COMPANY: NORTHWEST NATURAL GAS

WELL: OM-32-22-65

FIELD: CALVIN CREEK GAS STORAGE

COUNTY: COLUMBIA **STATE:** OREGON

COUNTY:	COLUMBIA
Field	CALVIN CREEK GAS STORAGE
Location:	1884.04' S & 1261.26' E FROM T
Well:	OM-32-22-65
Company:	NORTHWEST NATURAL GAS

Schlumberger

PLATFORM EXPRESS
BHC SONIC
LOG QUALITY

LOCATION

1884.04' S & 1261.26' E FROM THE
NE CORNER OF SECTION 22

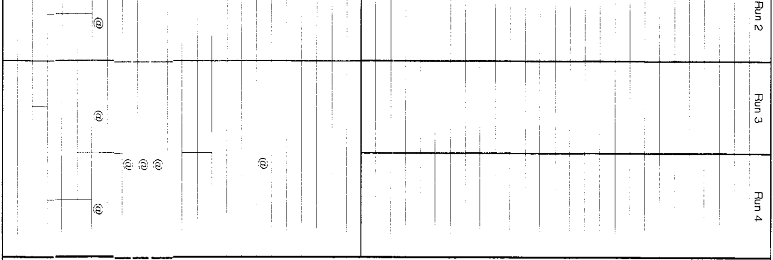
Elev.:	K.B.	762 F		
	G.L.	753 F		
	D.F.			
Permanent Datum:	GROUND LEVEL	Elev.:	753 F	
Log Measured From:	KELLY BUSHING	9.0 F	above Perm. Datum	
Drilling Measured From:	KELLY BUSHING			

API Serial No.	SECTION	TOWNSHIP	RANGE
	22	6N	5W

Logging Date	22-JUL-1998			
Run Number	ONE			
Depth Driller	2365 F			
Schlumberger Depth	2365 F			
Bottom Log Interval	2357 F			
Top Log Interval	425 F			
Casing Driller Size @ Depth	8.625 IN	@ 425 F		@
Casing Schlumberger	425 F			
Bit Size	7.875 IN			
Type Fluid In Hole	CYPAN			
MUD Density | Viscosity	9.5 LB/G	45 S		
MUD Fluid Loss | PH	7.8 C3	8		
MUD Source Of Sample	FLOWLINE			
RM @ Measured Temperature	1.870 OHMM	@ 80 DEGF		@
RMF @ Measured Temperature	1.910 OHMM	@ 70 DEGF		@
RMC @ Measured Temperature	1.650 OHMM	@ 70 DEGF		@
Source RMF | RMC	PRESS	PRESS		
RM @ MRT | RMF @ MRT	1.579 @ 96	1.427 @ 96	@	@
Maximum Recorded Temperatures	96 DEGF			
Circulation Stopped | Time	22-JUL-1998	2:30		
Logger On Bottom | Time	22-JUL-1998	5:30		
Unit Number | Location	3152	SACRAMENTO		
Recorded By	JASON GENDUR			
Witnessed By	JACK MEYER			

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		
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		



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OTHER SERVICES1	OTHER SERVICES2
OS1:	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

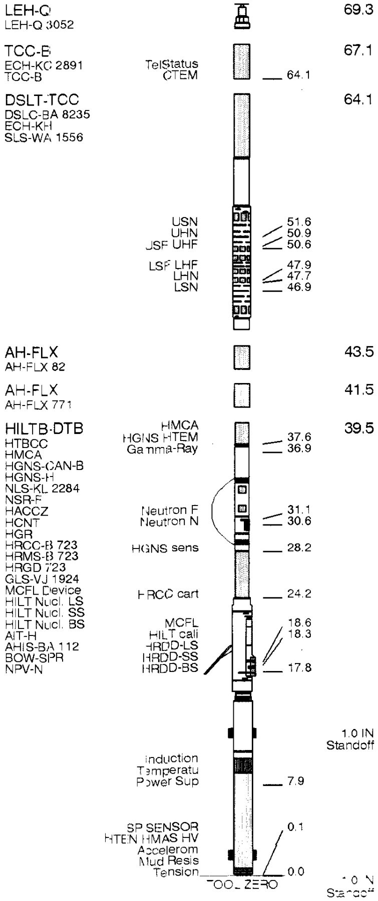
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Thank you for choosing Schlumbeger!	
AIT run with 1" standoffs.	
CNL run with bowspring for eccentralization.	
Log run on sandstone matrix = 2.65 g/c3.	
Your crew today is Forehand & Tye.	

