COMPANY: NORTHWEST NATURAL GAS

WELL: IW-24BH-23-65

FIELD: MIST

COUNTY: COLUMBIA STATE: OREGON

COUNTY: COLUMBIA
Field: MIST
Location: 976.5' NORTH 1256.3' EAST
Well: IW-24BH-23-65
Company: NORTHWEST NATURAL GAS

Schlumberger

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

LOCATION

976.5' NORTH, 1256.3' EAST
FROM THE SW SECTION CORNOR

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

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

API Serial No.	SECTION	TOWNSHIP	RANGE
36-009-00351	23	6N	5W

Logging Date		14-JUN-2000				
Run Number		1				
Depth Driller		1838 ft				
Schlumberger Depth		1828 ft				
Bottom Log Interval		1818 ft				
Top Log Interval		429 ft				
Casing Driller Size @ Depth		13.375 in	@	429 ft	@	
Casing Schlumberger		429 ft				
Bit Size		9.875 in				
Type Fluid In Hole		DMA				
MUD Density	Viscosity	8.8 lbm/gal	42 s			
Fluid Loss	PH	6.4 cm3	8.5			
Source Of Sample		FLOWLINE				
RM @ Measured Temperature		1.193 ohm.m	@	57 degF	@	
RMF @ Measured Temperature		1.492 ohm.m	@	62 degF	@	
RMC @ Measured Temperature		1.402 ohm.m	@	60 degF	@	
Source RMF	RMC	PRESS	PRESS			
RM @ MRT	RMF @ MRT	1.017 @ 68	1.380 @ 68		@	@
Maximum Recorded Temperatures		68 degF	68	68		
Circulation Stopped	Time	14-JUN-2000		3:00		
Logger On Bottom	Time	14-JUN-2000		7:00		
Unit Number	Location	3152	SACRAMENTO			
Recorded By		M.KHAN				
Witnessed By		JACK MEYER				

		Run 1	Run 2	Run
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				

@ @ @ @ @ @

n 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	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
Maximum Deviation: 72 Deg at 1828 ft	

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

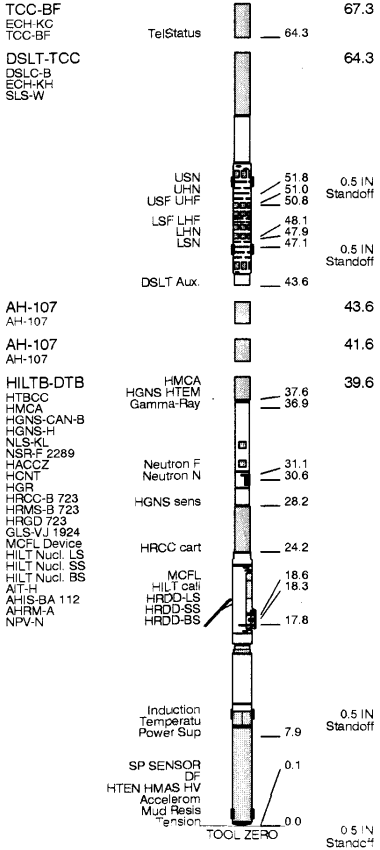
RUN 1	RUN 2

SURFACE EQUIPMENT

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

DOWNHOLE EQUIPMENT

LEH-QT 70.2
LEH-QT



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

Input DLIS Files

DEFAULT	HILTB .003	FN:2	PRODUCER	14-Jun-2000 04:22	1824.0 FT	307.5 FT

Output DLIS Files

DEFAULT	HILTB .004	FN:3	PRODUCER	14-Jun-2000 05:27	1829.0 FT	312.5 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

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

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

Gamma Ray (GR) 0 (GAPI) 150

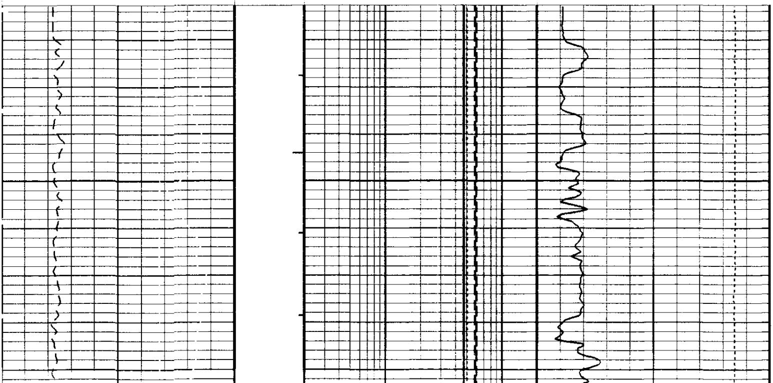
AIT-H 10 Inch Investigation (AHT10) 0.2 (OHMM) 20

