COMPANY: **NORTHWEST NATURAL GAS**

WELL: **I.W. 24C-23-65**

FIELD: **CALVIN CREEK GAS STORAGE**

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

COUNTY: COLUMBIA
Field: CALVIN CREEK GAS STORAGE
Location: 985.3' N & 1258.4' E FROM THE
Well: I.W. 24C-23-65
Company: NORTHWEST NATURAL GAS

Schlumberger

ARRAY INDUCTION BHC SONIC /SP/GR
SCALE: 5" = 100'

LOCATION

985.3' N & 1258.4' E FROM THE
FROM THE SW CORNER OF 23

Elev.:	K.B.	922.5 ft
	G.L.	905 ft
	D.F.	922.3 ft

Permanent Datum:	GROUND LEVEL	Elev.:	905 ft
Log Measured From:	K.B	17.5 ft	above Perm. Datum
Drilling Measured From:	K.B		

API Serial No.	SECTION	TOWNSHIP	RANGE
36-009-00350	23	6N	5W

Logging Date	28-APR-2000			7-MAY-2000		
Run Number	1			2		
Depth Driller	1746 ft			2591 ft		
Schlumberger Depth	1748 ft			2590 ft		
Bottom Log Interval	1740 ft			2581 ft		
Top Log Interval	400 ft			1724 ft		
Casing Driller Size @ Depth	13.375 in	@	445 ft	8.625 in	@	1724 ft
Casing Schlumberger	445 ft			1721 ft		
Bit Size	9.875 in			7.875 in		
Type Fluid In Hole	DMA			DMA		
MUD Density / Viscosity	9 lbm/gal	39 s		8.8 lbm/gal	38 s	
MUD Fluid Loss / PH	4.8 cm3	9		6.6 cm3	10.5	
MUD Source Of Sample	FLOWLINE			FLOWLINE		
RM @ Measured Temperature	1.830 ohm.m	@	65 degF	0.914 ohm.m	@	68 degF
RMF @ Measured Temperature	2.520 ohm.m	@	51 degF	1.250 ohm.m	@	52 degF
RMC @ Measured Temperature	1.650 ohm.m	@	51 degF	1.325 ohm.m	@	52 degF
Source RMF / RMC	PRESS	PRESS		PRESS	PRESS	
RM @ MRT / RMF @ MRT	1.463 @ 83	1.622 @ 83		0.692 @ 92	0.744 @ 92	
Maximum Recorded Temperatures	83 degF	83	82	92 degF	92	92
Circulation Stopped / Time	28-APR-2000		17:00	7-MAY-2000		0:30
Logger On Bottom / Time	28-APR-2000		22:30	7-MAY-2000		
Unit Number / Location	3152	SACRAMENTO		3152	SACRAMENTO	
Recorded By	M.KHAN			M.KHAN		
Witnessed By	JACK MEYER			JACK MEYER		

	Run 1	Run 2	Run 3	Run 4

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		

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: FMI GR
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2

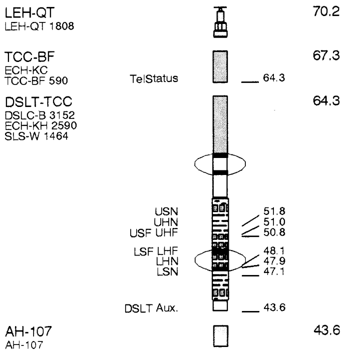
RUN 1		RUN 2	
SERVICE ORDER #		SERVICE ORDER #	
PROGRAM VERSION:	9C1-303	PROGRAM VERSION.	9C1-303
FLUID LEVEL:	0 ft	FLUID LEVEL:	0 ft

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1	RUN 2
SURFACE EQUIPMENT	SURFACE EQUIPMENT
GSR-U/Y NCT-B CNB-AB NCS-VB WITM (CTS)-A	GSR-U/Y NCT-B CNB-AB NCS-VB WITM (CTS)-A

