COMPANY: **NORTHWEST NATURAL GAS**

WELL: **IW 14dH-23-65**

FIELD: **CALVIN CREEK-REICHHOLD POOL**

COUNTY: **COLUMBIA** STATE: **OREGON**

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

Schlumberger

PLATFORM EXPRESS
DENSITY / NEUTRON / GR / CA
SCALE: 5" = 100FT

LOCATION

SHL: 976.5' NORTH & 1256.3' EAST FROM THE SW CORNER OF SEC 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:	KELLY BUSHING	18.0 ft above Perm. Datum		
Drilling Measured From:	KELLY BUSHING			

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

Logging Date		27-Oct-2001				
Run Number		TWO				
Depth Driller		3033 ft				
Schlumberger Depth		3020 ft				
Bottom Log Interval		3012 ft				
Top Log Interval		2144 ft				
Casing Driller Size @ Depth		8.625 in	@ 2144 ft		@	
Casing Schlumberger		2144 ft				
Bit Size		7.875 in				
Type Fluid In Hole		WATER BASED				
Density	Viscosity	8.9 lbm/gal	61 s			
Fluid Loss	PH	5.2 cm3	8.5			
Source Of Sample		MUD TANK				
RM @ Measured Temperature		0.254 ohm.m	@ 55 degF		@	
RMF @ Measured Temperature		0.219 ohm.m	@ 56 degF		@	
RMC @ Measured Temperature		0.322 ohm.m	@ 55 degF		@	
Source RMF	RMC	MUD PRESS	MUD PRESS			
RM @ MRT	RMF @ MRT	2.352 @ 77	2.238 @ 77	@		@
Maximum Recorded Temperatures		77 degF				
Circulation Stopped	Time	26-Oct-2001	4:00			
Logger On Bottom	Time	27-Oct-2001	23:30			
Unit Number	Location	3152	SACRAMENTO			
Recorded By		Z AHMED				
Witnessed By		ED VADER				

Run 1

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			
Fluid Loss	PH			
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 2

@

@ @ @ @

@

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: USIT	OS1:
OS2: NEUTRON	OS2:
OS3: PEX/FMI/SONIC ON	OS3:
OS4: TLC	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
CORRELATED TO LOG RAN BY SCHLUMBERGER ON 21-OCT-2001	
RAN ON TLC	
USED FOUR KNUCKLE JOINTS AND THREE GEMCOS	
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 POSSIBLE	
ECCENRALIZATION	
CREW:ROCKY BECK, BRAD TOMM	

RUN 1			RUN 2		
SERVICE ORDER #:			SERVICE ORDER #:		
PROGRAM VERSION:	9C2-303		PROGRAM VERSION:		
FLUID LEVEL:			FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1

RUN 2

SURFACE EQUIPMENT

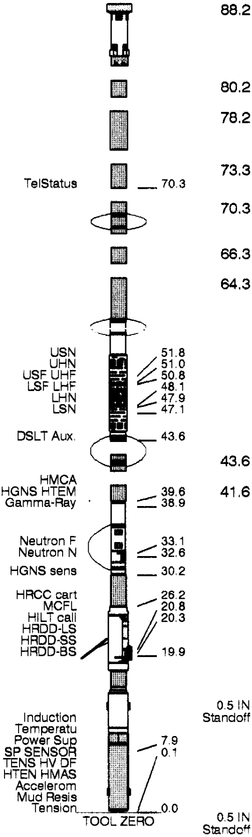
GSR-U/Y
NCT-B
CNB-AB
NCS-VB

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	78.2
TCC-BF	ECH-KC	73.3
ACTS-B1	ACTM-A ACTE-A	70.3
AH-107		66.3
DSLT-TCC	DSLC-B 8235 ECH-KH SLS-W 1085	64.3
AH-107		43.6
HILTB-DTB	HTBCC HMCA HGNS-CAN-B HGNS-H NLS-KL NSR-F 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 AH-107 AIT-H AHIS-BA 372 AHRM-A BOW-SPR NPV-N	41.6



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

Schlumberger

IMAGES

MAXIS 500 Field Log

Input DLIS Files

DEFAULT	Splice_AIT_TLD_MCFL_051CUP	FN:1	PRODUCER	28-Oct-2001 02:42	3024.0 FT	2133.0 FT

Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_052PUP	FN:47	PRODUCER	28-Oct-2001 02:44	3024.0 FT	2138.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 306.40 F3

Cement Volume = 161.79 F3 (assuming 5.50 IN casing O.D.)