RUN 1	RUN 2
SERVICE ORDER #: 1222172	SERVICE ORDER #
PROGRAM VERSION: 8C1-205	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	



MAXIMUM STRING DIAMETER 5.88 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Input DLIS Files

DEFAULT	HILTB .037	FN:1	FIELD	22-Jul-1998 12:54	2370.0 FT	249.7 FT

Output DLIS Files

DEFAULT	HILTB .038	FN:31	FIELD	22-Jul-1998 13:19	2370.0 FT	250.0 FT

Speed Corrected - Depth Matched LOG

OP System Version: 8C1-205

MCM

HILTB-DTB	APCW-98Q1	DSLT-TCC	8C1-205
TCC-B	APCW-98Q1		

PIP SUMMARY

◨ Time Mark Every 60 S

Std. Res. Resistivity Standoff (RSOZ)
2.5 (IN) 0

HGNS Deviation (GDEV)
-5 (DEG) 45

Bit Size (BS)
6 (IN) 16

AIT-H Bhole/Form Signal Ratio (AHBFR)
0 (----) 25

Tension
(TENS)
(LBF)
10000 0

AIT-H QC Fully Calibrated A8 Signal
(AHQABN[7])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A7 Signal
(AHQABN[6])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A6 Signal
(AHQABN[5])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A5 Signal
(AHQABN[4])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A4 Signal
(AHQABN[3])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A3 Signal
(AHQABN[2])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A2 Signal
(AHQABN[1])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A1 Signal
(AHQABN[0])
2 (MM/M) 20000

Pe Correction (HPRA)
-3 (----) 3

Hdrx (HDRX)
0 (----) 3

Delta Neutron Porosity
(DNPH)
-0.1 (V/V) 0.1

GR Borehole Correction
Factor (CFGR)
0.5 (----) 1.5

*** Flag Tracks ***

White = Absent Green = Good Yellow = Warn Red/Black = Bad

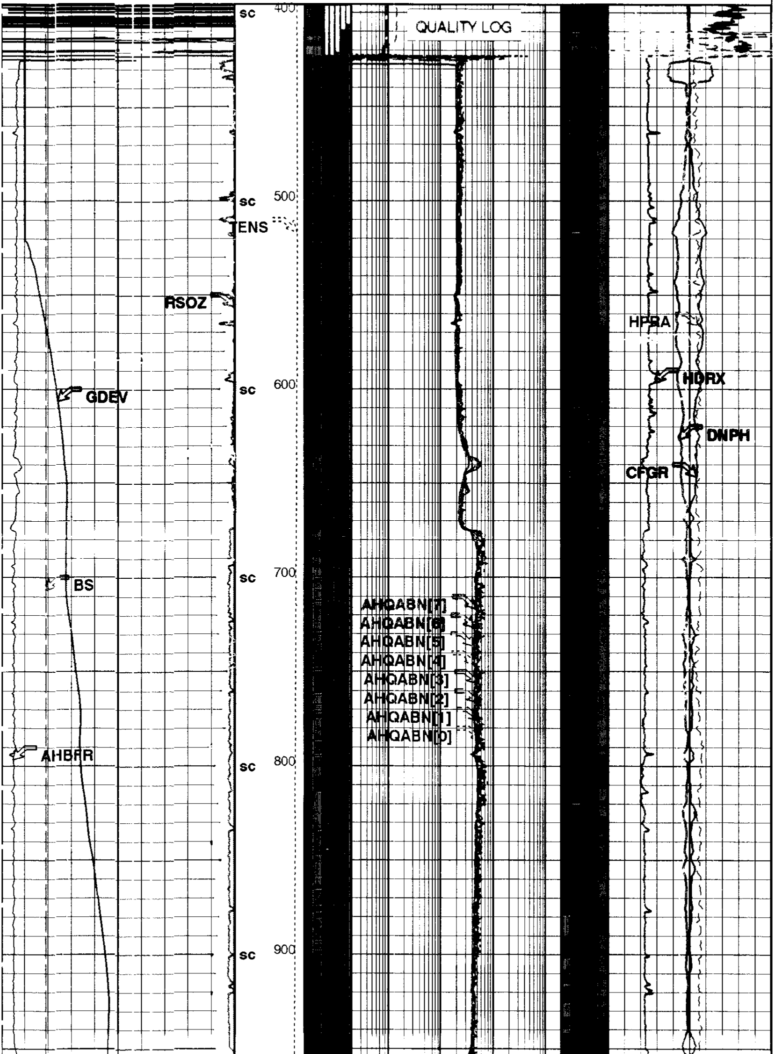
RESISTIVITY TRACK :

