COMPANY: NORTHWEST NATURAL GAS

WELL: IW 14dH-23-65

FIELD: CALVIN CREEK-REICHHOLD POOL

COUNTY: COLUMBIA **STATE:** OREGON

COUNTY: COLUMBIA
Field: CALVIN CREEK-REICHHOLD PO
Location: SHL: 976.5' NORTH & 1256.3 '
Well: IW 14dH-23-65
Company: NORTHWEST NATURAL GAS C

Schlumberger

ARRAY INDUCTION / SP
DENSITY/ NEUTRON / BHC
SCALE: 5"=100' COMPOSIT

LOCATION

SHL: 976.5' NORTH & 1256.3 ' EAST
FROM THE SW CORNER
OF SECTION 23

Elev.: K.B. 923 ft
G.L. 905 ft
D.F. 921.5 ft

Permanent Datum: GROUND LEVEL Elev.: 905 ft
Log Measured From: K.B. 18.0 ft above Perm. Datum
Drilling Measured From: K.B.

API Serial No.	SECTION	TOWNSHIP	RANGE
36-009-00353	23	6N	5W

Logging Date		21-Oct-2001		27-Oct-2001	
Run Number		1		TWO	
Depth Driller		2168 ft		3033 ft	
Schlumberger Depth		2152 ft		3020 ft	
Bottom Log Interval		2142 ft		3012 ft	
Top Log Interval		411 ft		2144 ft	
Casing Driller Size @ Depth		13.375 in	@ 411 ft	8.625 in	@ 2144 ft
Casing Schlumberger		411 ft		2144 ft	
Bit Size		12.250 in		7.875 in	
Type Fluid In Hole		GEL-WATER		WATER BASED	
MUD Density	Viscosity	9.6 lbm/gal	61 s	8.9 lbm/gal	61 s
MUD Fluid Loss	PH	5.2 cm3	8.5	5.2 cm3	8.5
MUD Source Of Sample		FLOWLINE		MUD TANK	
RM @ Measured Temperature		3.190 ohm.m	@ 55 degF	3.190 ohm.m	@ 55 degF
RMF @ Measured Temperature		2.987 ohm.m	@ 56 degF	2.987 ohm.m	@ 56 degF
RMC @ Measured Temperature		3.568 ohm.m	@ 55 degF	3.568 ohm.m	@ 55 degF
Source RMF	RMC	PRESS	PRESS	MUD PRESS	MUD PRESS
RM @ MRT	RMF @ MRT	2.036 @ 90	1.938 @ 90	2.352 @ 77	2.238 @ 77
Maximum Recorded Temperatures		90 degF	90 90	77 degF	
Circulation Stopped	Time	21-Oct-2001	4:00	26-Oct-2001	4:00
Logger On Bottom	Time	21-Oct-2001	14:30	27-Oct-2001	23:30
Unit Number	Location	3152	SACRAMENTO	3152	SACRAMENTO
Recorded By		M. KHAN		Z.AHMED	
Witnessed By		JACK MEYER		ED VADER	

		Run 1	Run 2
Logging Date			
Run Number			
Depth Driller			
Schlumberger Depth			
Bottom Log Interval			
Top Log Interval			
Casing Driller Size @ Depth		@	
Casing Schlumberger			
Bit Size			
Type Fluid In Hole			
MUD Density	Viscosity		
MUD Fluid Loss	PH		
MUD Source Of Sample			
RM @ Measured Temperature		@	
RMF @ Measured Temperature		@	
RMC @ Measured Temperature		@	
Source RMF	RMC		
RM @ MRT	RMF @ MRT	@	@
Maximum Recorded Temperatures			
Circulation Stopped	Time		
Logger On Bottom	Time		
Unit Number	Location		
Recorded By			
Witnessed By			

@ @ @ @ @ @ @

Run 3

Run 4

DISCLAIMER

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE OF AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

OTHER SERVICES1	OTHER SERVICES2
OS1: FMI-GR	OS1: USIT
OS2:	OS2: NEUTRON
OS3:	OS3: PEX/FMI/SONIC ON
OS4:	OS4: TLC
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
BHL: 1' NORTH & 1176' EAST OF THE SOUTHWEST CORNER OF SECTION [illegible]	CORRELATED TO LOG RAN BY SCHLUMBERGER ON 21-OCT-2001
RUN 1 , FROM 1658 TO 400 FT RECORDED WITH WIRELINE;	RAN ON TLC
RUN 2 , FROM TD 2152 TO 1500 FT RECORDED WITH TLC EQUIPMENT.	USED FOUR KNUCKLE JOINTS AND THREE GEMCOS
MAXIMUM HOLE DEVIATION: 73.8 DEG AT 1776 FT.	
	RESISTIVITY SCALE CHANGES MADE AS PER CLIENT REQUEST
	MAX TEMP REORDED AT BOTTOM: 75DEGF
	SP FISH MOVED SEVERAL TIMES
	SPLICEPERFORMED AT 2850FT AS SHOWN ON LOGS
	BHC REMOVED IN CONSULTATION WITH GEOLOGIST DUE TO POSSI
	ECCENRALIZATION
	CREW:ROCKY BECK, BRAD TOMM

RUN 1		RUN 2	
SERVICE ORDER #:		SERVICE ORDER #:	
PROGRAM VERSION:	9C2-303	PROGRAM VERSION:	9C2-303
FLUID LEVEL:	0 ft	FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1

