Casing Elev.: 4274.55'	
Bottom Hole Coord: N 770,218.55' E 562,297.92' @ 5850' MD Ref: Gyro, 11-22-80			
Rig On Location: 09-04-80	Spudded: 09-03-80	Completed: 01-25-81	
Circulating Media: Air Foam		Instrumented: 07-06-82	

Main Rig & Contractor: Ideco 525/REECO

No. Of Compressors & Capacity: 2-3/IR-1500, 2-CP-44

Bore Hole Record			Casing Record					
From	To	Size	I.D.	Wt/Ft.	Wall	From	To	Ft ³ Cement
0'	10'	48"						
10'	41'	46-1/2"	30"		5/16"	0'	38.5'	350
41'	335'	20"	16" O.D.	*		0'	334.21'	806
335'	384'	15"						**
384'	1740'	13-1/4"						
1740'	2257'	12-1/4"	8.921"	36#		0'	2255'	30
2257'	6000'	8-3/4"						***

Total Depth: 6000' Plugs: ***

Junk: NCQ rods from 4160' to 5250', 06-29-82.

Logging Data: Fluid density (20), Induction (2), Epithermal neutron (3),

Caliper (6), Density (3), Gamma ray-neutron (3), Temperature (2),

Magnetometer, Vibroseis (2), 3-D velocity (6), NAIL (13), Electric (3), ****

**Rigs
Used**

Rig No.	Name	Class	Days Operating	Sec. W/Crew	Sec. W/O Crew	Total Days On Location
85134	Auger #2	VIII				0.54
85124	Ideco 525	II				143.67

Remarks: * Bottom 5 joints are 75#, J-55 and top 4 joints are 65#, H-40.

** 15" hole was cemented from 347' to 315' with 30 ft³ of neat +3% CaCl₂ and then drilled out.

*** Piezometers on 2-1/16" tubing were run in the hole. String #1 was set at 5925', stemmed with gravel from 5950' to 5851', and cemented to 3682'; string #2 was set at 3657', stemmed from 3682' to 3598', and cemented to 2512'; string #3 was set at 2431', stemmed from 2512' to 2349', and cemented to 2207'. 2-3/4" rods were hung open ended at 2100'.

**** Neutron-neutron (3), Dual induction, Gyroscopic, Neutron (2), Spectral, Casing collar locator (4)

Prepared By: JEC:LLF:ps

Time Breakdown on Next Page

TIME BREAKDOWN

MAIN HOLE CONSTRUCTION

Hole No.: USW H-1

Drilling Operation Time (DOT)	Other Scheduled Time (OST)	Operational Delay Time (ODT)
Drill <u>13.06</u>	Mobe & Demobe <u>8.15</u>	Rig Repairs <u>3.27</u>
Trips <u>5.54</u>	Core <u>18.55</u>	W.O. Equipment <u>2.10</u>
Single Shot Dev. <u>0.37</u>	Log <u>11.09</u>	Fish <u>2.21</u>
Surveys <u>0.06</u>	Unload Hole _____	Clean Out Fill <u>1.54</u>
Fluid Survey <u>1.25</u>	Run Mandrel _____	Ream Hole <u>1.13</u>
Connections <u>0.29</u>	Hydrological Tests <u>27.12</u>	Plug Back <u>1.00</u>
Open Hole Dir. _____	_____	Drill Out Plugs <u>0.92</u>
Surveys _____	_____	Secured W/Crews <u>1.11</u>
_____	_____	Unload Water <u>0.92</u>
_____	_____	Inflow <u>15.74</u>
Main Hole DOT 20.57 Days	_____	Packer Problems <u>0.65</u>
_____	_____	Condition Hole _____
Casing Operation Time (COT)	_____	_____
Run Casing <u>1.41</u>	_____	_____
Run Casing _____	_____	_____
Cement Casing <u>1.35</u>	_____	_____
Cement Casing _____	_____	_____
Drill Out Shoe <u>0.34</u>	_____	_____
_____	_____	_____
_____	_____	_____

Main Hole COT: 3.10 Days	Main Hole OST: 64.91 Days	Main Hole ODT: 30.59 Days
---------------------------------	----------------------------------	----------------------------------

Total Main Hole Construction Time: 119.17 Days

Remarks:

TOTAL ELAPSED TIME	
--------------------	--

Total Site Prep. Time		Days	Remarks:
Total Main Hole Construction	<u>119.17</u>	Days	
Secured W/O Crew Site Prep.		Days	
Secured W/O Crew Main Hole Const.	<u>25.04</u>	Days	
Total Suspended Time (No Rig)		Days	
TOTAL ELAPSED TIME	<u>144.21</u>	Days	

USW H-1
HOLE HISTORY

09-02-80 Started moving in equipment.

09-03-80 Moved in Auger #1, rig #85127 and rigged up. Drilled 48" hole from 0' to 10' using 26", 36" and 48" Auger bits. Rigged down and moved out. Hole suspended, 2100 hours.

09-04-80 Hole suspended from 09-03-80 to 1230 hours. Moved in Ideco 525, rig #85124 and started rigging up.

09-05-80 Continued rigging up.

09-06-80 Rigged up. Drilled 46-1/2" hole from 10' to 14' using air. Drilled 46-1/2" hole from 14' to 22' using air foam.

09-07-80 Changed soap pump. Drilled 46-1/2" hole from 22' to 41'. Conditioned hole and laid down drilling assembly. Set 1 joint of 30" I.D., 5/16" wall casing at 38.5'. Cemented the annulus using Dowell as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	41' - 36'	60 75% neat & 25% gypsum cement	33	2215 Hours
2	36' - 0'	<u>290</u> "	<u>248</u>	2255 "
Totals		350 Ft ³	281 Ft ³	

Filled casing with water after stage #1.

09-08-80 Rigged up. Drilled mouse hole to 15.7' using Dyna-Drill and set 8-1/2" I.D. casing at 15.7'. Cemented the annulus to surface using Dowell with 50 ft³ of 75% neat and 25% gypsum cement. CIP at 1500 hours. Started drilling rat hole.

09-09-80 Drilled rat hole from 0' to 24'. Set 10" I.D. casing at 24' and cemented the annulus to surface using Dowell with 50 ft³ of 75% neat and 25% gypsum cement. CIP at 0900 hours. Rigged up. Cleaned out hole to 41'. Drilled 20" hole from 41' to 48' using air foam.

09-10-80 Drilled 20" hole from 48' to 104'. Laid down drill pipe and rigged up to core.

09-11-80 Made trip in and cut 7-1/2" core #1 from 104' to 124' using air foam. Opened 7-1/2" hole to 20" from 104' to 124' and drilled 20" hole to 221'. Made trip out.

09-12-80 Made trip in and cut 7-1/2" core #2 from 221' to 241'. Made trip to retrieve core. Cut 7-1/2" core #3 from 241' to 261'. Made trip for 20" rock bit.

USW H-1
Hole History
Page 2

09-13-80 Opened 7-1/2" hole to 20" from 221' to 261' and drilled 20" hole to 335'. Lost returns at 280' and had returns at 320'. Conditioned hole and made trip out. Ran Birdwell fluid density log to 334', no fluid indicated. Ran induction and epithermal neutron logs to 336'.

09-14-80 Ran caliper log to 335', formation density and gamma ray-neutron logs to 336'. Welded and set 5 joints of 16" O.D., 75#, J-55 slip joint casing and 4 joints of 16" O.D., 65#, H-40, T.C. casing on top at 334.21'.

09-15-80 Cemented the annulus using Dowell as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	335' - 15'	750 neat cement + 2% CaCl ₂	384	0015 Hours
2	15' - 0'	<u>56</u> "	<u>50</u>	0400 "
Totals		806 Ft ³	434 Ft ³	

After stage #2 a 1" x 7-1/4" flange bolt fell in the hole. Welded flange on the 16" casing. Cleaned out cement to 335'.

09-16-80 Made up 15" rock bit on 6-5/8" drill pipe. Cleaned out hole to 335' and drilled 15" hole to 347' using air foam. Made trip out and removed bit. Made trip in with 6-5/8" drill pipe open ended and cleaned out hole. Cemented the hole to 315' using Dowell with 30 ft³ of neat cement + 3% CaCl₂. CIP at 0545 hours. Made trip out. Made trip in with 15" bit. Cleaned out cement from 315' to 347' and drilled 15" hole to 379', metal was noted in cuttings.

09-17-80 Drilled 15" hole from 379' to 384'. Made trip for 13-1/4" hammer drill. Drilled 13-1/4" hole from 384' to 392' using air foam. Made trip for hammer drill repair. Drilled 13-1/4" hole from 392' to 405'.

09-18-80 Drilled 13-1/4" hole from 405' to 418'. Made trip for 8-3/4" diamond core bit and barrel. Cut 8-3/4" cores #4 and #5 from 418' to 448' using air foam.

09-19-80 Cut 8-3/4" core #6 from 448' to 474'. Made trip for 13-1/4" hammer drill. Opened 8-3/4" hole to 13-1/4" from 418' to 474' and drilled 13-1/4" hole to 480' using air foam.

09-20-80 Drilled 13-1/4" hole from 480' to 715'. Made trip for 8-3/4" core bit. Cut 8-3/4" core #7 from 715' to 720'.

09-21-80 Completed cutting core #7 from 720' to 723'. Cut 8-3/4" cores #8 and #9 from 723' to 745'. Made trip for hammer drill. Opened 8-3/4" hole to 13-1/4" from 715' to 745' and drilled 13-1/4" hole to 757'.

USW H-1
Hole History
Page 3

09-22-80 Drilled 13-1/4" hole from 757' to 1168'.

09-23-80 Drilled 13-1/4" hole from 1168' to 1272'. Made trip and cut 8-3/4" core #10 from 1272' to 1275'.

09-24-80 Completed cutting core #10 to 1283'. Cut 8-3/4" core #11 from 1283' to 1298'. Started cutting core #12.

09-25-80 Cut 8-3/4" cores #12 and #13 from 1298' to 1313'. Made trip out and secured rig at 1330 hours.

10-03-80 Rig secured from 9-25-80 to 1200 hours, 10-03-80. Serviced core barrel and made trip in. Cleaned out 3' fill and started cutting 8-3/4" core #14 from 1313'.

10-04-80 Cut 8-3/4" cores #14 and #15 from 1313' to 1332'. Made trip for 13-1/4" hammer drill. Opened 8-3/4" hole to 13-1/4" from 1272' to 1284'.

10-05-80 Opened 8-3/4" hole to 13-1/4" from 1284' to 1332'. Drilled 13-1/4" hole from 1332' to 1580'.

10-06-80 Drilled 13-1/4" hole from 1580' to 1740'. Made trip for core barrel and bit. Cut 8-3/4" core #16 from 1740' to 1769'.

10-07-80 Completed cutting core #16 to 1769'. Made trip for 12-1/4" button bit. Opened 8-3/4" hole to 12-1/4" hole from 1740' to 1770'. Drilled 12-1/4" hole from 1770' to 1857'. Worked stuck drill pipes free and made trip out. Unplugged bit and float sub.

10-08-80 Ran Birdwell fluid density log to 1855', checked fluid level at 1828'. Made trip in with core barrel and bit. Cleaned out 5' fill and cut 8-3/4" core #17 from 1857' to 1915'. Made trip for 12-1/4" bit.

10-09-80 Opened 8-3/4" hole to 12-1/4" from 1857' to 1915' and drilled 12-1/4" hole to 2090'. Made trip for core barrel and bit.

10-10-80 Cut 8-3/4" core #18 from 2090' to 2117'. Made trip for 12-1/4" bit. Opened 8-3/4" hole to 12-1/4" from 2090' to 2117' and drilled 12-1/4" hole to 2160'. Made trip for core barrel and bit.

10-11-80 Cut 8-3/4" cores #19 and #20 from 2160' to 2225'. Made trip for 12-1/4" bit.

10-12-80 Opened 8-3/4" hole to 12-1/4" from 2160' to 2225'. Made trip for 8-3/4" core barrel and bit. Cut 8-3/4" core #21 from 2225' to 2257'. Made trip for 12-1/4" bit. Opened 8-3/4" hole to 12-1/4" from 2225' to 2257'. Conditioned hole and made trip out.

USW H-1
Hole History
Page 4

10-13-80 Ran Birdwell caliper log to 2259'. Ran fluid density log, checked fluid level at 1879'. Ran electric and epithermal neutron logs to 2258'. Attempted to run USGS televiwer, tool did not work. Ran Birdwell borehole compensated density log to 2258'. Reran 200' of epithermal neutron log to 1600'.

10-14-80 Ran gamma ray-neutron log to 2258', induction log to 2257' and temperature log to 2257'. Ran Sandia TV camera to air foam at 1870'. Ran LLNL magnetometer to 2260'.

10-15-80 Ran Birdwell vibroseis survey on 25' stations to 2248', 3-D velocity logs on 3' spacing to 2254' and 6' spacing to 2253'. Ran USGS televiwer, tool not working. Ran and set 2-3/8" Hydril tubing with a mule shoe on bottom at 1957.78' to be used as a monitor line. Rigged up to run Centrilit submersible pump.

10-16-80 Ran in with Centrilit pump on 2-7/8" E.U.E. tubing. Set pump at 1957.94' with intake port at 1940'. Hooked up pump to electric panel. Checked water level at 1872.87' using USGS tool. Pumped out water at 11 gpm, water level remained the same.

10-17-80 Ran Birdwell tracejector tests, tagged bottom at 2252'. Made trip out for pump #2.

10-18-80 Made trip in with Centrilit pump on 2-7/8" tubing. Set pump at 2211' with intake port at 2197'. Lowered 2-3/8" monitor line to 2212' and flushed out line. Filled pump line with water. Checked fluid level in the hole at 1853'. Pumped out water from 1500 hours at 53 gpm. Checked fluid level at 1853.5' at 2400 hours.

10-19-80 Made hydrologic pump test at 55 gpm to 2400 hours.

10-20-80 Ran hydrologic water recovery test at 55.5 gpm to 2400 hours.

10-21-80 Ran hydrologic water recovery test to 2400 hours.

10-22-80 Ran hydrologic test to 1500 hours. Ran USGS water locator, checked fluid level at 1878.4'. Pulled out Centrilit pump on 2-7/8" tubing and 2-3/8" monitor line.

10-23-80 Ran USGS televiwer log to 2247'. Ran Birdwell caliper log to 2255'. Made up Lynes packer and transducers.

10-24-80 Made trip in with Lynes packer on 2-7/8" tubing and set bottom of packer at 2164.87'. Filled the tubing with water and conducted hydrologic tests from 0600 hours to 2030 hours. Laid down tubing and packer.

USW H-1
Hole History
Page 5

10-25-80 Made trip in and set 6-5/8" drill pipe open ended at 1850.45'. Ran Birdwell fluid density log to 2249', checked fluid level at 1871'. Plugged the hole using Birdwell monitor as follows;

Stage No.	Interval	Material Used Ft ³	Calc. Ft ³	CIP
1	2257' - 2253'	30 Monterey Sand	6	0700 Hours
2	2253' - 2239'	25 " "	13	0930 "
3	2239' - 2187'	50 " "	46	1130 "
4	2187' - 2154'	50 " "	31	1240 "
5	2154' - 2100'	50 " "	54	1400 "
6	2100' - 2043'	50 " "	64	1500 "
7	2043' - 1932'	50 " "	123	1745 "
8	1932' - 1913'	50 " "	25	1840 "
9	1913' - 1882'	50 " "	33	2115 "
10	1882' - 1832'	50 " "	58	2240 "
11	1832' - 1764'	40 " "	62	2330 "

10-26-80 Plugged the hole as follows:

12	1764' - 1729'	40 " "	37	0145 "
13	1729' - 1712'	20 " "	17	0245 "
14	1712' - 1707'	25 Gyp-Seal	5	0900 "

Totals 580 Ft³ 574 Ft³

Pumped in 286 barrels of water. Monitored fluid level at 1313', after 1 hour fluid was at 1413'. Pumped in 228 barrels of water. Monitored fluid level at 1219' at 1705 hours and 1225' at 2400 hours.

10-27-80 Pumped in water and monitored fluid level using Birdwell to 0200 hours. Ran two 3-D velocity logs to 1677'. Ran electric and neutron-neutron logs to 1676'. Ran Dresser Atlas dual induction logs to 1676' using two tools. Layed down 6-5/8" drill pipe.

10-28-80 Made trip in with 12-1/4" bit on 6-5/8" drill pipe and tagged fill at 1684'. Cleaned out fill from 1684' to 1707', Gyp-Seal to 1712' and sand to 2257' using air foam. Laid down drill pipe and drilling assembly measuring out, total measurement was 2257.65'.

10-29-80 Set 9-5/8" O.D., 36.00# casing at 2255'. Cemented the annulus using National Cementers with 30 ft³ of neat cement. CIP at 1370 hours. Ran Birdwell NAIL log, checked top of cement at 2231' and fluid level at 1879'. Calculated annular volume was 25 ft³.

10-30-80 Rigged up and made trip in with 8-3/4" bit on 4-1/2" drill pipe. Cleaned out soft cement from 2230' to 2232' and waited on cement to harden. Cleaned out hard cement and hole to 2257'. Drilled 8-3/4" hole from 2257' to 2262' using air foam.

USW H-1
Hole History
Page 6

10-31-80 Drilled 8-3/4" hole from 2262' to 2320' using air and detergent. Made trip for core bit and barrel. Cut 8-3/4" core #22 from 2320' to 2350'. Made trip for rock bit. Reamed core hole and drilled 8-3/4" hole from 2350' to 2361'.

11-01-80 Drilled 8-3/4" hole from 2361' to 2500'. Made trip for core bit and barrel. Cut 8-3/4" core #23 from 2500' to 2560'.

11-02-80 Cut 8-3/4" core #24 from 2560' to 2585'.

11-03-80 Cut 8-3/4" core #25 from 2585' to 2610'. Made trip for rock bit. Checked water outflow in the hole at 55 gpm. Drilled 8-3/4" hole from 2610' to 2684'.

11-04-80 Drilled 8-3/4" hole from 2684' to 2715'. Made trip for core bit and barrel. Cut 8-3/4" core #26 from 2715' to 2752'.

11-05-80 Completed cutting 8-3/4" core #26 from 2752' to 2771'. Made trip out. Replaced rig motor. Made trip in with rock bit and drilled 8-3/4" hole from 2771' to 2787'.

11-06-80 Drilled 8-3/4" hole from 2787' to 3211'.

11-07-80 Drilled 8-3/4" hole from 3211' to 3366'. Made trip for core bit and barrel. Cut 8-3/4" core #27 from 3366' to 3397'.

11-08-80 Completed cutting 8-3/4" core #27 from 3397' to 3426'. Made trip for rock bit. Drilled 8-3/4" hole from 3426' to 3648'.

11-09-80 Drilled 8-3/4" hole from 3648' to 3874'.

11-10-80 Drilled 8-3/4" hole from 3874' to 3930'. Made trip for core bit and barrel. Tagged bridge at 3879', washed and reamed the hole to 3915', bit plugged up. Made trip out and secured rig at 2400 hours.

11-12-80 Rig secured from 11-10-80 to 0800 hours, 11-12-80. Made trip in with 8-3/4" rock bit, circulated the hole at 2250', 2621', 2994', 3366', 3833' and reamed from 3884' to 3930'. Conditioned the hole and made trip out. Made trip in with core bit and barrel.

11-13-80 Cleaned out 4' fill. Cut 8-3/4" core #28 from 3930' to 3958'. Hole tight at 3880' after pulling up, could not get back to bottom.

11-14-80 Made trip for rock bit and cleaned out 10' fill. Drilled 8-3/4" hole from 3958' to 4456'.

11-15-80 Drilled 8-3/4" hole from 4456' to 5130'. Made trip out for core bit and barrel.

11-16-80 Replaced swivel, made trip in, cleaned out bridge and hole from 4978' to fill at 5100'. Made trip out for rock bit.

USW H-1
Hole History
Page 7

11-17-80 Made trip in and conditioned hole. Made trip out for core bit and barrel.

11-18-80 Made trip in and cleaned out 14' fill. Cut 8-3/4" core #29 from 5130' to 5163'. Made trip out.

11-19-80 Made trip in with rock bit. Drilled 8-3/4" hole from 5163' to 5770'.

11-20-80 Drilled 8-3/4" hole from 5770' to 5970'. Made trip out for core bit and barrel. Started in hole, had trouble unloading water inflow.

11-21-80 Made trip in and cleaned out fill from 5902' to 5970'. Had trouble unloading water inflow.

11-22-80 Cleaned out 5' fill. Cut 8-3/4" core #30 from 5970' to 6000'. Ran Eastman multishot gyroscopic survey using Birdwell equipment inside 4-1/2" drill pipe to 5850', in on 50' stations and out on 25' stations.

11-23-80 Made trip out and laid down core barrel. Ran Birdwell vibroseis survey on 25' stations to 6000'.

11-24-80 Had to stop vibroseis survey, high gusting wind disturbance. Ran caliper log to 6000' and fluid density log to 1900'. Ran electric survey tool, no log. Ran 3-D velocity tool on 3' spacing, no log. Ran 3-D velocity log on 6' spacing to 6000'.

11-25-80 Ran density log to 6000', compensated neutron log to 6000' and electric log to 6001'. Checked water level at 1890'.

11-26-80 Ran neutron-neutron, 3-D velocity and temperature logs to 6001', checked fluid level at 1878'. Secured rig at 2400 hours.

11-28-80 Rig secured from 11-26-80 to 0800 hours, 11-28-80. Ran gamma ray-epithermal neutron log to 6000', fluid density log, checked fluid level at 1878' and vibroseis survey on 25' stations to 4025'.

11-29-80 Ran and set 2-3/8" Hydril monitor line at 2240'. Ran in BJ water pump on 2-7/8" tubing. Set bottom of pump at 2229' with intake port at 2194.81'.

11-30-80 Made electrical repairs. Ran USGS hydrological test. Tubing clamp spread on 2-3/8" Hydril monitor line, tubing dropped down hole.

12-01-80 Pulled out 2-7/8" tubing, laid down and serviced BJ pump. Made trip with overshot, recovered 71 joints of 2-3/8" Hydril tubing, left 22' of tubing in the hole.

12-02-80 Ran and set 2-3/8" Hydril monitor line at 2255'. Waited on Centrilt personnel.

USW H-1
Hole History
Page 8

12-03-80 Made trip in with Centrillift pump on 2-7/8" upset tubing to 2230' with intake port at 2216'. Ran Gearhart-Owens tracejector as directed.

12-04-80 Ran hydrologic pump test as directed.

12-05-80 Continued hydrologic pump test. Secured rig at 2400 hours.

12-07-80 Rig secured from 12-05-80 to 0800 hours, 12-07-80. Continued hydrologic test.

12-08-80 Ran hydrologic test to 1400 hours. Made trip out with 2-3/8" monitor line, 2-7/8" tubing and Centrillift pump. Rigged up to run Lynes packer.

12-09-80 Made trip in with 7" O.D. Lynes packer on 2-7/8" tubing, instruments not working. Made trip out and changed conductor cable. Made trip in testing cable.

12-10-80 Filled tubing with water and attempted to set packer, packer leaked. Made trip out, down hole instrument was shorted. Waited on packer parts.

12-11-80 Waited on packer parts to 1800 hours. Started in with Lynes packer on 2-7/8" tubing.

12-12-80 Made trip in to 5325', center of packer. Filled tubing with water and set packer. Ran hydrologic test. Released packer and made trip out.

12-13-80 Down hole conductor cable was wrapped around tubing, cable not usable. Waited on new 3/16" conductor cable.

12-14-80 Continued waiting on down hole conductor cable for Lynes packer.

12-15-80 Waited on down hole conductor cables for Lynes packer to 1030 hours. Rigged up and started in with packer on 2-7/8" tubing.

12-16-80 Ran in with 7" Lynes packer to 5316', center of packer. Filled tubing with water and set packer. Ran hydrologic test.

12-17-80 Ran hydrologic test to 2000 hours. Released packer and pulled up for next test.

12-18-80 Filled tubing with water and set center of packer at 4615'. Ran hydrologic test from 0800 hours to 2400 hours.

12-19-80 Ran hydrologic test to 0100 hours. Made trip out, packer and tubing dirty. Made trip in with 2-7/8" tubing open ended to swab clean the tubing.

12-20-80 Made trip in to 5500' and swab cleaned tubing from 3000'. Made trip out. Made trip in with 7" Lynes packer, down hole conductor cable shorted. Made trip out.

USW H-1
Hole History
Page 9

12-21-80 Replaced down hole instrument and conductor cable. Made trip in with Lynes packer and instruments to 3000', annulus instrument quit working. Made trip and changed instrument. Filled 2-7/8" tubing with water and set packer. Started hydrologic test at 2230 hours.

12-22-80 Continued running hydrologic test to 2400 hours.

12-23-80 Ran hydrologic test to 0200 hours. Reset center of packer at 3934.59' and filled tubing with water, tool did not work. Made trip out. Dropped 471.32' of tubing and packer in the hole. Top of fish at 5528'.