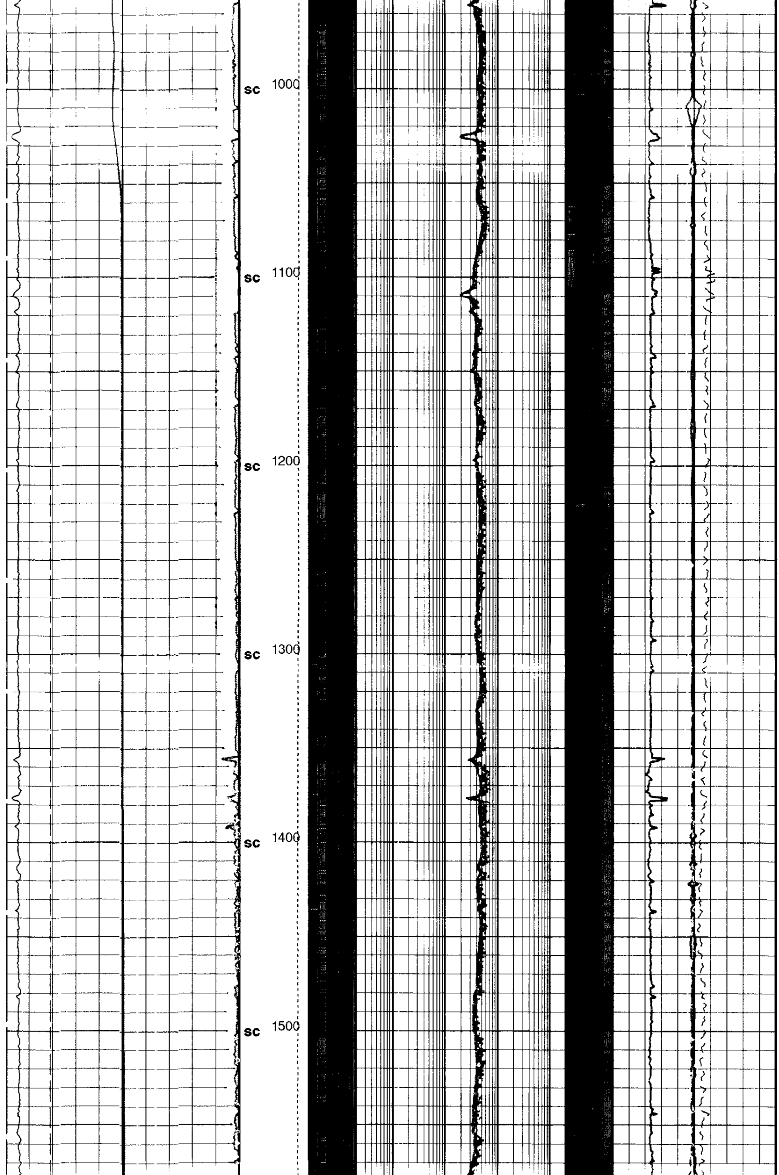
1. MCFL Hardware
2. RXO Processing
3. HAIT Hardware
4. HAIT Array[1-2]
5. HAIT Array[3-4]
6. HAIT Array[5-6]
7. HAIT Array[7-8]