DOWNHOLE EQUIPMENT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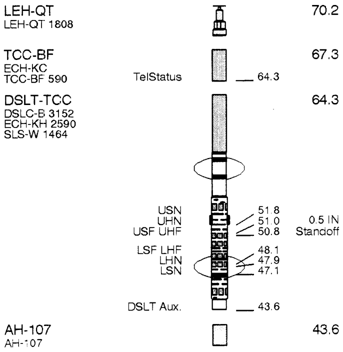
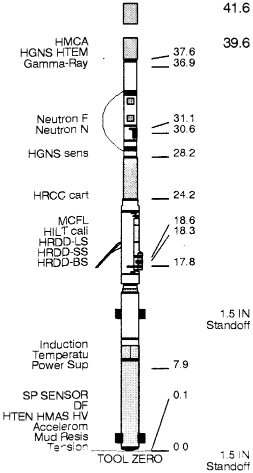
LEH-QT 1808
70.2
TCC-BF
ECH-KC
TCC-BF 590
TelStatus
64.3
67.3
DSLT-TCC
DSLC-B 3152
ECH-KH 2590
SLS-W 1464
64.3
USN
UHN
USF UHF
51.8
51.0
50.8
LSF LHF
LHN
LSN
48.1
47.9
47.1
DSLT Aux.
43.6
AH-107
AH-107
43.6

DOWNHOLE EQUIPMENT


LEH-QT
LEH-QT 1808
70.2
TCC-BF
ECH-KC
TCC-BF 590
TelStatus
64.3
67.3
DSLT-TCC
DSLC-B 3152
ECH-KH 2590
SLS-W 1464
64.3
USN
UHN
USF UHF
51.8
51.0
50.8
0.5 IN
Standoff
LSF LHF
LHN
LSN
48.1
47.9
47.1
DSLT Aux.
43.6
AH-107
AH-107
43.6

AH-107
AH-107

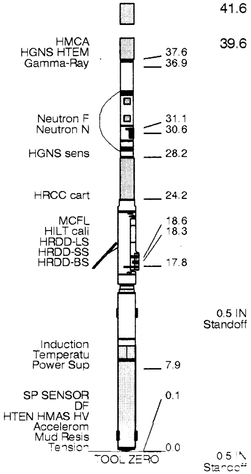
HILTB-DTB
HTBCC
HMCA 756
HGNS-CAN-B
HGNS-H 828
NLS-KL
NSR-F 2289
HACCZ
HCNT
HGR
HRCC-B 3152
HRMS-B 723
HRGD
GLS-VJ 1924
MCFL Device
HILT Nucl. LS
HILT Nucl. SS
HILT Nucl. BS
AIT-H
AHIS-BA 112
AHRM-A
BOW-SPR
NPV-N


41.6
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
24.2
MCFL
HILT cali
HRDD-LS
HRDD-SS
HRDD-BS
18.6
18.3
17.8
1.5 IN
Standoff
Induction
Temperatu
Power Sup
7.9
SP SENSOR
DF
HTEN HMAS HV
Accelerom
Mud Resis
Tension
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

AH-107
AH-107

HILTB-DTB
HTBCC
HMCA 756
HGNS-CAN-B
HGNS-H 828
NLS-KL
NSR-F
HACCZ
HCNT
HGR
HRCC-B 723
HRMS-B 723
HRGD 723
GLS-VJ 1924
MCFL Device
HILT Nucl. LS
HILT Nucl. SS
HILT Nucl. BS
AIT-H
AHIS-BA 112
AHRM-A
BOW-SPR
NPV-N


41.6
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MCFL
HILT cali
HRDD-LS
HRDD-SS
HRDD-BS
18.6
18.3
17.8
0.5 IN
Standoff
Induction
Temperatu
Power Sup
7.9
SP SENSOR
DF
HTEN HMAS HV
Accelerom
Mud Resis
Tension
0.1
0.0
TOOL ZERO
0.5 IN
Standoff

MAXIMUM STRING DIAMETER 4.88 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Input DLIS Files