12-24-80 Made up overshot on 4-1/2" drill pipe. Made trip in and latched onto 2-7/8" tubing at 5530'. Made trip out with 471.32' of tubing and secured rig at 1600 hours.

12-31-80 Rig secured from 12-24-80 to 0300 hours, 12-31-80. Ran Dresser Atlas neutron borehole compensated and spectral logs to 6000'.

01-01-81 Completed running spectral log. Secured rig at 1000 hours.

01-05-81 Rig secured from 01-01-81 to 0800 hours, 01-05-81. Laid down tubing and fishing tool. Made up 7" O.D. Lynes packer and instruments on 2-7/8" tubing.

01-06-81 Made trip in and set center of packer at 3934.12'. Filled the tubing with water and started hydrologic test at 2300 hours.

01-07-81 Changed from Lynes tubing instrument to USGS instrument. Ran hydrologic test to 1400 hours. Set center of packer at 3035' and filled tubing with water. Ran hydrologic test to 2400 hours.

01-08-81 Ran hydrologic test to 1200 hours. Pulled up and set center of packer at 2660'. Ran hydrologic test to 2400 hours.

01-09-81 Ran hydrologic test to 0900 hours. Made trip out, dressed packer and checked downhole instruments.

01-10-81 Made trip in with two packers, set center of bottom packer at 2704.47' and top packer at 2569.37'. Filled tubing with water. Ran hydrologic tests from 0800 hours to 1030 hours. Pulled up and set center of bottom packer at 2572.19' and top packer at 2440.09'. Filled tubing with water and ran tests from 1400 hours to 1630 hours. Pulled up and set center of bottom at 2452' and top packer at 2320'. Started running tests from 2030 hours.

01-11-81 Ran hydrologic test to 0130 hours. Attempted to reset packers, would not set. Made trip to dress packers and instruments. Filled tubing with water and set center of bottom packer at 2310.10' and top packer at 2178'.

USW H-1
Hole History
Page 10

01-12-81 Ran hydrologic tests to 0630 hours. Made trip to dress packers and check instruments. Filled tubing with water and set center of bottom packer at 2309' and top packer at 2177'. Ran tests from 1900 hours to 2100 hours, bottom packer did not hold. Attempted to reset packers, bottom packer did not hold.

01-13-81 Made trip out. Made trip with 7-3/8" O.D. overshot on 4-1/2" drill pipe, recovered 22' of 2-3/8" tubing. Dressed and made up Lynes packers.

01-14-81 Ran and set center of bottom packer at 2567' and top packer at 2435'. Filled tubing with water, bottom packer failed. Lowered and set center of bottom packer at 2572' and top packer at 2440', bottom packer failed. Made trip out and laid down packers.

01-15-81 Dressed packers, laid down 40' of tubing between the packers and made trip in to 499' for test, packers failed. Made trip out, dressed packers and checked instruments. Made trip in and set center of bottom packer at 667.1' and top packer at 575'. Filled tubing with water for packer test. Tests failed and made trip out. Released Lynes equipment and crew.

01-16-81 Waited on orders and secured rig at 1100 hours.

01-20-81 Rig secured from 01-16-81 to 0 hours, 01-20-81. Made up and ran in Lynes straddle packer and instruments. Test set packers in the 9-5/8" casing, packers did not work properly. Made trip out and dressed tools. Made trip and set center of bottom packer at 2289' and top packer at 2197'. Filled tubing with water.

01-21-81 Packers did not work properly. Made trip for repairs. Set center of bottom packer at 2289' and top packer at 2197'. Filled tubing with water. Ran hydrologic test from 1600 hours to 2000 hours. Set center of bottom packer at 2565' and top packer at 2473'. Ran hydrologic test from 2130 hours.

01-22-81 Ran hydrologic test to 0100 hours. Set center of bottom packer at 2473' and top packer at 2381'. Filled tubing with water, bottom packer leaked. Set center of bottom packer at 2477' and top packer at 2385'. Filled tubing with water. Ran hydrologic test from 0530 hours to 0700 hours. Set center of bottom packer at 2381' and top packer at 2289'. Filled tubing with water. Started running hydrologic test at 1030 hours.

01-23-81 Ran hydrologic swab test to 1500 hours. Made trip out and laid down Lynes packers and 2-7/8" tubing.

01-24-81 Made trip in with 8-3/4" bit and tagged fill at 5993'. Laid down drill pipe and drilling assembly. Started rigging down and moving out.

01-25-81 Rigged down and moved out. Hole completed 01-25-81.

03-11-81 Ran USGS caliper tool to 5980', tool did not work.

USW H-1
Hole History
Page 11

03-12-81 Ran caliper log to 5960'.

03-13-81 Ran Polaroid camera from 4000' to 3000'.

03-14-81 Ran Polaroid camera from 3000' to 2500' and 4750' to 4000' on 5' stations.

03-15-81 Ran caliper log as directed.

03-16-81 Ran acoustic televiewer camera from 5950' to 2250' on 5' stations.

03-18-81 Ran temperature log to 5980', checked fluid level at 1884'.

03-21-81 Ran sinker bar to 5970' and gamma ray log to 5960'.

03-23-81 Ran gravimeter log as directed.

03-24-81 Ran gravimeter log as directed.

03-25-81 Ran borehole gravimeter as directed.

01-13-82 Took water samples using Birdwell equipment at 2000', 3000', 4000', 5000' and 5900'.

06-21-82 Moved in Ideco #37, rig #85116 and started rigging up. Secured rig at 2400 hours.

06-22-82 Rigged up and started in the hole with 8-3/4" bit on 4-1/2" drill pipe.

06-23-82 Made trip in and cleaned out bridges at 4005', 4032' and 4310' using water.

06-24-82 Washed hole from 4630' to 4660', cleaned out bridge at 5860' and washed hole to 5868'. Lowered tools, tools stopped at 5962'. Started out of hole, drill pipe stuck at 3960'. Worked pipe free, washed and conditioned hole. Made trip out. Ran Birdwell fluid density log to 5939' T.D., checked fluid level at 1876'.

06-25-82 Ran caliper log to 5950' T.D. Ran Gearhart tracejector and temperature logs as directed.

06-26-82 Changed drilling line and laid down 4-1/2" drill pipe.

06-27-82 Rigged up to run 2-1/16" tubing. Made trip in with 12.23' piezometer-Johnson screen assembly on bottom of #1 string of 2-1/16", 3.25# Hydril tubing and landed tubing at 5924.87'. Started in with NCQ rods for stemming and grouting.

06-28-82 Landed NCQ rods at 5899'. Ran water sampler, checked fluid level at 2020' and took water samples. Stemmed the hole from 5950' to 5863' with 36 ft³ of 1/8" x 1/4" Chevro gravel.

USW H-1
Hole History
Page 12

06-29-82 Stemmed the hole to 5851' with 6 ft³ of Chevro gravel. Ran Birdwell NAIL log down 2-1/16" tubing to 5920' T.D. Cemented the annulus using National Cementers on stage #1 with 200 ft³ of neat cement + 2% CaCl₂. CIP at 0500 hours. Ran NAIL log down NCQ rods and tagged cement at 4635'. Backed off cemented NCQ rods at 4160' using Birdwell primacord back off shot. Left 109 joints of rods in the hole from 4160' to 5250'.

06-30-82 Cemented stage #2 with 425 ft³ of neat cement + 2% CaCl₂. CIP at 0105 hours. Log top of stage #2 at 3688' and fluid level at 1850'. Tagged top of stage #2 at 3682'. Made trip in with #2 string of 2-1/16" tubing with piezometer on bottom. Landed #2 string at 3657'. Pulled NCQ rods (grout line), rods plugged.

07-01-82 Replaced plugged NCQ rods and made trip in. Tagged cement at 3682', landed NCQ rods at 3640'. Stemmed hole to 3598' with 40 ft³ of Chevro gravel. Cemented stage #3 with 570 ft³ neat cement + 2% CaCl₂. CIP at 2110 hours. Monitored cement rise with NAIL log to 2506'.

07-02-82 Made trip in with #3 string of 2-1/16" tubing with piezometer on bottom. Landed #3 string at 2431.45'. Attempted to tag cement with NCQ rods, could not get below 2420'. Tagged cement at 2511.53' with #3 string of tubing, landed tubing at 2431'. Made trip with NCQ rods and landed rods at 2460' T.D. Stemmed hole from 2511.53' to 2349' with 110 ft³ of Chevro gravel. Ran Birdwell NAIL background logs to 2431' T.D., checked fluid level at 1875'. Cemented stage #4 with 120 ft³ neat cement + 2% CaCl₂. CIP at 2333 hours. Pulled NCQ rods up to 1700'.

07-03-82 Ran Birdwell NAIL log to 5923' T.D. in #1 string, checked fluid level at 1876'; to 3657' T.D. in #2 string, checked fluid level at 1877'; and to 2431' T.D. in #3 string, checked fluid level at 1875'. Ran NAIL log down NCQ rods and tagged cement at 2260'. Cemented stage #5 with 25 ft³ neat cement + 2% CaCl₂. CIP at 1005 hours. Ran NAIL log down NCQ rods, tagged cement at 2194'. Pulled rods up to 1740'. Flushed strings #1, #2 and #3 of 2-1/16" tubing with water and pressured up, no pressure in #3 string. Swabbed string #1, #2 and #3 to 2075', tight spots between 1905' to 2035'. Tagged top of cement at 2207' with NCQ rods. Landed NCQ rods, #4 string open ended at 2100'. Flushed #4 string with water and swabbed to 2075'. Installed bull plugs with 1/8" vent holes in top of each string. Started rigging down.

07-04-82 Continued rigging down. Secured rig at 2400 hours.

07-06-82 Rig secured from 07-04-82 to 0800 hours, 07-06-82. Crew on standby to 1200 hours. Rigged down and moved out. Hole instrumented 07-06-82.

TUBING CEMENT RECORD

<u>Stage No.</u>	<u>Interval</u>	<u>Material Used Ft³</u>	<u>Calc. Ft³</u>
	5950' - 5851'	42 1/8" x 1/4" Chevro pea gravel	42
1	5851' -	200 neat cement + 2% CaCl ₂	
2	- 3682'	425 "	1014
	3682' - 3598'	40 1/8" x 1/4" Chevro pea gravel	45
3	3598' - 2512'	570 neat cement + 2% CaCl ₂	562
	2512' - 2349'	110 1/8" x 1/4" Chevro pea gravel	124
4	2349' - 2260'	120 neat cement + 2% CaCl ₂	53
5	2260' - 2207'	<u>25</u>	<u>20</u>
Total Material		1532 Ft ³	1860 Ft ³

**USW H-1
CORE RECORD**

<u>Core No.*</u>	<u>Interval</u>	<u>Feet Cored</u>	<u>Feet Recovered</u>	<u>% Recovery</u>	<u>Oriented Core</u>
1	104.0- 124.0	20.0	15.0	75	
2	221.0- 241.0	20.0	19.7	99	
3	241.0- 261.0	20.0	17.5	88	
4	418.0- 433.0	15.0	7.0	47	X
5	433.0- 448.0	15.0	15.0	100	
6	448.0- 474.0	26.0	25.6	98	X
7	715.0- 723.0	8.0	7.0	88	X
8	723.0- 734.0	11.0	5.8	53	X
9	734.0- 745.0	11.0	11.0	100	X
10	1272.0-1283.0	11.0	11.0	100	X
11	1283.0-1298.0	15.0	8.0	53	X
12	1298.0-1308.0	10.0	10.0	100	X
13	1308.0-1313.0	5.0	5.0	100	X
14	1313.0-1328.0	15.0	15.0	100	
15	1328.0-1332.0	4.0	4.0	100	
16	1740.0-1769.0	29.0	13.0	45	X
17	1857.0-1915.0	58.0	56.0	97	
18	2090.0-2117.0	27.0	27.0	100	X
19	2160.0-2191.0	31.0	25.0	81	X
20	2191.0-2225.0	34.0	34.0	100	X
21	2225.0-2257.0	32.0	30.2	94	X
22	2320.0-2350.0	30.0	30.0	100	X
23	2500.0-2560.0	60.0	60.0	100	X
24	2560.0-2585.0	25.0	25.0	100	X
25	2585.0-2610.0	25.0	25.0	100	X
26	2715.0-2771.0	56.0	56.0	100	
27	3366.0-3426.0	60.0	60.0	100	
28	3930.0-3958.0	28.0	27.0	96	
29	5130.0-5163.0	33.0	31.5	95	
30	5970.0-6000.0	<u>30.0</u>	<u>30.0</u>	<u>100</u>	
Total Footage Cored		764.0	706.3	82	

* Cores #1 thru #3 are 7-1/2" diameter and cores #4 thru #30 are 8-3/4" diameter.

**USW H-1
MUD RECORD**

Mud Plant

<u>Date</u>	<u>Turco Detergent Gallons</u>	<u>Pipeline Water Barrels</u>	<u>Polymer Gallons</u>	<u>Other Additive Barrels</u>	<u>Remarks</u>
09-06-80	284	1000			
09-07-80	225	775			
09-08-80	72	270			
09-09-80	48	180			
09-10-80	240	800			
09-11-80	48	170			
09-12-80	30	166			
09-13-80	48				
09-17-80	72	240			
09-22-80	120	425			
09-24-80	44	150			
09-25-80	120	420			
10-03-80	60	231			
10-04-80	120	458			
10-05-80	80	323			
10-06-80	80	308			
10-07-80	70	262			
10-08-80	50	188			
10-09-80	80	310			
10-10-80	50	196			
10-11-80	72	262			
10-12-80	72				
10-26-80		529			Fill hole for logging
10-27-80	48	166			
10-28-80	54	181			
10-30-80	24				
10-31-80	99	333			
11-01-80	160	625			
11-02-80	95	382			
11-03-80	240	240			
11-05-80				142	Air, soap mix +
11-06-80	140	616			
11-07-80	91	437			
11-08-80	160	533			
11-09-80	192	623			
11-10-80	145	478			
11-12-80	22	109			
11-13-80	81	355			
11-14-80	81	379			
11-18-80	60	227			
11-21-80		480			
Total	3,777	13,827		142	

USW H-1
REVIEW OF HOLE CONDITIONS

762 mm (30") casing was set at 11.7 m (38.5') in a 1.18 m (46-1/2") hole drilled to 12.5 m (41') using air foam. The annulus was cemented to surface in 2 stages with 9.91 m³ (350 ft³) of cement slurry. Calculated annular volume was 7.96 m³ (281 ft³). 508 mm (20") hole was drilled to 102.1 m (335') using air foam. Fluid density, induction, epithermal neutron, caliper, density and gamma ray-neutron logs were run 09-13-80 and 09-14-80. 406 mm (16") casing was set at 101.9 m (334.21') and the annulus cemented to surface in 2 stages with 22.82 m³ (806 ft³) of cement slurry. Calculated annular volume was 12.29 m³ (434 ft³). 381 mm (15") hole was drilled to 117.0 m (384') and then 337 mm (13-1/4") hole drilled to 530.4 m (1740'). 311 mm (12-1/4") hole was drilled to 687.9 m (2257'). Caliper, fluid density, electric, epithermal neutron, compensated density, gamma ray-neutron, induction, temperature, magnetometer, 3-D velocity on 0.9 m and 1.8 m (3' and 6') spacing logs and vibroseis survey were completed, 10-15-80. Hydrologic tests were run. Caliper log was run 10-23-80. Two 3-D velocity, electric, neutron-neutron, and 2 dual induction logs were run, 10-27-80. 244 mm (9-5/8") casing was set at 687.3 m (2255') and the annulus cemented to 680.0 m (2231') with 0.85 m³ (30 ft³) of cement slurry. Calculated annular volume was 0.71 m³ (25 ft³). 222 mm (8-3/4") hole was then drilled to a total depth of 1828.8 m (6000'). A total of three 191 mm (7-1/2") and twenty-seven 222 mm (8-3/4") cores were taken between 31.7 m (104') and 1828.8 m (6000'). Gyroscopic, vibroseis survey, caliper, fluid density, 3-D velocity, density, compensated neutron, electric, neutron-neutron, temperature and gamma ray-epithermal neutron logs were completed, 11-28-80. Hydrologic tests were run. Compensated neutron and spectral logs were run, 12-31-80. Hydrologic tests were completed, 01-23-81. Hole completed 01-25-81. Caliper, acoustic televiewer, temperature, gravimeter, gamma ray logs and TV camera were run between 03-11-81 and 03-25-81. Water samples were taken 01-13-82. Fluid density and caliper logs were run 06-24-82 and 06-25-82. The average curve on caliper log run #6 indicated a slightly eroded zone from 698.6 m (2292') to 778.5 m (2554') with maximum enlargement of 349 mm (13-3/4") at 722.7 m (2371'). Log also indicated an eroded zone from 1217.7 m (3995') to 1231.7 m (4041') with maximum enlargement of 464 mm (18-1/4") at 1229.9 m (4035'). 3 strings of 52 mm (2- 1/16") tubing were run in the 222 mm (8-3/4") hole with piezometer instrumented on bottom of each string. String #1 was set at 1805.9 m (5925'). The annulus was stemmed from 1813.6 m (5950') to 1783.4 m (5851') with 1.19 m³ (42 ft³) of gravel and cemented in 2 stages to 1122.3 m (3682') with 17.70 m³ (625 ft³) of cement slurry. Calculated annular volume was 29.90 m³ (1056 ft³). 70 mm (2-3/4") cemented rods were left in the hole from 1268.0 m (4160') to 1600.2 m (5250') after stage #1. String #2 was set at 1114.7 m (3657'). The annulus was stemmed from 1122.3 m (3682') to 1096.7 m (3598') with 1.13 m³ (40 ft³) of gravel and cemented to 765.7 m (2512') with 16.14 m³ (570 ft³) of cement slurry. Calculated annular volume was 17.19 m³ (607 ft³). String #3 was set at 741.0 m (2431'). The annulus was stemmed from 765.7 m (2512') to 716.0 m (2349') with 3.11 m³ (110 ft³) of gravel and cemented in 2 stages into 244 mm (9-5/8") casing to 672.7 m (2207') with 4.11 m³ (145 ft³) of cement slurry. Calculated annular volume was 5.58 m³ (197 ft³). 70 mm (2-3/4") rods were hung open ended at 640.1 m (2100'). Hole instrumented 07-06-82.

FENIX & SCISSON, INC.
HOLE HISTORY DATA
NNWSI

Approved: William Hill Brington
 Date: June 12, 1984

Hole No.: USW H-3 Type Hole: Hydrologic Test Hole
 User: USGS Area: Off Site Site Prep. W.O. #: None
 Location: NTS County: Nye W.O. #: 3404-139
 Surface Coordinates: N 756,542.10' E 558,451.65'
 Ground Elev.: 4866.4' Pad Elev.: None Top Casing Elev.: 4866.87'
 Bottom Hole Coord: N 756,568.89' E 558,371.14' @ 3975' MD Ref: Gyro, 03-03-82
 Rig On Location: 01-21-82 Spudded: 01-27-82 Completed: 03-19-82
 Circulating Media: Air and soap
 Main Rig & Contractor: Ideco 525/REECO
 No. Of Compressors & Capacity: 1-3/IR-1500's

Bore Hole Record			Casing Record					
From	To	Size	I.D.	Wt/Ft.	Wall	From	To	Ft ³ Cement
0'	29'	36"	30"		1/2"	0'	29'	81
29'	130'	26"	15.01"	84#		0'	126'	673
130'	2650'	14-3/4"	9.950"	45.50#*		0'	2600'	75
2650'	4000'	8-3/4"						

Total Depth: 4000' Plugs: None
 Junk: Dyna-Drill drive shaft and 12-1/4" bit in rat hole at 43'.
 Logging Data: Fluid density (11), Caliper (6), Electric (3), Sinker bar (2),
 Compensated density (2), Magnetometer (2), Epithermal neutron (2), Gamma ray
 (2), TV camera, Gamma ray-neutron neutron, Compensated neutron, Compensated **

Rigs Used							
Rig No.	Name	Class	Days Operating	Sec. W/Crew	Sec. W/O Crew	Total Days On Location	
85124	Ideco 525	II	55.80		1.33	57.13	

Remarks: * 10-3/4" casing perforated from 2474' to 2600' with 2 shots per foot, 07-22-82.
 ** acoustic, Acoustic frac, Spectra, 3-D velocity (2), Gyroscopic, Tracejector, Casing collar locator, Temperature (3), Gamma ray-casing collar locator, Epithermal neutron-gamma ray.

Prepared By: JEC:LLF:ps

Time Breakdown on Next Page

TIME BREAKDOWN

MAIN HOLE CONSTRUCTION

Hole No.: USW H-3

Drilling Operation Time (DOT)	Other Scheduled Time (OST)	Operational Delay Time (ODT)
Drill <u>11.35</u>	Mobe & Demobe <u>10.44</u>	Rig Repairs <u>1.40</u>
Trips <u>3.05</u>	Core <u>0.23</u>	W.O. Equipment <u>0.35</u>
Dress Drilling	Log <u>6.17</u>	Fish <u>3.52</u>
Assembly	Unload Hole <u>0.17</u>	Clean Out Fill <u>0.52</u>
Fluid Probe	Run Mandrel	Ream Hole <u>0.46</u>
Connections <u>1.96</u>	Hydrological	Plug Back
Open Hole	Tests <u>13.27</u>	Drill Out Plugs
		Secured W/Crews
		Tight Hole <u>0.21</u>
		Condition Hole <u>0.62</u>
Main Hole DOT 16.36 Days		
Casing Operation Time (COT)		
Run Casing <u>0.94</u>		
Run Casing		
Cement Casing <u>0.83</u>		
Cement Casing		
Drill Out Shoe <u>0.31</u>		

Main Hole COT: 2.08 Days Main Hole OST: 30.28 Days Main Hole ODT: 7.08 Days

Total Main Hole Construction Time: 55.80 Days

Remarks:

TOTAL ELAPSED TIME

Total Site Prep. Time	Days	Remarks:
Total Main Hole Construction <u>55.80</u>	Days	
Secured W/O Crew Site Prep.	Days	
Secured W/O Crew Main Hole Const. <u>1.33</u>	Days	
Total Suspended Time (No Rig)	Days	
TOTAL ELAPSED TIME <u>57.13</u>	Days	

USW H-3
HOLE HISTORY

01-21-82 Started moving in Ideco 525, rig #85124 and equipment.

01-22-82 Moved in equipment and started rigging up.

01-23-82 Continued rigging up.

01-24-82 Continued rigging up.

01-25-82 Continued rigging up. Drilled mouse hole using air and soap.

01-26-82 Drilled 12-1/4" rat hole from 0' to 43', lost Dyna Drill drive shaft and 12-1/4" bit in the hole. Attempted to fish out, no success. Reamed rat hole using Dyna-Drill and 14-3/4" bit. Set in rat hole pipe.

01-27-82 Drilled and reamed mouse hole. Set in mouse hole pipe. Rigged up. Drilled 36" surface hole from 0' to 14' with conventional circulation using air foam. Made trip out.

01-28-82 Made up mandrel and 36" bit. Drilled 36" hole from 14' to 22'. Made trip out for bit flange gasket change. Some nuts and 3/4" x 2' bar fell in hole. Fished out bar in 3 pieces on second attempt with a magnet. Made trip in and drilled 36" hole from 22' to 29'. Laid down drilling assembly.

01-29-82 Set 30" I.D., 1/2" wall casing at 29'. Cemented the annulus as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	29' - 27'	16 neat cement + 2% CaCl ₂ + 10% sand	4	0345 Hrs.
2	27' - 0'	<u>65</u> "	<u>49</u>	0935 "
TOTALS		81 Ft ³	53 Ft ³	

Continued rigging up.

01-30-82 Rigged up. Cleaned out cement from 27' to 29' and drilled 26" hole from 29' to 56' with conventional circulation using air and water.

01-31-82 Made trip out, bit was locked. Made 3 runs with magnet, no junk recovery. Changed bit and made trip in. Drilled 26" hole from 56' to 94'.

02-01-82 Drilled 26" hole from 94' to 103', bit plugged. Made trip for bit change and equipment repair. Made trip to unplug bit.

USW H-3
Hole History
Page 2

02-02-82 Drilled 26" hole from 103' to 130'. Made trip out. Ran Birdwell fluid density log to 127' T.D., checked fluid level at 124'. Ran caliper log to 127' T.D. and induction log to 126' T.D.

02-03-82 Ran and set 16" O.D., 84#, K-55 casing at 126'. Cemented the annulus as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	127' - 122'	25 neat cement + 2% CaCl ₂	15	0614 Hrs.
2	122' - 80'	280 "	200	1130 "
3	80' - 33'	290 "	250	1500 "
4	33' - 0'	78 "	162	1900 "
TOTALS		673 Ft ³	627 Ft ³	

Cut off casing and welded on flange.

02-04-82 Rigged up. Cleaned out cement and hole from 122' to 130'. Drilled 14-3/4" hole from 130' to 156' with conventional circulation using air, soap and water.

02-05-82 Drilled 14-3/4" hole from 156' to 352'. Added second compressor to manifold.

