

Schlumberger

Company: **Kerr Mcgee Oil & Gas Onshore LP**

Well: **Howard 2-32**

Field: **Wattenberg #90750**

County: **Weld**

State: **Colorado**

Schlumberger

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Well: **Howard 2-32**

Field: **Wattenberg #90750**

County: **Weld**

State: **Colorado**

County: Weld Field: Wattenberg #90750 Location: Sec. 32, T1N, R67W Well: Howard 2-32 Company: Kerr Mcgee Oil & Gas Onshore L			
<h1>Platform Express – IFLEX</h1> <h2>Induction</h2>			
LOCATION			
Sec. 32, T1N, R67W Surf: 2411 FNL X 1534 FEL SWNE BHL: 661 FNL X 1952 FEL NWNE (est)		Elev.: K.B. 5076.00 ft G.L. 5061.00 ft D.F. 5075.00 ft	
Permanent Datum:	Ground Level	Elev.: 5061.00 ft	
Log Measured From:	Kelly Bushing	15.00 ft above Perm. Datum	
Drilling Measured From:	Kelly Bushing		
API Serial No.	Section	Township	Range
05-123-33720-0000	32	1N	67W

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Permanent Datum: _____ Log Measured From: _____ Drilling Measured From: _____	Ground Level _____ Kelly Bushing _____ Kelly Bushing _____	Elev.: 5061.00 ft 15.00 ft above Perm. Datum	
API Serial No. 05-123-33720-0000	Section 32	Township 1N	Range 67W

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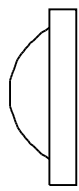



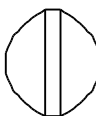

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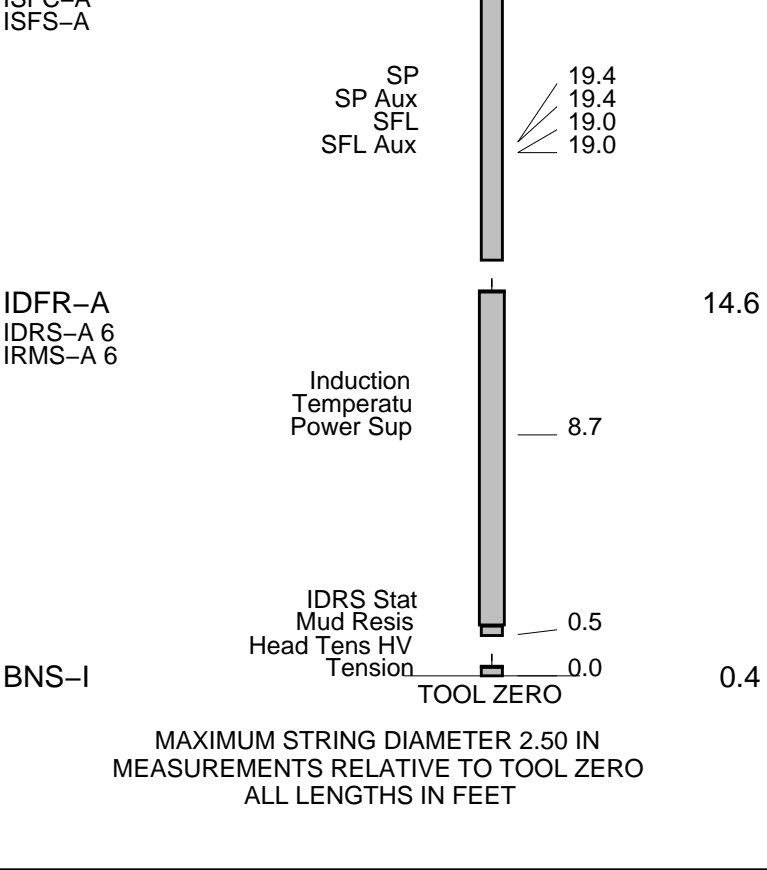
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[illegible]