SURFACE EQUIPMENT

GSR-U/Y
NCT-B
CNB-AB
NCS-VB
WITM (CTS)-A

DOWNHOLE EQUIPMENT

AH-CSES AH-CSES		91.2
AH-X-OVER		87.2
DWCH-A DWCH-A		86.2
AH-107		78.2

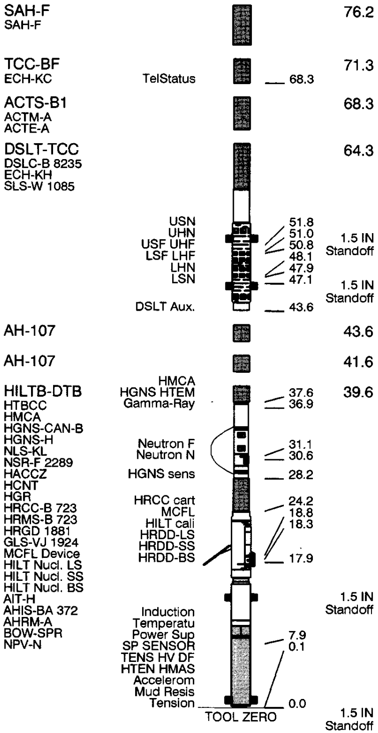
RUN 2

SURFACE EQUIPMENT

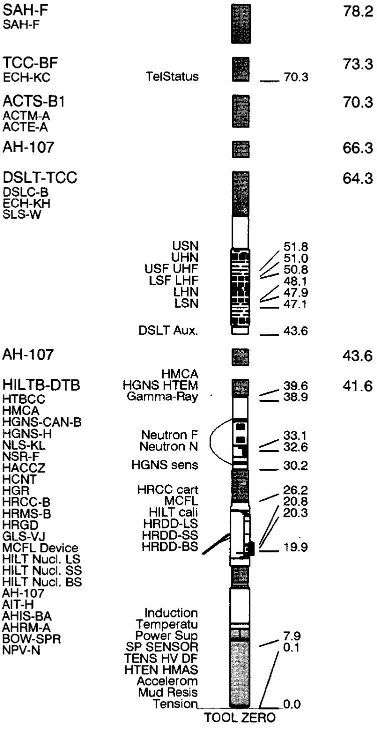
GSR-U/Y
NCT-B
CNB-AB
NCS-VB
WITM (CTS)-A

DOWNHOLE EQUIPMENT

AH-CSES AH-CSES		93.2
AH-X-OVER		89.2
DWCH-A DWCH-A		88.2
AH-107		80.2


SAH-F
SAH-F
76.2
TCC-BF
ECH-KC
TelStatus
68.3
71.3
ACTS-B1
ACTM-A
ACTE-A
68.3
DSLT-TCC
DSLC-B 8235
ECH-KH
SLS-W 1085
64.3
USN
UHN
USF UHF
LSF LHF
LHN
LSN
51.8
51.0
50.8
48.1
47.9
47.1
1.5 IN Standoff
1.5 IN Standoff
DSLT Aux.
43.6
AH-107
43.6
AH-107
41.6
HILTB-DTB
HTBCC
HMCA
HGNS-CAN-B
HGNS-H
NLS-KL
NSR-F 2289
HACCZ
HCNT
HGR
HRCC-B 723
HRMS-B 723
HRGD 1881
GLS-VJ 1924
MCFL Device
HILT Nucl. LS
HILT Nucl. SS
HILT Nucl. BS
AIT-H
AHIS-BA 372
AHRM-A
BOW-SPR
NPV-N
39.6
HMCA
HGNS HTEM
Gamma-Ray
37.6
36.9
Neutron F
Neutron N
31.1
30.6
HGNS sens
28.2
HRCC cart
MCFL
HILT cali
HRDD-LS
HRDD-SS
HRDD-BS
24.2
18.8
18.3
17.9
1.5 IN Standoff
Induction
Temperatu
Power Sup
SP SENSOR
TENS HV DF
HTEN HMAS
Accelerom
Mud Resis
Tension
7.9
0.1
0.0
TOOL ZERO
1.5 IN Standoff

MAXIMUM STRING DIAMETER 6.88 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET


SAH-F
SAH-F
78.2
TCC-BF
ECH-KC
TelStatus
70.3
73.3
ACTS-B1
ACTM-A
ACTE-A
70.3
AH-107
66.3
DSLT-TCC
DSLC-B
ECH-KH
SLS-W
64.3
USN
UHN
USF UHF
LSF LHF
LHN
LSN
51.8
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HILTB-DTB
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HGNS-CAN-B
HGNS-H
NLS-KL
NSR-F
HACCZ
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HRCC-B
HRMS-B
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AHIS-BA
AHRM-A
BOW-SPR
NPV-N
HMCA
HGNS HTEM
Gamma-Ray
39.6
38.9
41.6
Neutron F
Neutron N
33.1
32.6
HGNS sens
30.2
HRCC cart
MCFL
HILT cali
HRDD-LS
HRDD-SS
HRDD-BS
26.2
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20.3
19.9
Induction
Temperatu
Power Sup
SP SENSOR
TENS HV DF
HTEN HMAS
Accelerom
Mud Resis
Tension
7.9
0.1
0.0
TOOL ZERO

MAXIMUM STRING DIAMETER 5.00 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Input DLIS Files

DEFAULT	Splice_AIT_TLD_MCFL_003CUP	FN:1	PRODUCER	16-Nov-2001 12:01	3024.0 FT	293.5 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 306.40 ft3

Cement Volume = 161.79 ft3 (assuming 5.50 in casing O.D.)