02-06-82 Drilled 14-3/4" hole from 352' to 781'. Made trip for bit check at 380' and cleaned out rocks falling down hole.

02-07-82 Drilled 14-3/4" hole from 781' to 1077'. Made trip for bit change and dressed stabilizers. Cleaned out fill from 1022' to 1077'.

02-08-82 Drilled 14-3/4" hole from 1077' to 1580'.

02-09-82 Drilled 14-3/4" hole from 1580' to 2093'.

02-10-82 Drilled 14-3/4" hole from 2093' to 2306'. Made trip out. Left bottom stabilizer, bit sub and bit (8.85') in the hole. Top of fish at 2297'.

02-11-82 Ran 12-3/4" overshot with grapple and jars on 6-5/8" drill pipe to fill at 2289'. Cleaned out fill and attempted to work over fish. Made trip to check fishing tools. Cleaned out 12' fill and tagged fish at 2297.71'. Attempted to work over fish. Made trip out, no recovery.

USW H-3
Hole History
Page 3

02-12-82 Made trip in with 9-1/2" grapple and 12-3/4" skirt. Cleaned out 14' fill and attempted to work over fish at 2297'. Made trip out, no recovery. Shortened skirt and made trip in. Cleaned 20' fill and attempted to work tools over fish. Worked stuck tools free at 2287' and made trip out, no recovery. Made trip in.

02-13-82 Made trip to unplug tools. Attempted to work over fish, no recovery. Made trip for Midway fishing tool. Latched onto fish at 2297' and worked tool free. Made trip out with full recovery. Had 16' to 22' of fill on each trip. Started in with 14-3/4" bit on 6-5/8" drill pipe, tools dragging in 16" casing. Made trip out.

02-14-82 Made trip in and washed hole from 278' to 380'. Made trip in and cleaned out fill from 2263' to 2306'. Drilled 14-3/4" hole from 2306' to 2463'. Made trip out and secured rig at 2400 hours.

02-16-82 Rig secured from 2-14-82 to 0800 hours, 2-16-82. Ran Birdwell fluid density tool to bridge at 285'. Worked sinker bar thru bridge and went to 2421' T.D. Ran fluid density log to 2423' T.D., checked fluid level at 2418'. Made trip in with 14-3/4" bit on 6-5/8" drill pipe. Washed and reamed thru bridge from 469' to 589' and fill from 2153' to 2463'. Drilled 14-3/4" hole from 2463' to 2491'.

02-17-82 Drilled 14-3/4" hole from 2491' to 2650'. Made trip out. Ran Birdwell fluid density log to 2631' T.D., checked fluid level at 2600'. Ran caliper log to 2630' T.D.

02-18-82 Ran heavy sinker bar to 2624' T.D. Ran vibroseis survey on 25' stations to 2623' T.D., logged from 2600' to 130'. Ran compensated borehole density tool to 2620' T.D., no log. Ran induction log to 2621' T.D. Ran fluid density log to 2621' T.D., checked fluid level at 2563'.

02-19-82 Ran magnetometer tool to 2550', borehole compensated density log to 2615' T.D., epithermal neutron log to 2616' T.D. and gamma ray log to 2615' T.D. Started running Westech TV camera.

02-20-82 Ran TV camera from surface to 2530', checked fluid level at 2515'. Ran Birdwell core gun and took sidewall samples between 2600' to 340' as directed. Ran fluid density log to 2613' T.D., checked fluid level at 2524'. Laid down 6-5/8" drill pipe and drilling assembly.

02-21-82 Rigged up. Ran and set 10-3/4" O.D., 45.50# casing at 2600'. Ran USGS fluid probe, fluid level indicated at 2513' and slowly rising. Cemented the annulus using National Cementers with 75 ft³ of neat cement +2% CaCl₂. CIP at 2310 hours. Pumped in plug with 17 barrels of water. Calculated cement top at 2532'.

USW H-3
Hole History
Page 4

02-22-82 Rigged up and made up drilling assembly.

02-23-82 Made trip in and cleaned out cement from 2537' to 2602' and fill to 2650'. Drilled 8-3/4" hole from 2650' to 2764' using air and soap. Ran hydrologic test from 1700 hours to 1830 hours.

02-24-82 Drilled 8-3/4" hole from 2764' to 3071'. Made trip out for bit change.

02-25-82 Made trip in, had problems breaking circulation. Drilled 8-3/4" hole from 3071' to 3220'.

02-26-82 Drilled 8-3/4" hole from 3220' to 3435'. Ran hydrologic test at 3343'.

02-27-82 Drilled 8-3/4" hole from 3435' to 3742'.

02-28-82 Drilled 8-3/4" hole from 3742' to 4000'. Ran hydrologic test and made trip measuring out (3999.80'). Ran Birdwell fluid density log to 3989' T.D., monitored fluid level as follows:

<u>Run</u>	<u>Fluid Level</u>	<u>Time</u>
6	3350'	2300 Hours
	3285'	2345 Hours

03-01-82 Monitored fluid level as follows:

<u>Run</u>	<u>Fluid Level</u>	<u>Time</u>
7	3245'	0030 Hours
	2784'	0500 Hours
8	2556'	1300 Hours

Ran caliper log to 3993' T.D. Ran vibroseis survey on 25' stations to 3993' T.D., logged from 3975' to 2555'. Ran borehole compensated density-gamma ray log to 3992' T.D., magnetometer log to 3993' T.D. and gamma ray-neutron log to 3994' T.D.

03-02-82 Ran electric log to 3992' T.D. and epithermal neutron log to 3992' T.D. Ran Dresser-Atlas compensated neutron, compensated acoustic, acoustic frac and spectra logs to 3998' T.D.

03-03-82 Reran acoustic frac log to 3998' T.D. Ran Birdwell 3-D velocity log to 3996' T.D. Ran fluid density log, checked fluid level at 2471'. Ran USGS fluid probe, checked fluid level at 2478' at 1200 hours and 2474' at 1330 hours. Made trip in with 8-3/4" bit on 4-1/2" drill pipe to 3988'. Ran Eastman gyroscopic survey on 50' stations in and out from surface to 3975'. Attempted to break circulation.

USW H-3
Hole History
Page 5

03-04-82 Pulled up and made trip to 3988' stage circulating. Made trip out. Made trip in to 2570' with 2-7/8" tubing. Started running Gearhart trace ejector test at 1900 hours.

03-05-82 Ran trace ejector test to 0800 hours. Made trip out. Made trip in with 2-7/8" tubing, bottom 15' of tubing was perforated. Ran USGS fluid probe at 2230 hours, checked fluid level at 2439'. Ran fluid probe at 20 minute intervals, fluid was dropping slowly.

03-06-82 Ran swab test from 0100 hours.

03-07-82 Continued swab test.

03-08-82 Swab tested to 0800 hours. Monitored fluid rise to 1700 hours. Made trip out and made up Lynes straddle packers on 2-7/8" tubing.

03-09-82 Made trip in with straddle packer on 2-7/8" tubing. Set center of bottom packer at 3691' and center of top packer at 3484.5'. Started hydrologic test at 1600 hours.

03-10-82 Continued straddle packer hydrologic test.

03-11-82 Continued straddle packer hydrologic test.

03-12-82 Continued straddle packer hydrologic test. Made trip out to dress packers.

03-13-82 Made trip in and set center of bottom packer at 3193' and center of top packer at 2965'. Continued straddle packer hydrologic tests.

03-14-82 Continued straddle packer hydrologic tests.

03-15-82 Continued straddle packer hydrologic tests.

03-16-82 Continued straddle packer hydrologic tests.

03-17-82 Made trip out and laid down Lynes packers and tubing.

03-18-82 Laid down drill pipe and started rigging down.

03-19-82 Rigged down and moved out. Hole completed 03-19-82.

07-21-82 Moved in CP rig #85128 and rigged up.

07-22-82 Drilled anchor holes, rigged down and moved out. Perforated 10-3/4" casing using Wellex from 2474' to 2600' with 2 shots per foot. Ran junk basket for debris. Moved in Birdwell.

07-23-82 Ran Birdwell caliper log to 3967' T.D. Ran continuous temperature log to 3972' T.D., maximum recorded temperature was 108° F.

USW H-3
Hole History
Page 6

07-24-82 Operations secured to 1600 hours. Moved in CP rig and drilled 4 anchor holes to 10'. Rigged down and moved out. Moved in Ideco #37, rig #85116 and started rigging up.

07-25-82 Rigged up. Started in the hole with a 10-3/4", 45.50# casing scraper on 4-1/2" drill pipe.

07-26-82 Ran casing scraper to 2575'. Laid down drill pipe and casing scraper. Rigged up to run submersible pump.

07-27-82 Made trip in with series 400 Centrilt pump on 2-7/8" tubing along with 2-3/8" monitor line. Landed pump at 2570.72' with intake at 2554.11'. Installed surface equipment and checked fluid in the hole at 2253'. Started hydrologic tests at 2130 hours.

07-28-82 Ran hydrologic tests.

07-29-82 Crews on stand-by. Rigged up to pull series 400 Centrilt pump.

07-30-82 Pulled and laid down 2-7/8" tubing, pump and monitor line.

07-31-82 Crew on stand-by as directed.

08-01-82 Crew on stand-by as directed.

08-02-82 Crew on stand-by as directed.

08-03-82 Crew on stand-by as directed.

08-04-82 Crew on stand-by as directed.

08-05-82 Crew on stand-by to 0800 hours. Rigged down and moved out.

10-25-82 Ran Westech TV camera to 3900', checked fluid level at 2457'. Unable to get pictures due to oil and mud contamination.

12-17-82 Ran Birdwell caliper log to 3956' T.D. Ran gamma ray-casing collar locator log to 3958' T.D. and epithermal neutron-gamma ray to 2595'.

02-02-83 Moved in Joy #1, rig #85172 and rigged up. Made up 2 element TAM packer with a 13' long 2-7/8" slotted and bull nosed pup joint on bottom.

02-03-83 Made trip in with TAM packer on 2-7/8" tubing. Landed and set center of packer element at 3905.50'. Ran sinker bar and knocked out packer plug. Swabbed fluid out of tubing to 2250'. Ran and landed 1.9", 10rd. tubing at 2500.25'. Rigged down and moved out.

USW H-3
Hole History
Page 7

06-15-83 Rigged up Birdwell equipment on Birdwell boom truck to run stabilized temperature log.

06-16-83 Ran stabilized temperature log inside 2-7/8" tubing on 100' stations to 2600'. Temperature ranged from 68.9⁰ F to 91.7⁰ F. Ran fluid density log, checked fluid level at 2385'.

11-22-83 Moved in Ideco #37, rig #85116 and equipment.

11-23-83 Moved in equipment and started rigging up. Secured rig for holidays at 2400 hours.

11-26-83 Rig secured from 11-23-83 to 0800 hours, 11-26-83. Continued moving in equipment and rigging up.

11-27-83 Continued rigging up.

11-28-83 Rigged up. Pulled and laid down 1.9" tubing (monitor line). Released TAM packer, pulled and laid down 2-7/8" tubing and packer. Rigged up to run 7" casing. Ran Birdwell temperature log to 3946' T.D., fluid level indicated at 2452'.

11-29-83 Ran caliper log to 3948' T.D. Made up TAM 7" O.D. external casing packer on 7" O.D., 20#, J-55, T-C casing. Ran and set packer at 2697.48' with top at 2689.83' (center of element at 2693.33'). Pressured up and blew out plug on bottom of packer and tied off 7" casing to top of 10-3/4" casing. Ran Birdwell sinker bar to 3946' T.D. Made up 8.43' long Moyno pump on 2-7/8" O.D., 6.5#, EUE tubing. Ran and landed bottom of pump at 2999.88' with stop pin at 2999.15'.

11-30-83 Ran and landed 1.9" O.D., 2.76#, 10 rd., EUE integral tubing at 2950.13'. Ran rotor on 3/4" O.D. sucker rods down the 2-7/8" tubing and tagged the stop pin in the stator. Pulled up and landed rotor in place. Made up 3/4" sucker rod drive line on 7 HP motor. Tested pump at approximately 5 gpm.

12-01-83 Ran USGS water probe in 1.9" tubing to monitor fluid level. Pumped out water from 0200 hours to 0500 hours at 2 to 2.5 gpm, rods torqued up. Pulled water probe and removed motor and drive head. Laid down sucker rods and rotor. Laid down 2-7/8" tubing and pump body. Examined stator, rotor had worn thru stator stop pin. Laid down 1.9" monitor line.

12-02-83 Repaired and made trip in with Moyno pump on 2-7/8" tubing. Landed bottom of pump at 2999.15'. Ran and landed 1.9" monitor line at 2950.13'. Ran pump rotor on 3/4" sucker rods. Made up surface equipment and tested pump at 2 gpm. Secured rig for union holiday at 2400 hours.

USW H-3
Hole History
Page 8

12-05-83 Rig secured from 12-02-83 to 12-05-83. Rigged down and moved out rig. Started pump tests as directed, USGS fluid probe monitor did not work properly. Replaced probe and attempted to monitor fluid level, pipe thread compound affected probe. Pumped 70 barrels of LiBr water down the monitor line. Ran fluid probe and checked fluid level at 1900'. Ran pump test from 1100 hours to 1600 hours at 1.67 gpm. Checked fluid level at 2455' and pulled out fluid probe. Started installing transducer down monitor line.

12-06-83 Transducer did not work. Waited for replacement to 1000 hours. Pumped out fluid from 0800 hours to 1000 hours at 1.67 gpm. Installed transducer and increased sucker rod speed. Checked fluid level at 2466' with transducer. Started pumping out fluid at 1500 hours at 2.5 gpm.

12-07-83 Ran USGS pump test and F&S geologists monitored fluid recovery. At 0800 hours, shut down pump due to rotor hitting shear pin in stator. Pulled one 2' pony out of drive string and rigged back up.

12-08-83 No pump test from 2400 hours to 0800 hours. Started pump test at 0800 hours monitoring pump rate and fluid drawdown. Had 25' drawdown at 2.75 gpm at 1330 hours.

12-09-83 Shut pump down and monitored recovery to 0800 hours. Checked pump, 3/4" sucker rod had parted 9" below pump motor shaft. Rods had dropped to 3.5'. Fished and pulled up rods. Replaced 2' rod and checked out pump. Secured operation at 1600 hours.

12-12-83 Operation secured from 12-9-83 to 0900 hours, 12-12-83. Checked fluid level at 2467'. Started up pump, pumping rate at 2.85 gpm with 18.5' drawdown in 1-1/2 hours. Increased pump rate to 3.0 gpm and checked 22' drawdown at 1600 hours. Continued monitoring operation as directed.

12-13-83 Monitored pump rate at 3.15 gpm with 28.79' drawdown at 0800 hours. Monitored steady pump rate at 3 gpm from 0800 hours with 31' drawdown at 1700 hours.

12-14-83 Continued monitoring pump test as directed. Monitored pump rate at 3 gpm with 32' drawdown at 1430 hours. Stopped continuous monitor at 1600 hours. Pump monitor to be made daily as directed.

12-15-83 Pump discharge quit at 0500 hours. Checked surface equipment. Operation secured from 1100 hours to 1900 hours. Moved in Failing 1500, rig #85133 and rigged up. Started pulling 3/4" sucker rods.

12-16-83 Pulled sucker rods and rotor. Secured rig from 0300 hours to 0500 hours. Started pulling 2-7/8" tubing. Secured rig from 0700 hours to 0800 hours. Continued pulling tubing. Secured rig from 1130

USW H-3
Hole History
Page 9

12-16-83 hours to 1600 hours. Continued pulling tubing. Secured rig at
(Cont.) 2400 hours.

12-19-83 Rig secured from 12-16-83 to 1300 hours, 12-19-83. Continued
pulling 2-7/8" tubing to check Moyno stator. Secured rig at 1500
hours.

12-20-83 Continued pulling 2-7/8" tubing from 1600 hours to 1700 hours.

12-21-83 Pulled 2-7/8" tubing and Moyno stator from 1200 hours to 1500
hours.

12-22-83 Laid down 2-7/8" tubing and started pulling 1.9" tubing from 1100
hours to 1600 hours.

12-23-83 Laid down 1.9" tubing. Rigged down and secured rig for holidays.

01-04-84 Rig secured from 12-23-83 to 01-04-84. Completed laying down 1.9"
tubing. Rigged up surface installations for pump tests. Made up
new 8.43' long Moyno pump stator on 2-7/8" O.D., 6.5#, EUE tubing.
Ran and landed bottom of pump at 3001.2'. Started in with 1.9"
O.D., 2.76#, 10 rd., EUE integral tubing open ended for monitor
line.

01-05-84 Landed 1.9" monitor line at 2956.45'. Made trip in with Moyno
rotor on 3/4" sucker rods, nylon guides were used on rods. Landed
rotor 32" above stator stop pin. Filled tubing with water and
tested pump at 2.8 gpm from 1300 hours to 1400 hours. Rigged down
and secured rig on location.

01-06-84 Location secured from 1-5-84 to 1300 hours, 01-06-84. Checked
static fluid level at 2466'. Installed pump cut off switch in case
discharge fluid flow stopped. Started pumping out fluid at 1400
hours at 2.94 gpm. Stopped monitoring pump operation at 2400 hours
but continued pumping fluid.

01-09-84 Operation secured from 01-06-84 to 01-09-84. Checked pump
operation at 0030 hours, kill switch had shut off pump motor.
Operation secured to 1000 hours. Removed pump motor assembly using
a forklift, rods had parted 1.5' below 2-7/8" swedge. Fished out
3/4" sucker rods and replaced broken section. Landed rotor 40"
above stator stop pin. Made up motor assembly, tested pump from
1100 hours to 1500 hours at 2.75 gpm and secured operation.

01-10-84 Operation secured from 01-09-84 to 0900 hours. Checked static
fluid level at 2466'. Monitored Moyno pump rate from 2.7 gpm to
2.63 gpm. Checked fluid level at 2489.07' at 2400 hours.

USW H-3
Hole History
Page 10

01-11-84 Continued pumping out fluid. Checked pump rate at 2.60 gpm at 1300 hours. Checked pump rate at 2.70 gpm and fluid level at 2491' at 1500 hours.

01-12-84 Continued pumping out fluid. Checked 2.70 gpm at 0330 hours. Checked 2.70 gpm and fluid level at 2490.85' at 0900 hours. Checked 2.60 gpm and fluid level at 2491.78' at 1400 hours.

01-13-84 Continued pumping out fluid. Checked 2.68 gpm pump rate at 0300 hours. Checked 2.65 gpm pump rate and fluid level at 2491.43' at 0900 hours, and 2.60 gpm pump rate and fluid level at 2491.93' at 1400 hours.

01-16-84 Continued pumping out fluid from 01-13-83 to 01-16-83 with no monitoring. Checked 2.60 gpm pump rate at 0030 hours. Checked 2.63 gpm pump rate and fluid level at 2491.5' at 0900 hours, and 2.63 gpm pump rate and fluid level at 2492.21' at 1400 hours.

01-17-84 Continued pumping out fluid. Checked 2.60 gpm pump rate and fluid level at 2491.75' at 0900 hours. Moved Failing 1500 off location.

01-18-84 Continued pumping out fluid. Checked 2.60 gpm pump rate at 0430 hours. Checked 2.60 gpm pump rate, fluid level at 2491.64', and temperature at 28° C (82.4° F). Checked 2.60 gpm pump rate at 1700 hours. Hole pumped continuously from 0900 hours, 1-10-84 for 191 hours at 0800 hours, 1-18-84 for a total of 30,369 gallons.

01-19-84 Continued pumping out fluid. Checked 2.60 gpm pump rate at 0500 hours. Checked 2.59 gpm pump rate and fluid level at 2492.0' at 1045 hours. Recovered 33,795 gallons of water in 113 hours of continuous pumping at 0600 hours.

01-20-84 Continued pumping out fluid. Changed generators, pump down for 3 minutes. Checked 2.58 gpm pump rate and fluid level at 2491.64' at 0930 hours.

01-23-84 Location secured from 01-20-84 to 01-23-84. Continued pumping out fluid. Checked 2.59 gpm pump rate and fluid level at 2492.39' at 0930 hours.

01-24-84 Continued pumping out fluid to 1500 hours. Checked 2.60 gpm pump rate at 0500 hours and 3.00 gpm pump rate at 1200 hours. Started fluid recovery monitoring at 1500 hours.

01-25-84 Continued monitoring fluid recovery.

01-26-84 Monitored fluid recovery to 1100 hours, static fluid level at 2466'. Started pumping out fluid at 2.60 gpm using Moyno pump.

USW H-3
Hole History
Page 11

01-27-84 Continued pumping out fluid. Checked 2.67 gpm pump rate at 1400 hours and 2.60 gpm pump rate at 2000 hours. Pumping continued thru 01-29-84 with monitoring secured at 2000 hours.

01-30-84 Continued pumping out fluid. Checked 2.62 gpm pump rate at 0130 hours.

01-31-84 Continued pumping out fluid. Shut down pump from 0400 hours to 1000 hours and then continued pumping out fluid. Checked 2.60 gpm pump rate and fluid level at 2476' at 1000 hours.

02-01-84 Continued pumping out fluid. Checked 2.60 gpm rate at 0300 hours.

02-02-84 Continued pumping out fluid. Checked 2.60 gpm pump rate and fluid level at 2429.2' at 1030 hours.

02-03-84 Continued pumping out fluid. Checked 2.60 gpm pump rate and fluid level at 2492.6' at 1245 hours. Continued pumping fluid but suspended monitoring over weekend.

02-06-84 Continued pumping out fluid with monitoring secured from 02-03-84 to 02-06-84. Moyno pump had automatically shut off prior to 0 hours. Estimated shut off time was 1230 hours, 02-05-84. Sheared shaft pin inside of pump drive head was replaced from 0800 hours and resumed pumping at 1240 hours.

02-07-84 Pumped out fluid to 1400 hours, automatic switch cut pump off. Checked 2.59 gpm pump rate and fluid level at 2491.75' prior to 1400 hours. Removed pump to replace pump rod broken at pin.

02-08-84 Levelled pump landing plate and installed repaired rotating head and motor. Raised rotor 8" and started pumping out fluid at 1200 hours.

02-09-84 Continued pumping out fluid. Checked 1.13 gpm pump rate and fluid level at 2476.57' at 1300 hours.

02-10-84 Continued pumping out fluid. Checked 1.03 gpm pump rate at 0830 hours and 0.99 gpm pump rate at 1400 hours.

02-13-84 Continued pumping out fluid from 02-10-84, monitoring secured from 02-10-84 to 02-13-84. Checked 1.04 gpm pump rate and fluid level at 2476.1' at 1430 hours.

02-14-84 Continued pumping out fluid. Checked 0.95 gpm pump rate at 0730 hours.

02-15-84 Continued pumping out fluid. Checked 1.00 gpm pump rate and fluid level at 2475.07' at 1500 hours. Lowered rotor 8".

USW H-3
Hole History
Page 12

02-16-84 Continued pumping out fluid. Checked 2.40 gpm pump rate at 0800 hours and 1400 hours.

02-17-84 Continued pumping out fluid. Monitoring secured for weekend and holiday with pumping continued.

02-18-84 Continued pumping out fluid to 1230 hours.

02-21-84 Operation secured to 1330 hours, 02-21-84. Worked on rotating head repairing broken shaft at pin end to 1600 hours.

02-22-84 Raised rotor 6", made up surface installations, and started pumping out fluid between 1400 hours and 1600 hours. Checked 1.50 gpm pump rate at 1450 hours.

02-23-84 Continued pumping out fluid. Checked 1.57 gpm pump rate at 0315 hours and 1.60 gpm pump rate at 1630 hours.

02-24-84 Continued pumping out fluid. Checked 1.60 gpm pump rate. Secured monitoring for weekend.

02-27-84 Continued pumping out fluid. Pump monitoring secured from 02-24-84 to 02-27-84. Checked 1.60 gpm pump rate at 0600 hours and 1.50 gpm pump rate with water level at 2480' at 1100 hours.

02-28-84 Continued pumping out fluid. Checked 1.50 gpm pump rate.

02-29-84 Continued pumping out fluid. Checked 1.50 gpm pump rate and fluid level at 2480' at 1300 hours.

03-01-84 Continued pumping out fluid. Checked 1.50 gpm pump rate.

03-02-84 Continued pumping out fluid. Checked 1.60 gpm pump rate at 1430 hours. Monitoring secured for weekend.

03-05-84 Continued pumping out fluid. Monitoring secured from 03-02-84 to 03-05-84. Checked 1.50 gpm pump rate and fluid level at 2481.5' at 1300 hours.

03-06-84 Continued pumping out fluid. Checked 1.50 gpm pump rate at 0940 hours.

03-07-84 Continued pumping out fluid. Checked 1.50 gpm pump rate.

03-08-84 Continued pumping out fluid. Checked 1.60 gpm pump rate at 1400 hours.

03-09-84 Continued pumping out fluid. Monitored pump rate at 1.60 gpm. Secured monitoring for weekend.