DEFAULT	HILTB .036	FN:1	PRODUCER	07-May-2000 13:15	2607.0 FT	300.0 FT

Output DLIS Files

DEFAULT	HILTB .037	FN:32	PRODUCER	07-May-2000 13:18	2607.0 FT	1879.5 FT

OP System Version: 9C1-303

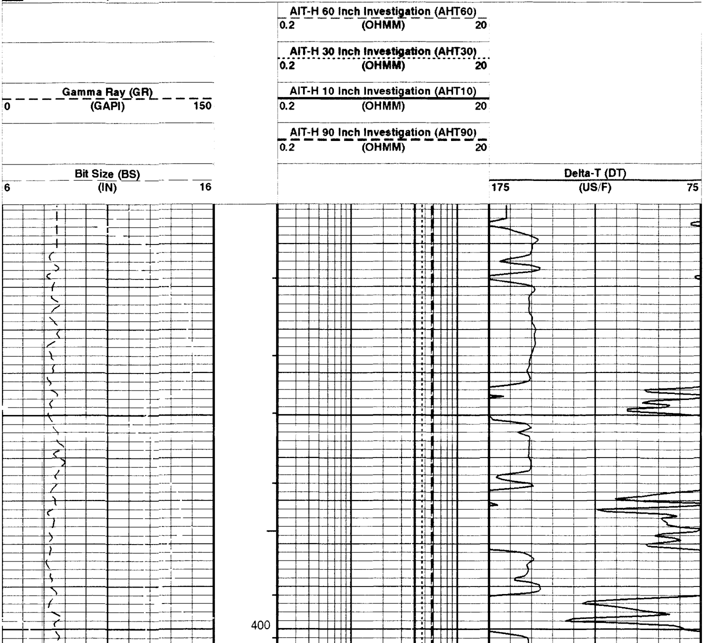
MCM

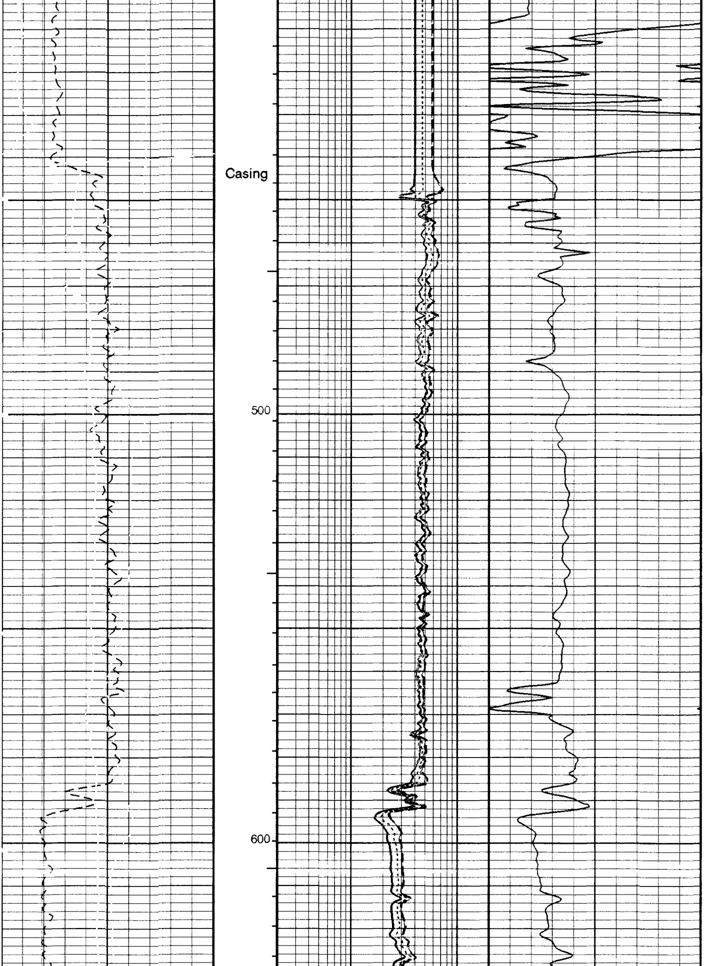
HILTB-DTB	OP91-KP1a	DSLT-TCC	OP91-KP1a
TCC-BF	OP91-KP1a		