Computed from 3020.0 ft to 2144.0 ft

OP System Version: 9C2-303

MCM

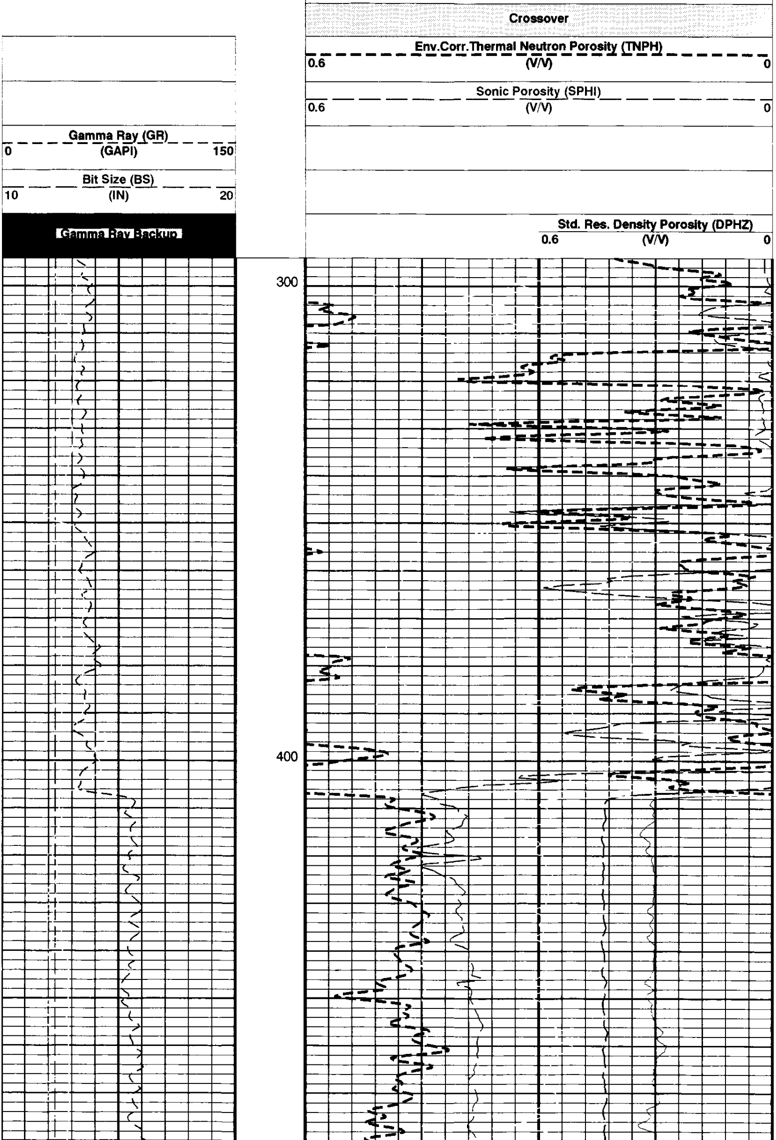
HILTB	SRPC-2078-HILT	DSLT-BA	OP92-KP1
ACTS1	9C2-303	TCCBF	9C2-303