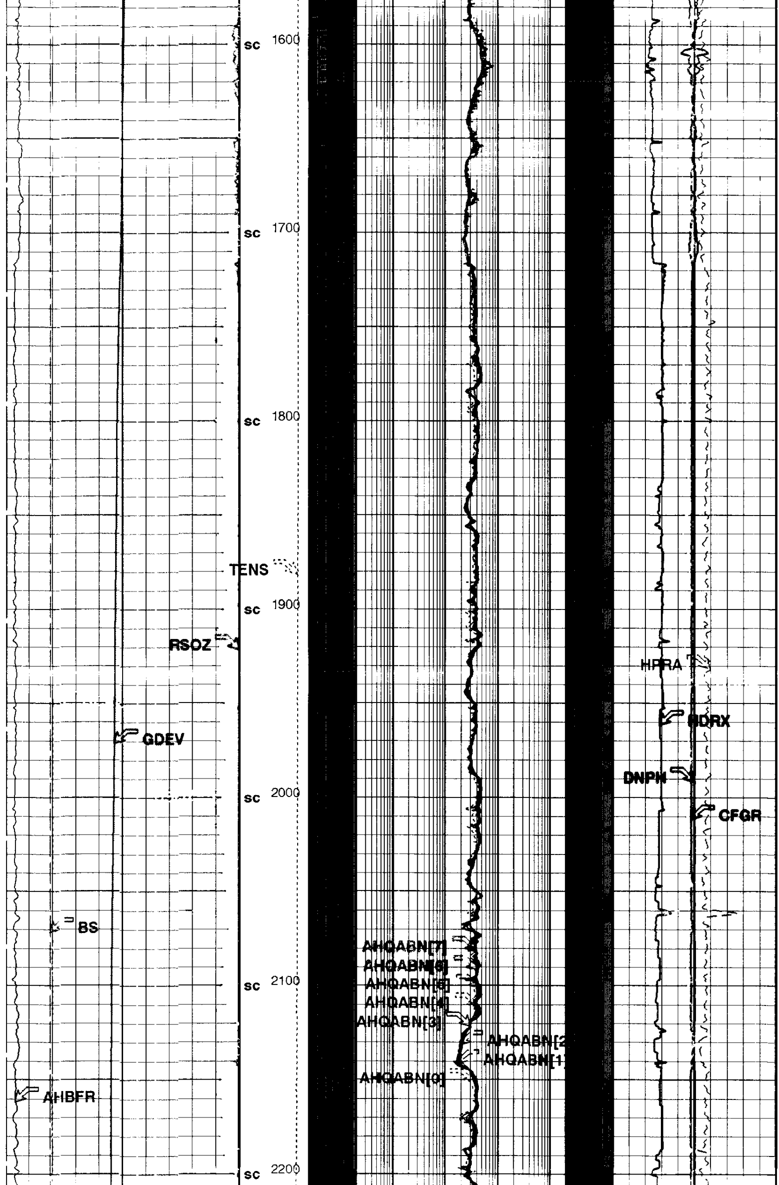
NUCLEAR TRACK :

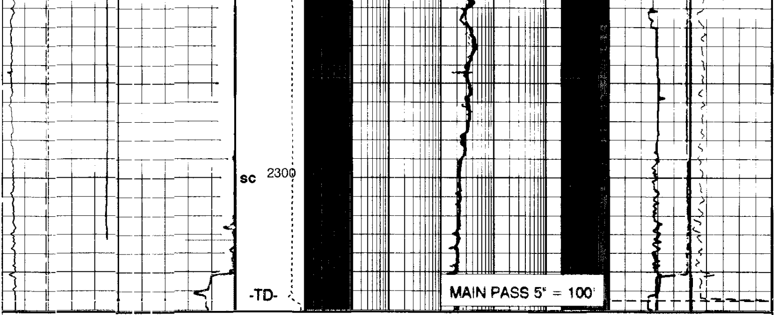
1. Accelerometer
2. Density Detector
3. Neutron Porosity
4. Density Computation

5. Pef Computation









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NUCLEAR TRACK :