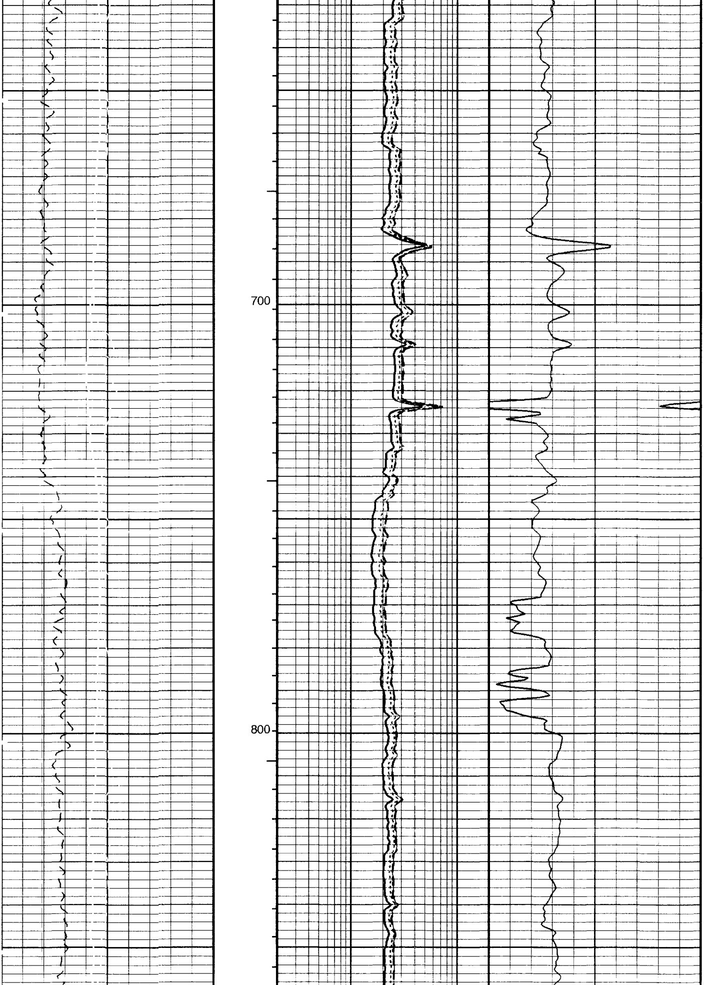
PIP SUMMARY

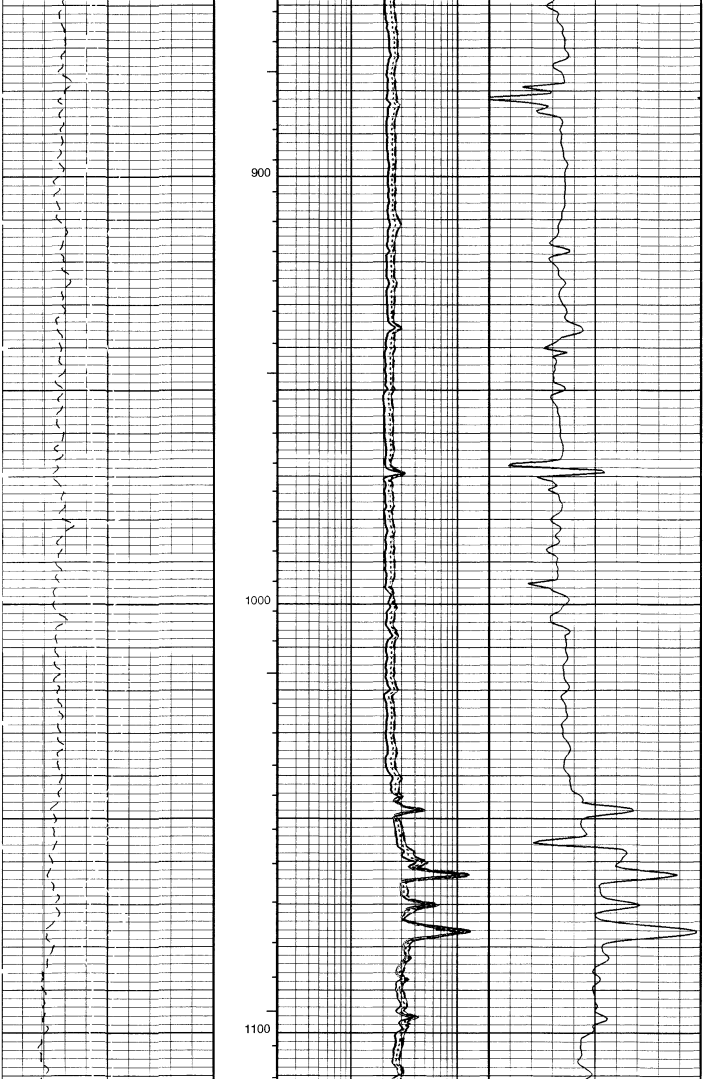
┤ Integrated Transit Time Minor Pip Every 1 MS
─┤ Integrated Transit Time Major Pip Every 10 MS