USW H-3
Hole History
Page 13

03-12-84 Continued pumping out fluid. Monitoring secured from 03-09-84 to 03-12-84. Monitored pump rate at 1.60 gpm at 1000 hours.

03-13-84 Continued pumping out fluid. Monitoring 1.60 gpm pump rate to 2400 hours.

03-14-84 Continued pumping out fluid. Monitored 1.60 gpm pump rate.

03-15-84 Continued pumping out fluid. Monitored 1.60 gpm pump rate.

03-16-84 Continued pumping out fluid. Monitored 1.60 gpm pump rate with fluid level at 2482.2'. Monitoring secured for weekend at 2400 hours.

03-19-84 Continued pumping out fluid. Monitoring secured from 03-16-84 to 03-19-84. Monitored 1.60 gpm pump rate with drawdown level at 2483.14'.

03-20-84 Continued pumping out fluid. Monitored 1.60 gpm pump rate.

03-21-84 Continued pumping out fluid. Monitored 1.60 gpm pump rate with fluid drawdown at 2483.14'.

03-22-84 Continued pumping out fluid. Monitored 1.60 gpm pump rate.

03-23-84 Continued pumping out fluid. Monitored 1.74 gpm pump rate. Secured monitoring at 2400 hours for weekend.

03-26-84 Continued pumping out fluid. Monitoring secured from 03-23-84 to 03-26-84.

03-27-84 Completed test #5 of pumping out fluid at 1000 hours using Moyno pump. Monitored fluid recovery. Maximum fluid drawdown was 2482' and static fluid level was 2466.5'.

05-23-84 Moved in Ideco #37, rig #85116 and started rigging up.

05-24-84 Rigged up and removed surface installations. Pulled 3/4" sucker rods, 1.9" monitor line, and 2-7/8" tubing with Moyno pump. Ran Welex collar log and perforated TAM casing packer with 6 shots.

05-25-84 Pulled and laid down 7" casing and TAM external packer, no drag coming out of hole. Ran Birdwell fluid density log, fluid indicated at 2468'. Made 3 runs with 6-5/8" x 12' bailer to check for any oil on top of fluid, no oil indicated. Steam cleaned 1.9" tubing and secured rig at 2400 hours for weekend and holiday.

05-29-84 Rig secured from 05-25-84 to 05-29-84. Made up TAM straddle packer on 2-7/8" tubing with 14' spacing between center of packers. Started in the hole.

USW H-3
Hole History
Page 14

05-30-84 Landed and set straddle packer to test zone from 3648' to 3662'. Downhole equipment leaked. Released packers and made trip out. Packer mandrel control sub damaged from wrench marks allowing leak at "O" ring seal.

05-31-84 Waited for packer parts to 1230 hours. Dressed and tested packers. Ran and set straddle packer to test zone from 3665' to 3679'.

06-01-84 Filled tubing with water and swabbed tubing to 2400'. Ran and landed 1.9" monitor line at 2497.17'. Rigged down and moved out.

USW H-3
MUD REPORT
F&S TIME LOG

<u>Date</u> <u>0600 Hours</u>	<u>Hole</u> <u>Depth-Bit</u>	<u>Remarks</u>	<u>Water</u> <u>Barrels</u>	<u>Soap</u> <u>Gallons</u>	<u>Lithium</u> <u>Gallons</u>	<u>Other</u>
01-25-82		From Mud Plant		5040		
01-27-82	3' 36"	Ideco 525				
01-28-82	36"					
01-29-82	29' 36"	30" csg. cem. @ 29'				
01-30-82	36' 26"					
01-31-82	63' 26"					
02-01-82	94' 26"		420	170		
02-02-82	115' 26"					
02-03-82	130' 26"	Log-16" csg. @ 126'	170	37		
02-04-82		Cem. csg.				
02-05-82	236' 14-3/4"					
02-06-82	380' 14-3/4"					
02-07-82	908' 14-3/4"					
02-08-82	1190' 14-3/4"					
02-09-82	1700' 14-3/4"		612	150	18	
02-10-82	2170' 14-3/4"					
02-11-82	2306' 14-3/4"	Fish				
02-12-82		Fish				
02-13-82		Fish				
02-14-82		Fish				
02-15-82	2463' 14-3/4"		900			
02-16-82		Holiday				
02-17-82	2585' 14-3/4"					
02-18-82	2650' 14-3/4"	Log	190	45		
02-19-82		Log				
02-20-82		Log				
02-21-82		Log 10-3/4" csg.				
02-22-82		10-3/4" csg. cem. @ 2600'				
02-23-82		Rig up				
02-24-82	2847' 8-3/4"		750	227		
02-25-82	3071' 8-3/4"					
02-26-82	3320' 8-3/4"					
02-27-82	3493' 8-3/4"		360	16		
02-28-82	3830' 8-3/4"					
03-01-82	4000' 8-3/4"	T.D.-Log				
03-02-82		Log				
03-03-82		Log				
03-04-82		Log				
03-05-82		Hydrologic Tests				
03-18-82		Hydrologic Tests				
03-19-82		Completed				
			3402	5685	18	

USW H-3
REVIEW OF HOLE CONDITIONS

762 mm (30") casing was set at 8.8 m (29') in a 914 mm (36") hole drilled to 8.8 m (29') with conventional circulation using air and soap. The annulus was cemented to surface in 2 stages with 2.29 m³ (81 ft³) of cement slurry. Calculated annular volume was 1.50 m³ (53 ft³). 660 mm (26") hole was drilled to 39.6 m (130'). Fluid density, caliper and induction logs were run 02-02-82. 406 mm (16") casing was set at 38.4 m (126') and the annulus cemented to surface in 4 stages with 19.06 m³ (673 ft³) of cement slurry. Calculated annular volume was 17.75 m³ (627 ft³). 375 mm (14-3/4") hole was drilled to 807.7 m (2650') using air and soap. Fluid density, caliper, compensated density, induction, magnetometer, epithermal neutron, gamma ray logs, vibroseis on 7.6 m (25') stations, TV camera were run and sidewall samples taken between 02-16-82 and 02-20-82. 273 mm (10-3/4") casing was set at 792.5 m (2600') and cemented bottom of the annulus with 2.12 m³ (75 ft³) of cement slurry. Calculated top in the annulus was 771.8 m (2532'). 222 mm (8-3/4") hole was drilled to a total depth of 1219.2 m (4000') using air and soap. Fluid density, caliper, compensated density, magnetometer, gamma ray-neutron neutron, electric, epithermal neutron, compensated neutron, compensated acoustic, acoustic frac, spectra, 3-D velocity logs, vibroseis survey on 7.6 m (25') stations and gyroscopic survey were run between 02-28-82 and 03-03-82. Hydrologic tests were run between 03-04-82 and 03-16-82. Hole completed 03-19-82. Perforated 273 mm (10-3/4") casing from 754.1 m (2474') to 792.5 m (2600'), 07-22-82. Caliper and temperature logs were run 07-23-82. Hydrologic tests were run 07-28-82. Caliper, gamma ray-casing collar locator, and epithermal neutron-gamma ray logs were run 12-17-82. TAM packer was set at 1190.4 m (3905.5') on 73 mm (2-7/8") tubing with 48 mm (1.9") tubing monitor line at 762.0 m (2500'), 02-03-83. Temperature and fluid density logs were run inside 73 mm (2-7/8") tubing 06-16-83. Stabilized temperatures ranged from 20.5° C (68.9° F) to 33.2° C (91.7° F) to 792.5 m (2600') and fluid level was indicated at 726.9 m (2385'). 73 mm (2-7/8") tubing, packer, and 48 mm (1.9") tubing were pulled 11-28-83. Temperature and caliper logs were run 11-28-83 and 11-29-83. Temperature log indicated fluid level at 747.4 m (2452'). Hydrologic pump down tests were run between 12-05-83 and 03-27-84. Fluid density log run 05-25-84 indicated fluid level at 752.2 m (2468'). Straddle packer was set to run hydrologic test on zone from 1117.1 m (3665') to 1121.4 m (3679') 05-31-84. 48 mm (1.9") tubing monitor line was set at 761.1 m (2497') 06-01-84.

FENIX & SCISSON, INC.
HOLE HISTORY DATA
NNWSI

Approved: *James Bell Covington*
 Date: *June 12, 1987*

Hole No.: USW H-4 | Type Hole: Hydrologic Test Hole
 User: USGS | Area: Off Site | Site Prep. W.O. #: None
 Location: NTS | County: Nye | W.O. #: 3404-143
 Surface Coordinates: N 761,643.62' E 563,911.11'
 Ground Elev.: 4096.5' | Pad Elev.: None | Center Csg. Elev.: 4097.10'
 Bottom Hole Coord: N 761,658.62' E 563,870.38' @ 3980' MD | Ref: Gyro, 04-29-82
 Rig On Location: 03-19-82 | Spudded: 03-22-82 | Completed: 06-07-82
 Circulating Media: Air foam

Main Rig & Contractor: Ideco 525/REEC
 No. Of Compressors & Capacity: 2-3/IR-1500

Bore Hole Record			Casing Record					
From	To	Size	I.D.	Wt/Ft.	Wall	From	To	Ft ³ Cement
0'	35'	36"	29.25"		3/8"	0'	35'	241
35'	153'	26"						
153'	316'	20"	15.010"	84#		0'	311'	720
316'	1850'	14-3/4"	9.950"	45.50#*		0'	1839'	100
1850'	4000'	8-3/4"	**					

Total Depth: 4000' | Plugs: None

Junk: None

Logging Data: Caliper (4), Electric (3), Formation density, Fluid density (2), Vibroseis (2), Compensated density, Gamma ray (4), Epithermal neutron (2), Temperature (2), Gyroscopic, Magnetometer, Compensated neutron, Compensated***

**Rigs
Used**

Rig No.	Name	Class	Days Operating	Sec. W/Crew	Sec. W/O Crew	Total Days On Location
85124	Ideco 525	II	56.30	1.90	0.67	58.87
85116	Ideco #37	III	15.58		2.67	18.25

Remarks: * 10-3/4" casing perforated from 1750' to 1770' at 2 shots per foot.

** Center of TAM packer set at 3875.86' on 2-7/8" tubing with slotted and bull nosed tail pipe 13' long. 1.9" monitor line landed at 1725'.

*** acoustic, Spectral, Tracejector, Collar locator.

Log T.D. consistently deeper than drilled T.D.

Prepared By: JEC:LLF:ps

Time Breakdown on Next Page

TIME BREAKDOWN					
MAIN HOLE CONSTRUCTION					
Hole No.: USW H-4					
Drilling Operation Time (DOT)	Other Scheduled Time (OST)	Operational Delay Time (ODT)			
Drill <u>17.37</u>	Mobe & Demobe <u>10.77</u>	Rig Repairs <u>3.69</u>			
Trips <u>3.50</u>	Core <u>0.81</u>	W.O. Equipment <u>0.48</u>			
Single Shot Dev. <u>0.39</u>	Log <u>5.23</u>	Fish <u>0.75</u>			
Fluid Probe <u>1.67</u>	Unload Hole <u>21.40</u>	Clean Out Fill <u>0.04</u>			
Connections <u>0.73</u>	Run Mandrel <u>2.56</u>	Ream Hole <u>0.19</u>			
Open Hole <u>0.31</u>	Hydrological Tests <u>0.31</u>	Plug Back <u>1.90</u>			
	Run Pump <u>0.04</u>	Drill Out Plugs <u>1.04</u>			
	Gyro Survey <u>1.04</u>	Secured W/Crews <u>0.04</u>			
		Tight Hole <u>1.04</u>			
		Condition Hole <u>1.04</u>			
Main Hole DOT 23.66 Days					
Casing Operation Time (COT)					
Run Casing <u>1.93</u>					
Run Casing <u>0.94</u>					
Cement Casing <u>0.29</u>					
Cement Casing <u>0.08</u>					
Drill Out Shoe <u>0.08</u>					
Perforate Casing <u>0.08</u>					
Main Hole COT: 3.24 Days			Main Hole OST: 41.08 Days		
Main Hole ODT: 8.13 Days					
Total Main Hole Construction Time: 76.11 Days					
Remarks:					
TOTAL ELAPSED TIME					
Total Site Prep. Time <u>76.11</u> Days		Remarks:			
Total Main Hole Construction <u>3.34</u> Days					
Secured W/O Crew Site Prep. <u>0.42</u> Days					
Total Suspended Time (No Rig) <u>0.42</u> Days					
TOTAL ELAPSED TIME <u>79.87</u> Days					

USW H-4
HOLE HISTORY

03-19-82 Moved in Ideco 525, rig #85124 and started rigging up.

03-20-82 Continued moving in equipment and rigging up.

03-21-82 Continued moving in equipment and rigging up. Drilled 14-3/4" mouse hole and set in mouse hole pipe.

03-22-82 Rigged up. Drilled 14-3/4" rat hole and set in rat hole pipe. Made up 36" bit and drilled 36" hole from 0' to 34'. Made trip for 23-1/2" mandrel at 25'.

03-23-82 Drilled 36" hole from 34' to 35'. Cleaned out hole and made trip out. Ran and set 30" O.D., 3/8" wall casing at 35'. Cemented the annulus using National Cementers as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	35' - 32'	30 neat cement + 2% CaCl ₂	6	0405 Hours
2	32' - 18'	175 "	27	0930 "
3	18' - 0'	<u>36</u> Redi-Mix	<u>34</u>	1415 "
Totals		241 Ft ³	67 Ft ³	

Cemented stage #2 to surface, cement dropped to 18'. Used REECO Redi-Mix truck on stage #3. Continued rigging up.

03-24-82 Rigged up. Drilled out cement from 32' to 35'. Drilled 26" hole from 35' to 45' with conventional circulation using air and soap.

03-25-82 Drilled 26" hole from 45' to 62'. Made trip for 24" mandrel and started working tools in tight hole going in.

03-26-82 Laid down drill collar. Drilled on boulders or junk at 62'. Made trip out, left 26" bit, sub and bolts in the hole. Fished out bit and sub. Made 6 attempts with a magnet on a sand line, no recovery. Cleaned out hole using a 26" bit. Recovered bolts and nuts using a magnet.

03-27-82 Made trip in. Drilled 26" hole from 62' to 91'.

03-28-82 Drilled 26" hole from 91' to 117'. Made trip for bit change at 93', left nut from mandrel in the hole. Unable to recover nut using a magnet and cleaned out 4' fill.

03-29-82 Drilled 26" hole from 117' to 134'. Made trip for bit change at 128', ran magnet, no junk recovery and cleaned out 4' fill.

03-30-82 Drilled 26" hole from 134' to 153'. Made trip out for 17-1/2" bit.

USW H-4
Hole History
Page 2

03-31-82 Made trip in. Drilled 17-1/2" hole from 153' to 316'. Made trip out for 20" hole opener.

04-01-82 Opened 17-1/2" hole to 20" from 153' to 316'. Washed and conditioned hole. Made trip out. Ran Birdwell caliper, induction, and formation density logs to 312' T.D.

04-02-82 Ran 1.6" tubing in the hole to 290' for grout line. Ran and set 16" O.D., 84# casing at 311'.

04-03-82 Cemented the annulus as follows:

	<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
	1	316' - 308'	25 neat cement + 3% CaCl ₂	18	1335 Hours
04-04-82	2	308' - 162'	315 "	117	1050 "
	3	162' - 0'	380 "	413	1430 "
		Totals	720 Ft ³	548 Ft ³	

Cut off 16" casing at surface. Stage #3 dropped to 3.5'. Made trip in with 14-3/4" bit on 6-5/8" drill pipe.

04-05-82 Cleaned out cement and hole from 290' to 316'. Drilled 14-3/4" hole from 316' to 573' using air foam.

04-06-82 Drilled 14-3/4" hole from 573' to 783'.

04-07-82 Drilled 14-3/4" hole from 783' to 909'. Made trip to remove bottom stabilizer and for bit change at 845'.

04-08-82 Drilled 14-3/4" hole from 909' to 1145'. Tested fabricated defoaming separator during drilling.

04-09-82 Drilled 14-3/4" hole from 1145' to 1411'. Tested for water inflow at 0730 hours and at 1230 hours.

04-10-82 Drilled 14-3/4" hole from 1411' to 1768'. Tested for water inflow at 1500 hours and at 2130 hours. Installed injector system in flow line and injected defoaming solution at 7 gallons per day.

04-11-82 Drilled 14-3/4" hole from 1768' to 1850'. Tested for water inflow at 1787', 1820', 1830', 1840' and 1850'. Made trip out, checked fluid level at 1710'. Ran TV camera to 1647'.

04-12-82 Completed running TV camera from 1647' to 300'. Ran Birdwell fluid density log, checked fluid level at 1700'. Ran caliper log to 1842' T.D. Ran vibroseis survey on 25' stations to 1843' T.D.,

USW H-4
Hole History
Page 3

04-12-82
(Cont.) logged from 1840' to 300'. Ran borehole compensated density log to 1843' T.D., gamma ray log to 1843' T.D., epithermal neutron log to 1842' T.D., and temperature log to 1842' T.D., maximum temperature was 88°F.

04-13-82 Ran induction log to 1837' T.D. Checked fluid level at 1000'. Made trip in with Hunt sidewall sample tool on 6-5/8" drill pipe and started taking sidewall samples.

04-14-82 Took sidewall samples between 1830' and 1312'. Laid down tools and 6-5/8" drill pipe. Ran Birdwell induction log to 1842' T.D. Rigged up and started running 10-3/4" O.D., 45.50# casing with bottom of joint #1 belled.

04-15-82 Lowered and set 10-3/4" casing at 1839'. Checked fluid level at 1702'. Cemented bottom of the annulus down the casing using National Cementers in 2 stages with 50 ft³ of neat cement + 3% CaCl₂ on each stage. CIP at 0745 hours. Calculated maximum annular top of cement at 1799'. Rigged up and secured rig at 2400 hours.

04-16-82 Rig secured to 1600 hours. Made trip in with 8-3/4" bit on 4-1/2" drill pipe and cleaned out cement from 1781' to wiper plug at 1814'.

04-17-82 Drilled out wiper plug, cement and cleaned out hole from 1814' to 1850'. Drilled 8-3/4" hole from 1850' to 2022' using air foam. Made trip for bit change at 2022'.

04-18-82 Drilled 8-3/4" hole from 2022' to 2275'. Increase of formation water indicated at 2261'.

04-19-82 Drilled 8-3/4" hole from 2275' to 2464'.

04-20-82 Drilled 8-3/4" hole from 2464' to 2605'.

04-21-82 Drilled 8-3/4" hole from 2605' to 2723'. Repaired equipment 9-1/2 hours.

04-22-82 Unable to break circulation, pulled up to 2300' and broke circulation in stages to bottom. Drilled 8-3/4" hole from 2723' to 2889'.

04-23-82 Drilled 8-3/4" hole from 2889' to 3020'. Pulled up 11 stands and stage circulated to bottom on connection at 2952' to get returns due to water inflow.

04-24-82 Drilled 8-3/4" hole from 3020' to 3115'. Made trip for bit change at 3024' and stage circulated from 2094' to bottom.

USW H-4
Hole History
Page 4

04-25-82 Drilled 8-3/4" hole from 3115' to 3321'. Weight indicator quit working properly (lost 18,000# string weight). Made trip out, changed float sub and made trip in to bottom of 10-3/4" casing at 1839'. Started repairing weight indicator.

04-26-82 Repaired weight indicator. Made trip in stage circulating to bottom. Drilled 8-3/4" hole from 3321' to 3598'.

04-27-82 Drilled 8-3/4" hole from 3598' to 3887'. Attempted to get returns after connection at 3887'.

04-28-82 Pulled up to 2488' and stage circulated to bottom. Drilled 8-3/4" hole from 3887' to 4000'. Conditioned and circulated hole.

04-29-82 Ran Eastman gyroscopic survey using Birdwell equipment. Made trip out with 4-1/2" drill pipe. Ran Birdwell fluid density log to 4006' T.D., checked fluid level at 1702'. Ran caliper log to 4004' T.D., electric log to 4004' T.D. and magnetometer log to 4007' T.D.

04-30-82 Ran Dresser Atlas gamma ray and compensated neutron logs to 4005' T.D. Attempted to run borehole compensated acoustic, tool not working correctly. Ran USGS seisviewer.

05-01-82 Completed USGS seisviewer log. Ran Dresser Atlas borehole compensated acoustic logs. Ran spectral log to 4005' T.D. Started running Birdwell vibroseis survey.

05-02-82 Ran vibroseis survey on 25' stations, logged from 3990' to 1825'. Pumped 40 barrels of water, soap and lithium chloride down the casing. Perforated the 10-3/4" casing using Birdwell from 1750' to 1770' with 2 shots per foot. Laid down drill pipe and drilling assembly. Rigged up to run 5-1/2" casing.

05-03-82 Moved in 5-1/2" casing and 2-3/8" tubing for monitor line. Rigged up to run submersible pump.

05-04-82 Rigged up pump to inject lithium chloride for trace ejector test. Received Centrilift pump at 1400 hours, pump sanded up. Changed pump and started in the hole.

05-05-82 Lowered and hung Centrilift pump on 5-1/2" casing at 1792.34' with intake at 1749.73'. Hung 2-3/8" tubing for monitor line.

05-06-82 Stand by for USGS pump down test.

05-07-82 Stand by for USGS pump down test to 1200 hours. Tested pump equipment and checked fluid level at 1702.5'. Ran pump down test from 1600 hours to 2400 hours.

USW H-4
Hole History
Page 5

05-08-82 Stand by for USGS pump down test and repaired generator to 1300 hours. Ran pump down test from 1300 hours.

05-09-82 Continued running USGS pump down test.

05-10-82 Ran USGS pump down test to 1000 hours. Ran Gearhart temperature log, checked 85°F at 1000'. Ran Gearhart tracejector log. Ran USGS pump down test from 2300 hours.

05-11-82 Continued running USGS pump down test.

05-12-82 Continued running USGS pump down test.

05-13-82 Continued running USGS pump down test.

05-14-82 Continued running USGS pump down test.

05-15-82 Continued running USGS pump down test.

05-16-82 Continued running USGS pump down test.

05-17-82 Rigged down and moved out rig. Continued running USGS pump down test.

05-18-82 Continued running USGS pump down test.

05-19-82 Completed running USGS pump down test at 1600 hours.

05-20-82 Hole suspended 0200 hours. Moved in Ideco #37, rig #85116 and Failing 1500, rig #85133 and rigged up. Started drilling anchor hole #1 using Failing 1500, clutch went out and moved out rig. Moved in Portadrill rig #85122 and rigged up.

05-21-82 Drilled #2, #3, and #4 anchor holes to 10' and set anchors. Rigged down and moved out Portadrill and Failing 1500 rigs. Rigged up Ideco #37. Pulled, laid down 5-1/2" casing, Centrillift pump and 2-3/8" monitor line.

05-22-82 Took 8 water samples between 2063' and 3855' using LANL pressurized bottles and Birdwell equipment. Made up Lynes straddle packers on 2-7/8" tubing and started in the hole.

05-23-82 Set bottom of top packer at 3850' and top of bottom packer at 3909.89'. Ran hydrologic test. Prepared for test #2.

05-24-82 Ran hydrologic test. Pulled up packers and set bottom of top packer at 2985' and top of bottom packer at 3045'. Ran hydrologic test.

USW H-4
Hole History
Page 6

05-25-82 Repaired clutch on sand line to 2400 hours. Checked fluid level at 1703.76' at 2400 hours.

05-26-82 Ran hydrologic tests. Pulled up and set bottom of top packer at 2865.36' and top of bottom packer at 2925.21'. Ran hydrologic test. Pulled up and set bottom of top packer at 2805.31' and top of bottom packer at 2865.16'.

05-27-82 Ran hydrologic test. Pulled up and set bottom of top packer at 2744' and top of bottom packer at 2803'. Ran hydrologic test. Made trip out with straddle packers.

05-28-82 Repaired and dressed packers. Made trip in and set bottom of top packer at 2300' and top of bottom packer at 2412.5'. Ran hydrologic test.

05-29-82 Ran hydrologic test, test no good. Made trip to dress packers. Set bottom of top packer at 2306.47' and top of bottom packer at 2411.35'. Ran hydrologic test. Lowered straddle packer and set bottom of top packer at 2410' and top of bottom packer at 2514', packers would not set. Made trip out.

05-30-82 Five hours repair rig throttle. Checked packers and made trip in. Set bottom of top packer at 2411.16' and top of bottom packer at 2516.01'. Ran hydrologic test. Made trip out and changed packer spacing. Secured rig at 2400 hours.

06-01-82 Rig secured from 05-30-82 to 0800 hours, 06-01-82. Made up straddle packers and made trip in. Set bottom of top packer at 1819.82' and top of bottom packer at 1979.67'. Ran hydrologic test.

06-02-82 Ran hydrologic test, no good. Made trip to dress packers. Set bottom of top packer at 1980' and top of bottom packer at 2140'. Started hydrologic test.

06-03-82 Completed hydrologic test. Lowered and set bottom of top packer at 2140' and top of bottom packer at 2300'. Ran hydrologic test. Lowered and set bottom of top packer at 2570' and top of bottom packer at 2730'. Started hydrologic test.