Computed from 3020.0 FT to 2144.0 FT using data channel(s) HCAL

OP System Version: 9C2-303

MCM

HILTB-DTB	SRPC-2078-HILT	DSLT-TCC	OP92-KP1
ACTS-B1	9C2-303	TCC-BF	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

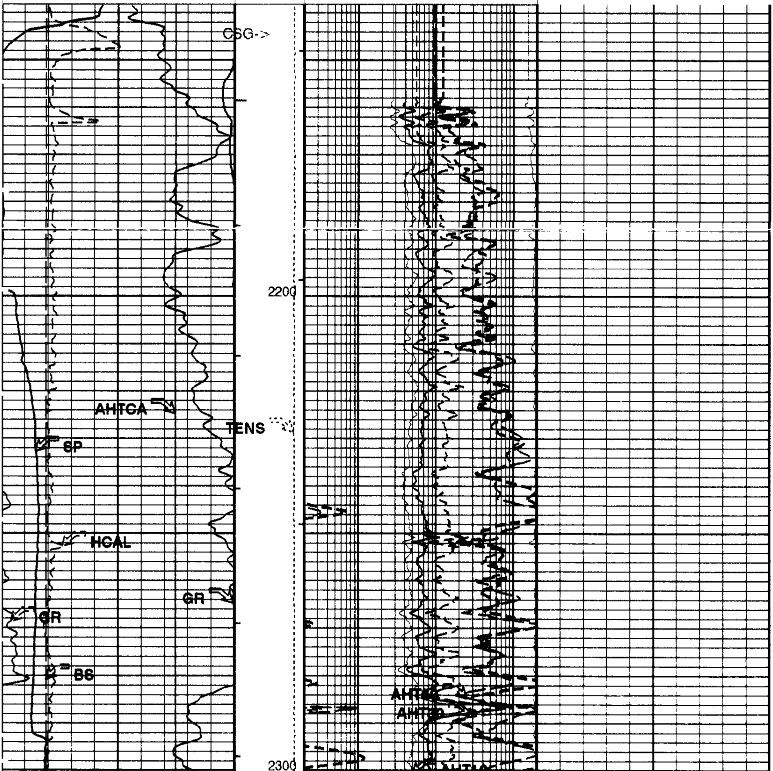
■ Time Mark Every 60 S