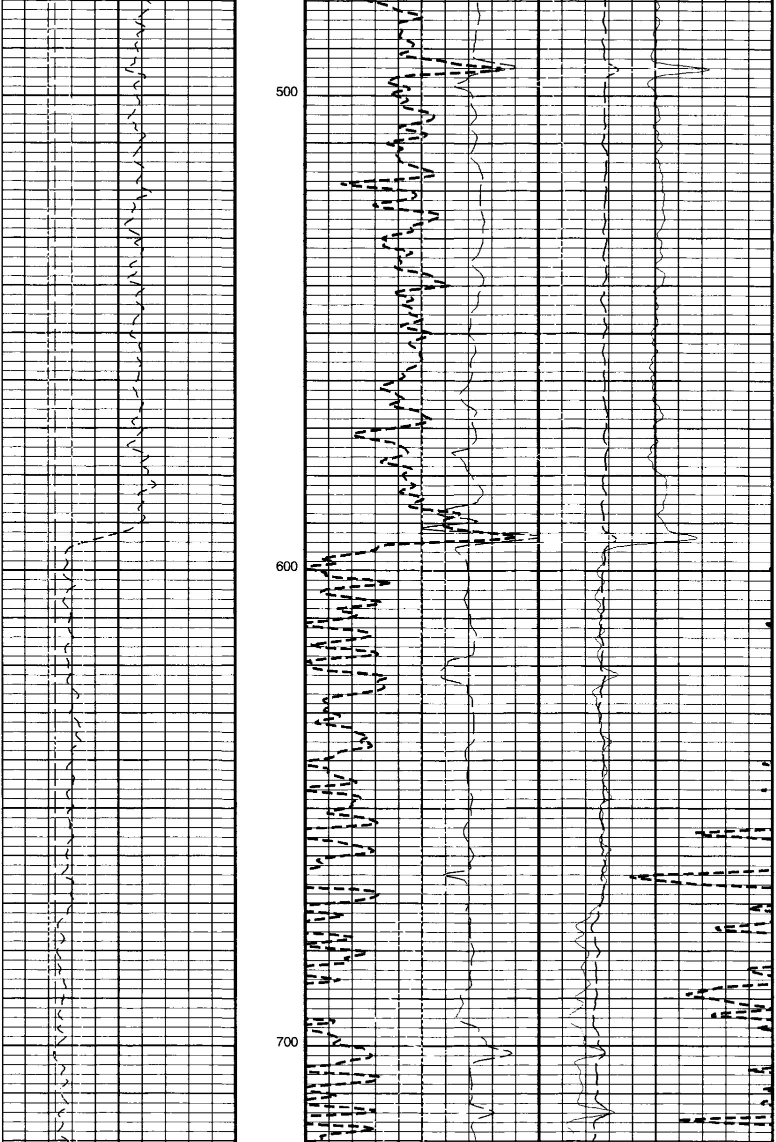
PIP SUMMARY

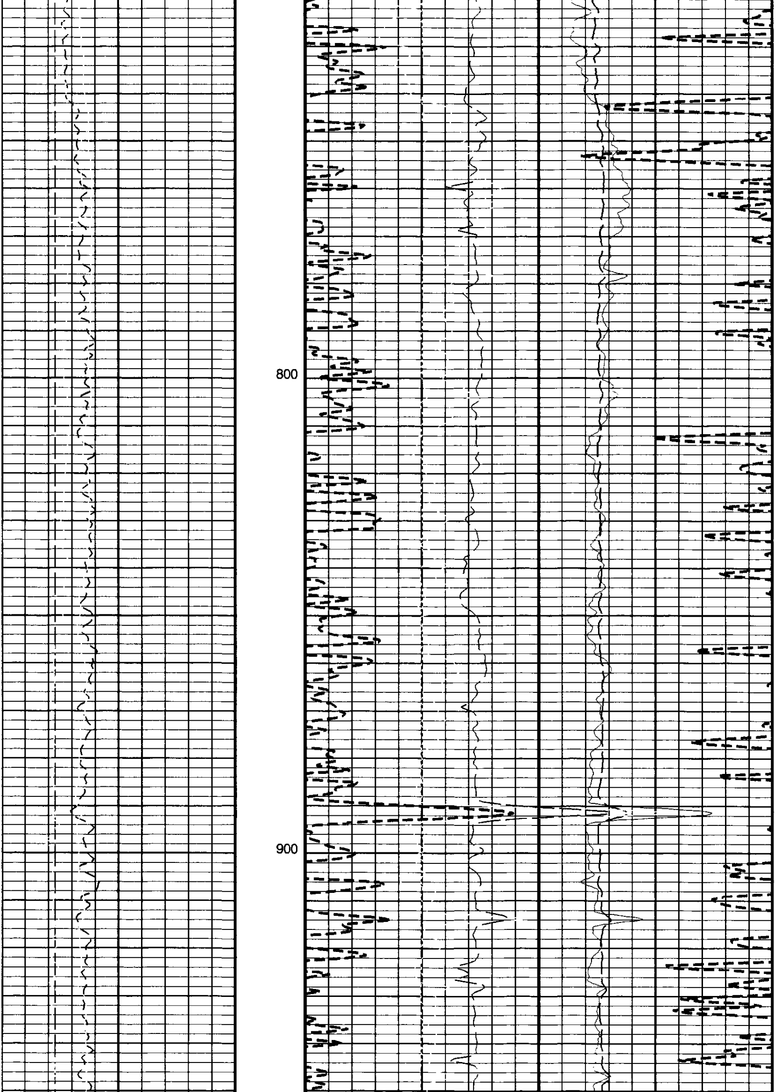
⊢ Integrated Hole Volume Minor Pip Every 10 F3
⊢ Integrated Hole Volume Major Pip Every 100 F3
⊣ Integrated Cement Volume Minor Pip Every 10 F3
⊣ Integrated Cement Volume Major Pip Every 100 F3