06-04-82 Completed hydrologic test. Made trip and ran hydrologic test. Made trip out, started rigging down and secured rig at 2400 hours.

06-06-82 Rig secured from 06-04-82 to 0800 hours, 06-06-82. Continued rigging down.

06-07-82 Rigged down and moved out. Hole completed 06-07-82.

USW H-4
Hole History
Page 7

10-26-82 Ran Westech underwater TV camera to 3982', checked fluid level at 1694', pictures good.

12-15-82 Ran Birdwell caliper log to 3990'.

12-16-82 Ran epithermal neutron-gamma ray log to 1860'. Ran gamma ray-collar log to 1848'.

01-27-83 Ran Gearhart tracejector log to 3998' T.D. using Birdwell mast. Maximum temperature was 102°F.

01-28-83 Completed running tracejector log.

01-31-83 Moved in Joy #1 rig #85172 and rigged up.

02-01-83 Moved in 2-7/8" tubing. Made trip in with TAM packer on 2-7/8" tubing and set packer at 3050'. Released packer and made trip out. Installed 13' slotted 2-7/8" pup joint with bottom bull nosed below packer. Made trip in and landed center of packer element at 3875.86'. Filled tubing with water.

02-02-83 Set packer and ran sinker bar to knock out packer plug. Ran swab in 2-7/8" tubing to 1600', no fluid indicated. Ran and landed 1.9" tubing at 1725'. Rigged down and moved out.

USW H-4
MUD REPORT
F&S Time Log

<u>DATE</u> <u>0600 Hours</u>	<u>HOLE</u> <u>Depth-Bit</u>	<u>WATER</u> <u>Barrels</u>	<u>TURCO</u> <u>Gallons</u>	<u>LiCl</u> <u>Gallons</u>	<u>Remarks</u>
03-21-82					Ideco 525
03-22-82					
03-23-82	35' 36"	215			30", 3/8" w., 39.95# csg. @ 35' w/30 ft ³ stg. #2 & #3 w/211 ft ³
03-24-82					
03-25-82	55' 26"				
03-26-82	62' 26"				
03-27-82					Fished out bit & bolts Bit change
03-28-82	93' 26"				
03-29-82	124' 26"	490			
03-30-82	144' 26"				
03-31-82	153' 26"				
	170' 17-1/2"				
04-01-82	316' 17-1/2"				
	255' 20"	380			
04-02-82	316' 20"				Logging
04-03-82					16" O.D., 1/2" w. csg @ 311'
04-04-82					stg. #1 w/25 ft ³ stg. #2 & #3 w/695 ft ³
04-05-82	307' 14-3/4"				
04-06-82	622' 14-3/4"	1000	125	12	
04-07-82	816' 14-3/4"	590			
04-08-82	985' 14-3/4"				
04-09-82	1170' 14-3/4"	1000	140	12	
04-10-82	1447' 14-3/4"	658			
04-11-82	1789' 14-3/4"	750	187		
04-12-82	1850' 14-3/4"	251	20		Logging
04-13-82					Logging
04-14-82					Logging - SWS
04-15-82					10-3/4", 40.50# csg. @ 1839'
04-16-82					2 stgs. w/100 ft ³
04-17-82	1880' 8-3/4"				
04-18-82	2096' 8-3/4"	447	200		
04-19-82	2305' 8-3/4"	529	110		
04-20-82	2515' 8-3/4"	500	22		
04-21-82	2640' 8-3/4"	415	73		11.5 gal. alcohol - flow line
04-22-82	2731' 8-3/4"	130	22		
04-23-82	2920' 8-3/4"				
04-24-82	3020' 8-3/4"	190	129		
04-25-82	3156' 8-3/4"	1239	103		Stage Circulate
04-26-82	3321' 8-3/4"				Stage Circulate
04-27-82	3685' 8-3/4"				
04-28-82	3887' 8-3/4"	877	104		Stage Circulate
04-29-82	4000' 8-3/4"				TD - Gyro
04-30-82					Logging

<u>DATE</u> <u>0600 Hours</u>	<u>HOLE</u> <u>Depth-Bit</u>	<u>WATER</u> <u>Barrels</u>	<u>TURCO</u> <u>Gallons</u>	<u>LiCl</u> <u>Gallons</u>	<u>Remarks</u>
05-01-82					Logging
05-02-82					Logging
05-03-82	(40 bbl. mix - water - soap - LiCl)				Perforate, 1750'-1770'
05-04-82					
05-05-82					
05-06-82					Run Centrilift pump
05-07-82					Hydrologic Tests
					"
					"
(05-17-82)					Moved out rig
					Cont. hydrologic test
(05-20-82)					Moved in Ideco #37
06-04-82					Hydrologic tests
06-07-82					Completed
TOTALS		9661	1235	24	

USW H-4
REVIEW OF HOLE CONDITIONS

762 mm (30") casing was set at 10.7 m (35') in a 914 mm (36") hole drilled to 10.7 m (35') and the annulus cemented in 3 stages to surface with 6.82 m³ (241 ft³) of cement slurry. Calculated annular volume was 1.90 m³ (67 ft³). 660 mm (26") hole was drilled to 46.6 m (153') with conventional circulation using air foam. 508 mm (20") hole was then drilled to 96.3 m (316'). Caliper, induction and formation density logs were run 04-01-82. The average curve on the caliper log indicated a slight hole enlargement to 559 mm (22") from 70.7 m (232') to 74.1 m (243'). 406 mm (16") casing was set at 94.8 m (311') and the annulus cemented to surface in 3 stages with 20.39 m³ (720 ft³) of cement slurry. Calculated annular volume was 15.52 m³ (548 ft³). 375 mm (14-3/4") hole was drilled to 563.9 m (1850'). TV camera, fluid density, caliper, compensated density, gamma ray, epithermal neutron, temperature, induction logs, vibroseis survey on 7.6 m (25') stations from 560.8 m (1840') to 91.4 m (300') were run and sidewall samples taken between 04-11-82 and 04-14-82. The average curve on the caliper log indicated several eroded areas below 100.6 m (330') with a maximum hole enlargement of 737 mm (29") at 323.1 m (1060'). A gradual wash-out to 559 mm (22") was indicated from 502.9 m (1650') to 541.6 m (1777'). 273 mm (10-3/4") casing was set at 560.5 m (1839') and the annulus cemented in 2 stages with 2.83 m³ (100 ft³) of cement slurry. Calculated annular top of cement was 548.3 m (1799'). 222 mm (8-3/4") hole was drilled to a total depth of 1219.2 m (4000') using air foam. Fluid density, caliper, electric, magnetometer, gamma ray, compensated neutron, compensated acoustic, spectral logs, gyroscopic survey and vibroseis survey on 7.6 m (25') stations from 1216.2 m (3990') to 556.3 m (1825') were run between 04-29-82 and 05-02-82. The average curve on the caliper log indicated several gradual wash-out areas between 566.9 m (1860') and 874.8 m (2870') with a maximum hole enlargement of 502 mm (19-3/4") at 693.1 m (2274'). 273 mm (10-3/4") casing was perforated from 533.4 m (1750') to 539.5 m (1770') at 2 shots per foot. Hydrologic pump down tests were run between 05-05-82 and 05-19-82. Hydrologic tests were run using a straddle packer between 05-23-82 and 06-04-82. Hole completed 06-07-82. TV camera was run 10-26-82. Caliper, epithermal neutron-gamma ray and gamma ray-collar logs were run 12-15-82 and 12-16-82. Tracejector log was run 01-27-83 and 01-28-83. TAM packer on 73 mm (2-7/8") tubing was set at 1181.4 (3876') with bottom of slotted and bull nosed tubing at 1187.5 m (3896'). 48 mm (1.9") tubing was set at 525.8 m (1725'), 02-02-83.

FENIX & SCISSON, INC.
HOLE HISTORY DATA
NNWSI

Approved: Wally Hall Covington
 Date: June 12, 1987

Hole No.: USW H-5				Type Hole: Hydrologic Test Hole			
User: USGS		Area: Off Site		Site Prep. W.O. #: None			
Location: NTS		County: Nye		W.O. #: 3404-146			
Surface Coordinates: N 766,634.27' E 558,908.72'							
Ground Elev.: 4850.8'		Pad Elev.: None		Top Casing Elev.: 4851.8'			
Bottom Hole Coord: N 766,608.72' E 558,875.83' @ 3975' MD Ref: Gyro, 06-23-82							
Rig On Location: 05-17-82		Spudded: 05-19-82		Completed: 08-01-82			
Circulating Media: Water - Air foam							
Main Rig & Contractor: Ideco 525/REEC							
No. Of Compressors & Capacity: 2-3/IR-1500, 1-3/Atlas-1200							

Bore Hole Record				Casing Record				
From	To	Size	I.D.	Wt/Ft.	Wall	From	To	Ft ³ Cement
0'	38'	36"	29.25"		3/8"	0'	38'	198
38'	311'	20"	15"		0.495"	0'	311'	1070
311'	2599'	14-3/4"	10.05"	40.50#*		0'	2585'	100
2599'	4000'	8-3/4"	**					

Total Depth: 4000' Plugs:

Junk: None

Logging Data: Caliper (6), Electric (3), Formation density, Fluid density (3), Epithermal neutron, Neutron (2), Gamma ray, Magnetometer, Compensated density (2), Temperature (3), Vibroseis (3), Gyroscopic, Acoustic-fracture, ***

Rigs Used						
Rig No.	Name	Class	Days Operating	Sec. W/Crew	Sec. W/O Crew	Total Days On Location
85124	Ideco 525	II	66.52	2.15	8.00	76.67

Remarks: * 10-3/4" casing perforated as follows: 2520'-2535', 2400'-2415', 2320'-2335' at 2 holes per foot, 06-25-82. 2535'-2565', 2415'-2520', 2355'-2400' with 360 holes, 07-22-82.

** Center of 7" TAM packer set at 3579.92' on 2-7/8", 8rd., 6.5# tubing with slotted and bull nosed tail pipe 13' long. 1.9" monitor line was landed at 2324.10'.

*** Spectral, Tracejector (3), Casing collar locator (2), Gamma ray-casing collar locator, Epithermal neutron-gamma ray

Prepared By: JEC:LLF:ps Time Breakdown on Next Page

TIME BREAKDOWN					
MAIN HOLE CONSTRUCTION					
Hole No.: USW H-5					
Drilling Operation Time (DOT)		Other Scheduled Time (OST)		Operational Delay Time (ODT)	
Drill	14.74	Mobe & Demobe	15.36	Rig Repairs	2.39
Trips	2.33	Core	1.02	W.O. Equipment	0.75
Single Shot Dev.		Log	5.52	Fish	
Surveys	0.48	Unload Hole		Clean Out Fill	0.42
Fluid Probe		Run Mandrel		Ream Hole	0.04
Connections	1.13	Hydrological		Plug Back	
Open Hole	0.56	Tests	16.96	Drill Out Plugs	
Trips	0.17	Perf. Casing	0.52	Secured W/Crews	2.15
				Condition Hole	0.42
				Work Drill Pipe	0.08
				Ream casing	1.46
Main Hole DOT 19.41 Days					
Casing Operation Time (COT)					
Run Casing	0.93				
Run Casing					
Cement Casing	1.09				
Cement Casing					
Drill Out Shoe	0.15				
Main Hole COT: 2.17 Days		Main Hole OST: 39.38 Days		Main Hole ODT: 7.71 Days	
Total Main Hole Construction Time: 68.67 Days					
Remarks:					
TOTAL ELAPSED TIME					
Total Site Prep. Time			Days	Remarks:	
Total Main Hole Construction		68.67	Days		
Secured W/O Crew Site Prep.			Days		
Secured W/O Crew Main Hole Const.		8.00	Days		
Total Suspended Time (No Rig)			Days		
TOTAL ELAPSED TIME		76.67	Days		

USW H-5
HOLE HISTORY

05-17-82 Moved in Ideco 525, rig #85124 and started rigging up.

05-18-82 Continued moving in equipment and rigging up.

05-19-82 Rigged up. Drilled 36" hole from 0' to 4' with conventional circulation using water.

05-20-82 Drilled 36" hole from 4' to 38'. Made trip for 24" mandrel at 12'.

05-21-82 Blew out fluid and laid down tools. Ran and set 30" O.D., 3/8" wall casing at 38'. Cemented the annulus using REECO Redi-Mix trucks as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	38' - 37.8'	9 Gyp-Seal	1	1200 Hours
2	37.8' - 32'	54 Redi-Mix	13	1350 "
3	32' - 0'	135 "	69	1715 "
Totals		198 ft ³	83 ft ³	

Drilled and set rat hole pipe using a Dyna-Drill.

05-22-82 Drilled and set mouse hole pipe. Cleaned out cement in the casing from 32' to 38' and drilled 14-3/4" hole to 41' using a 26" hole opener with 14-3/4" pilot bit. Rigged up drilling equipment and drilled 14-3/4" hole from 41' to 69' with conventional circulation using air foam.

05-23-82 Drilled 14-3/4" hole from 69' to 296'.

05-24-82 Drilled 14-3/4" hole from 296' to 311'. Made trip for 20" hole opener. Opened 14-3/4" hole to 20" from 38' to 140'.

05-25-82 Opened 14-3/4" hole to 20" from 140' to 311' and drilled 14-3/4" pilot hole to 314.58'. Made trip out. Ran Birdwell caliper log to 314' T.D., induction log to 313' T.D. and formation density log to 311' T.D. Rigged up to run 16" casing.

05-26-82 Ran and set 16" O.D., 0.495" wall casing with 1.6" grout line welded on the outside at 311'. Ran 1.6" tubing inside the casing and pumped in 1st stage then pulled tubing out. Cemented the annulus using National Cementers as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	311' - 301'	20 Gyp-Seal	7	1010 Hours
2	301' -	300 Neat cement + 2% CaCl ₂	-	1210 "
3	- 104'	300 "	288	1445 "

USW H-5
Hole History
Page 2

05-26-82 (Cont.)	<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
	4	104' - 54'	300 Neat cement + 2% CaCl ₂	40	1930 "
	5	54' - 0'	<u>150</u> "	<u>135</u>	2230 "
	Totals		1070 Ft ³	470 Ft ³	
05-27-82	Rigged up. Cleaned out cement and hole from 195' to 314.5'. Drilled 14-3/4" hole from 314.5' to 386' using air and soap.				
05-28-82	Drilled 14-3/4" hole from 386' to 817'.				
05-29-82	Drilled 14-3/4" hole from 817' to 1042', lost returns at 1005'. Attempted to get returns from 1600 hours. Worked 4 hours on pump.				
05-30-82	Attempted to get returns and worked on compressors to 0800 hours. Made trip out. Ran Birdwell caliper log to 1032' T.D. Made trip in and attempted to get returns. Increased soap mixture and had returns. Drilled 14-3/4" hole from 1042' to 1050'. Pulled tools up in 16" casing and secured rig at 2400 hours.				
06-01-82	Rig secured from 05-30-82 to 0800 hours, 06-01-82. Made trip out and rearranged stabilizers. Made trip in, no fill. Drilled 14- 3/4" hole from 1050' to 1166' with partial returns.				
06-02-82	Drilled 14-3/4" hole from 1166' to 1329', lost returns. Added 20% additional soap to drilling fluid at 2330 hours.				
06-03-82	Drilled 14-3/4" hole from 1329' to 1476'. Regained returns at 0015 hours and had partial returns from 2000 hours to 2300 hours.				
06-04-82	Drilled 14-3/4" hole from 1476' to 1600'. Made trip out and secured rig at 2400 hours.				
06-06-82	Rig secured from 6-4-82 to 0800 hours, 6-6-82. Made trip in and reamed hole to bottom. Drilled 14-3/4" hole from 1600' to 1855'.				
06-07-82	Drilled 14-3/4" hole from 1855' to 2212'. Lost returns for 15 minutes at 2135'.				
06-08-82	Drilled 14-3/4" hole from 2212' to 2478'. Lost returns from 2386' to 2396' and from 2465' to 2475'.				
06-09-82	Drilled 14-3/4" hole from 2478' to 2599'. Ran water test at 2490'. Blew out fluid at 2599'. Made trip out. Ran Birdwell fluid density log to 2592' T.D., checked fluid level at 2361'. Ran caliper log to 2592' T.D.				

USW H-5
Hole History
Page 3

06-10-82 Ran epithermal neutron log to 2592' T.D., compensated neutron log to 2583' T.D., gamma ray log to 2583' T.D. and LLNL magnetometer log to 2581' T.D. Ran Westech TV camera to fluid at 2306'.

06-11-82 Ran induction electric log to 2581' T.D., borehole compensated density log to 2586' T.D., temperature log to 2578' T.D. and vibroseis survey on 25' stations to 2585' T.D.

06-12-82 Logged vibroseis survey from 2330' to 550'. Ran fluid density log, checked fluid level at 2306'. Monitored fluid level between 1230 hours and 1600 hours, no fluid change indicated. Rigged up and made trip for sidewall samples.

06-13-82 Took sidewall samples between 2245' and 1690'. Made trip out. Ran Birdwell vibroseis survey on 25' stations from 550' to 311'. Made trip in with 14-3/4" bit, returns erratic.

06-14-82 Cleaned out and conditioned hole. Pulled up and checked 5' fill. Made trip out. Ran and set 10-3/4" O.D., 40.50# casing at 2585', tagged fill at 2587'. Cemented the annulus using National Cementers with 100 ft³ of neat cement + 3% CaCl₂. CIP at 2235 hours. Used 20 barrels of water behind rubber wiper plug. Estimated calculated cement top at 2569'.

06-15-82 Rigged up and made trip in with 8-3/4" bit on 4-1/2" drill pipe to plug at 2422'. Drilled out plug and cement from 2422' to 2548'.

06-16-82 Drilled out cement from 2548' to 2585' and cleaned out fill to 2599'. Made trip for bit change. Drilled 8-3/4" hole from 2599' to 2743' using air foam.

06-17-82 Drilled 8-3/4" hole from 2743' to 2983'.

06-18-82 Drilled 8-3/4" hole from 2983' to 3099'. Ran inflow test at 3057'. Moved in three new Atlas 1200 compressors and one booster.

06-19-82 Rigged up compressors to 0800 hours. Drilled 8-3/4" hole from 3099' to 3265'.

06-20-82 Drilled 8-3/4" hole from 3265' to 3503'.

06-21-82 Drilled 8-3/4" hole from 3503' to 3647'. Made trip for bit change at 3520'.

06-22-82 Drilled 8-3/4" hole from 3647' to 3947'.

06-23-82 Drilled 8-3/4" hole from 3947' to 4000'. Conditioned hole using air and took fluid sample. Ran Eastman gyroscopic survey using Birdwell equipment. Made trip out. Ran Birdwell fluid density

USW H-5
Hole History
Page 4

06-23-82 log to 3991' T.D., checked fluid level at 2310'. Ran caliper log
(Cont.) to 3991' T.D. and vibroseis survey on 25' stations to 3993' T.D.,
logged from 3975'.

06-24-82 Completed vibroseis survey to 2550'. Ran Dresser Atlas dual
induction lateral, borehole compensated density, compensated
neutron, borehole compensated acoustic-fracture and spectral logs
to 3996' T.D.

06-25-82 Perforated 10-3/4" casing from 2520' to 2535', 2400' to 2415' and
2320' to 2335' at 2 holes per foot using Birdwell jet charges. Ran
fluid density log, checked fluid level at 2310'. Laid down 4-1/2"
drill pipe.

06-26-82 Rigged up to run Hughes Centrilift pump. Started in with
Centrilift pump on 5-1/2" casing along with 2-3/8" monitor line.

06-27-82 Made trip in and hung pump at 2509' with intake at 2469' and bottom
of monitor line at 2519'. Made up surface equipment and tested
pump. Secured operations at 2400 hours.

06-28-82 Rig secured to 0800 hours. Repaired generators. Ran pump test #1
from 1245 hours to 1600 hours and test #2 from 1700 hours to 2100
hours.

06-29-82 Made 3 attempts for pump test #3, generator not working properly.
Repaired generator and equipment. Ran pump test #3 from 1930
hours.

06-30-82 Continued running pump test #3.

07-01-82 Continued running pump test #3.

07-02-82 Ran USGS pump test #3 to 0800 hours. Ran Gearhart tracejector log.
Ran Gearhart temperature log at 2000'. Made trip to check
transducer. Continued pump test #3.

07-03-82 Ran pump test #3 to 1600 hours. Ran Gearhart tracejector log.
Started running USGS flukemeter.

07-04-82 Ran USGS flukemeter. Started running USGS recovery tests.

07-10-82 Rig secured from 07-04-82 to 07-10-82. Rigged up, laid down 5-1/2"
casing and pump.

07-11-82 Rigged up to run straddle packers.

07-12-82 Waited on Lynes straddle packers to 1300 hours. Checked fluid
level at 2308.74' at 1130 hours. Made up Lynes packers on 2-7/8"

USW H-5
Hole History
Page 5

07-12-82 tubing and made trip in. Filled tubing with LiCl water and set
(Cont.) packers at 2550' and 2610' for hydrologic test.

07-13-82 Ran hydrologic test. Released and lowered packers, unable to set
packers. Made trip to dress the packers. Set packers at 2612' and
2672' for hydrologic test.

07-14-82 Ran hydrologic test. Released and reset packers at 2675' and
2735'. Ran hydrologic test. Released and reset packers at 3330'
and 3390' for hydrologic test.

07-15-82 Ran hydrologic test. Released and reset packers at 3390' and 3450'
for hydrologic test.

07-16-82 Ran hydrologic test. Made trip out, packer elements damaged with
cuts. Made trip in with 9-7/8" tapered mill to 2600'.

07-17-82 Made trip for 8-3/4" bit and tagged bottom at 3977.37'. Made trip
out. Dressed packers and made trip in with straddle packer.

07-18-82 Set packers at 2736.5' and 2936.5'. Ran hydrologic test. Released
and reset packers at 2910' and 3110'. Ran hydrologic test.
Released and reset packers at 3120' and 3320'. Ran hydrologic
test. Released and reset packers at 3220' and 3420'.

07-19-82 Reset packers at 3250' and 3450'. Ran hydrologic test. Released
and reset packers at 2908' and 3108'. Ran hydrologic test. Made
trip out. Laid down packers and 2-7/8" tubing.

07-20-82 Started rigging down and cleaning location.

07-21-82 Drilling crews on stand-by.

07-22-82 Rig secured to 0800 hours. Perforated 10-3/4" casing using Welex
from 2355' to 2400', 2415' to 2520' and 2535' to 2565' with 360
shots. Ran junk basket for debris. Made trip with 9.98" O.D.
casing scraper to 2542', casing was clear.

07-23-82 Completed running casing scraper. Ran Birdwell caliper log to
3983' T.D. Ran continuous temperature log to 3978' T.D., maximum
recorded temperature was 111° F. Serviced submersible pump.

07-24-82 Changed electrical reel. Started in the hole with series #513
Centrilift pump on 5-1/2" casing along with 2-7/8" monitor line and
electric cable banded on the outside.

07-25-82 Landed pump at 2359.60' with intake at 2330' and monitor line at
2303'. Checked fluid level at 2310'. Ran Gearhart tracejector
test as directed.

USW H-5
Hole History
Page 6

07-26-82 Continued hydrologic tests as directed.

07-27-82 Completed hydrologic tests at 0430 hours. Crews on stand-by.

07-28-82 Crew on stand-by to 0800 hours. Pulled and laid down 5-1/2" casing, Centrilift pump and 2-3/8" monitor line. Started rigging down.

07-29-82 Continued rigging down and moving out equipment.

07-30-82 Continued rigging down and moving out equipment.

07-31-82 Continued moving out equipment.

08-01-82 Moved out rig and equipment. Hole completed 08-01-82.

08-02-82 Completed moving out equipment.

10-25-82 Ran Westech TV camera to 3432', checked fluid level at 2297'. Pictures not clear below 3414'.

01-03-83 Ran Birdwell caliper log to 3678' T.D. Ran gamma ray-collar log. Ran gamma ray-epithermal neutron log.

02-03-83 Moved in Joy #1, rig #85172 and rigged up.

02-04-83 Made up 7" O.D. dual element TAM packer on 2-7/8", 8rd., 6.5# tubing with 2-7/8" slotted and bull nosed tail pipe on bottom. Landed and set center of packer element at 3579.92'. Knocked out packer plug using a sinker bar and swabbed tubing to 2200'. Ran and landed 1.9" monitor line with mule shoe on bottom at 2324.10'. Rigged down and moved out.

03-13-84 Ran Gearhart temperature log and stabilized log down 2-7/8" tubing to 2310' T.D. using Birdwell mast. Maximum temperature was 96° at 2310'.