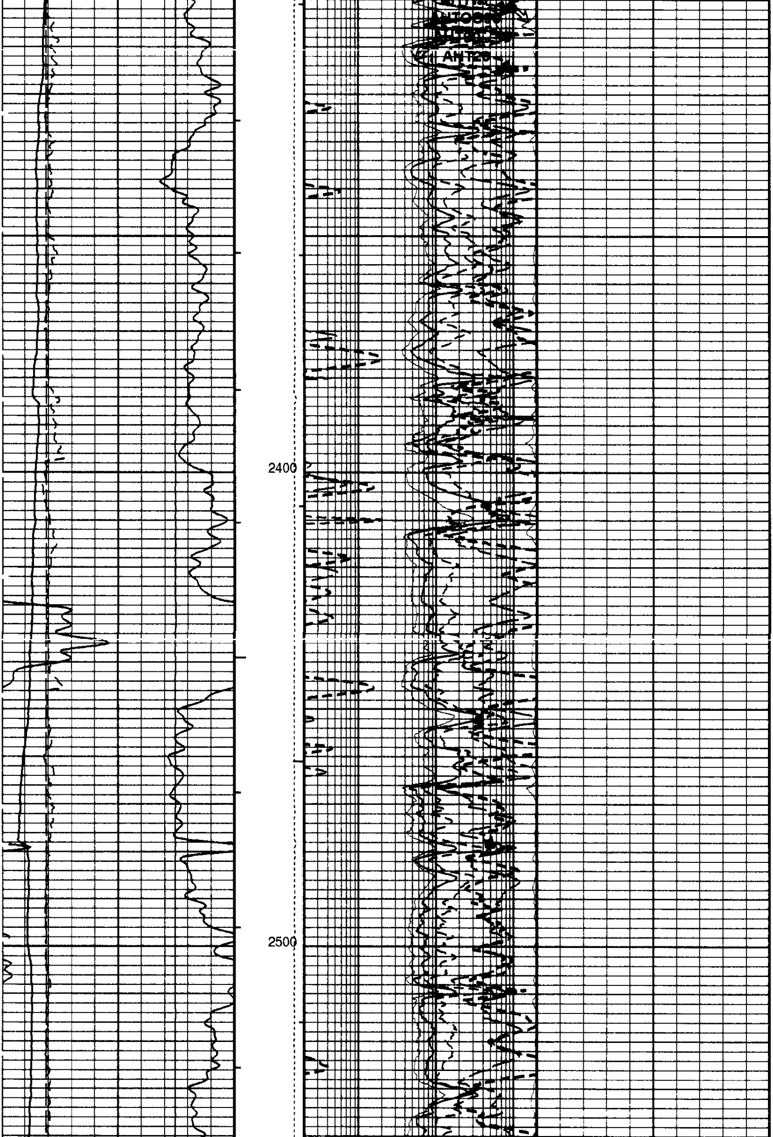
AIT-H 90 Inch

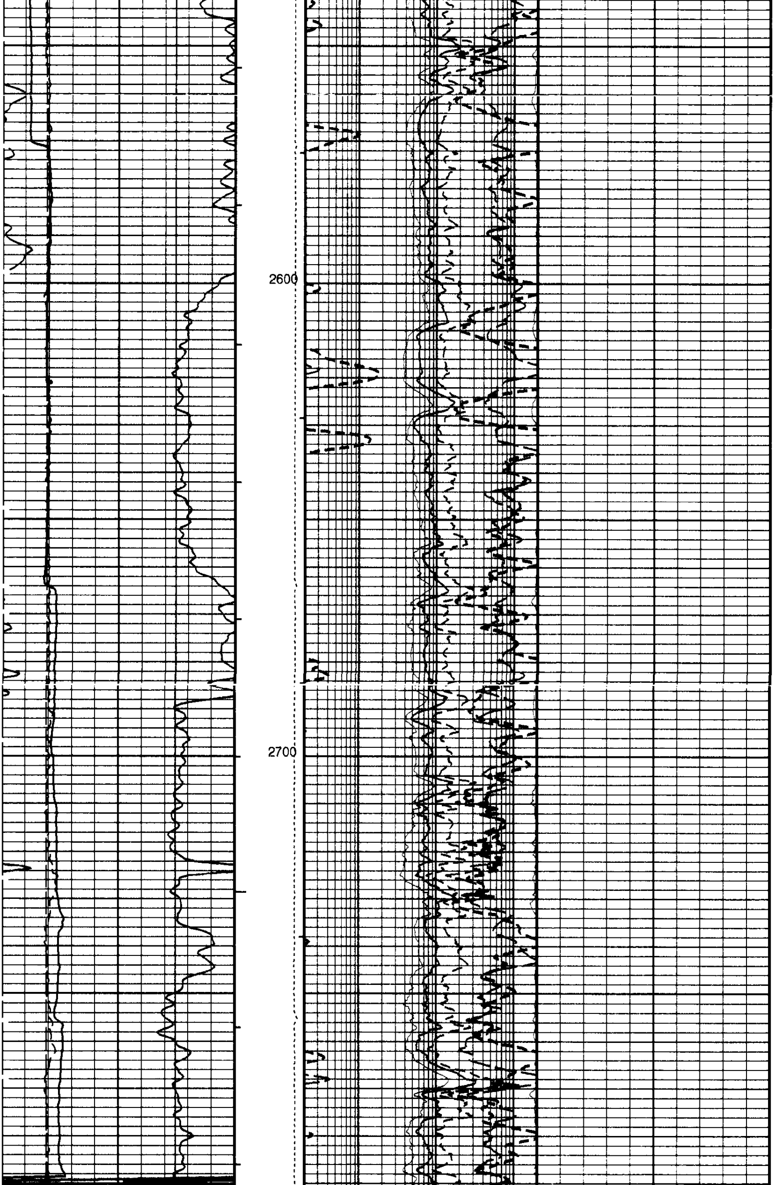
SP (SP)	-100	(MV)	0
Temperature (AHTCA)	100	(DEGF)	200
HILT Caliper (HCAL)	6	(IN)	16
Gamma Ray (GR)	150	(GAPI)	300
Gamma Ray (GR)	0	(GAPI)	150
Bit Size (BS)	6	(IN)	16