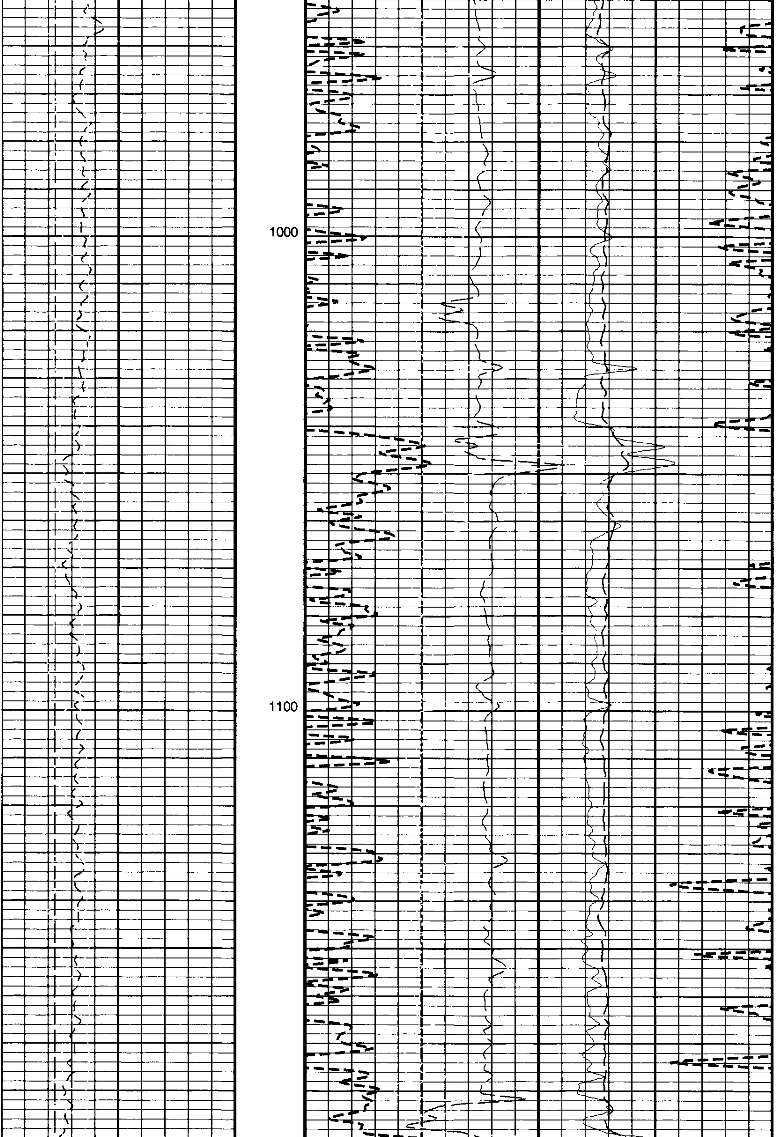
▶ Time Mark Every 60 S

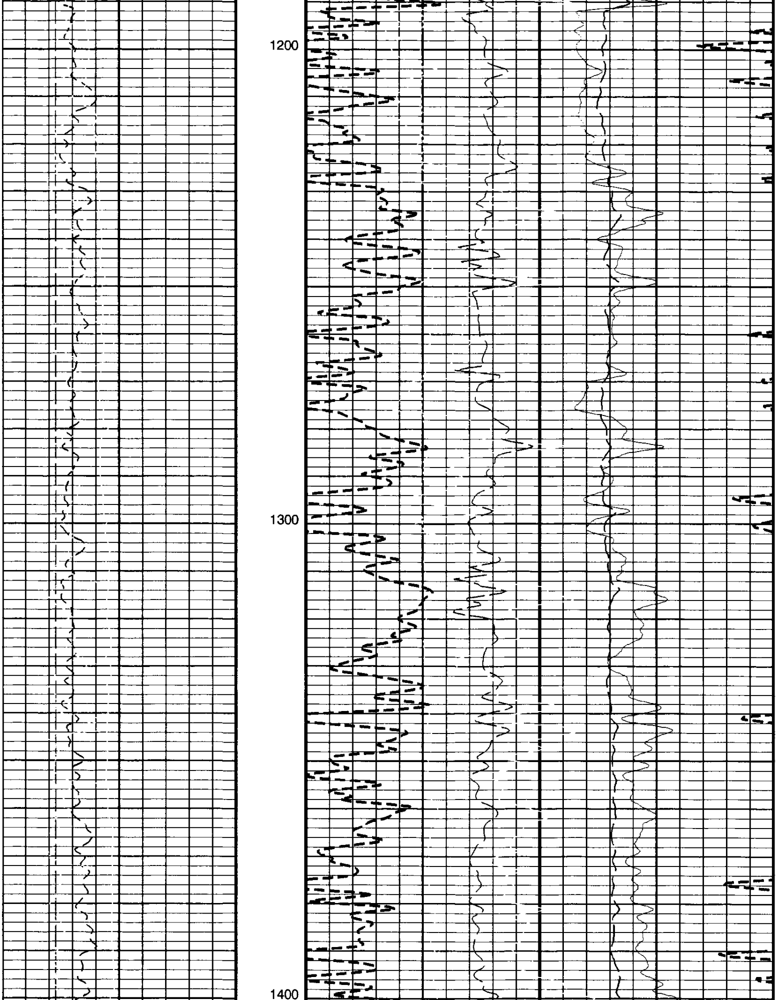
Curve	Left	Unit	Right
Std. Res. Formation Pe (PEFZ)	0	(—)	10
Std. Res. Density Porosity (DPHZ)	1.2	(V/V)	0.6
Env.Corr.Thermal Neutron Porosity (TNPH)	1.2	(V/V)	0.6