USW H-5
MUD REPORT
F&S Time Log

<u>DATE</u> 0600 Hours	<u>HOLE</u> <u>Depth-Bit</u>	<u>WATER</u> <u>Barrels</u>	<u>TURCO</u> <u>Gallons</u>	<u>LiCl</u> <u>Gallons</u>	<u>Remarks</u>
05-18-82					Move in Ideco 525
05-19-82					Rigging Up.
05-20-82	12' 36"	Water			
05-21-82	38' 36"	Water			30" O.D.x3/8" w.csg@38'
05-22-82		387	130		Cem. 3 stgs. w/198 ft ³ , Rat & Mouse Holes
05-23-82	112' 14-3/4"				
05-24-82	311' 14-3/4"	1050	233	12	
05-25-82	237' 20"	120	48		
05-26-82	311' 20"				Logs, 16" csg. @ 311'
05-27-82					Cem. 5 stgs. w/1070 ft ³
05-28-82	570' 14-3/4"	867	145	21	
05-29-82	930' 14-3/4"	443	83	4	
05-30-82	1042' 14-3/4"	719	223		Poor to no returns
05-31-82	1050' 14-3/4"	708	224		25 gal.TURCO/100 bbl.H ₂ O
06-01-82					Holiday
06-02-82	1236' 14-3/4"	900	298		
06-03-82	1357' 14-3/4"	890	622	21	Increased TURCO 20%
06-04-82	1511' 14-3/4"	506	93		
06-05-82	1600' 14-3/4"	378	120		
06-06-82					Holiday
06-07-82	1935' 14-3/4"	620	128		
06-08-82	2275' 14-3/4"	1062	440		No returns, 15 min@2135'
06-09-82	2515' 14-3/4"	1326	415		
06-10-82	2599' 14-3/4"	458	142		Logs
06-11-82					Logs
06-12-82					Logs
06-13-82					Logs & SWS
06-14-82		324	100		SWS & Log, Cond. Hole
06-15-82					10-3/4" csg. @ 2585'
06-16-82	2599' 8-3/4"	210	50		cem. w/100 ft ³
06-17-82	2828' 8-3/4"	882	205		Cem. & Fill from 2422'
06-18-82	3030' 8-3/4"	1907	443		
06-19-82	3099' 8-3/4"	266	138		Installed 3 Atlas Comp.
06-20-82	3333' 8-3/4"				
06-21-82	3520' 8-3/4"	888	265		
06-22-82	3698' 8-3/4"	870	288		
06-23-82	4000' 8-3/4"	1047	173		T.D. Logs
06-24-82					Logs
06-25-82		Fluid level @ 2310'			Logs, Perf. 2520' to 2535', 2400' to 2415', 2320' to 2335'
06-26-82					Run Centrilift pump

USW H-5
Mud Report
Page 2

<u>DATE</u> <u>0600 Hours</u>	<u>HOLE</u> <u>Depth-Bit</u>	<u>WATER</u> <u>Barrels</u>	<u>TURCO</u> <u>Gallons</u>	<u>LiCl</u> <u>Gallons</u>	<u>Remarks</u>
06-27-82					Set pump on 5-1/2" csg. @ 2509', 2-3/8" tubing @ 2519'
06-28-82					Hydrologic tests
06-29-82					"
07-06-82					Holiday
07-10-82					Secured
07-11-82					Pulled pump
					Straddle packer tests
07-19-82					"
07-22-82					Perf. casing
07-28-82					Pump tests
					Rigging down
08-01-82					Completed
	TOTALS	16828	5006	58	

USW H-5
REVIEW OF HOLE CONDITIONS

762 mm (30") casing was set at 11.6 m (38') in a 914 mm (36") hole drilled to 11.6 m (38') with conventional circulation using water. The annulus was cemented to surface in 3 stages with 5.61 m³ (198 ft³) of cement slurry. Calculated annular volume was 2.35 m³ (83 ft³). 508 mm (20") hole was drilled to 94.8 m (311') using air foam. Caliper, induction and formation density logs were run 05-25-82. The average curve on the caliper log indicated hole erosion from 14.3 m (47') to 63.4 m (208') with maximum hole enlargement of 914 mm (36") at 29.9 m (98') and 51.2 m (168'). 406 mm (16") casing was set at 94.8 m (311') and the annulus cemented to surface in 5 stages with 30.30 m³ (1070 ft³) of cement slurry. Calculated annular volume was 13.31 m³ (470 ft³). 375 mm (14-3/4") hole was drilled to 317.6 m (1042') using air foam. Caliper log was run 05-30-82. The average curve on the caliper log indicated a gradual wash-out from 128.0 m (420') to 173.7 m (570') with maximum hole enlargement to 629 mm (24-3/4") thru the area from 148.1 m (486') to 166.1 m (545'). Hole erosion was indicated between 212.8 m (698') and 235.6 m (773') with hole enlargements of 673 mm (26-1/2") at 214.0 m (702') and 838 mm (33") at 223.7 m (734'). Erosion was also indicated between 243.8 m (800') and 304.8 m (1000') with hole enlargement to 667 mm (26-1/4") at 266.7 m (875'). 375 mm (14-3/4") hole was then drilled to 792.2 m (2599'). Fluid density, caliper, epithermal neutron, compensated neutron, gamma ray, magnetometer, induction, compensated density, temperature logs, TV camera, and vibroseis survey on 7.6 m (25') stations from 710.2 m (2330') to 94.8 m (311') were run and sidewall samples taken between 06-09-82 and 06-13-82. The average curve on the caliper log below 304.8 m (1000') indicated erosion between 335.3 m (1100') and 505.4 m (1658') with hole enlargement to 699 mm (27-1/2") at 345.6 m (1134'). Gradual wash-out areas were indicated between 513.0 m (1683') and 760.8 m (2496') with hole enlargement to 660 mm (26") at 756.2 m (2481'). 273 mm (10-3/4") casing was set 787.9 m (2585') and the annulus cemented with 2.83 m³ (100 ft³) of cement slurry. Calculated top of cement in the annulus was 783.0 m (2569'). 222 mm (8-3/4") hole was drilled to a total length of 1219.2 m (4000') using air foam. Gyroscopic survey, fluid density, caliper, induction lateral, compensated density, compensated acoustic-fracture, spectral logs and vibroseis survey on 7.6 m (25') stations from 906.8 m (2975') to 777.2 m (2550') were run 06-23-82 and 06-24-82. The average curve on the caliper log indicated hole to be nearly in gauge with maximum hole enlargement to 330 mm (13") at 868.1 m (2848'). 273 mm (10-3/4") casing was perforated from 768.1 m (2520') to 772.7 m (2535'), 731.5 m (2400') to 736.1 m (2415') and 707.1 m (2320') to 711.7 m (2335') with 2 shots per foot. Hydrologic pump tests were run from 06-28-82 to 07-04-82. Hydrologic tests using a straddle packer were run from 07-13-82 to 07-19-82. 273 mm (10-3/4") casing was again perforated from 772.7 m (2535') to 781.8 m (2565'), 736.1 m (2415') to 768.1 m (2520') and 717.8 m (2355') to 731.5 m (2400') with 360 shots, 07-22-82. Caliper and temperature logs were run 07-23-82 with maximum temperature of 43.9^o C (111^o F) at 1212.5 m (3978'). The average curve on the caliper indicated additional hole enlargements of 362 mm (14-1/4") at 1047.0 m (3435') and 387 mm (15-1/4") at 1098.5 m (3604'). Hydrologic pump tests were run from 07-25-82 to 07-27-82. Hole completed 08-01-82. TV camera was run 10-25-82. Caliper, gamma ray-collar, and gamma ray-epithermal neutron logs were run 01-03-83. The average curve on caliper log run #6 indicated few changes in hole conditions; increased erosion was shown at 1047.3 m (3436') to 521 mm (20-1/2"). TAM packer on 73 mm (2-7/8") tubing was set at 1091.2 m (3580') with bottom of slotted and bull nosed tubing at 1097.3 m (3600'). 48 mm (1.9") tubing was set at 708.4 m (2324'), 02-04-83. Temperature log run on 03-13-84 indicated maximum temperature 35.6^o C (96^o F) at 704.1 m (2310').

FENIX & SCISSON, INC.
HOLE HISTORY DATA
NNWSI

Approved: *Jimmy Nell Covington*
 Date: *June 12, 1987*

Hole No.: USW H-6		Type Hole: Hydrologic Test Hole	
User: USGS	Area: Off Site	Site Prep. W.O. #: None	
Location: NTS	County: Nye	W.O. #: 3404-149	
Surface Coordinates: N 763,298.86' E 554,074.94'			
Ground Elev.: 4270.6'	Pad Elev.: None	Top Casing Elev.: 4271.90'	
Bottom Hole Coord: N 763,300.37' E 554,022.52' @ 3950' MD Ref: Gyro, 09-29-82			
Rig On Location: 08-03-82		Spudded: 08-07-82 Completed: 10-28-82	
Circulating Media: Air foam			
Main Rig & Contractor: Ideco 525 - REECO			
No. Of Compressors & Capacity: 1-3/Atlas 1200			

Bore Hole Record				Casing Record				
From	To	Size	I.D.	Wt/Ft.	Wall	From	To	Ft ³ Cement
0'	33'	36"	29.376"		0.312"	0'	31'	315
33'	335'	22"	15.010"		0.495"	0'	311'	1000
335'	1912'	14-3/4"	9.850"	51#		0'	1906'	200 *
1912'	3990'	8-3/4"	**					
3990'	4002'	6-1/8"						

Total Depth: 4002' | Plugs: None

Junk: None

Logging Data: Caliper (5), NCTL, Collar locator, Fluid density (5), Density (3), Epithermal neutron (2), Neutron, Acoustic, Gamma ray (4), NAIL, Temperature, Magnetometer, Electric (3), Spectralog, Acoustic-gamma ray, Gyro, Water ***

Rigs Used						
Rig No.	Name	Class	Days Operating	Sec. W/Crew	Sec. W/O Crew	Total Days On Location
85124	Ideco 525	II	84.36	2.31	1.33	88.00

Remarks: * Two separate 100 ft³ cement jobs.

** Packer set at 2468' on 2-7/8" tubing; bottom of packer assembly bull plugged with circulating sub below elements open. 1.9" monitor line was landed at 1751.5', 07-19-84.

*** locator, Vibroseis (2).

Prepared By: JEC:LLF:ps

Time Breakdown on Next Page

TIME BREAKDOWN					
MAIN HOLE CONSTRUCTION					
Hole No.: USW H-6					
Drilling Operation Time (DOT)		Other Scheduled Time (OST)		Operational Delay Time (ODT)	
Drill	18.59	Mobe & Demobe	8.68	Rig Repairs	7.89
Trips	5.96	Core	7.91	W.O. Equipment	0.06
Dress Drilling		Log	5.37	Fish	2.71
Assembly		Unload Hole	0.38	Clean Out Fill	0.67
Fluid Probe		Run Mandrel		Ream Hole	
Connections		Hydrological		Plug Back	
Open Hole	1.06	Tests	17.65	Drill Out Plugs	
		Gyro Survey	0.19	Secured W/Crews	2.31
		Perforate Casing	0.38	Condition Hole	1.59
Main Hole DOT 25.61 Days				Condition Fluid	0.44
Casing Operation Time (COT)				Trip Tubing	0.27
Run Casing	1.35			Test Rods	1.00
Run Casing					
Cement Casing	1.40				
Cement Casing					
Drill Out Shoe	0.81				
Main Hole COT: 3.56 Days		Main Hole OST: 40.56 Days		Main Hole ODT: 16.94 Days	
Total Main Hole Construction Time: 86.67 Days					
Remarks:					
TOTAL ELAPSED TIME					
Total Site Prep. Time			Days	Remarks:	
Total Main Hole Construction			86.67 Days		
Secured W/O Crew Site Prep.			Days		
Secured W/O Crew Main Hole Const.			1.33 Days		
Total Suspended Time (No Rig)			Days		
TOTAL ELAPSED TIME			88.00 Days		

USW H-6
HOLE HISTORY

08-03-82 Moved in Ideco #525, rig #85124 and started rigging up.

08-04-82 Continued rigging up.

08-05-82 Continued rigging up.

08-06-82 Continued rigging up. Drilled mouse hole and set pipe.

08-07-82 Drilled rat hole and rigged up. Drilled 36" hole 0' to 18' with conventional circulation using air foam.

08-08-82 Drilled 36" hole from 18' to 22'. Made trip out. Repaired equipment and waited on parts 12-1/2 hours. Made trip in and cleaned out 2' fill.

08-09-82 Drilled 36" hole from 22' to 33'. Made trip out, left 2 bolts, 2 nuts and 2 jet pipes 9" long in the hole. Recovered 1 bolt, 1 jet nozzle and 2 pint cartons of junk using a magnet. Ran and set 30" O.D., 0.312" wall casing at 31'. Cemented the annulus using National Cementers as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	33' - 26'	40 neat cement + 2 CaCl ₂	25	1715 Hours
2	26' - 0'	<u>275</u> "	<u>56</u>	2115 Hours
Totals		315 Ft ³	81 Ft ³	

08-10-82 Installed well head assembly and Shaffer rotating head. Made trip with 20" hole opener and 17-1/2" pilot bit. Drilled 3' of 17-1/2" pilot hole. Rigged up to drill 17-1/2" hole.

08-11-82 Made trip in. Drilled 17-1/2" hole from 33' to 169' with conventional circulation using air foam.

08-12-82 Drilled 17-1/2" hole from 169' to 335'. Blew hole dry. Made trip for 22" hole opener. Opened 17-1/2" hole to 22" from 33' to 40'.

08-13-82 Opened 17-1/2" hole to 22" from 40' to 335'. Encountered voids while opening hole. Cleaned out 30' of fill at 327'. Conditioned hole using air and took water samples. Made trip out. Ran Birdwell caliper log to 313' T.D. and induction log to 311' T.D.

08-14-82 Ran formation density log to 310' T.D., no fluid indicated. Started running and welding 16" O.D., 0.495" wall casing with Texas shoe on bottom along with 1.9" tubing outside of casing. Bottom of tubing was orange peeled and tubing slotted.

USW H-6
Hole History
Page 2

08-15-82 Welded and set 16" casing at 311', tagged fill at 312'. Ran 2-3/8" Hydril tubing inside the casing. Cemented stage #1 down 2-3/8" tubing, stage #2 and #3 down 1.9" tubing. Cemented the annulus using National Cementers and Birdwell NAIL monitor as follows:

<u>Stage No.</u>	<u>Interval</u>	<u>Cement Used Ft³</u>	<u>Calc. Ft³</u>	<u>CIP</u>
1	312' -	80 neat cement + 2% CaCl ₂	---	0400 Hours
2		350 "	---	1130 "
3	- 0'	<u>570</u> "	<u>434</u>	1500 "
Totals		1000 Ft ³	434 Ft ³	

Cut off 16" casing and installed flange for rotating head.

08-16-82 Made trip in, cleaned out cement and hole from 302' to 335'. Drilled 14-3/4" hole from 335' to 588' using air foam.

08-17-82 Drilled 14-3/4" hole from 588' to 902' using air foam.

08-18-82 Drilled 14-3/4" hole from 902' to 1088' using air foam, tools started torquing.

08-19-82 Made trip out, left roller and 1/2 roller block in the hole. Attempted to fish junk with 8-1/4" magnet on sand line and then on drill pipe, no success. Made trip in with 14-1/2" x 4.94' Globe basket on 6-5/8" drill pipe and reamed tight hole from 1033' to 1088'. Rotated basket to 1090' and made trip out. Recovered bottom block and 1/2 roller pin. Made trip in and rotated basket from 1090' to 1091'.

08-20-82 Made trip out, recovered roller. Filled pit with water, made trip in with 6-1/8" core bit and barrel and cleaned out 3' fill. Cut 6-1/8" core #1 from 1091' to 1100', core barrel jammed. Made trip for 14-3/4" bit. Opened 6-1/8" hole to 14-3/4" from 1091' to 1100' and conditioned hole using air foam.

08-21-82 Made trip for 6-1/8" core bit and barrel. Cut 6-1/8" core #2 from 1100' to 1114'. Made trip for 14-3/4" bit and cleaned out 12' fill. Opened 6-1/8" hole to 14-3/4" hole from 1100' to 1114' and drilled 14-3/4" hole to 1125'. Conditioned hole and made trip for 6-1/8" core bit and barrel.

08-22-82 Filled pits with 450 barrels of water. Cut 6-1/8" core #3 from 1125' to 1134'.

08-23-82 Made trip for 14-3/4" bit. Opened 6-1/8" hole to 14-3/4" from 1125' to 1134' and drilled 14-3/4" hole to 1144'. Made trip for

USW H-6
Hole History
Page 3

08-23-82
(Cont.) 6-1/8" core bit and barrel. Cleaned out 10' fill, core barrel plugged. Made trip for 14-3/4" Globe basket and cleaned out 13' fill. Drilled 14-3/4" hole from 1144' to 1147' using water. Made trip for 6-1/8" core bit and barrel. Cleaned out bridge at 1098' and 3' fill. Started cutting core #4 from 1147' to 1151' using air foam.

08-24-82 Cut 6-1/8" core #4 from 1151' to 1153.5', core barrel jammed. Made trip out. Cleaned and repaired pits. Changed core bit and made trip in conditioning hole. Cut 6-1/8" core #5 from 1153.5' to 1161.5', core barrel plugged off. Made trip out.

08-25-82 Made trip in with 14-3/4" bit. Opened 6-1/8" hole to 14-3/4" from 1147' to 1161.5'. Made trip for 8-3/4" core bit and barrel and cleaned out 1' fill. Cut 8-3/4" core #6 from 1161.5' to 1169'. Made trip for 14-3/4" bit. Installed gauge tank to measure returns. Conditioned hole.

08-26-82 Opened 8-3/4" hole to 14-3/4" from 1161.5' to 1169' and drilled 14-3/4" hole to 1314'.

08-27-82 Drilled 14-3/4" hole from 1314' to 1340'. Made trip out, left 2 blocks, pin and stabilizer roller in the hole. Made trip in with 14-1/4" O.D. Globe basket and cleaned out 6' fill. Drilled basket from 1340' to 1342'. Made trip out, no recovery. Built up basket shoe to 14-3/4" and made trip in. Drilled basket from 1342' to 1350' not using air. Conditioned hole and made trip out, no recovery. Changed basket shoe and made trip in. Drilled 14-3/4" basket from 1350' to 1358'. Made trip out, no recovery.

08-28-82 Made trip in with 14-3/4" Globe basket. Rotated on junk for 4", lost torque and made trip out, no recovery. Made trip in with 14-5/8" O.D. Globe basket. Drilled basket from 1358' to 1368'. Made trip out, recovered all of junk. Replaced mud gauge tank with smaller tank. Made trip in with 6-1/8" core bit, 5-3/4" barrel and 14-3/4" reamer.

08-29-82 Cut 6-1/8" core #7 from 1368' to 1387'. Made trip for 14-3/4" bit. Opened 6-1/8" hole to 14-3/4" hole to 1387' and drilled 14-3/4" hole to 1417'. Made trip for 6-1/8" core bit and barrel. Cut 6-1/8" core #8 from 1417' to 1427'. Made trip for 14-3/4" bit. Opened 6-1/8" hole to 14-3/4" from 1417' to 1427' and drilled 14-3/4" hole to 1432'.

08-30-82 Drilled 14-3/4" hole from 1432' to 1510'. Conditioned hole and made trip for core bit and barrel. Cut 6-1/8" core #9 from 1510' to 1520.5'. Made trip measuring out, no depth correction.

08-31-82 Made trip in. Opened 6-1/8" hole to 14-3/4" from 1510' to 1520.5' and drilled 14-3/4" hole to 1670'. Made trip out for core bit and barrel.

USW H-6
Hole History
Page 4

09-01-82 Cut 6-1/8" core #10 from 1670' to 1680'. Made trip for 14-3/4" bit. Opened 6-1/8" hole to 14-3/4" from 1670' to 1680' and drilled 14-3/4" hole to 1701'. Made trip out and raised flow line at wellhead 26".

09-02-82 Changed bit and made trip in. Drilled 14-3/4" hole from 1701' to 1820'. Made trip for core bit and barrel and cleaned out 1' fill. Cut 6-1/8" core #11 from 1820' to 1833'.

09-03-82 Cut 6-1/8" core #11 from 1833' to 1840'. Made trip for 14-3/4" bit. Opened 6-1/8" hole to 14-3/4" from 1820' to 1840' and drilled 14-3/4" hole to 1912'. Made trip out. Ran Birdwell fluid density log to 1856' T.D., checked fluid level at 1778'. Ran caliper log to 1904' T.D.

09-04-82 Ran epithermal neutron logs to 1902' T.D., 3 attempts, no logs. Ran gamma ray log to 1901' T.D. Ran Westech TV camera, fluid level indicated at 1725'. Ran Birdwell borehole compensated density log to 1896' T.D. Started running induction electric log.

09-05-82 Ran induction electric log to 1891' T.D. Attempted to run epithermal neutron log, no log. Ran temperature log to 1898' T.D. Ran fluid density log, checked fluid level at 1728'. Ran vibroseis survey to 1893' T.D. on 25' stations from 1875' to 350'. Ran fluid density log to 1899' T.D., checked fluid level at 1728'. Made trip in with 14-3/4" bit and tagged fill at 1899'. Cleaned out fill to 1912'. Pulled tools up into 16" casing and secured rig at 2400 hours.

09-07-82 Rig secured from 09-05-82 to 0800 hours, 09-07-82. Made trip in and tagged fill at 1903'. Cleaned out fill to 1912' and made trip out. Ran magnetometer log to 1909' T.D. Lost electric power logging out at 680'. Pulled out of hole and dropped tool on rig floor. Ran epithermal neutron log to 1909' T.D.

09-08-82 Attempted to run magnetometer log, no log. Ran fluid density log to 1909' T.D., checked fluid level at 1740'. Ran and set 10-3/4" O.D., 51# casing at 1906' with Baker float collar on top of bottom joint at 1884.4'. Pumped 100 ft³ of neat cement +2% CaCl₂ down the casing using National Cementers followed by 163 barrels of water. CIP at 1500 hours. Cut off 10-3/4" casing, welded on flange and installed rotating head.

09-09-82 Made trip in with 8-3/4" bit on 4-1/2" drill pipe stage circulating to cement at 1694'. Cleaned out cement to rubber pump down plug at 1705'. Drilled out plug to 1706' using broken glass and air. Cleaned out cement to 1840' using air foam. Cement soft below 1830'.

USW H-6
Hole History
Page 5

- 09-10-82 Cleaned out cement from 1840' to float collar at 1887'. Drilled out float collar, no cement below. Cleaned out fill from 1907' to 1912' and made trip out. Made trip with 2-3/8" Hydril tubing. Made trip with 9-5/8" bit and cleaned out fill from 1905' to 1912'. Made trip in with 2-3/8" Hydril tubing and tagged fill at 1911'. Cemented 10-3/4" casing annulus using National Cementers with 100 ft³ of neat cement +2% CaCl₂. CIP at 2150 hours. Calculated annular top was 1825'.
- 09-11-82 Tagged top of cement inside casing at 1874'. Laid down 2-3/8" tubing. Made trip in with 9-5/8" bit. Cleaned out cement and fill from 1874' to 1912'. Made trip for 8-3/4" bit and conditioned hole. Drilled 8-3/4" hole from 1912' to 1947' using air foam.
- 09-12-82 Drilled 8-3/4" hole from 1947' to 1986'. Made trip for bit check at 1975'. Had air returns around annulus of 16" casing at 1986' and made trip out. Made trip in with 2-3/8" tubing and tagged bottom at 1986'. Pulled up to 1530' and pumped air, had air returns around 16" casing. Made trip out. Ran Birdwell collar locator log to 1921' T.D. Ran nuclear cement top log to 1906' T.D., annular cement top indicated at 1845'.
- 09-13-82 Ran caliper log to 1984' T.D. Made trip in and drilled 8-3/4" hole from 1986' to 2050', indication of water at 2044'. Made trip out.
- 09-14-82 Made trip in with 6-1/8" core bit and barrel. Cut 6-1/8" core #12 from 2050' to 2057'. Made trip for 8-3/4" bit. Opened 6-1/8" hole to 8-3/4" from 2050' to 2057' and drilled 8-3/4" hole to 2179'.
- 09-15-82 Drilled 8-3/4" hole from 2179' to 2350'.
- 09-16-82 Made trip for core barrel and 6-1/8" bit. Cut 6-1/8" core #13 from 2350' to 2358'. Made trip and cut 6-1/8" core #14 from 2358' to 2368'. Made trip for 8-3/4" bit.
- 09-17-82 Opened 6-1/8" hole to 8-3/4" from 2350' to 2368' and drilled 8-3/4" hole to 2536'.
- 09-18-82 Drilled 8-3/4" hole from 2536' to 2826'.
- 09-19-82 Drilled 8-3/4" hole from 2826' to 2858', tools started torquing. Conditioned hole and made trip out, bit good. Made trip in with 6-1/8" core bit and barrel, stage circulating from 2367' with no returns. Cleaned out 2' fill and cut 6-1/8" core #15 from 2858' to 2868' using only water. Made trip for 8-3/4" bit, stage circulating from 2361' with returns. Opened 6-1/8" hole from 2858' to 2868' and drilled 8-3/4" hole to 2887' using air foam.