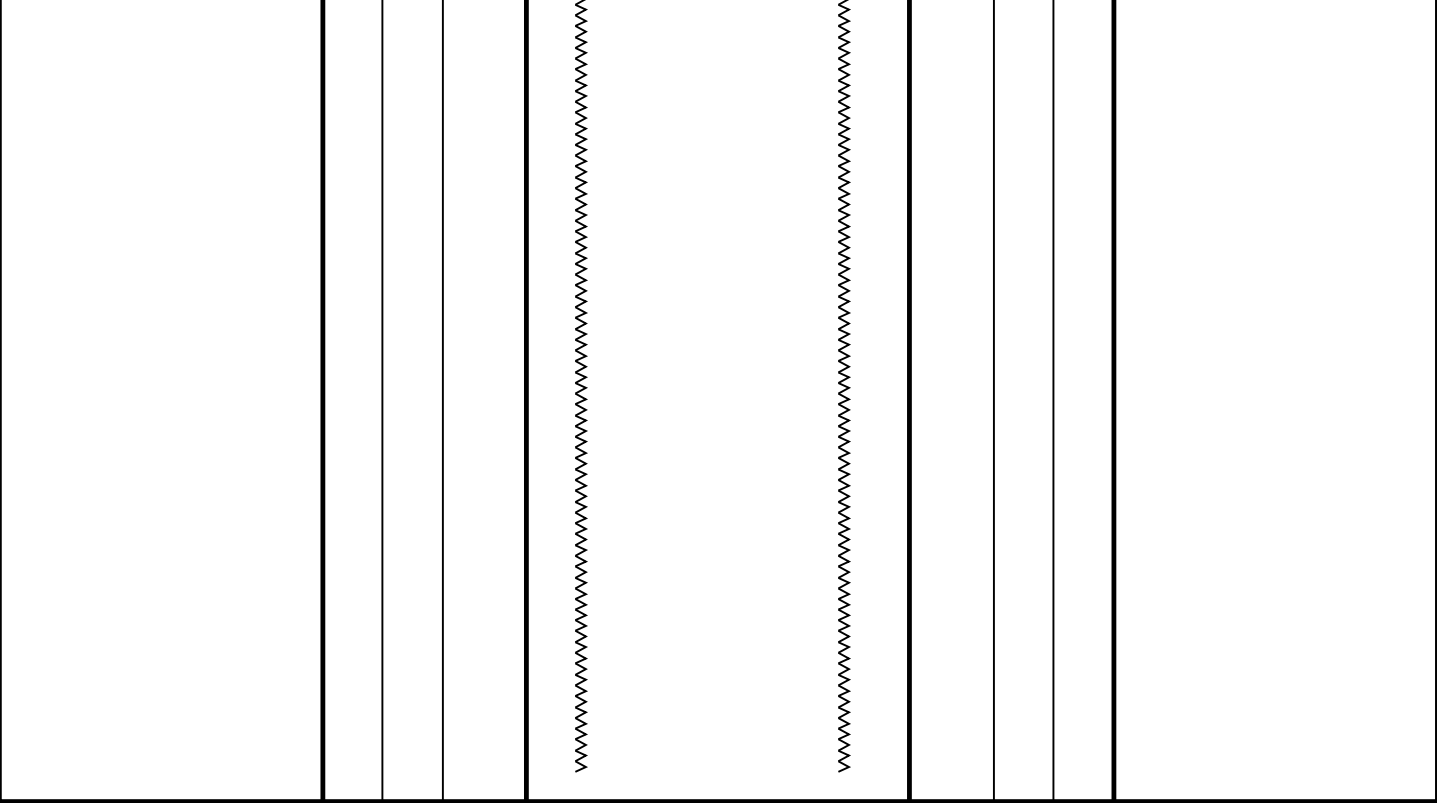
Logging Date						28-Oct-2011					
Run Number						1					
Depth Driller						8702 ft					
Schlumberger Depth						8667 ft					
Bottom Log Interval						8667 ft					
Top Log Interval						3000 ft					
Casing Driller Size @ Depth						8.625 in @ 1216 ft					
Casing Schlumberger						1216 ft					
Bit Size						7.875 in					
Type Fluid In Hole						Water Based Mud					
Density			Viscosity			8.3 lbm/gal			26 s		
Fluid Loss			PH						6.5		
Source Of Sample						Flowline					
RM @ Measured Temperature						0.620 ohm.m @ 167 degF					
RMF @ Measured Temperature						0.465 ohm.m @ 167 degF					
RMC @ Measured Temperature						0.930 ohm.m @ 167 degF					
Source RMF			RMC			Calculated			Calculated		
RM @ MRT			RMF @ MRT			0.586 @ 177			0.440 @ 177		
Maximum Recorded Temperatures						177 degF					
Circulation Stopped			Time			28-Oct-2011			1:00		
Logger On Bottom			Time			28-Oct-2011			6:30		
Unit Number			Location			3055			Ft. Morgan, CO		
Recorded By						Allison Johnston					
Witnessed By						Tekabe Gedamu					