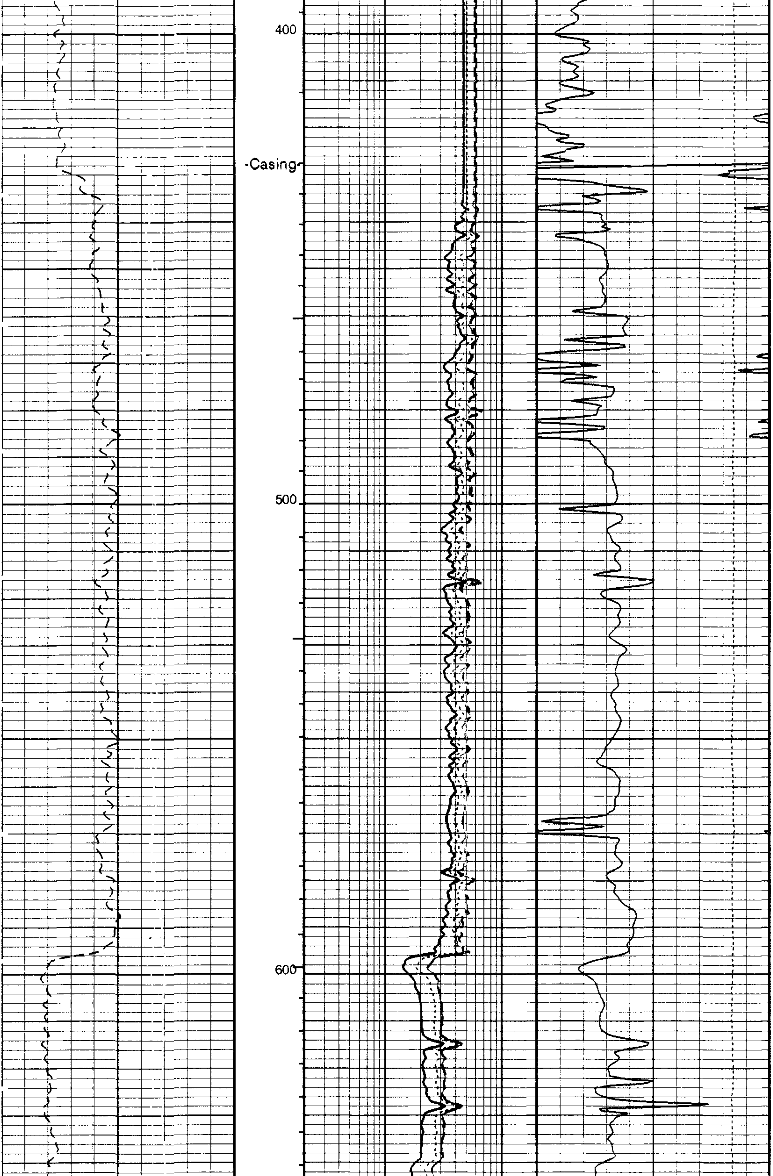
AIT-H 90 Inch Investigation (AHT90) 0.2 (OHMM) 20