USW H-6
Hole History
Page 6

09-20-82 Drilled 8-3/4" hole from 2887' to 3000'. Made trip for 6-1/8" core bit and barrel, stage circulated from 2483'. Cut 6-1/8" core #16 from 3000' to 3010'. Made trip for 8-3/4" bit, stage circulated from 2543'.

09-21-82 Opened 6-1/8" hole to 8-3/4" from 3000' to 3010' and drilled 8-3/4" hole to 3180'.

09-22-82 Drilled 8-3/4" hole from 3180' to 3186'. Made trip for 6-1/8" core bit and barrel. Cut 6-1/8" core #17 from 3186' to 3196'. Made trip for 8-3/4" bit, stage circulating in from 2400'.

09-23-82 Opened 6-1/8" hole to 8-3/4" from 3186' to 3196' and drilled 8-3/4" hole to 3326'.

09-24-82 Drilled 8-3/4" hole from 3326' to 3400'. Made trip for 6-1/8" core bit and barrel. Cut 6-1/8" core #18 from 3400' to 3410' using only air and soap. Made trip for 8-3/4" bit.

09-25-82 Stage circulated in from 2640'. Opened 6-1/8" hole to 8-3/4" from 3400' to 3410' and drilled 8-3/4" hole to 3575'.

09-26-82 Drilled 8-3/4" hole from 3575' to 3600'. Made trip for 6-1/8" core bit and barrel. Cut 6-1/8" core #19 from 3600' to 3610'. Made trip for 8-3/4" bit, stage circulated in from 2672'.

09-27-82 Opened 6-1/8" hole to 8-3/4" from 3600' to 3610' and drilled 8-3/4" hole to 3757'. Lost returns for 30 minutes at 3709'.

09-28-82 Drilled 8-3/4" hole from 3757' to 3800'. Made trip for 6-1/8" core bit and barrel. Cut 6-1/8" core #20 from 3800' to 3810' using only water. Made trip for 8-3/4" bit, stage circulated in from 2483'.

09-29-82 Opened 6-1/8" hole to 8-3/4" from 3800' to 3810', drilled 8-3/4" hole to 3990' using air foam and conditioned hole. Ran Eastman gyroscopic survey using Birdwell equipment. Made trip for 6-1/8" core bit and barrel.

09-30-82 Cut 6-1/8" core #21 from 3990' to 4002'. Made trip out. Ran Birdwell caliper log to 3982' T.D. Ran borehole compensated density, induction electric and gamma ray logs to 3984' T.D.

10-01-82 Ran fluid density log, checked fluid level at 1724'. Ran Dresser Atlas borehole compensated acoustic-gamma ray, borehole compensated neutron and spectra logs to 3984' T.D.

10-02-82 Completed running spectra log. Ran Birdwell vertical seismic profile log from 3970' to 1925' on 25' stations. Crews on standby from 0900 hours.

USW H-6
Hole History
Page 7

10-03-82 Crews on standby.

10-04-82 Ran Westech TV camera from 1992' to 2600'. Ran Welex collar locator log. Perforated 10-3/4" casing from 1876' to 1740' using Welex. Made trip with casing scraper to 1900'. Started laying down tools.

10-05-82 Rigged up to run pump. Made trip in with 6-3/4" O.D. Centrillift pump on 5-1/2" O.D., 15.50# casing along with 2-3/8" monitor line 5' below bottom of pump.

10-06-82 Landed pump at 1871.60' with intake at 1812.06' and bottom of monitor line at 1886.44'. Ran USGS fluid probe, checked fluid level at 1725'. Tested pump and worked on generator.

10-07-82 Worked on generator to 0800 hours. Waited on generator replacement.

10-08-82 Waited on generator replacement. Started installing generator and transformer.

10-09-82 Waited on parts for transformer.

10-10-82 Repaired transformer. Ran USGS pump test from 1045 hours pumping between 465 gpm and 458 gpm with fluid level at 1725'.

10-11-82 Continued USGS pump down test.

10-12-82 Continued USGS pump down test.

10-13-82 Ran USGS pump down test to 1900 hours. Cut off 2-3/8" O.D. Hydril monitor line at 1876' using Gearhart chemical cutter. Orange-peeled bottom of tubing would not permit tracejector survey to be run. Ran Gearhart 1-11/16" collar locator to confirm open tubing.

10-14-82 Worked on electrical equipment to 2030 hours. Started running USGS pump down test.

10-15-82 Ran USGS pump down test to 0200 hours. Ran Gearhart temperature log to 3996' T.D., checked maximum temperature at 129°F. Attempted to run tracejector survey, tool not working. Continued pump down test from 0800 hours to 1700 hours. Ran temperature and collar locator log. Ran tracejector survey, checked no flow below 2568'. Ran collar locator log and checked bottom of 10-3/4" casing at 1906'. Ran tracejector test #2.

10-16-82 Ran temperature and collar locator log. Ran tracejector test #3. Set transducer at 1830' and checked fluid level at 1767.72'. Ran USGS pump down test from 0230 hours to 1500 hours, checked fluid

USW G-6
Hole History
Page 8

10-16-82 level at 1727'. Pulled 2-3/8" O.D. Hydril monitor line, 5-1/2" casing and Centrilift pump.
(Cont.)

10-17-82 Rigged up to run straddle packers. Made up TAM straddle packer on 2-7/8" EUE tubing. Overall length of packer assembly was 174.91' (110' spacing between packers). Ran fluid probe and checked static fluid level at 1725.73'. Ran and set top of bottom packer at 1990' with bottom of top packer at 1880'. Started running hydrologic test.

10-18-82 Ran hydrologic test to 0900 hours. Checked static fluid level at 1725.05'. Released and reset top of bottom packer at 2100' and bottom of top packer at 1990'. Ran hydrologic test from 1400 to 1600 hours. Released and reset packers at 2240' and 2130'. Swabbed tubing from 1750', static fluid level at 1725.83'.

10-19-82 Monitored fluid, ran and set transducer. Started hydrologic test at 0430 hours.

10-20-82 Completed hydrologic test at 0400 hours. Released and reset top of bottom packer at 2360' and bottom of top packer at 2250'. Ran hydrologic test from 0530 hours to 1200 hours. Released and reset packers at 2360' and 2250', packers leaking. Released straddle packer and made trip out. Checked fluid level at 1740'. Made up new packers.

10-21-82 Made trip in with straddle packer and set top of bottom packer at 2360' and bottom of top packer at 2250'. Attempted hydrologic test, packers leaking. Made trip for packer repair. Reset packers at 2360' and 2250', packers leaked. Made trip out for repair.

10-22-82 Made up straddle packer. Ran and set top of bottom packer at 2360' and bottom of top packer at 2250'. Ran hydrologic test. Released and reset packer in 10-3/4" casing for packer test, tested good. Released, lowered and set packers at 2580' and 2470'. Ran hydrologic test. Released, lowered and reset packers at 2750' and 2640'. Started hydrologic test.

10-23-82 Completed hydrologic test. Released and reset top of bottom packer at 2850' and bottom of top packer at 2740'. Started hydrologic test.

10-24-82 Completed hydrologic test. Opened packer and ran hydrologic test below 2850'. Released and reset packers at 3780' and 3670'. Started hydrologic test.

10-25-82 Ran hydrologic test. Opened packer and ran hydrologic test. Closed packer and continued test.

10-26-82 Completed hydrologic test. Released packers and made trip to service straddle packer, changed test interval to 220'. Set top of bottom packer at 2470' and bottom of top packer at 2250'. Monitored fluid level.

USW H-6
Hole History
Page 9

10-27-82 Ran hydrologic test. Released, lowered and set top of bottom packer at 3890' and bottom of top packer at 3670'. Monitored fluid level.

10-28-82 Laid down packers and 2-7/8" tubing. Rigged down and moved out rig. Hole completed 10-28-82.

10-29-82 Continued moving out equipment.

10-30-82 Continued moving out equipment.

11-01-82 Continued moving out equipment.

11-02-82 Moved out equipment.

12-16-82 Ran Birdwell caliper log to 3949' T.D. and gamma ray-epithermal neutron log, T.D. not reached.

12-17-82 Ran gamma ray-collar log to 3950' T.D.

02-12-83 Moved in Joy #1, rig #85172 and rigged up.

02-13-83 Made up 7-1/2" dual element TAM packer on 2-7/8", 8rd. tubing with 2-7/8" slotted and orange peeled tail pipe below packer. Ran and set packer at 3895.49'. Knocked out shut in packer plug and swabbed tubing to 1700', no fluid indicated. Ran and landed 1.9" monitor line at 1750'. Rigged down and moved out.

06-04-84 Moved in CP rig #85128 and rigged up. Drilled four 12-1/4" x 10' anchor holes and set in anchors. Rigged down and moved out. Moved in Ideco #37, rig #85116 and rigged up. Pulled and laid down 1.9" monitor line. Released packer and made trip out with 2-7/8" tubing.

06-05-84 Waited for Lynes packer to 1130 hours. Ran and set 7", #300 Lynes retrievable packer at 2750.84' (top of element) using 2-7/8", 8rd., EUE tubing. Pulled tubing and started in the hole with 2 element 7" PIP packer on 7", 20# casing.

06-06-84 Ran and landed packer at 2468.31' (bottom of element), unable to set packer. Made trip out and dressed packer. Ran and set dual element 7" PIP packer on 7", 20# casing at 2462.81' (center of elements). Started in the hole with rental Centrillift pump on 2-7/8" tubing, electric conductor, and 1.9" monitor line. (Bottom of monitor line 50' above pump intake was tack welded to 2-7/8" tubing.)

06-07-84 Landed series 513 Centrillift pump at 2242.58' with intake at 2203.15', monitor line at 2153.15', and USGS transducer at 1628'. Installed surface connections and tested pump. Started rigging down.

USW H-6
Hole History
Page 10

06-08-84 Moved out drilling support equipment. Rigged up for pump down test. Started pump down test at 210 gpm as directed by USGS from 1009 hours.

06-11-84 Operations secured from 06-08-84 to 1200 hours 06-11-84. Pump stopped over weekend. Checked out electric equipment and repaired generator. Started pump down test at 210 gpm as directed by USGS from 1500 hours.

06-12-84 Continued pump down test as directed by USGS.

06-13-84 Continued pump down test as directed by USGS. Pump rate at 202 gpm.

06-14-84 Continued pump down test as directed by USGS. Pump rate at 202 to 205 gpm.

06-15-84 Continued pump down test as directed by USGS. Pumping continued and monitoring secured for weekend.

06-18-84 Monitoring secured from 06-15-84 to 06-18-84. Continued pump down test as directed by USGS.

06-19-84 Continued pump down test as directed by USGS.

06-20-84 Continued pump down test as directed by USGS.

06-21-84 Continued pump down test as directed by USGS.

06-22-84 Continued pump down test as directed by USGS to 1015 hours. Shut off pump and started monitoring fluid recovery. Secured rig for weekend.

06-25-84 Rig secured from 06-22-84 to 1000 hours, 06-25-84. Rigged up. Pulled 2-7/8" tubing, Centrilift pump, and 1.9" monitor line. Released PIP packer at 2463' and started out of the hole laying down 7" casing.

06-26-84 Pulled 7" casing and packer. Made trip with overshot on 2-7/8" tubing and retrieved packer at 2750'. Dressed plug. Made trip in with #300 Lynes retrievable packer on 2-7/8" tubing and set packer at 2120' with top at 2114.5'. Made trip out with tubing.

06-27-84 Dressed Lynes dual element casing PIP packer. Made trip in with packer on 7", 20#, 8 rd. casing and set packer at 1992', bottom of element. Serviced Centrilift pump.

06-28-84 Made trip in with Series 513 Centrilift pump on 2-7/8", 8 rd. tubing with 1.9" monitor line tack welded on tubing 50' above intake. Landed pump at 1939.8' with intake at 1900.37' and monitor

USW H-6
Hole History
Page 11

06-28-84 line at 1850.37'. Made up surface installations and started pump
(Cont.) test #2 at 230 gpm as directed by USGS at 1300 hours.

06-29-84 Ran pump test at 225/230 gpm as directed by USGS.

07-02-84 Continued pump test. Monitoring secured from 06-29-84 to 07-02-84.

07-03-84 Continued pump test at 235 gpm as direct by USGS.

07-05-84 Monitoring secured from 07-03-84 to 07-05-84. Continued pump test
as directed by USGS.

07-06-84 Continued pump test as directed by USGS. Secured monitoring for
weekend.

07-09-84 Pump test monitoring secured from 07-06-84 to 07-09-84. Started
pump down and recovery test as directed by USGS.

07-10-84 Monitored fluid recovery as directed by USGS.

07-11-84 Continued monitoring fluid recovery as directed by USGS.

07-12-84 Continued monitoring fluid recovery as directed by USGS.

07-13-84 Continued monitoring fluid recovery as directed by USGS. Secured
monitoring for weekend.

07-16-84 Monitoring secured from 07-13-84 to 07-16-84. Continued monitoring
fluid recovery as directed by USGS.

07-17-84 Completed monitoring fluid recovery and removed monitoring
equipment as directed by USGS at 0800 hours. Rig secured to 1600
hours. Rigged up to pull Centrilift pump. Started out of the hole
with 2-7/8" tubing and 1.9" monitor line.

07-18-84 Repaired electrical equipment to 1200 hours. Pulled 2-7/8" tubing
and 1.9" monitor line, laid down Centrilift pump. Released packer
and pulled 7" casing, laid down packer. Rigged up to pull
retrievable packer.

07-19-84 Made trip with Lynes packer retrieving tool on 2-7/8" tubing. Laid
down retrievable packer. Ran Birdwell water locator log, fluid
indicated at 1725'. Made 2 runs with 6-5/8" x 16.75' bailer,
recovered 10 gallons of water on each run. Ran and set Lynes
dual element packer on 2-7/8", 8rd tubing, bottom at 2468'.
Bottom of packer assembly was bull plugged with circulating sub
below elements open. Ran and landed new 1.9" monitor line at
1751.5'. Started rigging down.

07-20-84 Rigged down and moved out.

USW H-6
CORE RECORD

Run No.	Core Hole Size	Interval Feet	Cored Feet	Recovered Feet	% Recovery
1	6-1/8"	1091.0 - 1100.0	9.0	3.6	40
2	"	1100.0 - 1114.0	14.0	10.7	76
3	"	1125.0 - 1134.0	9.0	9.0	100
4	"	1147.0 - 1153.5	6.5	6.0	92
5	"	1153.5 - 1161.5	8.0	7.0	88
6	8-3/4"	1161.5 - 1169.0	7.5	4.0	53
7	6-1/8"	1368.0 - 1387.0	19.0	16.5	87
8	"	1417.0 - 1427.0	10.0	12.8	128
9	"	1510.0 - 1520.5	10.5	10.5	100
10	"	1670.0 - 1680.0	10.0	10.0	100
11	"	1820.0 - 1840.0	20.0	20.0	100
12	"	2050.0 - 2057.0	7.0	7.0	100
13	"	2350.0 - 2358.0	8.0	0.0	0
14	"	2358.0 - 2368.0	10.0	18.0	180
15	"	2858.0 - 2868.0	10.0	9.1	91
16	"	3000.0 - 3010.0	10.0	9.8	98
17	"	3186.0 - 3196.0	10.0	9.3	93
18	"	3400.0 - 3410.0	10.0	9.8	98
19	"	3600.0 - 3610.0	10.0	10.2	102
20	"	3800.0 - 3810.0	10.0	9.5	95
21	"	3990.0 - 4002.0	12.0	12.0	100

FLUID USAGE USW H-6						
<u>Date</u>	<u>Depth</u>	<u>Size</u>	<u>Water Gal.</u>	<u>LiCl H₂O Gal.</u>	<u>Soap Gal.</u>	<u>Remarks</u>
08-07-82	18'	36"				
08-08-82	22'	36"				
08-09-82	33'	36"				
08-10-82						Casing
<u>L. D. Young Report *</u>						
08-11-82	169'	17-1/2"	21115	13869	84	
08-12-82	335'	17-1/2"				
08-12-82	40'	22"	6255	8830	7	
08-13-82	335'	22"	14695	4740	25	Logs
08-14-82						Logs
08-15-82			955			Casing
08-16-82	588'	14-3/4"	38090	34100	92	
08-17-82	902'	14-3/4"	38845	32141	180	
08-18-82	1088'	14-3/4"	33830	18491	53	
08-19-82	1091'	14-3/4"	9875	NG	35	Fish
08-20-82	1100'	6-1/8"				Core
08-20-82	1100'	14-3/4"	19190	10430	6	
08-21-82	1114'	6-1/8"				Core
08-21-82	1125'	14-3/4"	16780	65170	27	
08-22-82	1134'	6-1/8"	19695	165	4	Core
08-23-82	1147'	14-3/4"				
08-23-82	1151'	6-1/8"	16967	23107	108	Core
08-24-82	1161.5'	6-1/8"	4883	9028	40	Core
08-25-82	1161.5'	14-3/4"				
08-25-82	1169'	8-3/4"	28095	9741	50	Core
08-26-82	1314'	14-3/4"	42800	30619	100	
08-27-82	1358'	14-3/4"	18003	20557	150	Fish
08-28-82	1368'	14-3/4"	6335			Fish
08-29-82	1427'	6-1/8"				Core
08-29-82	1432'	14-3/4"	17120	22196	108	
08-30-82	1510'	14-3/4"				
08-30-82	1520.5'	6-1/8"	5494	10971	74	Core
08-31-82	1671'	14-3/4"	21943	22571	75	
<u>REEC Co Report</u>						
09-01-82	1680'	6-1/8"				Core
09-01-82	1701'	14-3/4"				
09-02-82	1820'	14-3/4"				
09-02-82	1833'	6-1/8"	22259		143	Core
09-03-82	1840'	6-1/8"				Core
09-03-82	1912'	14-3/4"				
						Logs
09-09-82	1840'	8-3/4"				Casing
09-10-82						Cement
						Recement

REECO Report (cont.)

<u>Date</u>	<u>Depth</u>	<u>Size</u>	<u>Water Gal.</u>	<u>LiCl H₂O Gal.</u>	<u>Soap Gal.</u>	<u>Remarks</u>
09-11-82	1947'	8-3/4"				
09-12-82	1986'	8-3/4"				Log
09-13-82	2050'	8-3/4"				Log
09-14-82	2057'	6-1/8"				Core
09-14-82	2179'	8-3/4"				
09-15-82	2350'	8-3/4"				
09-16-82	2368'	6-1/8"				Core
09-17-82	2536'	8-3/4"				
09-18-82	2826'	8-3/4"				
09-19-82	2858'	8-3/4"				
09-19-82	2868'	6-1/8"				Core
09-19-82	2887'	8-3/4"				
09-20-82	3000'	8-3/4"				
09-20-82	3010'	6-1/8"				Core
09-21-82	3180'	8-3/4"	19273		125	
09-22-82	3186'	8-3/4"				
09-22-82	3196'	6-1/8"	18444		125	Core
09-23-82	3326'	8-3/4"	34037		205	
09-24-82	3400'	8-3/4"				
09-24-82	3410'	6-1/8"	10822		50	Core
09-25-82	3575'	8-3/4"	35576		292	
09-26-82	3600'	8-3/4"				
09-26-82	3610'	6-1/8"	19225		159	Core
09-27-82	3757'	8-3/4"				
09-28-82	3800'	8-3/4"				
09-28-82	3810'	6-1/8"	19310		125	Core
09-29-82	3990'	8-3/4"	10389		85	
09-30-82	4002'	6-1/8"				Core
	T.D.					Logs
			570,300	336,726	2,527	Perf.Csg. Hydrologic Tests

Mud Plant Report

	<u>Stepan Gal.</u>	<u>Chem. Mud Bbl.</u>
09-10-82		240
09-11-82		240
09-20-82	2100	

* Mud Logging Engineer's report

USW H-6
REVIEW OF HOLE CONDITIONS

762 mm (30") casing was set at 9.4 m (31') in a 914 mm (36") hole drilled to 10.1 m (33') with conventional circulation using air foam. The annulus was cemented to surface in 2 stages with 8.92 m³ (315 ft³) of cement slurry. Calculated annular volume was 2.29 m³ (81 ft³). 559 mm (22") hole was drilled to 102.1 m (335') using air foam. Caliper, induction and formation density logs were run 08-13-82 and 08-14-82. The average curve on caliper log run #1 indicated eroded zones beyond maximum arm diameter of 762 mm (30") between 29.3 m (96') and 40.8 m (134') and between 76.2 m (250') and 94.2 m (309'). 406 mm (16") casing was set at 94.8 m (311') and the annulus cemented from fill at 95.1 m (312') to surface in 3 stages with 28.32 m³ (1000 ft³) of cement slurry. Calculated annular volume was 12.29 m³ (434 ft³). 375 mm (14-3/4") hole was drilled to 582.8 m (1912') using air foam. A total of 11 cores were cut between 332.5 m (1091') and 560.8 m (1840'). Fluid density, caliper, gamma ray, density, electric, epithermal neutron, magnetometer, temperature logs and vibroseis survey on 7.6 m (25') stations from 571.5 m (1875') to 106.7 m (350') were run between 09-03-82 and 09-08-82. The average curve on caliper log run #2 indicated hole enlargement beyond maximum arm diameter of 762 mm (30") from bottom of 406 mm (16") casing to 97.5 m (320') and a maximum hole enlargement of 686 mm (27") at 550.5 m (1806'). 273 mm (10-3/4") casing was set at 580.9 m (1906') and bottom of the annulus cemented with two separate 2.83m³ (100ft³) cement jobs for a total of 5.66m³ (200 ft³) of cement slurry. 222 mm (8-3/4") hole was drilled to 1216.2 m (3990') and 156 mm (6-1/8") hole to a total depth of 1219.8 m (4002') using air foam. A total of 10 cores were cut between 624.8 m (2050') and 1219.8 m (4002'). Gyroscopic survey was run 09-29-82. Caliper, density, electric, gamma ray, fluid density, acoustic-gamma ray, neutron, spectra logs and vibroseis survey on 7.6 m (25') stations from 1210.1 m (3970') to 586.7 m (1925') were run between 09-30-82 and 10-02-82. The average curve on caliper log #4 indicated a fairly uniform hole below 273 mm (10-3/4") casing to 1211.0 m (3973') with a maximum hole enlargement of 508 mm (20") at 616.9 m (2024'). 273 mm (10-3/4") casing was perforated from 571.8 m (1876') to 530.4 m (1740'). A series of hydrologic tests were run between 10-06-82 and 10-27-82. Hole completed 10-28-82. Caliper, gamma ray-epithermal neutron and gamma ray-collar logs were run 12-16-82 and 12-17-82. 191 mm (7-1/2") packer on 73 mm (2-7/8") tubing with 73 mm (2-7/8") slotted and orange peeled tail pipe on bottom was set at 1187.2 m (3895'). 48 mm (1.9") monitor line was landed at 533.4 m (1750') 02-13-83. 73 mm (2-7/8") tubing with packer and 48 mm (1.9") monitor line were pulled 06-04-84. Hydrologic tests were run between 06-05-84 and 07-19-84. Water locator run 07-19-84 indicated fluid level at 525.8 m (1725'). Packer was set at 752.2 m (2468') on 73 mm (2-7/8") tubing; bottom of packer assembly bull plugged with circulating sub below elements open. 48 mm (1.9") monitor line was landed at 533.9 m (1751.5'), 07-19-84.

