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: 2" = 100'

LOCATION			
985.3' N & 1258.4' E FROM THE FROM THE SW CORNER OF 23		Elev.:	K.B. 917.5 ft G.L. 905 ft D.F. 917.3 ft
Permanent Datum:	GROUND LEVEL	Elev.:	905 ft
Log Measured From:	K.B		above Perm. Datum
Drilling Measured From:	K.B		

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

Logging Date	7-MAY-2000			
Run Number	1			
Depth Driller	2591 ft			
Schlumberger Depth	2590 ft			
Bottom Log Interval	2581 ft			
Top Log Interval	1725 ft			
Casing Driller Size @ Depth	8.625 in	@ 1724 ft	@	
Casing Schlumberger	1725 ft			
Bit Size	7.875 in			
Type Fluid In Hole	DMA			
MUD Density / Viscosity	8.8 lbm/gal	38 s		
Fluid Loss / PH	6.6 cm3	10.5		
Source Of Sample	FLOWLINE			
RM @ Measured Temperature	0.914 ohm.m	@ 68 degF	@	
RMF @ Measured Temperature	1.250 ohm.m	@ 52 degF	@	
RMC @ Measured Temperature	1.325 ohm.m	@ 52 degF	@	
Source RMF / RMC	PRESS	PRESS		
RM @ MRT / RMF @ MRT	0.692 @ 92	0.744 @ 92	@	@
Maximum Recorded Temperatures	92 degF	92	92	
Circulation Stopped / Time	7-MAY-2000	0:30		
Logger On Bottom / Time	7-MAY-2000			
Unit Number / Location	3152	SACRAMENTO		
Recorded By	M.KHAN			
Witnessed By	JACK MEYER			

	Run 1	Run 2	Run 3

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 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:
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:	
FLUID LEVEL:	0 ft	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

LEH-QT
LEH-QT 1808

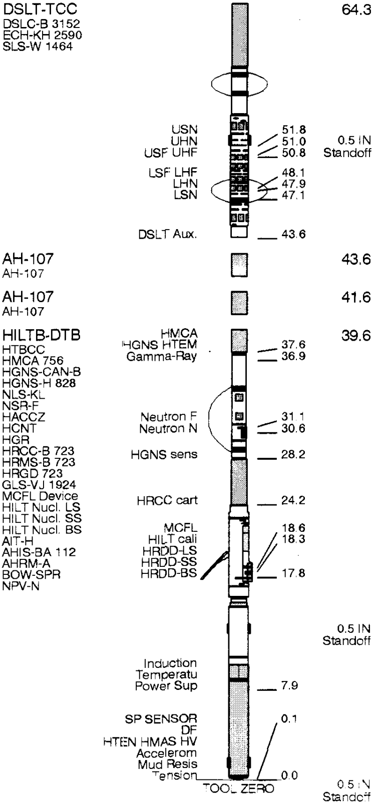
70.2

TCC-BF
ECH-KC
TCC-BF 590

TelStatus

64.3

67.3



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

Input DLIS Files

DEFAULT	HILTB .009	FN:8	PRODUCER	07-May-2000 07:06	2602.0 FT	1620.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 319.87 F3

Cement Volume = 319.87 F3 (assuming 0.00 IN casing O.D.)

Computed from 2591.0 FT to 1727.0 FT using data channel(s) HCAL

OP System Version: 9C1-303

MCM

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

PIP SUMMARY

⊢ Integrated Hole Volume Minor Pip Every 10 F3

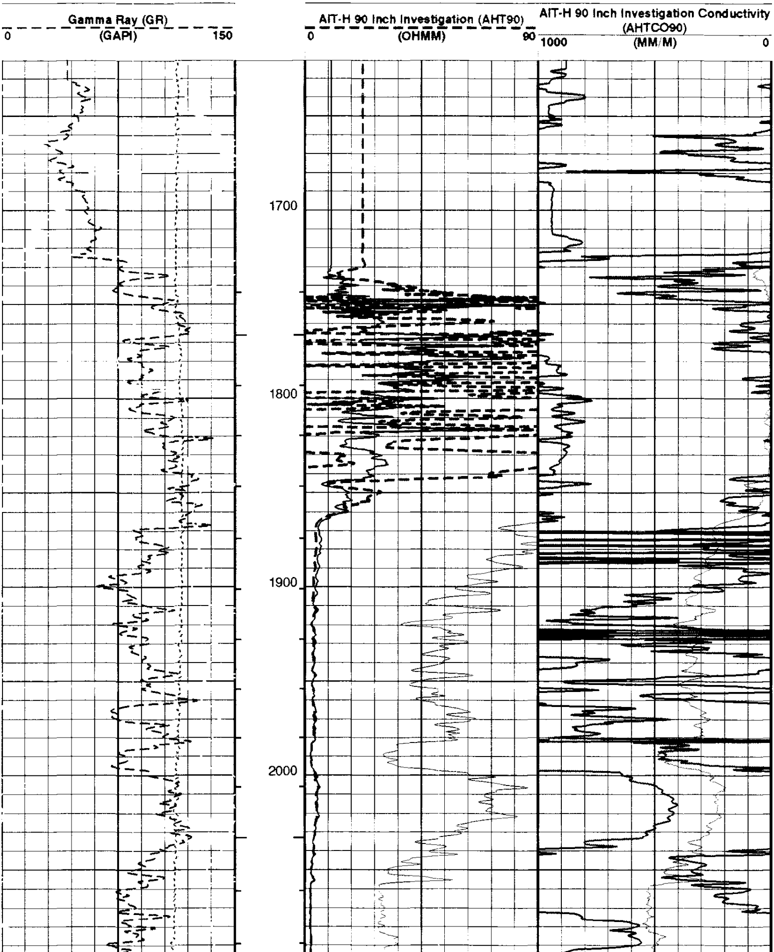
⊢ Integrated Hole Volume Major Pip Every 100 F3