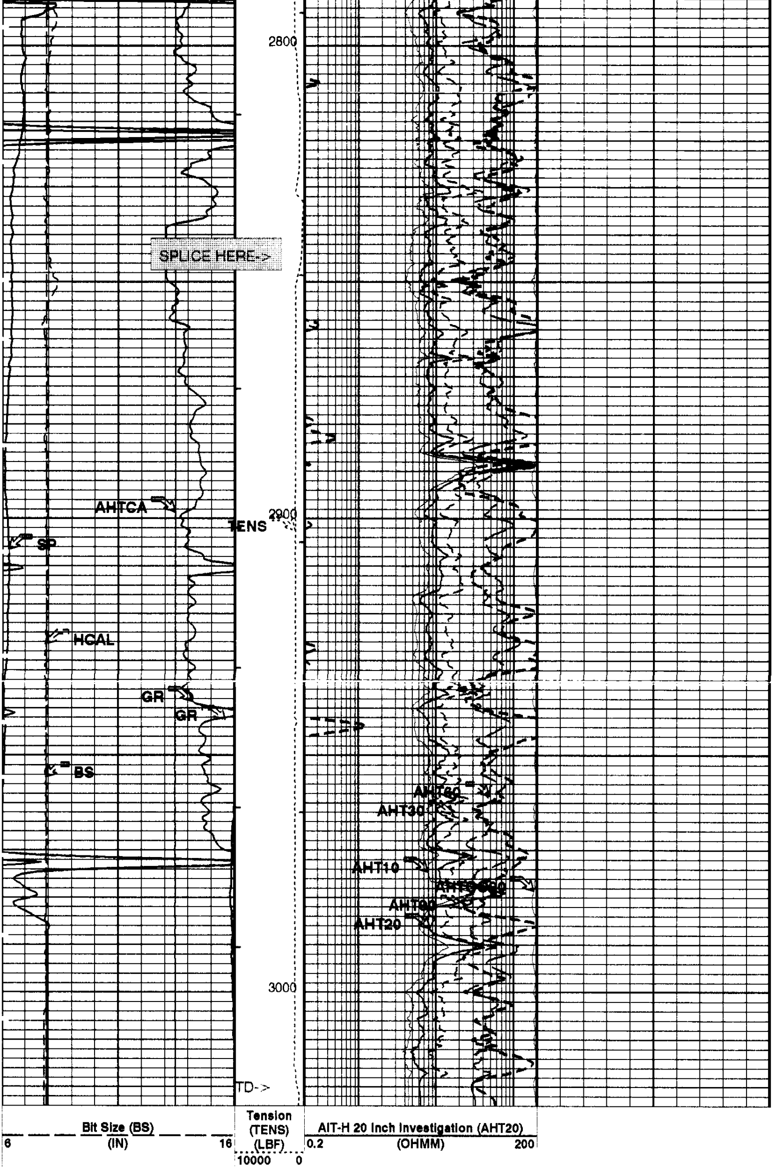
Tension (TENS)	10000	(LBF)	0

Investigation Conductivity (AHTCO90)	1000	(MM/M)	0
AIT-H 60 Inch Investigation (AHT60)	0.2	(OHMM)	200
AIT-H 30 Inch Investigation (AHT30)	0.2	(OHMM)	200
AIT-H 10 Inch Investigation (AHT10)	0.2	(OHMM)	200
AIT-H 90 Inch Investigation (AHT90)	0.2	(OHMM)	200
AIT-H 20 Inch Investigation (AHT20)	0.2	(OHMM)	200