Appendix A
GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 1 of 5

HOLE: USW H-1

INSTRUMENT HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED BTM LOG</u>	<u>INTERNAL TOP LOG</u>
Caliper	(1,1)	1	9/13/80	Birdwell	326'	0'
Caliper	(1,2)	2	10/13/80	Birdwell	2,258'	280'
Caliper	(1,5)	3	10/23/80	Birdwell	2,247'	300'
Caliper	(2,2)	4	11/24/80	Birdwell	6,000'	2,200'
Caliper	(3,2)	5	6/17/82	Birdwell	4,025'	2,190'
Caliper	(3,5)	6	6/24/82	Birdwell	5,943'	2,194'
Casing Collar Locator	(4,5)	1	6/17/82	Birdwell	2,270'	1,660'
Casing Collar Locator	(4,5)	2	6/17/82	Birdwell	2,280'	1,800'
Casing Collar Locator	(5,2)	3	6/29/82	Birdwell	4,700'	4,550'
Casing Collar Locator	(5,2)	4	6/29/82	Birdwell	4,614'	370'
Density	(5,4)	1	9/14/80	Birdwell	335'	20'
Density Borehole Compensated	(6,1)	1	10/13/80	Birdwell	2,256'	300'
Density Borehole Compensated	(6,3)	2	11/25/80	Birdwell	5,999'	2,240'
Fluid Density for Water Location	(7,2)	1	9/13/80	Birdwell	334'	250'
Fluid Density for Water Location	(7,3)	2	10/8/80	Birdwell	1,855'	1,800'
Fluid Density for Water Location	(7,4)	3	10/13/80	Birdwell	1,896'	1,856'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 2 of 5

HOLE: USW H-1 (continued)

INSTRUMENT HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED INTERNAL BTM LOG TOP LOG</u>
Fluid Density for Water Location	(7,5)	4	10/25/80	Birdwell	1,910' 1,810'
Fluid Density for Water Location	(8,1)	5	10/25/80	Birdwell	1,900' 1,850'
Fluid Density for Water Location	(8,1)	6	10/25/80	Birdwell	1,900' 1,850'
Fluid Density for Water Location	(8,1)	7	10/25/80	Birdwell	1,900' 1,850'
Fluid Density for Water Location	(8,1)	8	10/25/80	Birdwell	1,900' 1,850'
Fluid Density for Water Location	(8,2)	9-14	10/25/80	Birdwell	1,864' 1,650'
Fluid Density for Water Location	(8,3)	15	10/26/80	Birdwell	1,418' 1,250'
Fluid Density for Water Location	(8,3)	16	10/26/80	Birdwell	1,439' 1,150'
Fluid Density for Water Location	(8,4)	17	11/24/80	Birdwell	1,900' 1,850'
Fluid Density for Water Location	(8,5)	18	11/28/80	Birdwell	1,948' 1,790'
Fluid Density for Water Location	(9,1)	19	11/30/80	Birdwell	1,890' 1,850'
Fluid Density for Water Location	(9,2)	20	6/24/82	Birdwell	1,896' 1,826'
Water Locator	(7,1)	1	10/27/80	Birdwell	1,289' 1,004'
Epithermal Neutron	(13,2)	1	9/13/80	Birdwell	334' 20'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 3 of 5

HOLE: USW H-1 (continued)

INSTRUMENT HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED BTM LOG</u>	<u>INTERNAL TOP LOG</u>
Epithermal Neutron	(13,3)	2	10/13/80	Birdwell	2,257'	296'
Epithermal Neutron	(12,4)	3	10/28/80	Birdwell	2,200'	Water
Neutron Borehole Compensated	(13,5)	1	11/25/80	Birdwell	6,001'	2,216'
Neutron	(11,5)	1	10/13/80	Birdwell	2,257'	300'
Neutron	(14,3)	2	10/27/80	Birdwell	1,675'	830'
Neutron	(14,4)	3	11/26/80	Birdwell	6,000'	1,870'
Gamma Ray	(11,4)	1	9/14/80	Birdwell	333'	0'
Gamma Ray	(11,5)	2	10/13/80	Birdwell	2,250'	300'
Gamma Ray	(12,4)	3	11/28/80	Birdwell	2,200'	Water
Compensated Neutron (2")	(15,2)	2	12/31/80	Dresser Atlas	5,998'	2,240'
Compensated Neutron (5")	(15,3)	2	12/31/80	Dresser Atlas	5,998'	2,240'
Radioactive Tracer	(12,2)	1-13	10/17/80	Birdwell	2,150'	2,015'
Spectralog (2")	(15,5)	1	12/31/80	Dresser Atlas	5,998'	70'
Spectralog (5")	(16,2)	1	12/31/80	Dresser Atlas	5,998'	70'
Induction	(9,3)	1	9/13/80	Birdwell	330'	40'
Induction	(9,4)	2	10/14/80	Birdwell	2,253'	300'
Electric	(10,3)	1	10/13/80	Birdwell	2,256'	1,916'
Electric	(10,4)	2	10/27/80	Birdwell	1,675'	1,200'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 4 of 5

HOLE: USW H-1 (continued)

INSTRUMENT HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED INTERNAL BTM LOG TOP LOG</u>
Electric	(10,5)	3	11/25/80	Birdwell	5,999' 2,220'
Dual Induction Focused Log (2")	(10,1)	1	10/27/80	Dresser Atlas	1,679' 334'
Dual Induction Focused Log (5")	(10,2)	1	10/27/80	Dresser Atlas	1,679' 334'
Magnetometer	(16,5)	1	10/14/80	Birdwell	2,257' 342'
Nuclear Annulus Investigation	(17,2)	1	10/29/80	Birdwell	2,249' 1,878'
Nuclear Annulus Investigation	(17,3)	2-6	6/29/82	Birdwell	5,923' 1,850'
Nuclear Annulus Investigation	(18,3)	7-8	7/1/82	Birdwell	3,640' 1,850'
Nuclear Annulus Investigation	(19,1)	9-13	7/2/82	Birdwell	5,923' 1,841'
Temperature	(19,3)	1	10/14/80	Birdwell	2,257' 0'
Temperature	(19,5)	2	11/26/80	Birdwell	6,001' 20'
Temperature- Tracer	(23,4)	1	11/30/80	Gearhart	5,810' 1,650'
3-D/Velocity	(20,3)	1	10/15/80	Birdwell	2,254' 1,850'
3-D/Velocity	(20,3)	2	10/15/80	Birdwell	2,252.5' 1,850'
3-D/Velocity	(20,4)	3	10/27/80	Birdwell	1,673' 1,100'
3-D/Velocity	(20,4)	4	10/27/80	Birdwell	1,674' 1,100'
3-D/Velocity	(20,5)	5	11/24/80	Birdwell	5,997' 2,166'
3-D/Velocity	(21,2)	6	11/26/80	Birdwell	5,993' 2,150'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 5 of 5

HOLE: USW H-1 (continued)

INSTRUMENT HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED INTERNAL</u> <u>BTM LOG</u>	<u>TOP LOG</u>
Geophone Survey (VSP)	(21,5)	1	10/14/80	Birdwell	2,248'	350'
Geophone Survey (VSP)	(22,3)	2	11/23/80	Birdwell	5,975'	4,025'
Geophone Survey (VSP)	(22,3)	2	11/28/80	Birdwell	4,025'	2,250'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 1 of 4

HOLE: USW H-3

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED INTERNAL</u>	
					<u>BTM LOG</u>	<u>TOP LOG</u>
Caliper	(1,1)	1	2/2/82	Birdwell	124'	10'
Caliper	(1,2)	2	2/17/82	Birdwell	2,620'	50'
Caliper	(1,5)	3	3/1/82	Birdwell	3,984'	2,540'
Caliper	(2,2)	4	6/22/82	Birdwell	3,960'	2,394'
Caliper	(2,4)	5	12/17/82	Birdwell	3,949'	2,492'
Caliper	(3,1)	6	11/29/84	Birdwell	3,940'	2,540'
Casing Collar Locator	(3,3)	1	5/24/84	Welex	2,800'	2,500'
Casing Collar Locator	(11,1)	1	12/17/82	Birdwell	3,957'	0'
Density Borehole Compensated	(3,4)	1	2/19/82	Birdwell	2,610'	100'
Density Borehole Compensated	(4,2)	2	3/1/82	Birdwell	3,991'	2,350'
Fluid Density for Water Location	(4,4)	1	2/2/82	Birdwell	127'	50'
Fluid Density for Water Location	(4,5)	2	2/16/82	Birdwell	2,423'	2,350'
Fluid Density for Water Location	(5,1)	3	2/17/82	Birdwell	2,610'	2,570'
Fluid Density for Water Location	(5,2)	4	2/18/82	Birdwell	2,621'	2,580'
Fluid Density for Water Location	(5,3)	5	2/20/82	Birdwell	2,440'	2,470'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 2 of 4

HOLE: USW H-3 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED BTM LOG</u>	<u>INTERNAL TOP LOG</u>
Fluid Density for Water Location	(5,4)	6	2/28/82	Birdwell	3,376'	3,220'
Fluid Density for Water Location	(5,4)	7	3/1/82	Birdwell	2,800'	2,751'
Fluid Density for Water Location	(5,5)	8	3/1/82	Birdwell	2,610'	2,530'
Fluid Density for Water Location	(6,1)	9	3/3/82	Birdwell	2,500'	2,430'
Fluid Density for Water Location	(6,2)	10	6/16/83	Birdwell	2,399'	2,325'
Fluid Density for Water Location	(4,1)	11	5/25/84	Birdwell	2,580'	2,400'
Spectralog (5")	(11,5)	1	3/2/82	Dresser Atlas	3,996'	0'
Spectralog (2")	(11,4)	1	3/2/82	Dresser Atlas	3,996'	0'
BHC Acoustilog Gamma Ray (5")	(9,1)	1	3/2/82	Dresser Atlas	3,989'	3,998'
BHC Acoustilog Gamma Ray (2")	(8,5)	1	3/3/82	Dresser Atlas	3,989'	3,998'
Neutron	(10,4)	1	3/1/82	Birdwell	3,994'	2,550'
BHC Acoustic Fraclog (5")	(9,2)	1	3/3/82	Dresser Atlas	3,988'	2,601'
Compensated Neutron (5")	(16,2)	1	3/2/82	Dresser Atlas	3,996'	2,601'
Compensated Neutron (2")	(8,3)	1	3/2/82	Dresser Atlas	3,996'	2,601'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 3 of 4

HOLE: USW H-3 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED BTM LOG</u>	<u>INTERNAL TOP LOG</u>
Gamma Ray	(10,2)	1	2/19/82	Birdwell	2,614'	100'
Gamma Ray	(4,2)	2	3/1/82	Birdwell	3,979'	2,350'
Gamma Ray	(10,4)	3	3/1/82	Birdwell	3,986'	2,544'
Gamma Ray	(8,1)	4	3/2/82	Birdwell	3,982'	2,540'
Gamma Ray	(11,1)	5	12/17/82	Birdwell	3,954'	4'
Gamma Ray	(9,4)	6	12/17/82	Birdwell	2,583'	4'
Epithermal Neutron Porosity	(7,3)	1	2/19/82	Birdwell	2,615'	60'
Epithermal Neutron Porosity	(8,1)	2	3/2/82	Birdwell	3,992'	2,550'
Epithermal Neutron Porosity	(9,4)	3	12/17/82	Birdwell	2,595'	4'
Induction	(6,3)	1	2/2/82	Birdwell	120'	20'
Induction	(6,4)	2	2/18/82	Birdwell	2,616'	50'
Electric	(7,1)	1	3/2/82	Birdwell	3,990'	2,550'
3-D Magnetometer	(12,2)	1	2/18/82	Lawrence Livermore National Laboratory	2,614'	130'
3-D Magnetometer	(12,4)	2	3/1/82	Lawrence Livermore National Laboratory	4,000'	2,610'
Temperature	(12,5)	1	7/23/82	Birdwell	3,972'	0'
Temperature	(13,2)	2	6/15/83	Birdwell	2,400'	15'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 4 of 4

HOLE: USW H-3 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED BTM LOG</u>	<u>INTERNAL TOP LOG</u>
Temperature	(13,5)	3	11/28/83	Birdwell	3,946'	8'
Temperature- Tracer	(17,1)	1	3/4/82	Gearhart	3,994'	1,500'
3-D/Velocity	(14,3)	1	3/3/82	Birdwell	3,991'	2,570'
3-D/Velocity	(14,3)	2	3/3/82	Birdwell	3,993'	2,570'
Geophone Survey (VSP)	(14,5)	1	2/18/82	Birdwell	2,600'	_____
Geophone Survey (VSP)	(15,4)	2	3/1/82	Birdwell	3,975'	2,600'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 1 of 3

HOLE: USW H-4

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED INTERNAL</u>	
					<u>BTM LOG</u>	<u>TOP LOG</u>
Caliper	(1,1)	1	4/1/82	Birdwell	304'	0'
Caliper	(1,3)	2	4/12/82	Birdwell	1,836'	260'
Caliper	(1,5)	3	4/29/82	Birdwell	3,996'	1,800'
Caliper	(2,3)	4	12/15/82	Birdwell	3,990'	1,790'
Casing Collar Locator	(5,2)	1	12/16/82	Birdwell	1,848'	90'
Density	(3,1)	1	4/1/82	Birdwell	310'	0'
Density Borehole Compensated	(3,3)	1	4/12/82	Birdwell	1,840'	250'
Fluid Density for Water Location	(4,3)	1	04/12/82	Birdwell	1,720'	1,690'
Fluid Density for Water Location	(4,4)	2	4/29/82	Birdwell	1,730'	1,652'
Gamma Ray	(4,5)	1	4/12/82	Birdwell	1,841'	0'
Gamma Ray	(6,1)	2	12/16/82	Birdwell	1,850'	90'
Gamma Ray	(5,2)	3	12/16/82	Birdwell	1,845'	90'
Densilog Gamma Ray (5")	(4,1)	1	4/29/82	Dresser Atlas	4,003'	1,640'
Densilog Gamma Ray (2")	(3,5)	1	4/29/82	Dresser Atlas	4,003'	1,640'
BHC Acoustilog Gamma Ray (5")	(13,5)	1	5/1/82	Dresser Atlas	3,996'	1,890'
BHC Acoustilog Gamma Ray (2")	(7,1)	1	5/1/82	Dresser Atlas	3,996'	1,890'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 2 of 3

HOLE: USW H-4 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED BTM LOG</u>	<u>INTERNAL TOP LOG</u>
BHC Acousti Fraclog/Gamma Ray (5")	(6,3)	1	5/1/82	Dresser Atlas	3,996'	1,890'
Compensated Neutron (5")	(7,3)	1	4/29/82	Dresser Atlas	4,004'	1,640'
Compensated Neutron (2")	(7,2)	1	4/29/82	Dresser Atlas	4,004'	1,640'
Spectralog Gamma Ray (5")	(8,1)	1	5/1/82	Dresser Atlas	4,004'	0'
Spectralog Gamma Ray (2")	(7,5)	1	5/1/82	Dresser Atlas	4,004'	0'
Epithermal Neutron Porosity	(5,4)	1	4/12/82	Birdwell	1,841'	100'
Epithermal Neutron Porosity	(6,1)	2	12/16/82	Birdwell	1,860'	90'
Induction	(9,5)	1	4/1/82	Birdwell	307'	20'
Induction Electric	(9,1)	2	4/13/82	Birdwell	1,838'	300'
Induction Electric	(9,3)	3	4/14/82	Birdwell	1,836'	295'
Electric	(8,4)	1	4/29/82	Birdwell	4,000'	1,790'
3-D Magnetometer	(10,1)	1	4/29/82	Lawrence Livermore National Laboratory	4,000'	1,845'
Temperature	(8,3)	1	4/13/82	Birdwell	1,842'	0'
Temperature- Tracer	(10,3)	1	5/10/82	Gearhart	3,997'	100'
Temperature- Tracer	(11,2)	2	1/27/83	Gearhart	3,998'	1,600'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 3 of 3

HOLE: USW H-4 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED INTERNAL BTM LOG TOP LOG</u>
Geophone Survey (VSP)	(13,2)	1	4/12/82	Birdwell	1,835' 325'
Geophone Survey (VSP)	(12,3)	2	5/1/82	Birdwell	3,990' 1,825'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 1 of 3

HOLE: USW H-5

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED</u>	<u>INTERNAL</u>
					<u>BTM LOG</u>	<u>TOP LOG</u>
Caliper	(1,1)	1	5/25/82	Birdwell	304'	0'
Caliper	(1,2)	2	5/30/82	Birdwell	1,032'	250'
Caliper	(1,4)	3	6/9/82	Birdwell	2,585'	260'
Caliper	(2,2)	4	6/23/82	Birdwell	3,982'	2,535'
Caliper	(2,4)	5	7/23/82	Birdwell	3,976'	2,250'
Caliper	(3,2)	6	1/3/83	Birdwell	3,671'	2,514'
Casing Collar Locator	(3,4)	1	5/25/82	Birdwell	2,618'	2,083'
Casing Collar Locator	(3,4)	2	5/25/82	Birdwell	2,618'	2,083'
Casing Collar Locator	(7,3)	3	1/3/83	Birdwell	2,585'	0'
Density	(3,5)	1	05/25/82	Birdwell	307'	20'
Density Borehole Compensated	(4,1)	1	6/11/82	Birdwell	2,585'	275'
Fluid Density for Water Location	(5,2)	1	6/9/82	Birdwell	2,386'	2,310'
Fluid Density for Water Location	(5,3)	2	6/12/82	Birdwell	2,330'	2,277'
Fluid Density for Water Location	(5,4)	3	6/23/82	Birdwell	2,340'	2,294'
Fluid Density for Water Location	(5,5)	4	6/25/82	Birdwell	2,330'	2,281'
Gamma Ray	(7,1)	1	6/10/82	Birdwell	2,580'	280'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 2 of 3

HOLE: USW H-5 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED INTERNAL</u>	
					<u>BTM LOG</u>	<u>TOP LOG</u>
Gamma Ray	(7,3)	2	1/3/83	Birdwell	3,672'	0'
Gamma Ray	(9,4)	3	1/3/83	Birdwell	2,614'	0'
BHC Acoustilog Gamma Ray (5")	(10,3)	1	6/24/82	Dresser Atlas	3,989'	2,585'
BHC Acoustilog Gamma Ray (2")	(10,2)	1	6/24/82	Dresser Atlas	3,989'	2,585'
BHC Acoustic Frac- log Gamma Ray (5")	(10,4)	1	6/25/82	Dresser Atlas	3,996'	2,885'
Compensated Densilog Compensated Neutron (4,5) Gamma Ray (5")	(4,5)	1	6/24/82	Dresser Atlas	3,996'	2,310'
Compensated Densilog Compensated Neutron (4,3) Gamma Ray (2")	(4,3)	1	6/24/82	Dresser Atlas	3,996'	2,310'
Neutron Borehole Compensated	(8,5)	1	6/10/82	Birdwell	2,582'	286'
Compensated Neutron (5")	(8,4)	1	6/24/82	Dresser Atlas	3,996'	2,310'
Compensated Neutron (2")	(14,2)	1	6/24/82	Dresser Atlas	3,996'	2,310'
Spectralog Gamma Ray w/Neutron (5")	(8,2)	1	6/25/82	Dresser Atlas	3,996'	10'
Spectralog Gamma Ray w/Neutron (2")	(8,1)	1	6/25/82	Dresser Atlas	3,996'	10'
Epithermal Neutron Porosity	(9,2)	1	6/10/82	Birdwell	2,584'	260'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 3 of 3

HOLE: USW H-5 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED</u>	<u>INTERNAL</u>
					<u>BTM LOG</u>	<u>TOP LOG</u>
Epithermal Neutron Porosity	(9,4)	2	1/3/83	Birdwell	2,630'	0'
Induction	(6,1)	1	5/25/82	Birdwell	307'	10'
Induction Electric	(6,2)	2	6/11/82	Birdwell	2,575'	290'
Dual Induction Focused Log (5")	(6,5)	1	6/24/82	Dresser Atlas	3,995'	2,585'
Dual Induction Focused Log (2")	(6,4)	1	6/24/82	Dresser Atlas	3,995'	2,585'
Magnetometer Survey	(11,3)	1	6/10/82	Birdwell	2,580'	313'
Total Magnetic Intensity	(11,1)	1	6/10/82	Lawrence Livermore National Laboratory	2,580'	313'
Temperature	(11,5)	1	6/11/82	Birdwell	2,578'	0'
Temperature	(12,2)	2	7/23/82	Birdwell	3,978'	10'
Temperature Survey	(12,4)	1	3/13/84	Gearhart	2,310'	10'
Geophone Survey (VSP)	(13,2)	1	6/10/82	Birdwell	2,575'	305'
Geophone Survey (VSP)	(13,5)	2	6/23/82	Birdwell	3,975'	2,575'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 1 of 3

HOLE: USW H-6

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED BTM LOG</u>	<u>INTERNAL TOP LOG</u>
Caliper	(1,1)	1	8/13/82	Birdwell	312'	0'
Caliper	(1,2)	2	9/4/82	Birdwell	1,896'	25'
Caliper	(1,5)	3	9/13/82	Birdwell	1,969'	0'
Caliper	(2,2)	4	9/30/82	Birdwell	3,973'	1,850'
Caliper	(2,5)	5	12/16/82	Birdwell	3,942'	1,850'
Casing Collar Locator	(3,3)	1	9/12/82	Birdwell	1,921'	15' above ground level
Casing Collar Locator	(7,2)	2	12/16/82	Birdwell	3,949'	0'
Density	(3,4)	1	8/13/82	Birdwell	310'	0'
Density Borehole Compensated	(3,5)	1	9/4/82	Birdwell	1,895'	250'
Density Borehole Compensated	(4,2)	2	9/30/82	Birdwell	3,981'	1,870'
Water Locator	(4,4)	1	7/19/84	Birdwell	1,734'	1,678'
Fluid Density for Water Location	(4,5)	1	9/3/82	Birdwell	1,826'	1,700'
Fluid Density for Water Location	(4,5)	2	9/5/82	Birdwell	1,749'	1,700'
Fluid Density for Water Location	(5,1)	3	9/5/82	Birdwell	1,750'	1,670'
Fluid Density for Water Location	(4,5)	4	9/7/82	Birdwell	1,769'	1,700'
Fluid Density for Water Location	(5,2)	5	10/1/82	Birdwell	1,750'	1,700'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 2 of 3

HOLE: USW H-6 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED</u>	<u>INTERNAL</u>
					<u>BTM LOG</u>	<u>TOP LOG</u>
Gamma Ray	(6,3)	1	9/4/82	Birdwell	1,899'	250'
Gamma Ray	(6,5)	2	9/30/82	Birdwell	3,982'	1,874'
Gamma Ray	(8,3)	3	12/16/82	Birdwell	1,938'	250'
Gamma Ray	(7,2)	4	12/16/82	Birdwell	3,948'	0'
BHC Acoustilog Gamma Ray (5")	(9,5)	1	10/1/82	Dresser Atlas	3,976'	1,906'
BHC Acoustilog Gamma Ray (2")	(7,5)	1	10/1/82	Dresser Atlas	3,976'	1,906'
BHC Acoustic Frac- log Gamma Ray (5")	(9,3)	1	10/1/82	Dresser Atlas	3,976'	1,906'
Compensated Neutron (5")	(9,1)	1	10/1/82	Dresser Atlas	3,984'	1,730'
Compensated Neutron (2")	(8,5)	1	10/1/82	Dresser Atlas	3,984'	1,730'
Spectralog (5")	(10,3)	1	10/1/82	Dresser Atlas	3,985'	0'
Spectralog (2")	(10,2)	1	10/1/82	Dresser Atlas	3,985'	0'
Epithermal Neutron Porosity	(8,1)	1	9/7/82	Birdwell	1,904'	250'
Epithermal Neutron Porosity	(8,3)	2	9/16/82	Birdwell	1,946'	250'
Induction	(5,3)	1	8/13/82	Birdwell	306'	0'
Induction Electric	(5,4)	2	9/4/82	Birdwell	1,894'	300'
Induction Electric	(6,1)	3	9/30/82	Birdwell	3,976'	1,888'
Magnetometer	(10,5)	1	9/7/82	Birdwell	1,907'	690'

GEOPHYSICAL LOGS RUN IN DRILL HOLE

PAGE 3 of 3

HOLE: USW H-6 (continued)

HYDROLOGIC TEST HOLE

<u>LOG TYPE</u>	<u>MICROFICHE (sheet,row)</u>	<u>RUN NO.</u>	<u>LOG DATE</u>	<u>LOGGING COMPANY</u>	<u>LOGGED</u>	<u>INTERNAL</u>
					<u>BTM LOG</u>	<u>TOP LOG</u>
Total Magnetic Intensity	(11,1)	1	9/7/82	Birdwell	1,907'	708'
Nuclear Annulus Investigation Log	(11,3)	1	9/15/82	Birdwell	311'	280'
Nuclear Cement Top Locator	(11,2)	1	9/12/82	Birdwell	1,906'	1,680'
Temperature	(11,4)	1	9/5/82	Birdwell	1,898'	0'
Geophone Survey (VSP)	(12,1)	1	9/5/82	Birdwell	1,875'	350'
Geophone Survey (VSP)	(12,2)	2	10/2/82	Birdwell	3,970'	1,925'

VIDEO TAPES RUN IN DRILL HOLES

<u>Hole</u>	<u>Run #</u>	<u>From</u>	<u>To</u>
USW H-3	1	0'	897'
	2	897'	1836'
	3	1836'	2530'
USW H-4	1	0'	712'
	2	712'	1123'
	3	1123'	1492'
	4	1492'	1657'
	1	1830'	2400'
	2	2400'	2931'
	3	2931'	3694'
	4	3694'	3981'
USW H-5	1	309'	773'
	2	773'	1340'
	3	1340'	1942'
	4	1942'	2306'
	1	2573'	3140'
	2	3140'	3414'
USW H-6	1	0'	1668'
	2	1668'	0'
	1	1992'	2561'
	2	2561'	2977'

Item Description:	NNWSI Hole Histories USW H-1 USW H-6 USW H-3 USW H-4 USW H-5
Availability:	<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available
Sensitivity:	<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Non-Sensitive-Copyright <input type="checkbox"/> Sensitive <input type="checkbox"/> Sensitive-Copyright
Electronic Media Type: (If applicable)	Microfiche
Contact:	US Nuclear Regulatory Commission Office of Nuclear Materials Safety and Safeguards Yucca Mountain Project Manager
Storage/File Location:	US Nuclear Regulatory Commission Office of Nuclear Materials Safety and Safeguards Two White Flint North Room T7- E34 11545 Rockville Pike Rockville, Maryland 20852-2738