1. Accelerometer
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AIT-H Bhole/Form Signal Ratio (AHBFR)
0 (----) 25

Bit Size (BS)
6 (IN) 16

HGNS Deviation (GDEV)
-5 (DEG) 45

Std. Res. Resistivity Standoff (RSOZ)
2.5 (IN) 0

Tension
(TENS)
(LBF)
10000 0

AIT-H QC Fully Calibrated A1 Signal
(AHQABN[0])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A2 Signal
(AHQABN[1])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A3 Signal
(AHQABN[2])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A4 Signal
(AHQABN[3])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A5 Signal
(AHQABN[4])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A6 Signal
(AHQABN[5])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A7 Signal
(AHQABN[6])
2 (MM/M) 20000

AIT-H QC Fully Calibrated A8 Signal
(AHQABN[7])
2 (MM/M) 20000

GR Borehole Correction Factor (CFGR)
0.5 (----) 1.5

Delta Neutron Porosity (DNPH)
-0.1 (V/V) 0.1

Hdrx (HDRX)
0 (----) 3

Pe Correction (HPRA)
-3 (----) 3

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AHBHM	AIT-H Bhole Correction Mode	2_ComputeStandoff	
AHBLM	AIT-H Basic Logs Mode	6_One_Two_and_Four	
AHCEN	AIT-H Tool Centering Flag (in Borehole)	Eccentered	
AHMRF	AIT-H Mud Resistivity Factor	1	
AHSTA	AIT-H Tool Standoff	1	IN
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	96	DEGF
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	
CWEI	Casing Weight	-50000.00	LB/F
DFD	Drilling Fluid Density	9.50	LB/G
DHC	Density Hole Correction	BS	
DO	Depth Offset	0.0	FT
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
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
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HSCM	HILT Speed Correction Mode	TSCD_SPEED_CORRECTION	
HSCO	Hole Size Correction Option	YES	
HSTI	STI Uses HILT Acceleration	YES	
MATR	Rock Matrix Type	SANDSTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MPOF	MCFL Processing Operation Mode	ON	
MST	Mud Sample Temperature	80.00	DEGF
MWCO	Mud Weight Correction Option	NO	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	StdRes	
NSAR	HRDD Depth Sampling Rate	1	IN
PP	Playback Processing	NORMAL	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	1.9100	OHMM
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	68	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	NO	
TD	Total Depth	2365	FT
TDL	Total Depth - Logger	2365.00	FT