Gamma Ray (GR)
0 (GAPI) 150

Gamma Ray (GR)
150 (GAPI) 300

HILT Caliper (HCAL)
6 (IN) 16

Temperature (AHTCA)
100 (DEGF) 200

SP (SP)
-100 (MV) 0

AIT-H 90 Inch Investigation (AHT90)
0.2 (OHMM) 200

AIT-H 10 Inch Investigation (AHT10)
0.2 (OHMM) 200

AIT-H 30 Inch Investigation (AHT30)
0.2 (OHMM) 200

AIT-H 60 Inch Investigation (AHT60)
0.2 (OHMM) 200

AIT-H 90 Inch Investigation Conductivity (AHTCO90)
1000 (MM/M) 0

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	
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff	
AHBHV	Array Induction Borehole Correction Code Version Number	880	
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four	
AHBLV	Array Induction Basic Logs Code Version Number	108	
AHCDE	Array Induction Casing Detection Enable	Yes	
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered	
AHCSED	Array Induction Casing Shoe Estimated Depth	-50000	FT
AHFRSV	Array Induction Response Set Version for Four ft Resolution	40.70.24.21	
AHMRF	Array Induction Mud Resistivity Factor	1	
AHORSV	Array Induction Response Set Version for One ft Resolution	40.70.24.21	
AHRFV	Array Induction Radial Profiling Code Version Number	700	
AHRPV	Array Induction Radial Parametrization Code Version Number	223	
AHSTA	Array Induction Tool Standoff	0.5	IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	40.70.24.21	
BHT	Bottom Hole Temperature (used in calculations)	77	DEGF
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	8.90	LB/G
DO	Depth Offset for Playback	0.0	FT
FCD	Future Casing (Outer) Diameter	5.5	IN
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
MST	Mud Sample Temperature	55.00	DEGF
PP	Playback Processing	RECOMPUTE	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
SPVD	TVD of Starting Point	0	FT
TD	Total Depth	3020	FT
TIMD	Along-hole depth of Tie-in Point	0	FT
TIVD	TVD of Tie-in Point	0	FT

Format: 5INCH Vertical Scale: 5" per 100' Graphics File Created: 28-Oct-2001 02:44

OP System Version: 9C2-303

MCM

HILTB-DTB	SRPC-2078-HILT	DSLT-TCC	OP92-KP1
ACTS-B1	9C2-303	TCC-BF	9C2-303

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Output DLIS Files

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Schlumberger

IMAGES

MAXIS 500 Field Log

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ACTS-B1	9C2-303	TCC-BF	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

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

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

Crossover

SP (SP)
-100 (MV) 0

Caliper (HCAL)
6 (IN) 16

Gamma Ray (GR)
0 (GAPI) 150

Bit Size (BS)
6 (IN) 16

Gamma Ray Backup

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

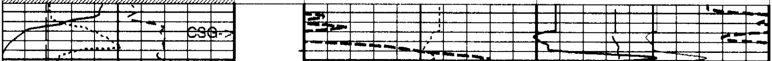
Env.Corr.Thermal Neutron Porosity (TNPH)
0.6 (V/V) 0