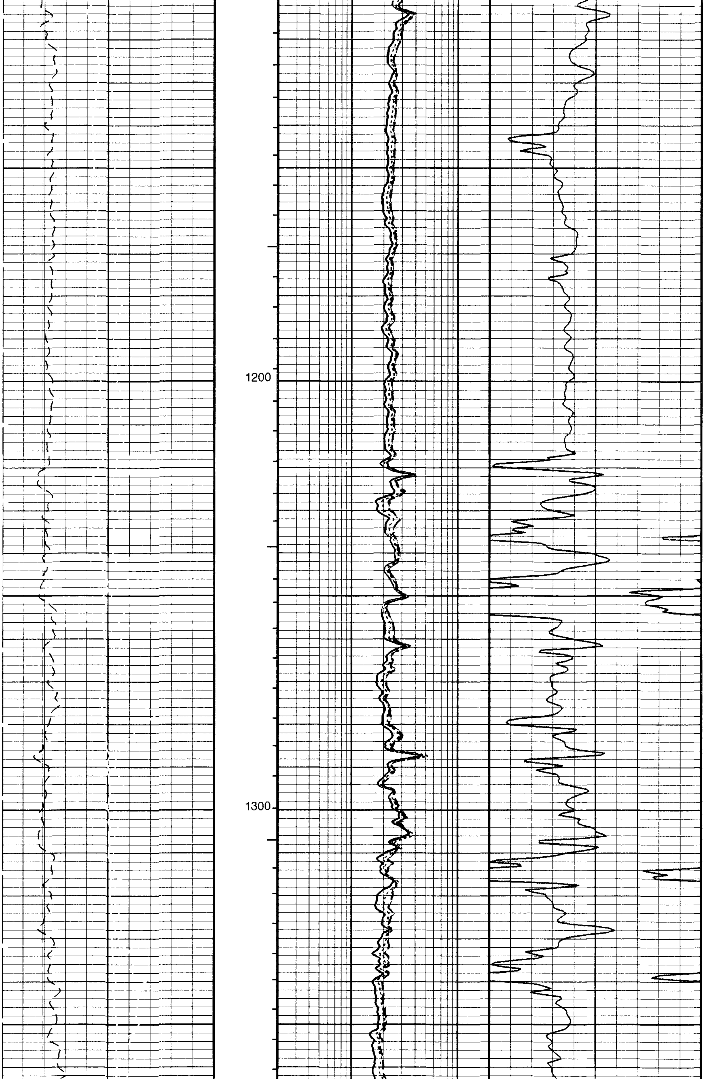
Time Mark Every 60 S

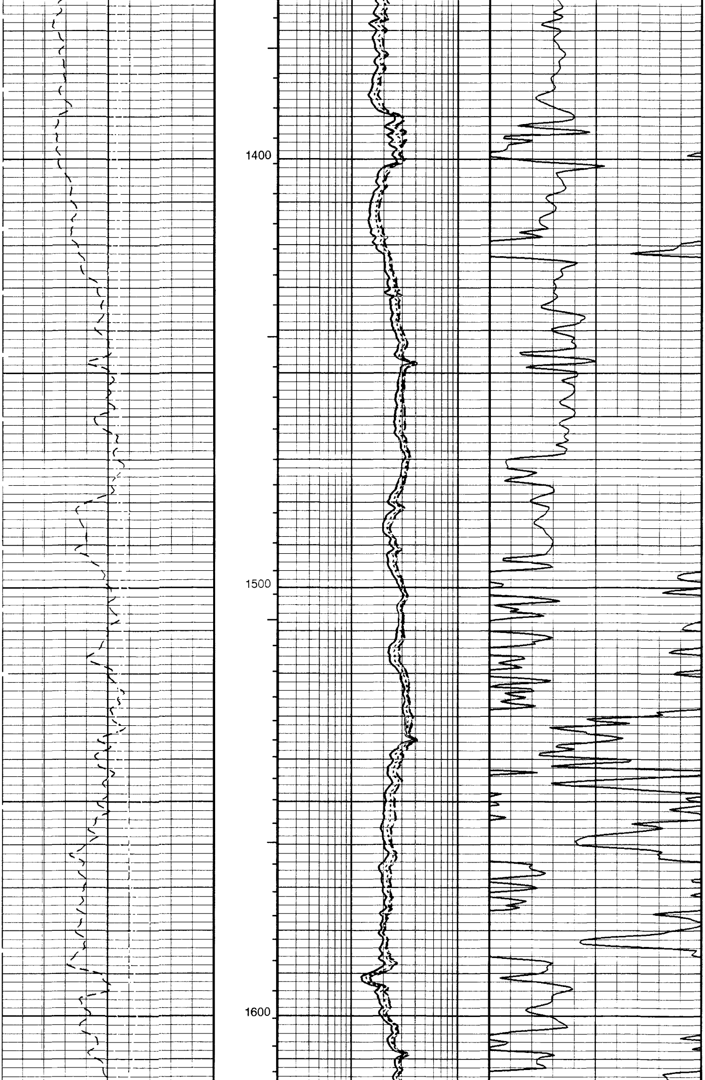


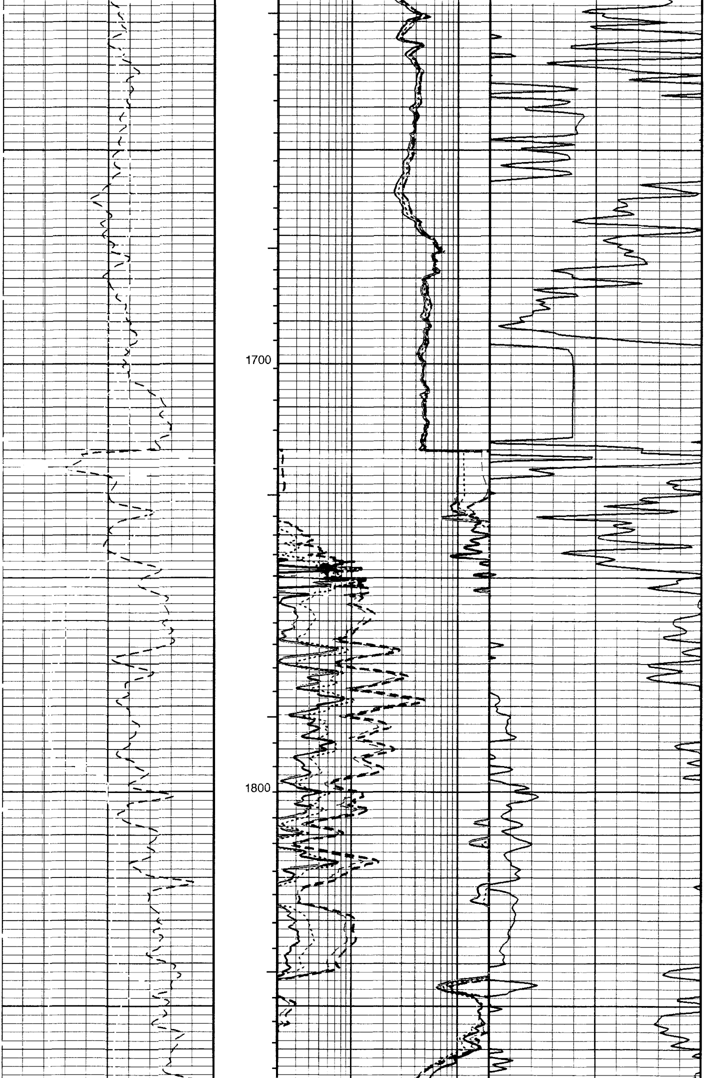


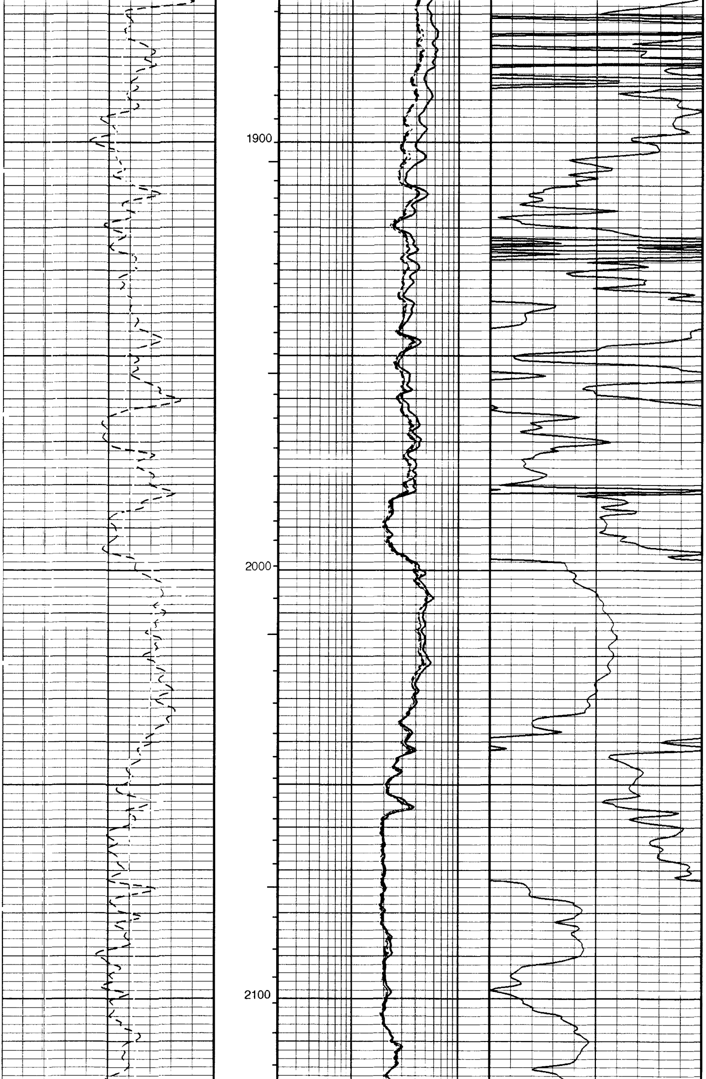


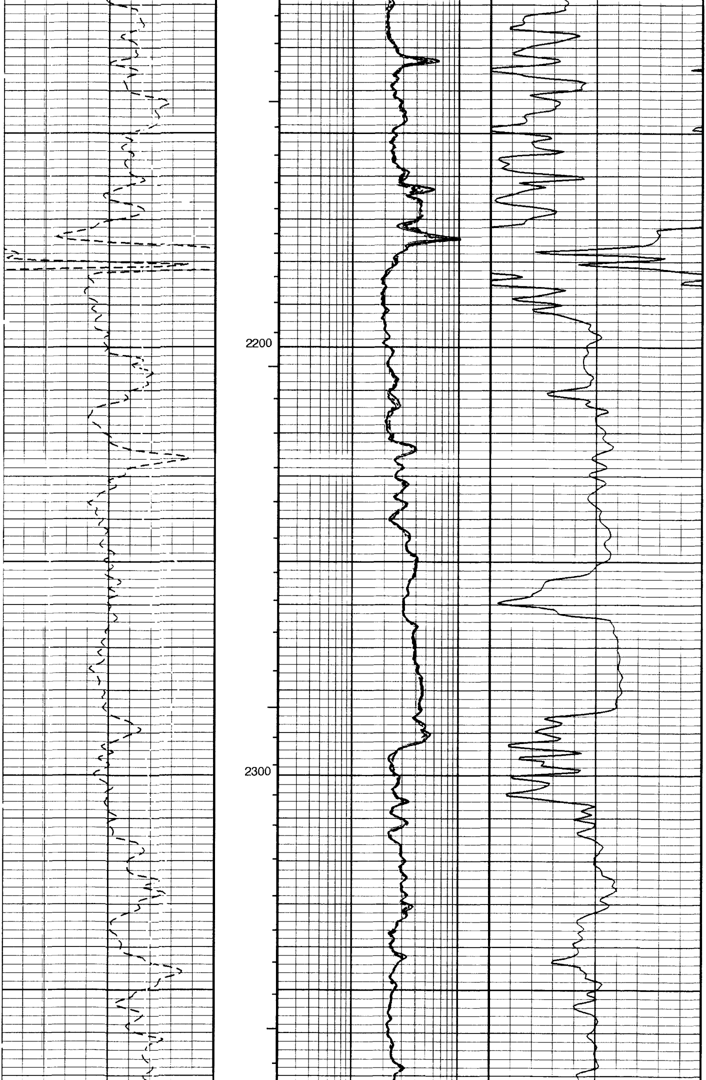


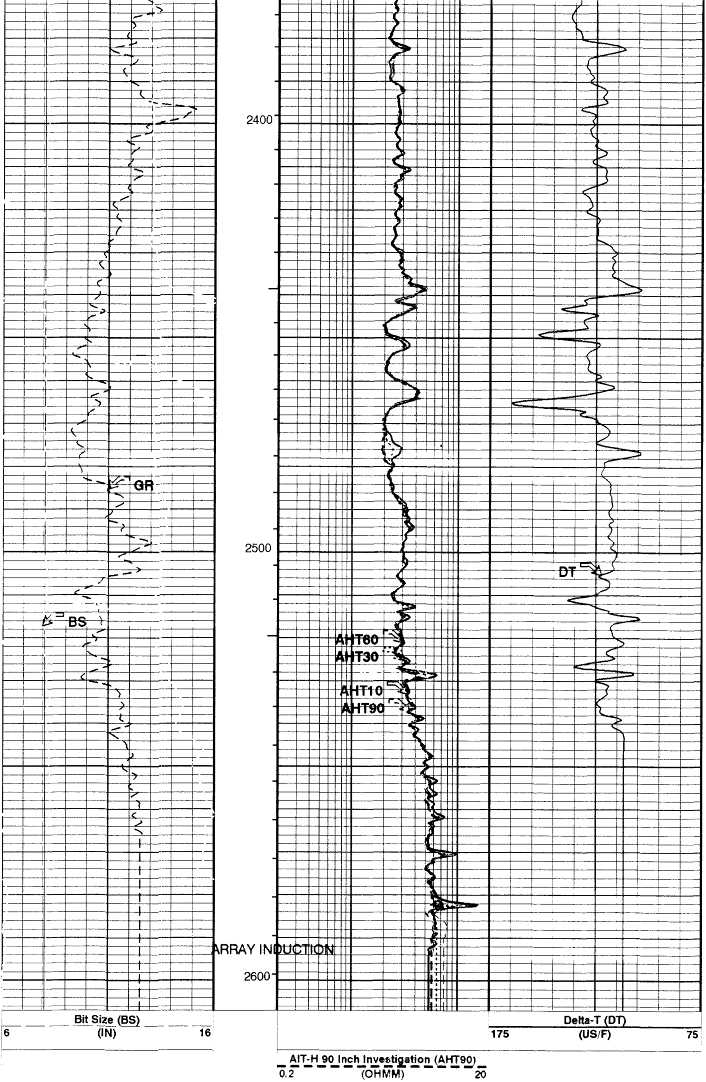












Gamma Ray (GR)
0 (GAPI) 150

AIT-H 10 Inch Investigation (AHT10)
0.2 (OHMM) 20

AIT-H 30 Inch Investigation (AHT30)
0.2 (OHMM) 20

AIT-H 60 Inch Investigation (AHT60)
0.2 (OHMM) 20

PIP SUMMARY

⊣ Integrated Transit Time Minor Pip Every 1 MS
⊣ Integrated Transit Time Major Pip Every 10 MS

▣ 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	870	