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OP System Version: 8C1-205

MCM

HILTB-DTB	APCW-98Q1	DSLT-TCC	8C1-205
TCC-B	APCW-98Q1		

Speed Corrected - Depth Matched LOG

Input DLIS Files

DEFAULT	HILTB .037	FN:1	FIELD	22-Jul-1998 12:54	2370.0 FT	249.7 FT

Output DLIS Files

DEFAULT	HILTB .038	FN:31	FIELD	22-Jul-1998 13:19

Input DLIS Files

DEFAULT	HILTB .037	FN:1	FIELD	22-Jul-1998 12:54	2370.0 FT	249.7 FT

Output DLIS Files

DEFAULT	HILTB .038	FN:31	FIELD	22-Jul-1998 13:19	2370.0 FT	250.0 FT

OP System Version: 8C1-205

MCM

HILTB-DTB	APCW-98Q1	DSLT-TCC	8C1-205
TCC-B	APCW-98Q1		

PIP SUMMARY

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

■ Time Mark Every 60 S

Sonic Velocity (SVEL)
5000 (FT/S) 25000

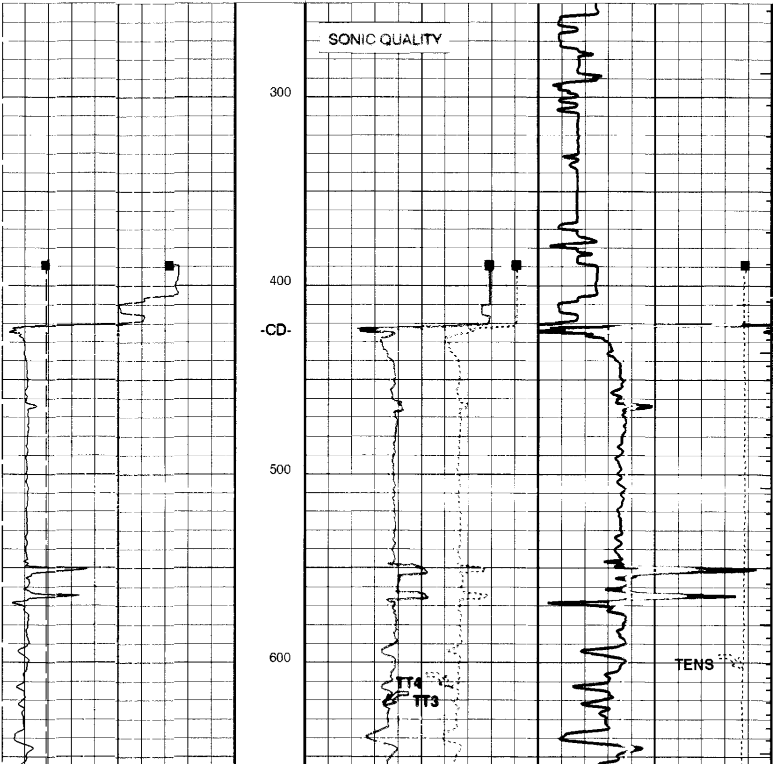
Transit Time 4 (TT4)
1200 (US) 200

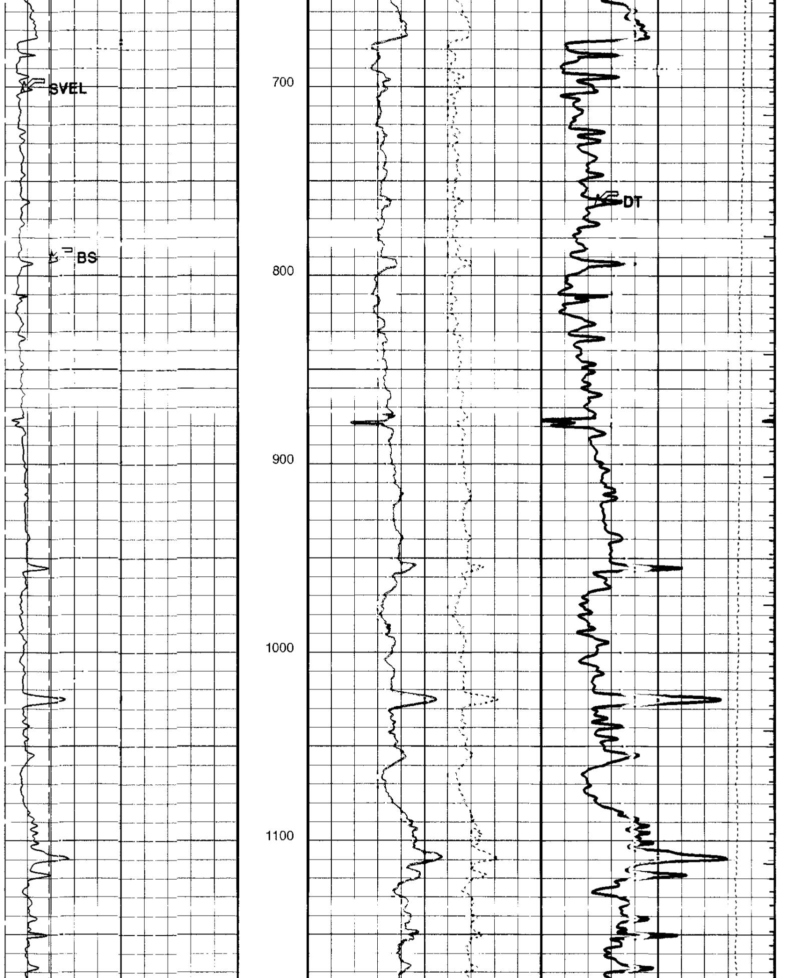
Transit Time 3 (TT3)
1200 (US) 200

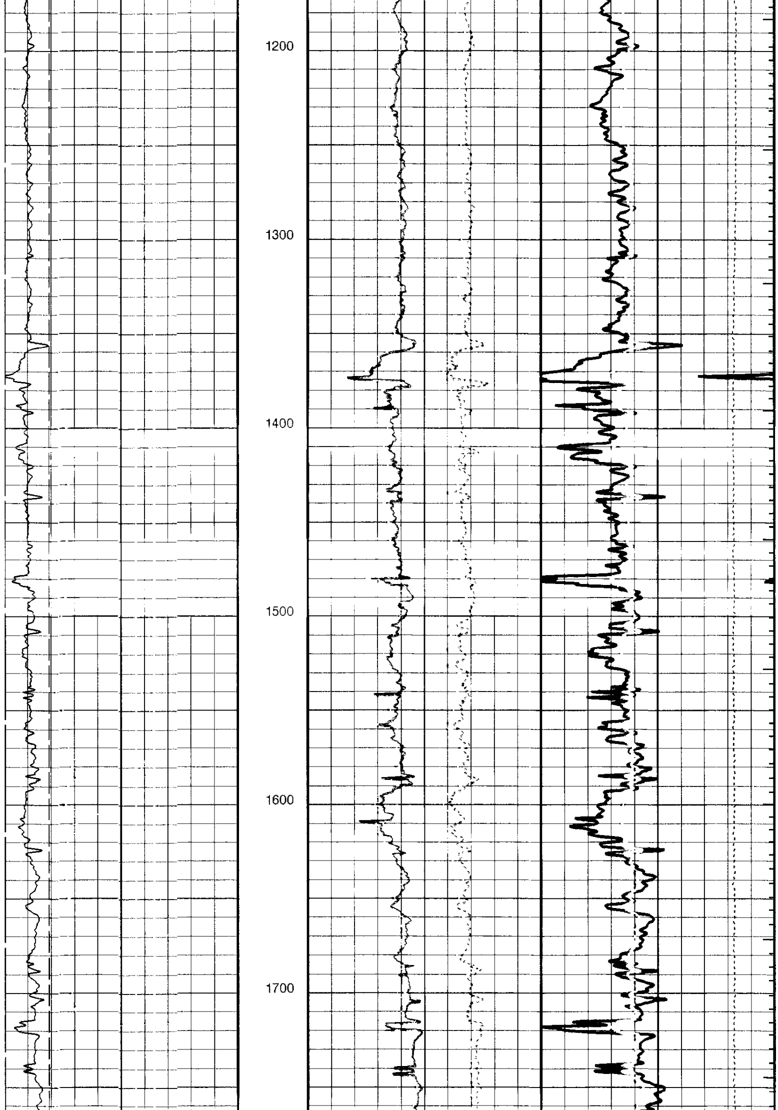
Tension (TENS)
10000 (LBF) 0

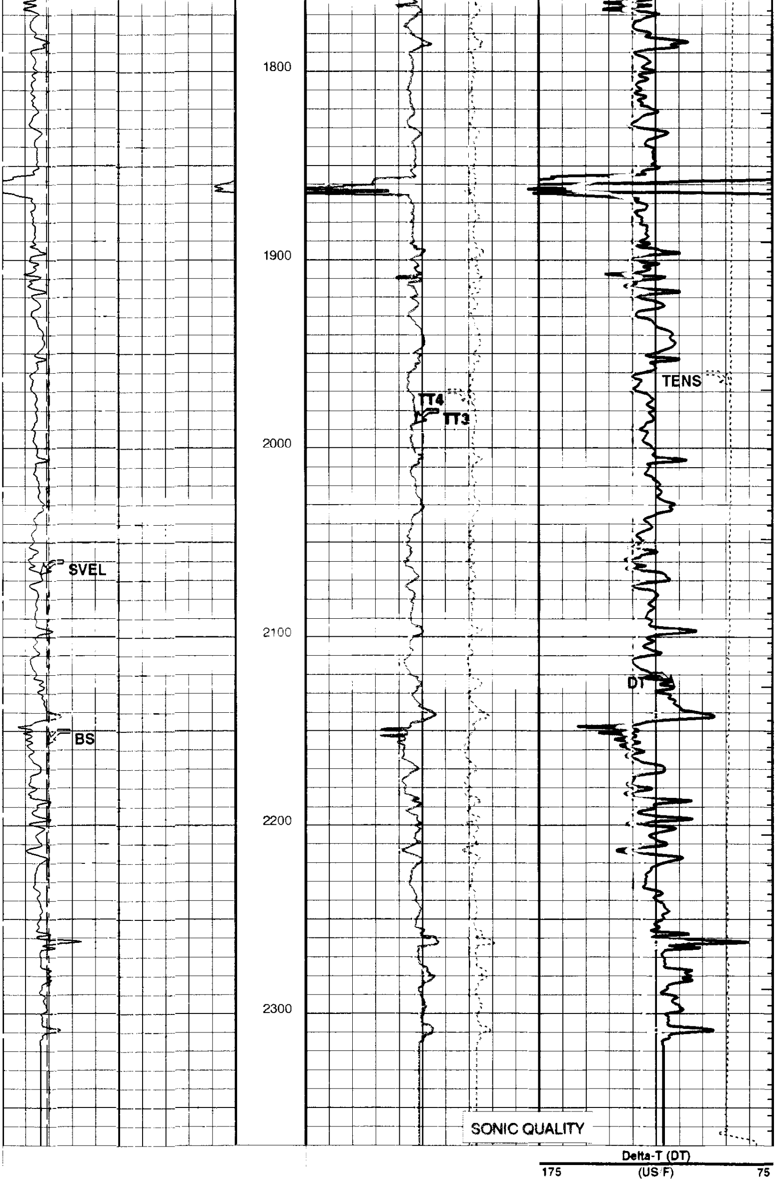
Bit Size (BS)