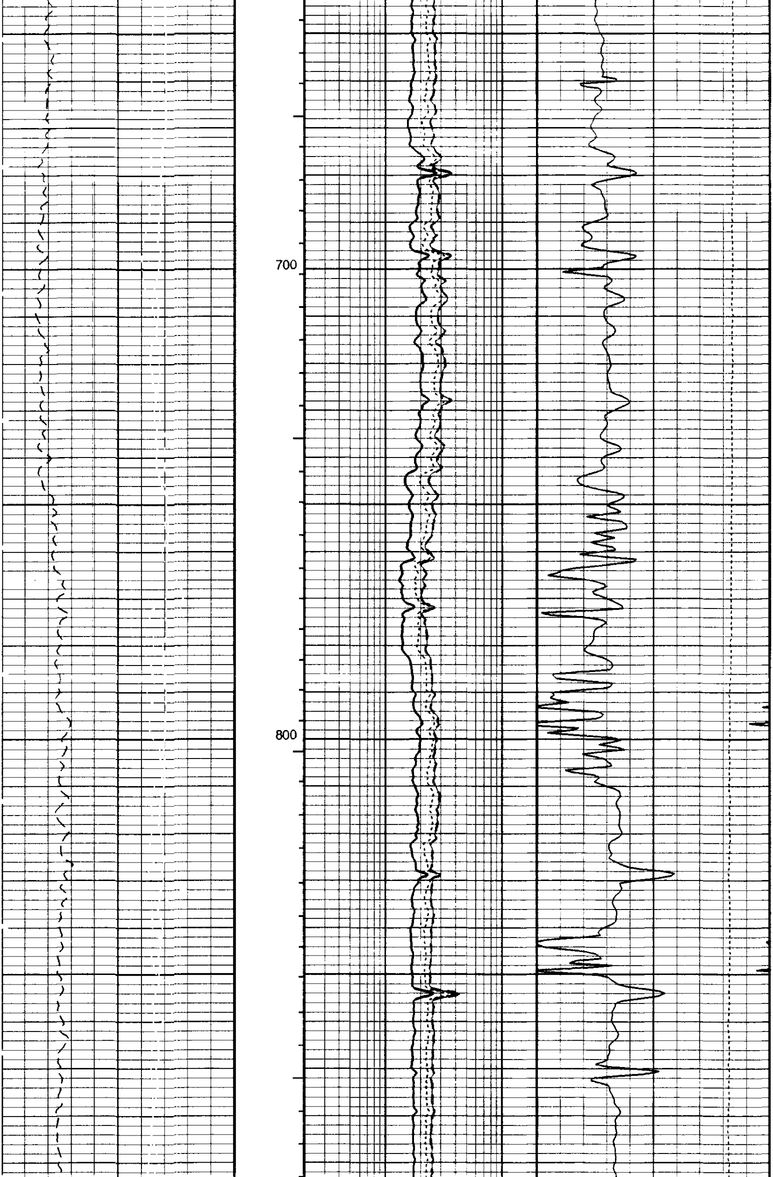
Tension (TENS) 10000 (LBF) 0

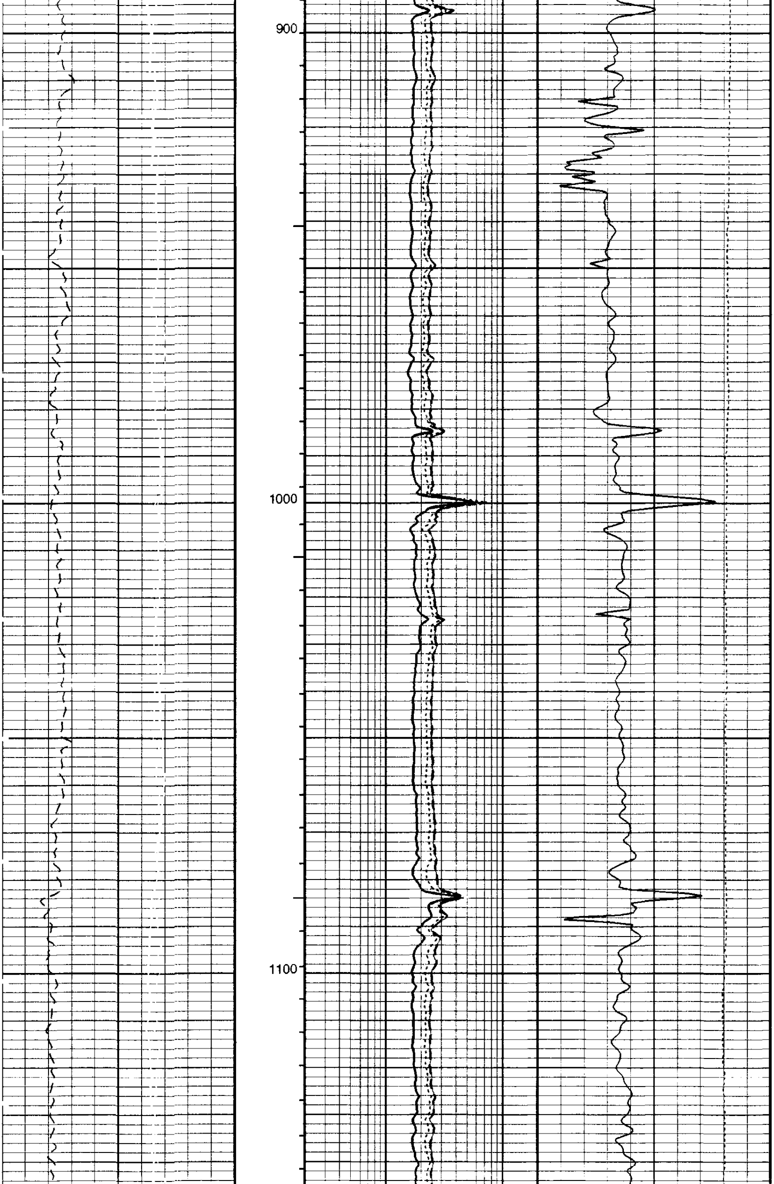
Bit Size (BS) 6 (IN) 16

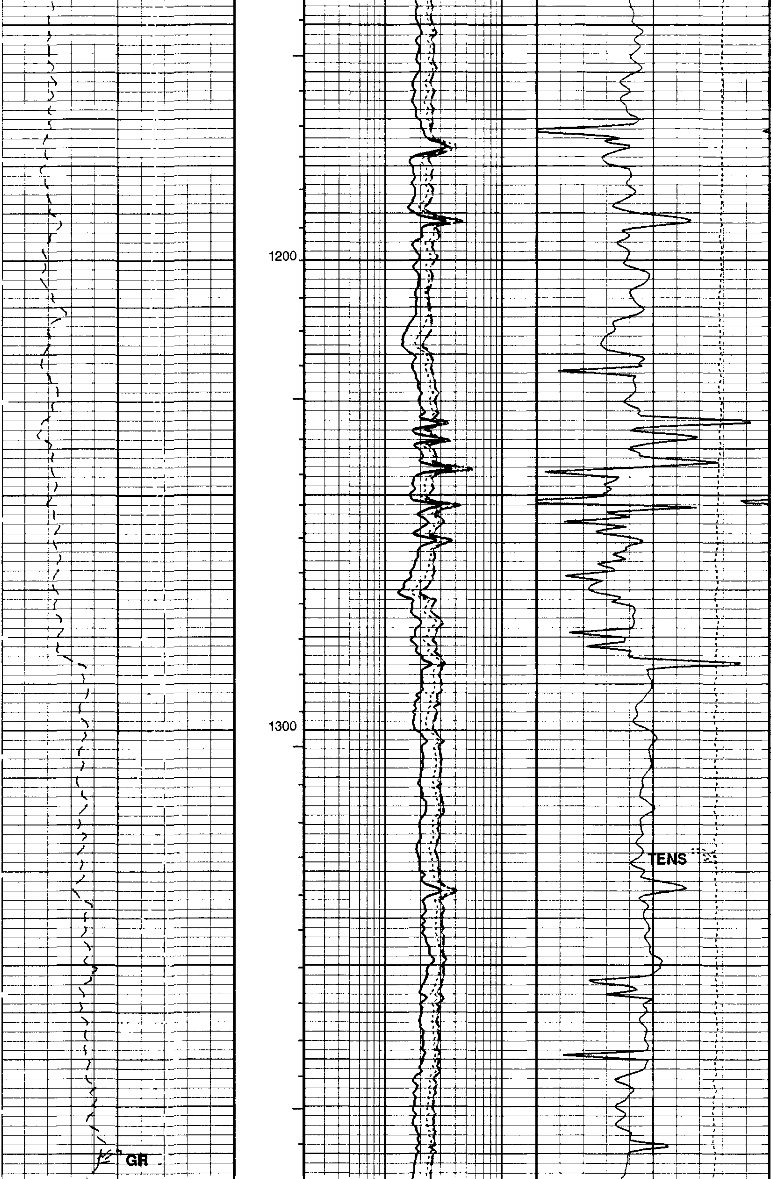
Delta-T (DT) 175 (US/F) 75

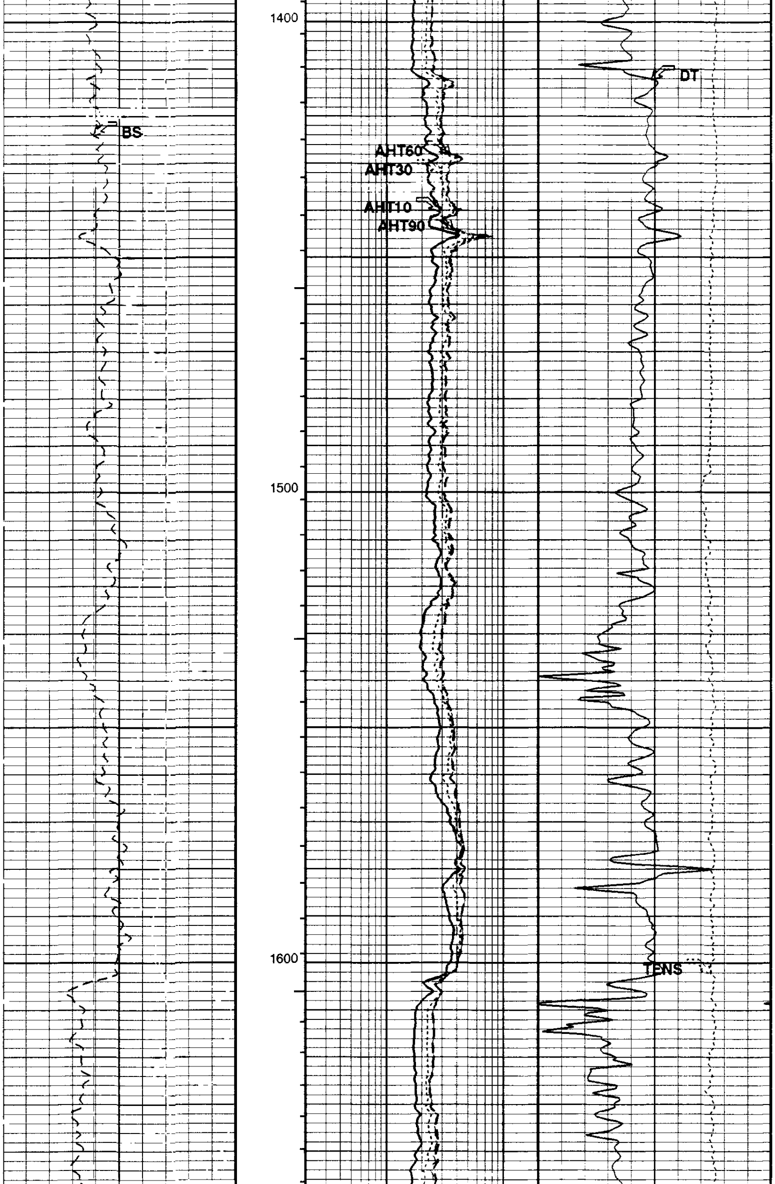


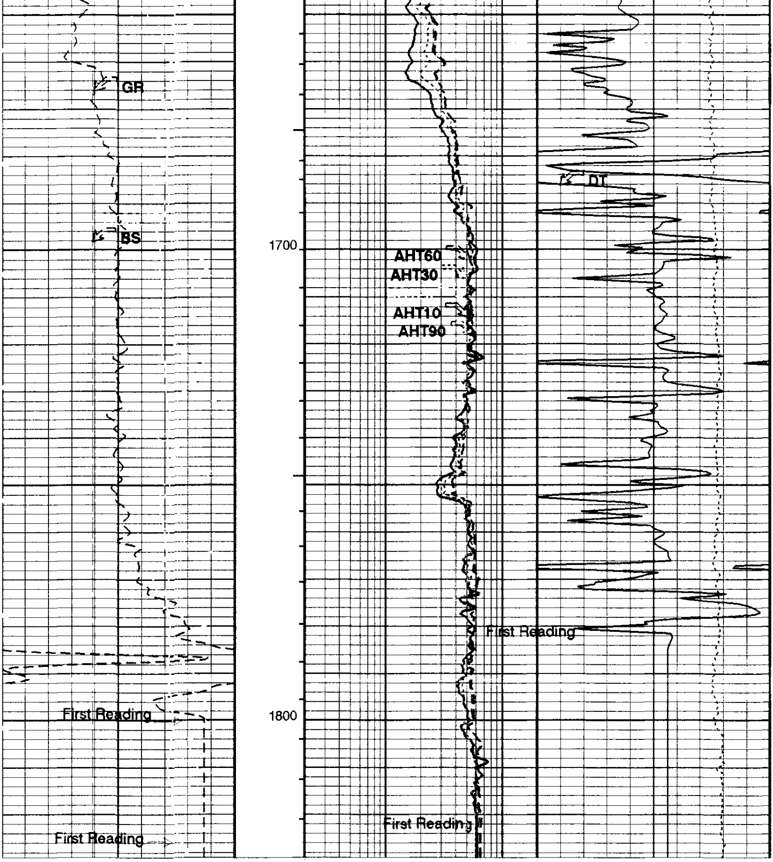












Bit Size (BS)
6 (IN) 16

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

AIT-H 90 Inch Investigation (AHT90)
0.2 (OHMM) 20

Tension (TENS)
10000 (LBF) 0

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	0.5	IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	30.66.23.11	
BHT	Bottom Hole Temperature (used in calculations)	212	DEGF
BS	Bit Size	9.875	IN
DFD	Drilling Fluid Density	8.80	LB/G
DO	Depth Offset for Logical Unit 1	5.0	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	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	NO_SC	
HSTI	STI Uses HILT Acceleration	YES	
MODE	Sonic Firing Mode	BHC	
MST	Mud Sample Temperature	57.00	DEGF
PP	Playback Processing	NORMAL	
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
TD	Total Depth	1838	FT