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four	
AHBLV	Array Induction Basic Logs Code Version Number	973	
AHBPO	Array Induction Basic Logs Processing Option	Standard_Processing	
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	30.66.23.11	
AHMRF	Array Induction Mud Resistivity Factor	1	
AHORSV	Array Induction Response Set Version for One ft Resolution	30.66.23.11	
AHRFV	Array Induction Radial Profiling Code Version Number	700	
AHRPV	Array Induction Radial Parametrization Code Version Number	710	
AHSTA	Array Induction Tool Standoff	1.5	IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	30.66.23.11	
BHT	Bottom Hole Temperature (used in calculations)	92	DEGF
BS	Bit Size	7.875	IN
DO	Depth Offset for Logical Unit 1	0.0	FT
DTCM	Delta-T Computation Mode	FULL	
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	35	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HSCM	HILT Speed Correction Mode	NO_SC	
HSTI	STI Uses HILT Acceleration	YES	
MODE	Sonic Firing Mode	BHC	
PP	Playback Processing	NORMAL	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
SPVD	TVD of Starting Point	500	FT
TD	Total Depth	2591	FT
TIMD	Along-hole depth of Tie-in Point	500	FT
TIVD	TVD of Tie-in Point	500	FT

Format: AITSON Vertical Scale: 5" per 100' Graphics File Created: 07-May-2000 13:18

OP System Version: 9C1-303

MCM

HILTB-DTB	OP91-KP1a	DSLT-TCC	OP91-KP1a
TCC-BF	OP91-KP1a		

Input DLIS Files

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Output DLIS Files

DEFAULT	HILTB .037	FN:32	PRODUCER	07-May-2000 13:18

COMPANY: **NORTHWEST NATURAL GAS**

WELL: **I.W. 24C-23-65**
FIELD: **CALVIN CREEK GAS STORAGE**
COUNTY: **COLUMBIA**
STATE: **OREGON**

BOTTOM LOG INTERVAL	1740 ft
SCHLUMBERGER DEPTH	1748 ft
DEPTH DRILLER	1746 ft
KELLY BUSHING	922.5 ft
DRILL FLOOR	922.3 ft
GROUND LEVEL	905 ft

Schlumberger

ARRAY INDUCTION
BHC SONIC /SP/GR
SCALE: 5" = 100'