I-FLEX logged through drillpipe set at 3000 feet

Repeat pass not done due to borehole temperature					
Rig: Xtreme 15					
Schlumberger Crew: Ed Ponce & Jake Jump					
RUN 1			RUN 2		
SERVICE ORDER #: PROGRAM VERSION: FLUID LEVEL:			SERVICE ORDER #: PROGRAM VERSION: FLUID LEVEL:		
BVZK-00008 18C0-147 200 ft					
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP
EQUIPMENT DESCRIPTION					
RUN 1			RUN 2		
SURFACE EQUIPMENT					
WITM-A PSC_16MHZ					
DOWNHOLE EQUIPMENT					
LEH-AA LEH-AA	Head Temp	 61.8	63.1		
ILE-I ILE-I 53			60.7		
ITGN-B PSC-ATS PSTC-A ITNH-B 21 ITNS-B 21 NNLS-C 6017	Detail MT TelStatus PSTC CTEM GR CCL	 53.5 51.9 50.4	53.5		
	Far Near Epi Status	45.3 44.8 43.3			
ILD-T-B ICEC-B 33 IMCS-A 33 GGLS-C IPDP-A 33	ICEC Stat	 41.1	43.3		
	PEFL Caliper LS PEFS SS	36.0 35.6 35.5 35.2 35.1			
	IMCS Stat	33.0			
AH-306 AH-306 82			33.0		
ICME-A ICME-A 1			31.4		
ISFL-A ISEC-A			27.1		



Production String	(in)			(ft)	Well Schematic	(ft)			(in)	Casing String
	OD	ID	MD			MD	OD	ID		
						0.0	8.625			Casing String
						1216.0	8.625			Casing Shoe
						1216.0	7.875			Borehole Segment



Schlumberger

UPPER RESISTIVITY LOG 5" = 100'

MAXIS Field Log

Company: Kerr Mcgee Oil & Gas Onshore LP Well: Howard 2-32

Input DLIS Files

DEFAULT IDL_SFL_LDL_CNL_014LUP FN:13 PRODUCER 28-Oct-2011 06:17 8660.0 FT 0.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 380.36 ft3
Cement Volume = 268.75 ft3 (assuming 4.50 in casing O.D.)
Computed from 5499.5 ft to 4489.5 ft