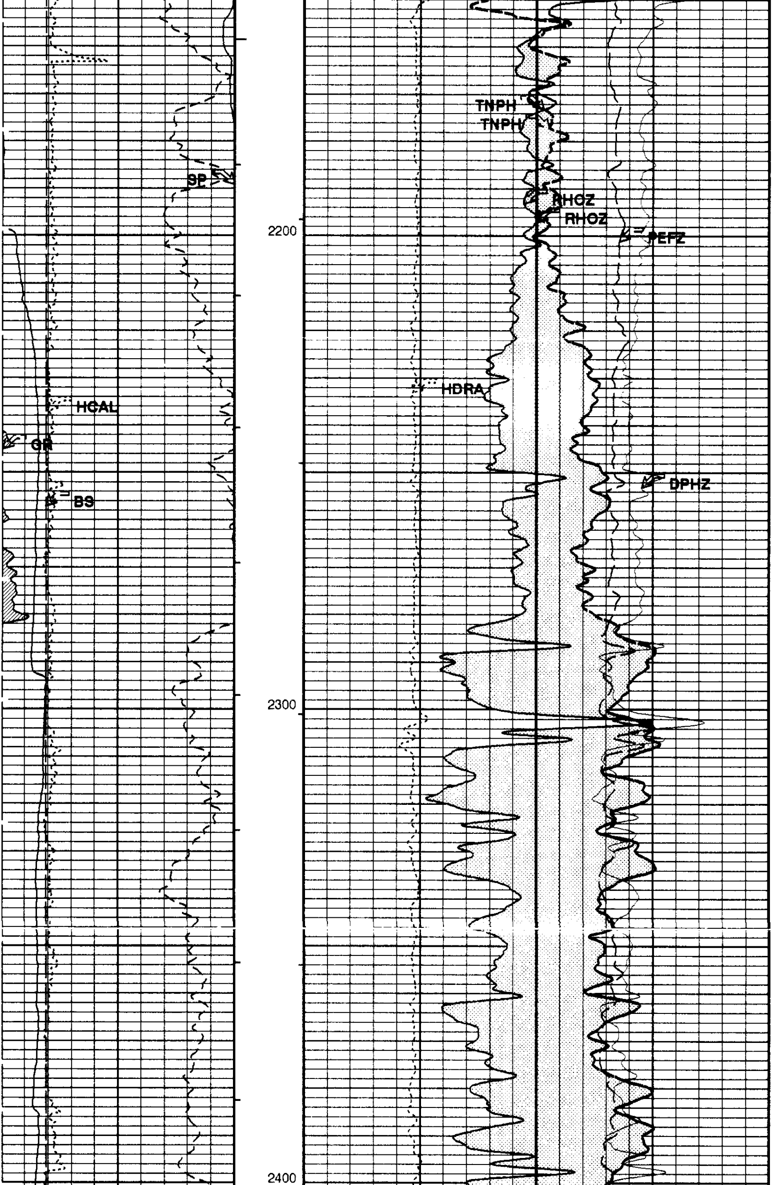
Std. Res. Formation Density (RHOZ)
0.65 (G/C3) 1.65

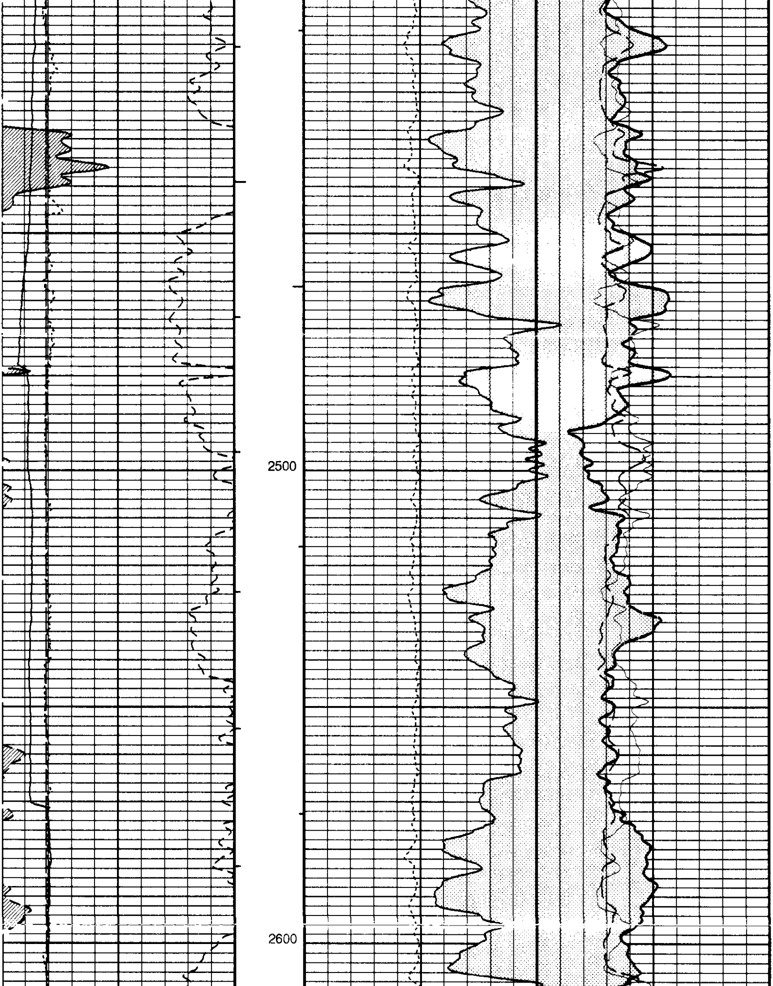
Std. Res. Formation Density (RHOZ)
1.65 (G/C3) 2.65