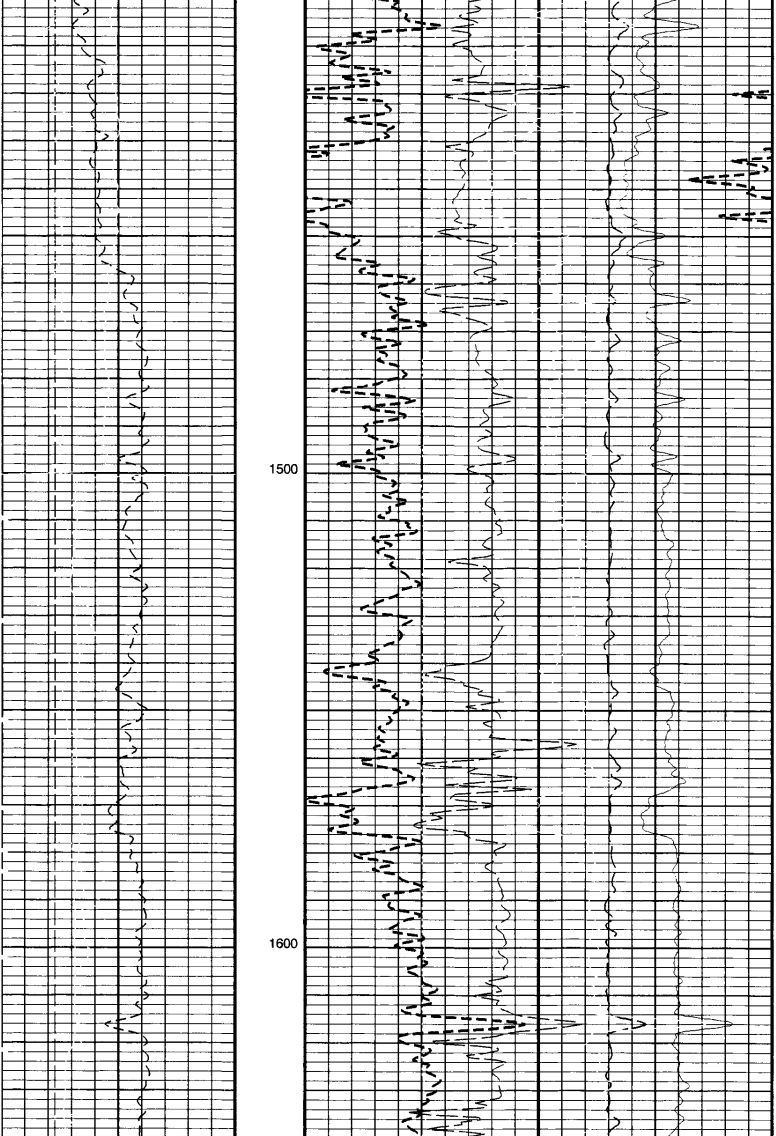


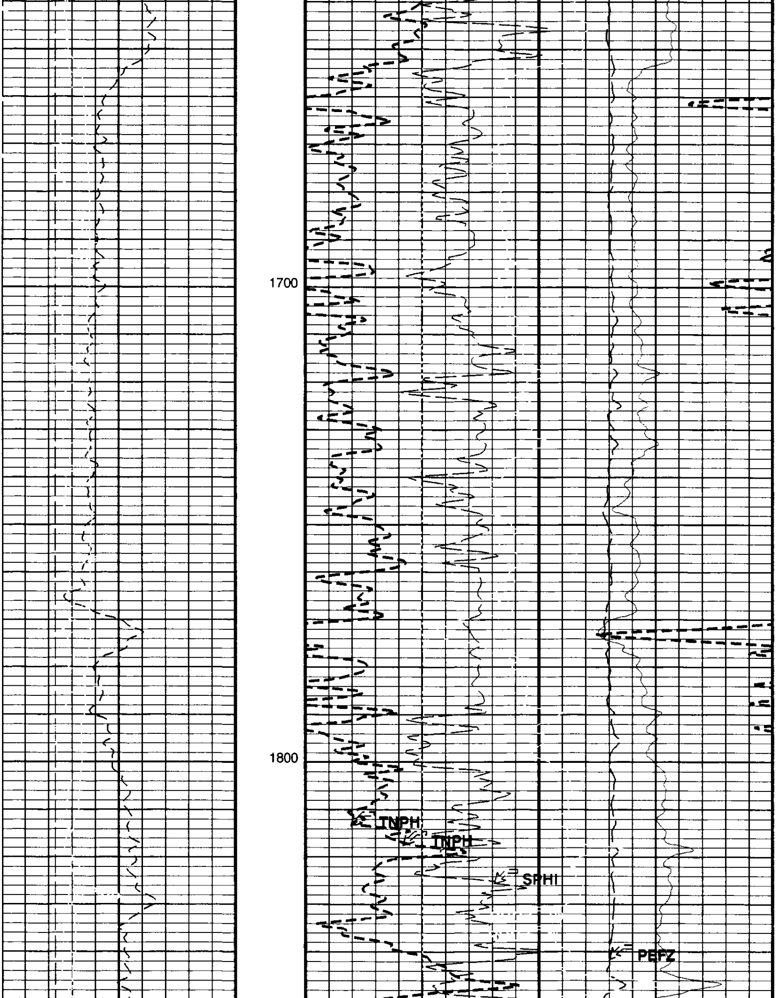


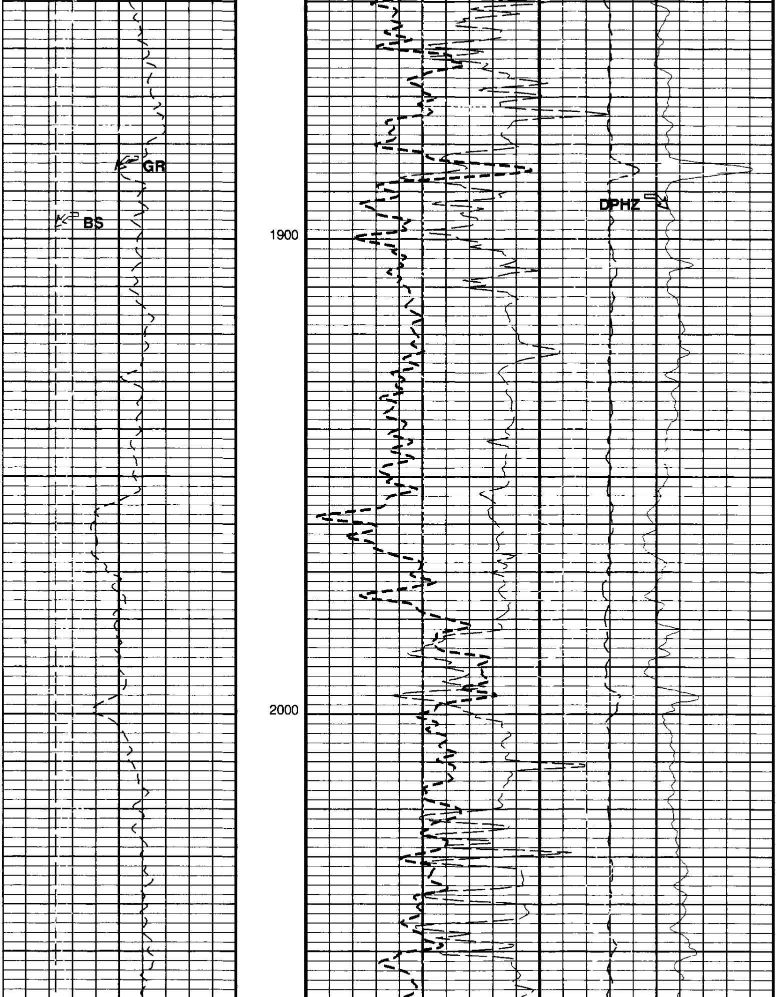


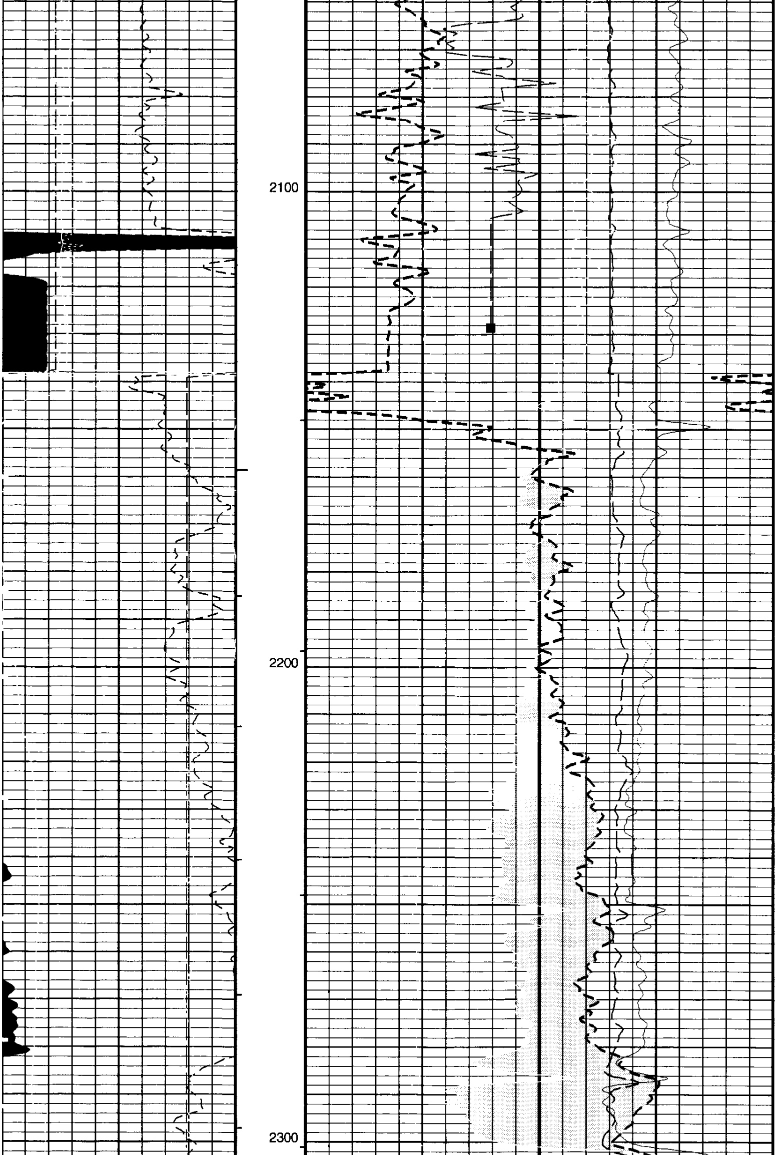


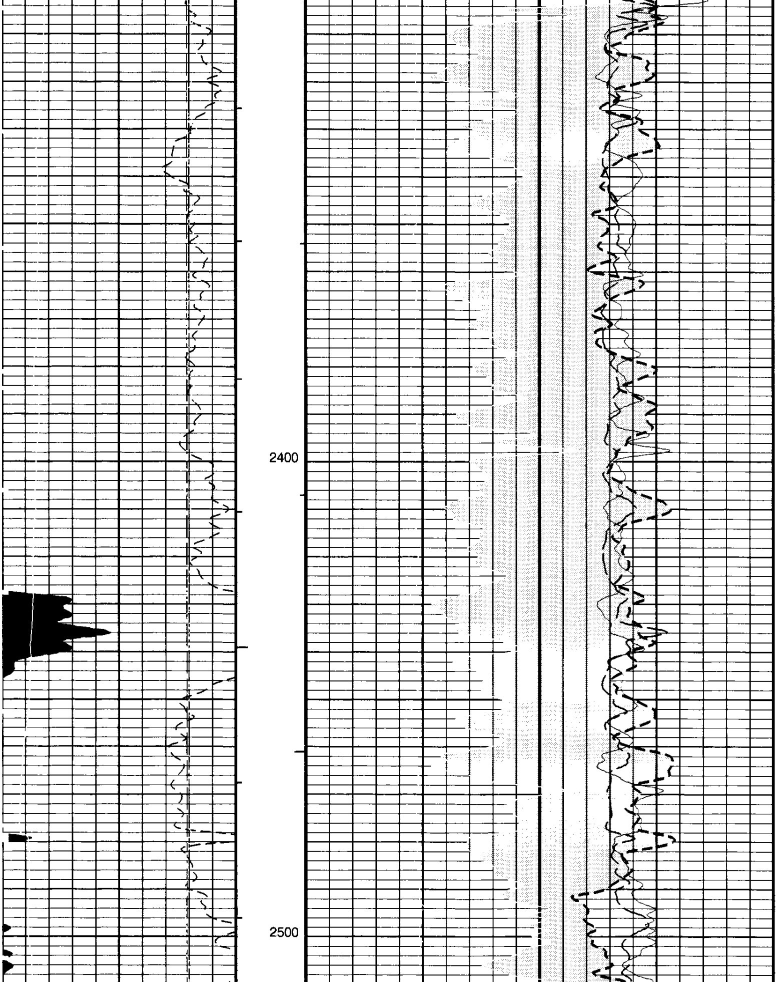


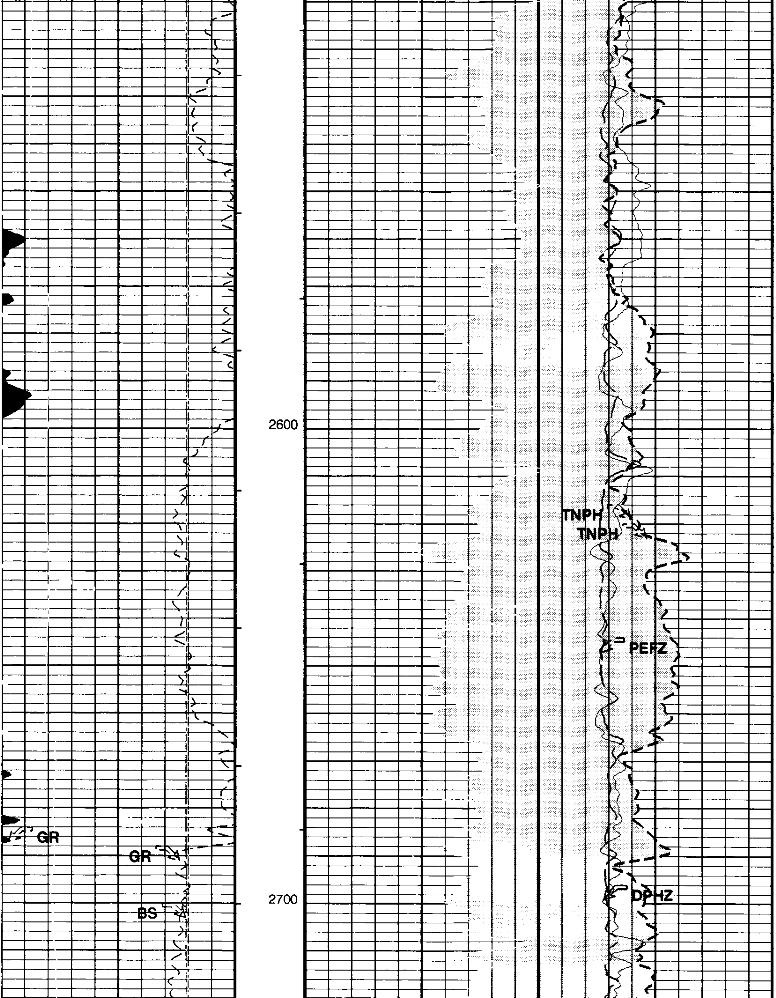


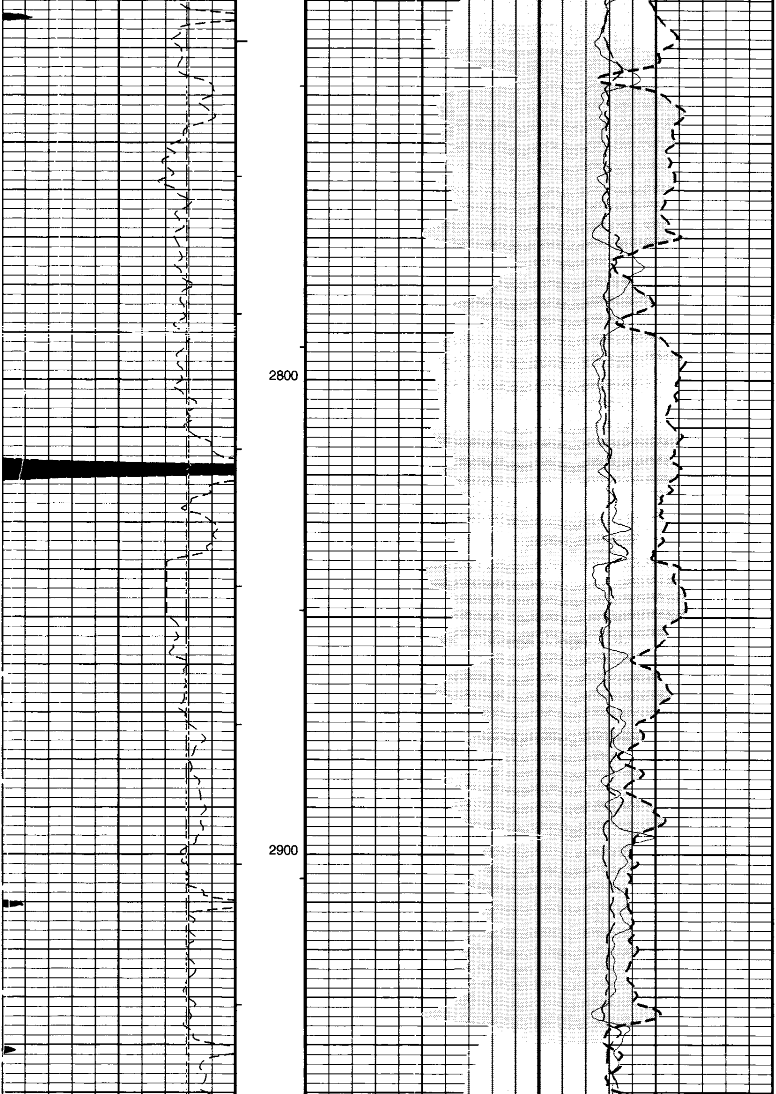


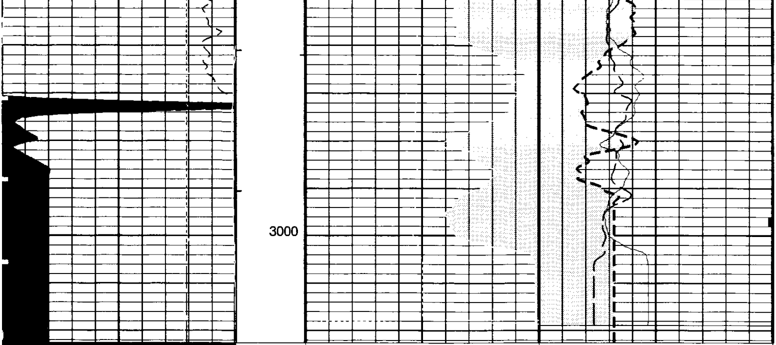












Gamma Ray Backup

Bit Size (BS)
10 (IN) 20

Gamma Ray (GR)
0 (GAPI) 150

Std. Res. Density Porosity (DPHZ)
0.6 (V/V) 0

Sonic Porosity (SPHI)
0.6 (V/V) 0

Env.Corr.Thermal Neutron Porosity (TNPH)
0.6 (V/V) 0

Crossover

Env.Corr.Thermal Neutron Porosity (TNPH)
1.2 (V/V) 0.6

Std. Res. Density Porosity (DPHZ)
1.2 (V/V) 0.6

Std. Res. Formation Pe (PEFZ)
0 (---) 10

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 10 F3
⊢ Integrated Hole Volume Major Pip Every 100 F3
⊣ Integrated Cement Volume Minor Pip Every 10 F3
⊣ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BHFL	Borehole Fluid Type	WATER	