OP System Version: 18C0-147

IDFR-A SPC-5020-IFLEX_b ISFL-A SPC-5020-IFLEX_b
ILD-T-B SPC-5020-IFLEX_b ITGN-B SPC-5020-IFLEX_b

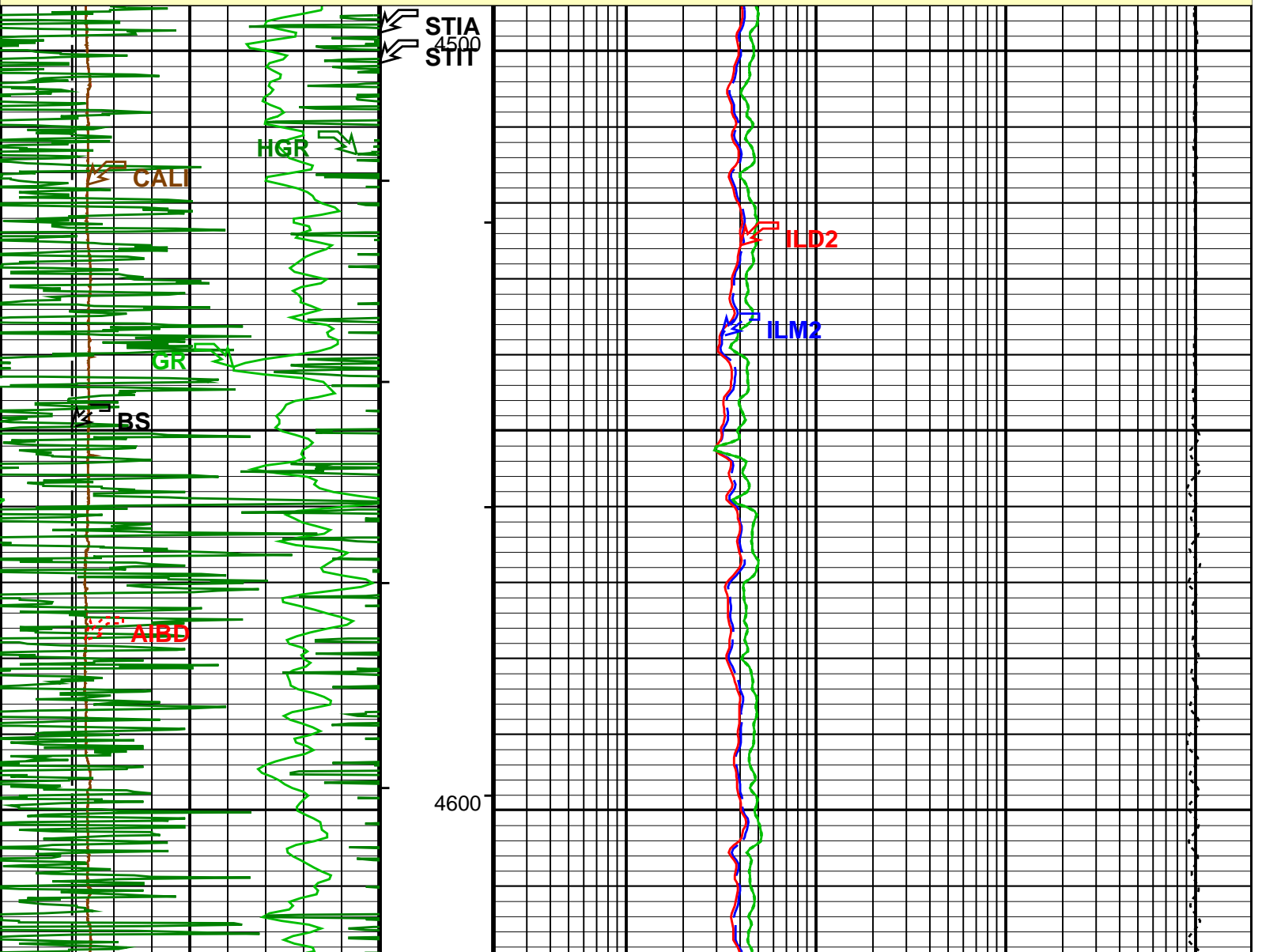
PIP SUMMARY

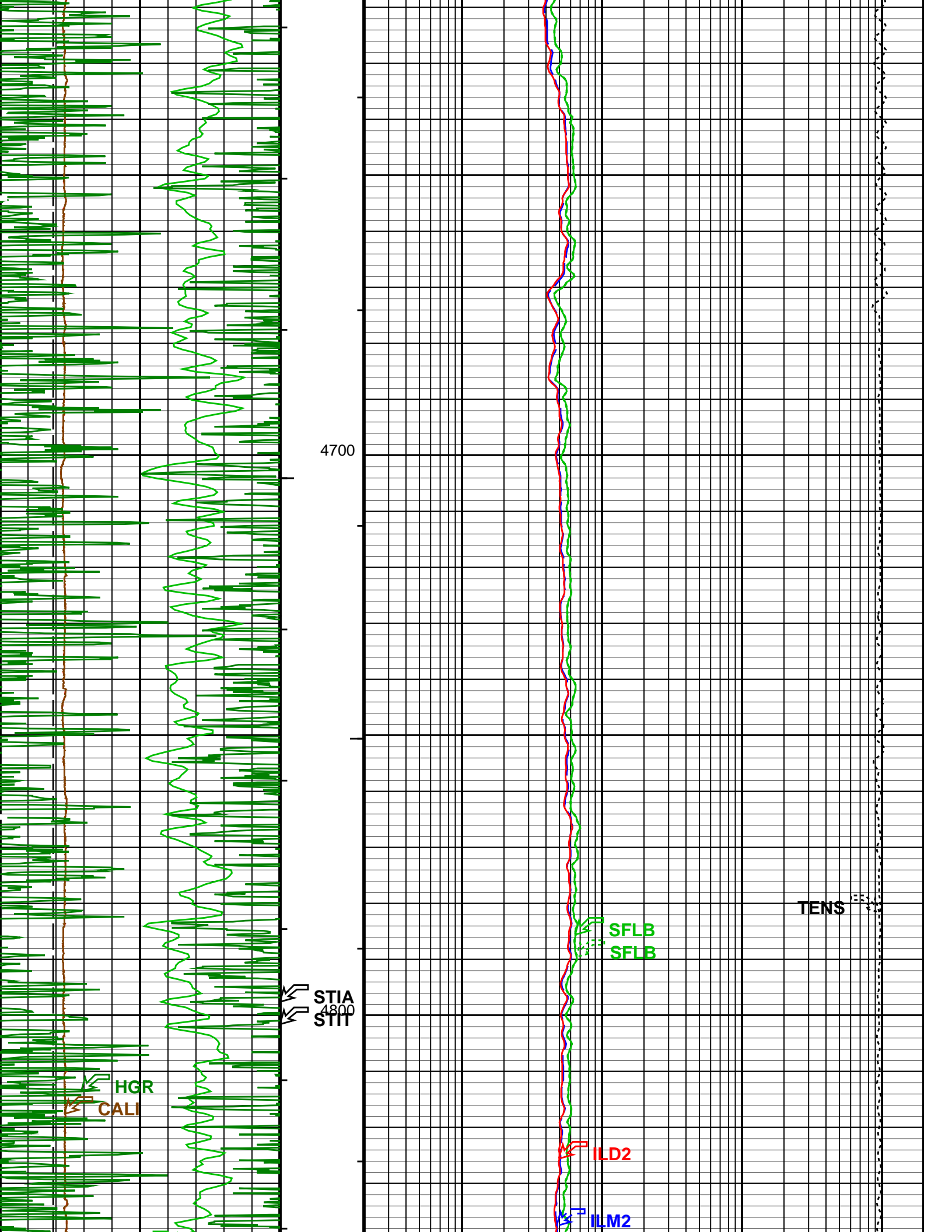
- └ Integrated Hole Volume Minor Pip Every 10 F3
- └ Integrated Hole Volume Major Pip Every 100 F3
 - └ Integrated Cement Volume Minor Pip Every 10 F3
 - └ Integrated Cement Volume Major Pip Every 100 F3