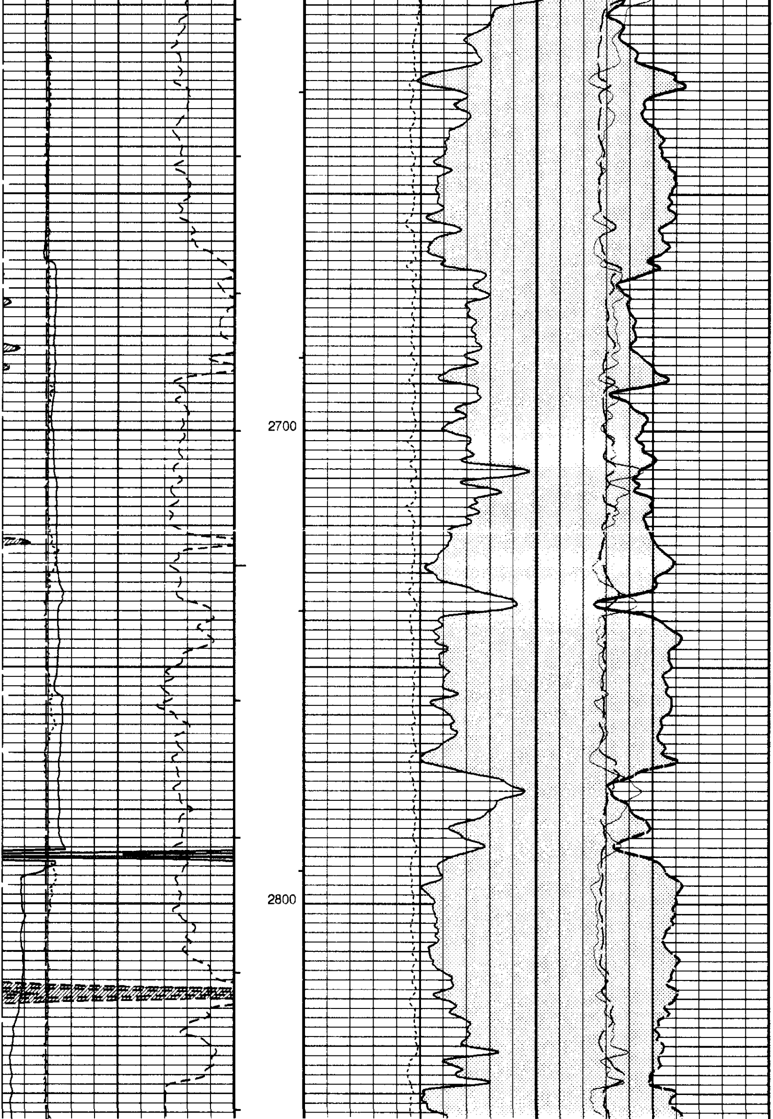
Density Correction (HDRA)
-0.5 (G/C3) 0.5