Format: AITSON Vertical Scale: 5" per 100' Graphics File Created: 14-Jun-2000 05:27

OP System Version: 9C1-303

MCM

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

Input DLIS Files

DEFAULT	HILTB .003	FN:2	PRODUCER	14-Jun-2000 04:22	1824.0 FT	307.5 FT

Output DLIS Files

DEFAULT	HILTB .004	FN:3	PRODUCER	14-Jun-2000 05:27

Schlumberger

REPEAT SECTION

MAXIS 500 Field Log

Output DLIS Files

DEFAULT	HILTB .010	FN:9	PRODUCER	14-Jun-2000 06:20	594.0 FT	340.0 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

REPEAT SECTION

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

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

Gamma Ray (GR)
0 (GAPI) 150

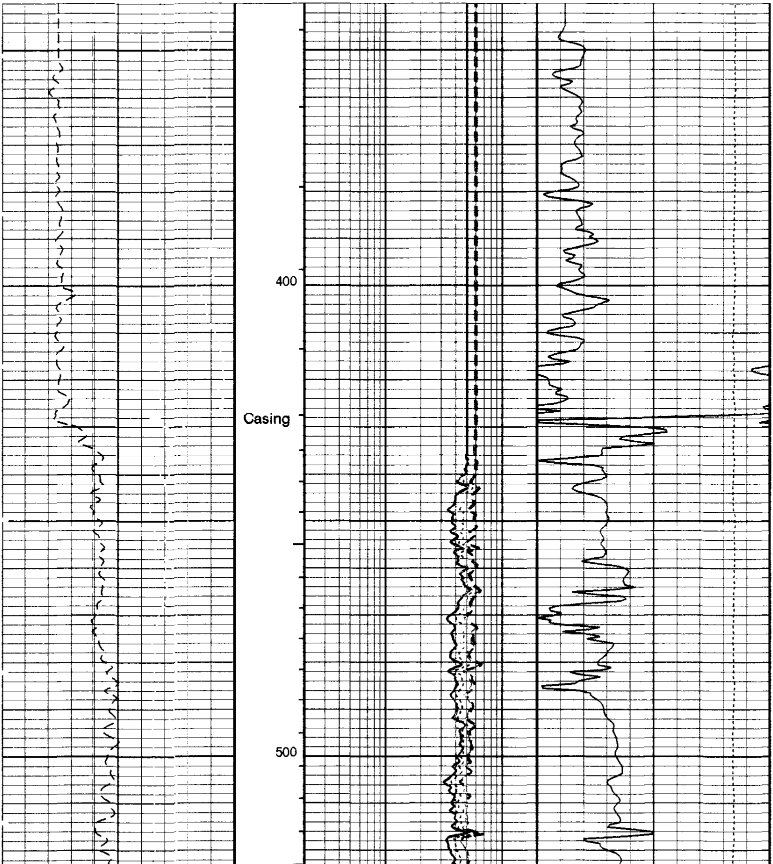
AIT-H 10 Inch Investigation (AHT10)
0.2 (OHMM) 20

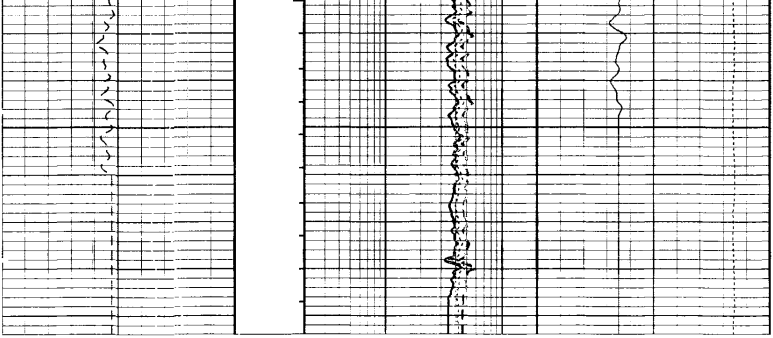
AIT-H 90 Inch Investigation (AHT90)
0.2 (OHMM) 20

Tension (TENS)
10000 (LBF) 0

Bit Size (BS)
6 (IN) 16

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





Bit Size (BS)
6 (IN) 16

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

AIT-H 90 Inch Investigation (AHT90)
0.2 (OHMM) 20

Tension (TENS)
10000 (LBF) 0

Gamma Ray (GR)
0 (GAPI) 150

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

REPEAT SECTION

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	0.5	IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	30.66.23.11	
BHT	Bottom Hole Temperature (used in calculations)	212	DEGF
BS	Bit Size	9.875	IN
DFD	Drilling Fluid Density	8.80	LB/G
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	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	NO_SC	
HSTI	STI Uses HILT Acceleration	YES	
MODE	Sonic Firing Mode	BHC	
MST	Mud Sample Temperature	57.00	DEGF
SHT	Surface Hole Temperature	68	DEGF
SPNV	SP Next Value	0	MV
TD	Total Depth	1838	FT

Format: AITSON Vertical Scale: 5" per 100' Graphics File Created: 14-Jun-2000 06:20