BHS	Borehole Status	OPEN	
BS	Bit Size	7.875	in
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CDTS	C-Delta-T Shale	100.0	us/ft

CSIZ	Current Casing Size	8.625	in
CWEI	Casing Weight	32.000	lbm/ft
DFD	Drilling Fluid Density	8.900	lbm/gal
DHC	Density Hole Correction	BS	
DTF	Delta-T Fluid	189.0	us/ft
DTM	Delta-T Matrix	56.000	us/ft
FD	Fluid Density	1.000	g/cm3
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix for Neutron Porosity Corrections	SAND	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.680	g/cm3
MST	Mud Sample Temperature	55.000	degF
MWCO	Mud Weight Correction Option	NO	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	STDRES	
NSAR	HRDD Depth Sampling Rate	1.000	in
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	2.987	ohm.m
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	68.000	degF
SOCN	Standoff Distance	0.125	in
SOCO	Standoff Correction Option	YES	
SPDR	SP Drift	0.000	mV/ft
SPFS	Sonic Porosity Formula	R-H	
SPNV	SP Next Value	0.000	mV
SPSO	Sonic Porosity Source	DT	
SPVD	TVD of Starting Point	0.000	ft
TDL	Total Depth - Logger	3020.0	ft
TIMD	Along-hole depth of Tie-in Point	0.000	ft
TIVD	TVD of Tie-in Point	0.000	ft

Format: PORO_S5 Vertical Scale: 5" per 100' Graphics File Created: 18-Nov-2001 08:14

OP System Version: 9C2-303

MCM

HILTB	SRPC-2078-HILT	DSLT-BA	OP92-KP1
ACTS1	9C2-303	TCCBF	9C2-303

Input DLIS Files

DEFAULT	Splice_AIT_TLD_MCFL_003CUP	FN:1	PRODUCER	16-Nov-2001 12:01	3024.0 FT	293.5 FT

COMPANY:	NORTHWEST NATURAL GAS COMPANY	BOTTOM LOG INTERVAL	2142 ft
		SCHLUMBERGER DEPTH	2152 ft
WELL:	IW 14dH-23-65	DEPTH DRILLER	2168 ft
FIELD:	CALVIN CREEK-REICHHOLD POOL	KELLY BUSHING	923 ft
COUNTY:	COLUMBIA	DRILL FLOOR	921.5 ft
STATE:	OREGON	GROUND LEVEL	905 ft

Schlumberger

ARRAY INDUCTION / SP
DENSITY / NEUTRON / BHC
SCALE: 5"=100'