6 (IN) 16

Delta-T (DT)
175 (US/F) 75









Bit Size (BS)		
6	(IN)	16

Transit Time 3 (TT3)			Tension (TENS)		
1200	(US)	200	10000	(LBF)	0

Sonic Velocity (SVEL)		
5000	(FT/S)	25000

Transit Time 4 (TT4)		
1200	(US)	200

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	
	Telemetry Mode	DSLC_TCC	
	DSLT Firing Mode	BHC	
AGC	Automatic Gain Control Status	ON	
AMSG	Auxilliary Minimum Sliding Gate	180	US
BS	Bit Size	7.875	IN
CBLG	CBL Gate Width	45	US
CDTS	C-Delta-T Shale	100	US/F
DDEL	Digitizing Delay	0	US
DETE	Delta-T Detection	E2	
DFAD	Digital First Arrival Detection Switch	DSP	
DO	Depth Offset	0.0	FT
DTCM	Delta-T Computation Mode	FULL	
DTF	Delta-T Fluid	189	US/F
DTM	Delta-T Matrix	56	US/F
DWCO	Digitizer Word Count	40	
GAI	Manual Gain	40	
HSCM	HILT Speed Correction Mode	TSCD_SPEED_CORRECTION	
HSTI	STI Uses HILT Acceleration	YES	
MGAI	Maximum Gain	100	
MIGA	Minimum Gain	1	
MODE	Sonic Firing Mode	BHC	
NMSG	Near Minimum Sliding Gate	180	US
NMXG	Near Maximum Sliding Gate	750	US
NUMP	Number of Detection Passes	2	