OP System Version: 9C1-303
MCM

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

Output DLIS Files

DEFAULT **HILTB .010** **FN:9** **PRODUCER** **14-Jun-2000 06:20**

Schlumberger

CALIBRATIONS

MAXIS 500 Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
High resolution Integrated Logging Tool-CTS Wellsite Calibration - Electronics Calibration Check - Thru Cal Mag. & Phase							
Master: Calibration out of date 20-JAN-2000 11:39 Before: 14-JUN-2000 2:44							
Thru Cal Magnitude - 0	0	0.6214	0.6238	N/A	N/A	N/A	V
Thru Cal Magnitude - 1	0	1.274	1.279	N/A	N/A	N/A	V
Thru Cal Magnitude - 2	0	0.6329	0.6353	N/A	N/A	N/A	V
Thru Cal Magnitude - 3	0	0.7152	0.7182	N/A	N/A	N/A	V
Thru Cal Magnitude - 4	0	1.335	1.340	N/A	N/A	N/A	V
Thru Cal Magnitude - 5	0	1.943	1.951	N/A	N/A	N/A	V
Thru Cal Magnitude - 6	0	1.947	1.955	N/A	N/A	N/A	V
Thru Cal Magnitude - 7	0	1.371	1.380	N/A	N/A	N/A	V
Phase - 0	0	64.91	65.49	N/A	N/A	N/A	DEG
Phase - 1	0	63.80	64.38	N/A	N/A	N/A	DEG
Phase - 2	0	60.03	60.64	N/A	N/A	N/A	DEG
Phase - 3	0	59.25	59.86	N/A	N/A	N/A	DEG
Phase - 4	0	52.91	53.56	N/A	N/A	N/A	DEG
Phase - 5	0	50.96	51.64	N/A	N/A	N/A	DEG
Phase - 6	0	50.92	51.60	N/A	N/A	N/A	DEG
Phase - 7	0	47.08	48.00	N/A	N/A	N/A	DEG
High resolution Integrated Logging Tool-CTS Wellsite Calibration - Electronics Calibration Check - Auxilliary							
Master: Calibration out of date 20-JAN-2000 11:39 Before: 14-JUN-2000 2:44							
Array Induction SPA Plus	990.5	989.8	990.9	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	0.1083	0.09257	N/A	N/A	N/A	MV
Array Induction Temperature Pl	0.9150	0.9169	0.9180	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	0.0001095	0.00009801	N/A	N/A	N/A	V
High resolution Integrated Logging Tool-CTS Wellsite Calibration - Test Loop Gain Correction							
Master: Calibration out of date 20-JAN-2000 11:39							
Test Loop Gain Magnitude - 0	0	1.042	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 1	0	1.011	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 2	0	1.012	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 3	0	1.010	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 4	0	0.9940	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 5	0	0.9835	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 6	0	0.9934	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 7	0	0.9945	N/A	N/A	N/A	N/A	V
Phase - 0	0	0.3672	N/A	N/A	N/A	N/A	DEG
Phase - 1	0	-0.6191	N/A	N/A	N/A	N/A	DEG
Phase - 2	0	-0.01578	N/A	N/A	N/A	N/A	DEG
Phase - 3	0	0.1871	N/A	N/A	N/A	N/A	DEG
Phase - 4	0	0.1325	N/A	N/A	N/A	N/A	DEG
Phase - 5	0	-0.1680	N/A	N/A	N/A	N/A	DEG
Phase - 6	0	0.2889	N/A	N/A	N/A	N/A	DEG
Phase - 7	0	-0.2642	N/A	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool-CTS Wellsite Calibration - Sonde Error Correction
Master: Calibration out of date 20-JAN-2000 11:39

R Sonde Error Correction - 0	0	-121.4	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 1	0	149.7	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 2	0	113.9	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 3	0	58.40	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 4	0	24.16	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 5	0	11.87	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 6	0	7.431	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 7	0	-3.605	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 0	0	34.14	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 1	0	-240.4	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 2	0	67.33	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 3	0	81.72	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 4	0	-1.172	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 5	0	-10.09	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 6	0	10.78	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 7	0	0.3313	N/A	N/A	N/A	N/A	MM/M

High resolution Integrated Logging Tool-CTS Wellsite Calibration - Mud Gain Correction
Master: Calibration out of date 20-JAN-2000 11:39

Coarse - Mag, Real, Imag - 0	0	1.013	N/A	N/A	N/A	N/A
Coarse - Mag, Real, Imag - 1	0	1.013	N/A	N/A	N/A	N/A
Coarse - Mag, Real, Imag - 2	0	1.013	N/A	N/A	N/A	N/A
Fine - Mag, Real, Imag - 0	0	1.011	N/A	N/A	N/A	N/A
Fine - Mag, Real, Imag - 1	0	1.011	N/A	N/A	N/A	N/A
Fine - Mag, Real, Imag - 2	0	1.011	N/A	N/A	N/A	N/A

High resolution Integrated Logging Tool-CTS Wellsite Calibration - Stab Measurement Summary
Before: 14-JUN-2000 2:54

BS Window Ratio	1.033	N/A	1.026	N/A	N/A	N/A	
BS Window Sum	14310	N/A	14350	N/A	N/A	N/A	CPS
SS Window Ratio	0.5004	N/A	0.5047	N/A	N/A	N/A	
SS Window Sum	11490	N/A	11410	N/A	N/A	N/A	CPS
LS Window Ratio	0.2862	N/A	0.2832	N/A	N/A	N/A	
LS Window Sum	1163	N/A	1152	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool-CTS Wellsite Calibration - Photo-multiplier High Voltages Calibrations
Before: 14-JUN-2000 2:54

BS PM High Voltage (Command)	1614	N/A	1650	N/A	N/A	N/A	V
SS PM High Voltage (Command)	1916	N/A	1959	N/A	N/A	N/A	V
LS PM High Voltage (Command)	1966	N/A	1965	N/A	N/A	N/A	V

High resolution Integrated Logging Tool-CTS Wellsite Calibration - Crystal Quality Resolutions Calibration
Before: 14-JUN-2000 2:54

BS Crystal Resolution	12.26	N/A	12.47	N/A	N/A	N/A	%
SS Crystal Resolution	11.63	N/A	11.93	N/A	N/A	N/A	%
LS Crystal Resolution	10.59	N/A	10.92	N/A	N/A	N/A	%