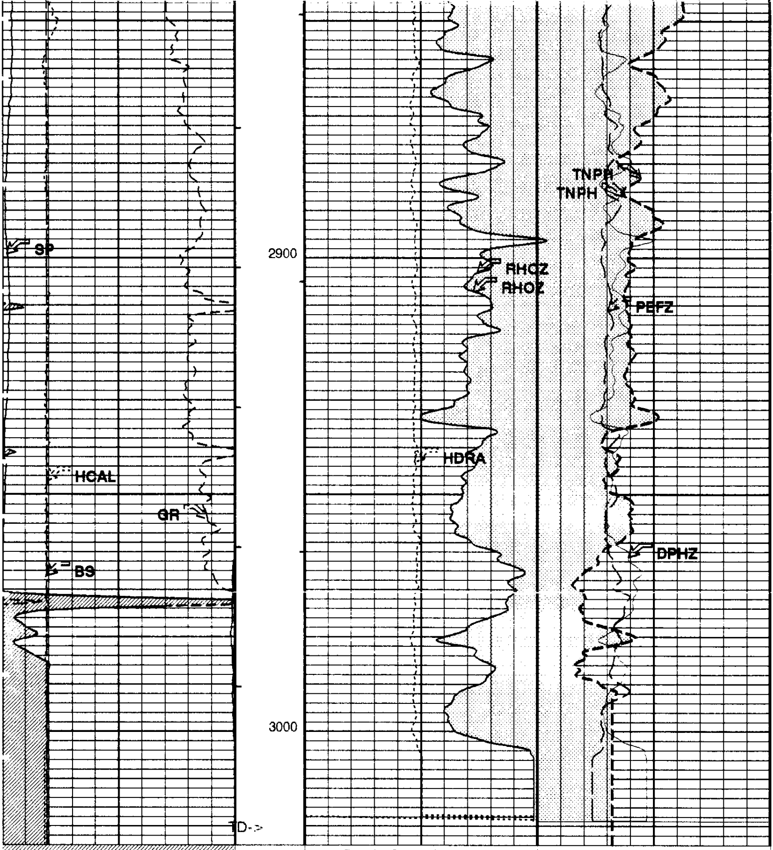
Std. Res. Density Porosity (DPHZ)
0.6 (V/V) 0











Gamma Ray Backup

Bit Size (BS)
6 (IN) 16

Gamma Ray (GR)
0 (GAPI) 150

Caliper (HCAL)
6 (IN) 16

SP (SP)
-100 (MV) 0

Density Correction (HDRA)
-0.5 (G/C3) 0.5

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

Std. Res. Formation Density (RHOZ)
1.65 (G/C3) 2.65

Std. Res. Formation Density (RHOZ)
0.65 (G/C3) 1.65

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

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

Crossover

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
BSAL	Borehole Salinity	-50000.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CSIZ	Current Casing Size	8.625	IN
CWEI	Casing Weight	32.00	LB/F
DFD	Drilling Fluid Density	8.90	LB/G
DHC	Density Hole Correction	BS	
DO	Depth Offset for Playback	0.0	FT
FCD	Future Casing (Outer) Diameter	5.5	IN
FD	Fluid Density	1	G/C3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
HSCO	Hole Size Correction Option	YES	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.68	G/C3
MST	Mud Sample Temperature	55.00	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	IN
PP	Playback Processing	RECOMPUTE	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	2.9870	OHMM
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	68	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	YES	
SPNV	SP Next Value	0	MV
SPVD	TVD of Starting Point	0	FT
TD	Total Depth	3020	FT
TDL	Total Depth - Logger	3020.00	FT
TIMD	Along-hole depth of Tie-in Point	0	FT
TIVD	TVD of Tie-in Point	0	FT

Format: PORO_S5 Vertical Scale: 5" per 100' Graphics File Created: 28-Oct-2001 02:44

OP System Version: 9C2-303

MCM

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COMPANY:	NORTHWEST NATURAL GAS
WELL:	IW 14dH-23-65
FIELD:	CALVIN CREEK-REICHHOLD POOL
COUNTY:	COLUMBIA
STATE:	OREGON

BOTTOM LOG INTERVAL	3012 ft
SCHLUMBERGER DEPTH	3020 ft
DEPTH DRILLER	3033 ft
KELLY BUSHING	923 ft
DRILL FLOOR	921.5 ft
GROUND LEVEL	905 ft

Schlumberger

PLATFORM EXPRESS
DENSITY / NEUTRON / GR / CAL
SCALE: 5" = 100FT