PP	Playback Processing	NORMAL	
SFAF	Sonic Formation Attenuation Factor	0	DB/F
SGAD	Sliding Gate Status	ON	
SGAI	Selectable Acquisition Gain	AUTO	
SGCL	Sliding Gate Closing Delta-T	250	US/F
SGCW	Sliding Gate Closing Width	25	US
SGDT	Sliding Gate Delta-T	50	US/F
SGW	Sliding Gate Width	80	US
SLEV	Signal Level for AGC	5000	
SPFS	Sonic Porosity Formula	RAYMER_HUNT	
SPNV	SP Next Value	-15	MV
SPSO	Sonic Porosity Source	DT	

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OP System Version: 8C1-205

MCM

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TCC-B	APCW-98Q1		

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Output DLIS Files

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COMPANY: NORTHWEST NATURAL GAS

WELL: OM 32-22-65

FIELD: CALVIN CREEK GAS STORAGE

COUNTY: COLUMBIA

STATE: OREGON

BOTTOM LOG INTERVAL	2357 F
SCHLUMBERGER DEPTH	2365 F
DEPTH DRILLER	2365 F
KELLY BUSHING	762 F
DRILL FLOOR	
GROUND LEVEL	753 F

Schlumberger

PLATFORM EXPRESS
BHC SONIC
LOG QUALITY