High resolution Integrated Logging Tool-CTS Wellsite Calibration - MCFL Calibration
Before: 14-JUN-2000 2:55

Raw B0 Resistivity	3875	N/A	3844	N/A	N/A	N/A	OHMM
Raw B1 Resistivity	3830	N/A	3809	N/A	N/A	N/A	OHMM
Raw B2 Resistivity	3830	N/A	3822	N/A	N/A	N/A	OHMM

High resolution Integrated Logging Tool-CTS Wellsite Calibration - HILT Caliper Calibration
Before: 14-JUN-2000 2:45

HILT Caliper Zero Measurement	8.000	N/A	7.212	N/A	N/A	N/A	IN
HILT Caliper Plus Measurement	16.00	N/A	15.93	N/A	N/A	N/A	IN

High resolution Integrated Logging Tool-CTS Wellsite Calibration - Detector Calibration
Before: Calibration not done

Gamma Ray Background	30.00	N/A	N/A	N/A	N/A	N/A	GAPI
Gamma Ray (Jig - Bkg)	N/A	N/A	N/A	N/A	N/A	N/A	GAPI
Gamma Ray (Calibrated)	165.0	N/A	N/A	N/A	N/A	15.00	GAPI

High resolution Integrated Logging Tool-CTS Wellsite Calibration - Zero Measurement
Master: 6-APR-2000 4:31 Before: 14-JUN-2000 2:51

CNTC Background	27.31	27.31	27.31	N/A	N/A	4.096	CPS
CFTC Background	28.31	28.31	29.65	N/A	N/A	4.247	CPS

High resolution Integrated Logging Tool-CTS Wellsite Calibration - Accelerometer Calibration
Before: 14-JUN-2000 2:52

Z-Axis Acceleration	32.19	N/A	32.16	N/A	N/A	N/A	F/S2

The GLS-VJ source activity is acceptable.

The HGNS Neutron Master Calibration was done with the following parameters :

NCT-B Water Temperature	90.0	DEGF.
Thermal Housing Size	3.375	IN.

High resolution Integrated Logging Tool-CTS / Equipment Identification

Primary Equipment:		
Array Induction Tool - H	AIT - H	
Rm/SP Bottom Nose	AHRM - A	
Array Induction Sonde	AHIS - BA	112
HILT high-Resolution Mechanical Sonde	HRMS - B	723
HILT Rxo Gamma-ray Device	HRGD -	723
HILT Nuclear Back-Scatter Detector	HILT -	
HILT Nuclear Short-Spacing Detector	HILT -	
HILT Nuclear Long-Spacing Detector	HILT -	
Auxiliary Equipment:		

High resolution Integrated Logging Tool-CTS Wellsite Calibration

Electronics Calibration Check - Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6214		0.6050	64.91		71.00
	Before	0.6238			65.49		
1	Master	1.274		1.270	63.80		70.00
	Before	1.279			64.38		
2	Master	0.6329		0.6230	60.03		66.00
	Before	0.6353			60.64		
3	Master	0.7152		0.7040	59.25		65.00
	Before	0.7182			59.86		
4	Master	1.335		1.337	52.91		59.00
	Before	1.340			53.56		
5	Master	1.943		1.955	50.96		57.00
	Before	1.951			51.64		
6	Master	1.947		1.955	50.92		57.00
	Before	1.955			51.60		
7	Master	1.371		1.415	47.08		53.00
	Before	1.380			48.00		
			60.00 % (Minimum) (Nominal) 140.0 % (Maximum)			Nom -60.00 (Minimum) (Nominal) Nom + 60.00 (Maximum)	

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High resolution Integrated Logging Tool-CTS Wellsite Calibration

Electronics Calibration Check - Auxiliary

Phase	Array Induction SPA Plus MV	Value	Phase	Array Induction SPA Zero MV	Value
Master		989.8	Master		0.1083
Before		990.9	Before		0.09257
	941.0 (Minimum) 990.5 (Nominal) 1040 (Maximum)			-50.00 (Minimum) 0 (Nominal) 50.00 (Maximum)	

Phase	Array Induction Temperature Plus V	Value	Phase	Array Induction Temperature Zero V	Value
Master		0.9169	Master		0.0001095
Before		0.9180	Before		9.801E-00
	0.8700 (Minimum) 0.9150 (Nominal) 0.9600 (Maximum)			-0.05000 (Minimum) 0 (Nominal) 0.05000 (Maximum)	

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High resolution Integrated Logging Tool-CTS Wellsite Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude V			Value	Phase DEG		
		(Minimum)	(Nominal)	(Maximum)		(Minimum)	(Nominal)	(Maximum)
0	1.042	0.9500	1.000	1.050	0.3672	-3.000	0	3.000
1	1.011	0.9500	1.000	1.050	-0.6191	-3.000	0	3.000
2	1.012	0.9500	1.000	1.050	-0.01578	-3.000	0	3.000
3	1.010	0.9500	1.000	1.050	0.1871	-3.000	0	3.000
4	0.9940	0.9500	1.000	1.050	0.1325	-3.000	0	3.000
5	0.9835	0.9500	1.000	1.050	-0.1680	-3.000	0	3.000
6	0.9934	0.9500	1.000	1.050	0.2889	-3.000	0	3.000
7	0.9945	0.9500	1.000	1.050	-0.2642	-3.000	0	3.000

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High resolution Integrated Logging Tool-CTS Wellsite Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M		
		(Minimum)	(Nominal)	(Maximum)		(Minimum)	(Nominal)	(Maximum)
0	-121.4	-231.0	-56.00	119.0	34.14	-2250	0	2250
1	149.7	114.0	159.0	204.0	-240.4	-625.0	0	625.0
2	113.9	66.00	111.0	156.0	67.33	-350.0	0	350.0
3	58.40	39.00	64.00	89.00	81.72	-250.0	0	250.0
4	24.16	15.00	25.00	35.00	-1.172	-63.00	0	63.00
5	11.87	4.000	14.00	24.00	-10.09	-50.00	0	50.00
6	7.431	5.000	10.00	15.00	10.78	-30.00	0	30.00
7	-3.605	-5.000	0	5.000	0.3313	-30.00	0	30.00