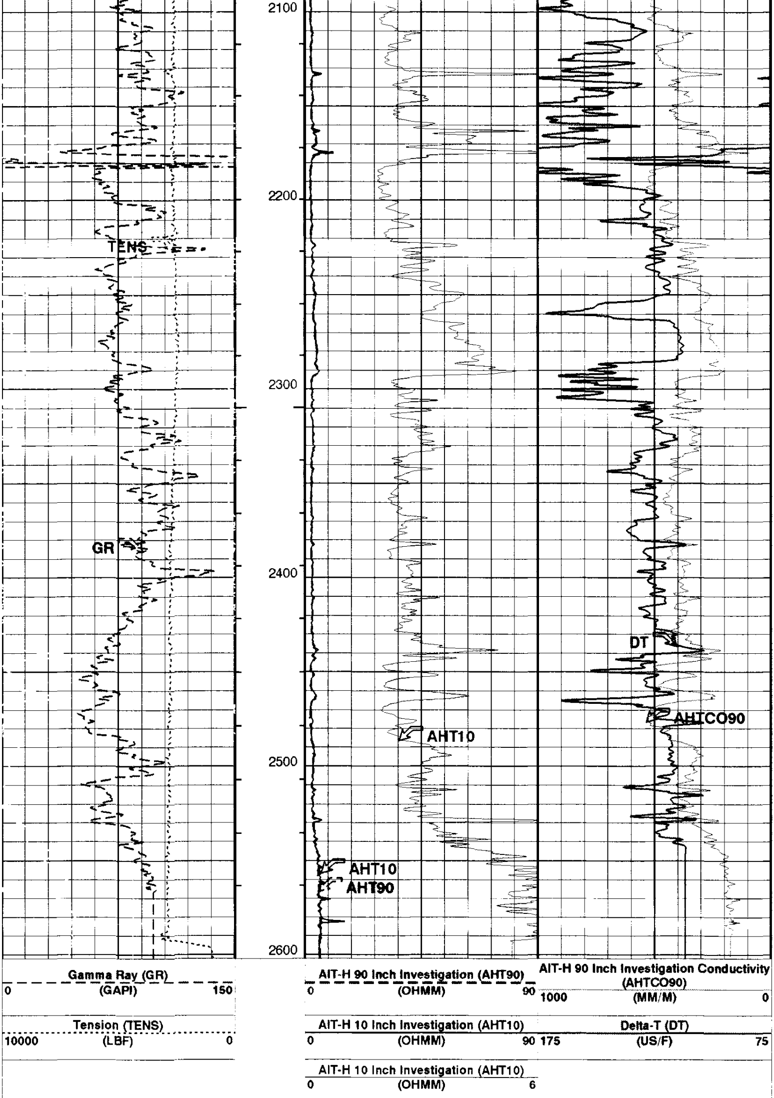
⊣ Integrated Cement Volume Minor Pip Every 10 F3

⊣ Integrated Cement Volume Major Pip Every 100 F3

■ Time Mark Every 60 S

	AIT-H 10 Inch Investigation (AHT10) 0 (OHMM) 6	
Tension (TENS) 10000 (LBF) 0	AIT-H 10 Inch Investigation (AHT10) 0 (OHMM) 90	Delta-T (DT) 175 (US/F) 75





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	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	0	FT
TD	Total Depth	2591	FT
TIMD	Along-hole depth of Tie-in Point	0	FT
TIVD	TVD of Tie-in Point	0	FT

Format: AITSONS2 Vertical Scale: 2" per 100' Graphics File Created: 10-May-2000 18:11

OP System Version: 9C1-303

MCM

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

Input DLIS Files

DEFAULT HILTB .009 FN:8 PRODUCER 07-May-2000 07:06 2602.0 FT 1620.0 FT

COMPANY:	NORTHWEST NATURAL GAS	BOTTOM LOG INTERVAL	2581 ft
		SCHLUMBERGER DEPTH	2590 ft
WELL:	I.W. 24C-23-65	DEPTH DRILLER	2591 ft
FIELD:	CALVIN CREEK GAS STORAGE	KELLY BUSHING	917.5 ft
COUNTY:	COLUMBIA	DRILL FLOOR	917.3 ft
STATE:	OREGON	GROUND LEVEL	905 ft

Schlumberger

ARRAY INDUCTION
BHC SONIC /SP/GR
SCALE: 2" = 100'