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High resolution Integrated Logging Tool-CTS Wellsite Calibration

Mud Gain Correction

Idx	Value	Coarse - Mag, Real, Imag			Value	Fine - Mag, Real, Imag		
		(Minimum)	(Nominal)	(Maximum)		(Minimum)	(Nominal)	(Maximum)
0	1.013	0.8000	1.000	1.200	1.011	0.8000	1.000	1.200
1	1.013	0.8000	1.000	1.200	1.011	0.8000	1.000	1.200
2	1.013	0.8000	1.000	1.200	1.011	0.8000	1.000	1.200

Master: Calibration out of date 20-JAN-2000 11:39

High resolution Integrated Logging Tool-CTS Wellsite Calibration

Stab Measurement Summary

Phase	BS Window Ratio	Value	Phase	SS Window Ratio	Value	Phase	LS Window Ratio	Value
Before		1.026	Before		0.5047	Before		0.2832
	0.9818 (Minimum) 1.033 (Nominal) 1.085 (Maximum)			0.4754 (Minimum) 0.5004 (Nominal) 0.5255 (Maximum)			0.2719 (Minimum) 0.2862 (Nominal) 0.3005 (Maximum)	

Phase	BS Window Sum CPS	Value	Phase	SS Window Sum CPS	Value	Phase	LS Window Sum CPS	Value
Before		14350	Before		11410	Before		1152
	13590 (Minimum) 14310 (Nominal) 15020 (Maximum)			10920 (Minimum) 11490 (Nominal) 12070 (Maximum)			1105 (Minimum) 1163 (Nominal) 1221 (Maximum)	

Before: 14-JUN-2000 2:54

High resolution Integrated Logging Tool-CTS Wellsite Calibration

Photo-multiplier High Voltages Calibrations

Phase	BS PM High Voltage (Command) V	Value	Phase	SS PM High Voltage (Command) V	Value	Phase	LS PM High Voltage (Command) V	Value
Before		1650	Before		1959	Before		1965
	1514 (Minimum) 1614 (Nominal) 1714 (Maximum)			1816 (Minimum) 1916 (Nominal) 2016 (Maximum)			1866 (Minimum) 1966 (Nominal) 2066 (Maximum)	

Before: 14-JUN-2000 2:54

High resolution Integrated Logging Tool-CTS Wellsite Calibration

Crystal Quality Resolutions Calibration

Phase	BS Crystal Resolution %	Value	Phase	SS Crystal Resolution %	Value	Phase	LS Crystal Resolution %	Value
Before		12.47	Before		11.93	Before		10.92
	11.26 (Minimum) 12.26 (Nominal) 13.26 (Maximum)			10.63 (Minimum) 11.63 (Nominal) 12.63 (Maximum)			9.591 (Minimum) 10.59 (Nominal) 11.59 (Maximum)	

Before: 14-JUN-2000 2:54

High resolution Integrated Logging Tool-CTS Wellsite Calibration

MCFL Calibration

Phase	Raw B0 Resistivity OHMM	Value	Phase	Raw B1 Resistivity OHMM	Value	Phase	Raw B2 Resistivity OHMM	Value
Before		3844	Before		3809	Before		3822
	3565 (Minimum) 3875 (Nominal) 4185 (Maximum)			3524 (Minimum) 3830 (Nominal) 4136 (Maximum)			3524 (Minimum) 3830 (Nominal) 4136 (Maximum)	

Before: 14-JUN-2000 2:55

High resolution Integrated Logging Tool-CTS Wellsite Calibration

HILT Caliper Calibration

Phase	HILT Caliper Zero Measurement IN	Value	Phase	HILT Caliper Plus Measurement IN	Value
Before		7.212	Before		15.93
	6.000 (Minimum) 8.000 (Nominal) 10.00 (Maximum)			12.00 (Minimum) 16.00 (Nominal) 20.00 (Maximum)	

Before: 14-JUN-2000 2:45

High resolution Integrated Logging Tool-CTS Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before	NOT DONE	N/A	Before	NOT DONE	N/A	Before	NOT DONE	N/A
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			N/A (Minimum) N/A (Nominal) N/A (Maximum)			150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: Calibration not done

High resolution Integrated Logging Tool-CTS Wellsite Calibration

Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value
Master		27.31	Master		28.31
Before		27.31	Before		29.65
	5.000 (Minimum) 27.31 (Nominal) 40.00 (Maximum)			5.000 (Minimum) 28.31 (Nominal) 40.00 (Maximum)	

Master: 6-APR-2000 4:31 Before: 14-JUN-2000 2:51

High resolution Integrated Logging Tool-CTS Wellsite Calibration

Accelerometer Calibration

Phase	Z-Axis Acceleration F/S2	Value
Before		32.16
	31.53 (Minimum) 32.19 (Nominal) 32.84 (Maximum)	

Before: 14-JUN-2000 2:52

COMPANY: **NORTHWEST NATURAL GAS**

WELL: **IW-24BH-23-65**
FIELD: **MIST**
COUNTY: **COLUMBIA**
STATE: **OREGON**

BOTTOM LOG INTERVAL	1818 ft
SCHLUMBERGER DEPTH	1828 ft
DEPTH DRILLER	1838 ft
KELLY BUSHING	923 ft
DRILL FLOOR	923 ft
GROUND LEVEL	905 ft

Schlumberger

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