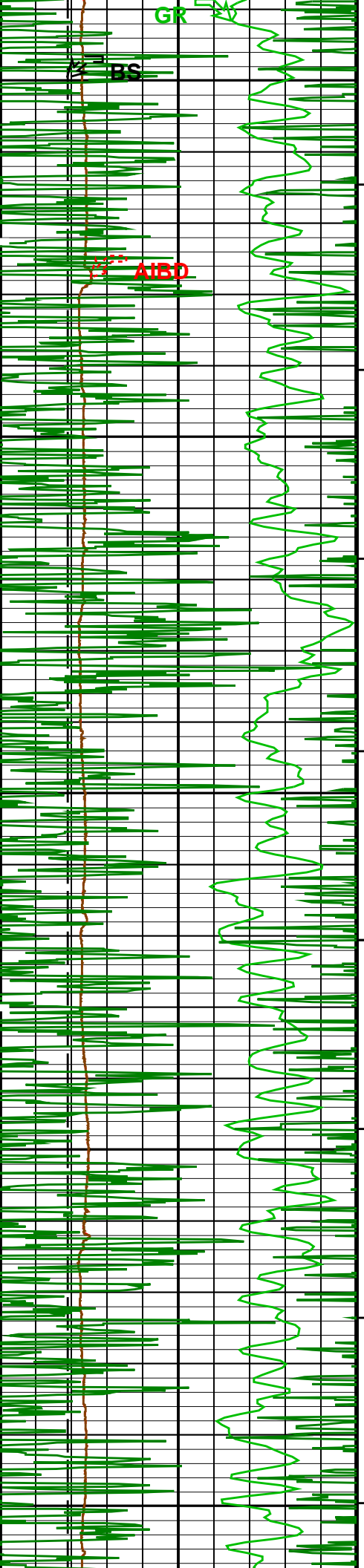
Time Mark Every 60 S

High Resolution Gamma Ray (HGR) (GAPI)		Tension (TENS) (LBF)	
0	100	10000	0
Caliper (CALI) (IN)		Borehole Corrected SFL (SFLB) (OHMM)	
6	16	0.2	2000
Gamma Ray (GR) (GAPI)		Borehole Corrected SFL (SFLB) (OHMM)	
0	150	0.2	2000
Bit Size (BS) (IN)		Induction Deep Resistivity (ILD2) (OHMM)	
6	16	0.2	2000
AIT Input Bhole Diameter (AIBD) (IN)		Induction Medium Resistivity (ILM2) (OHMM)	
6	16	0.2	2000

Main Pass: Resistivity 2 ft Vertical Res 5 inch Scale

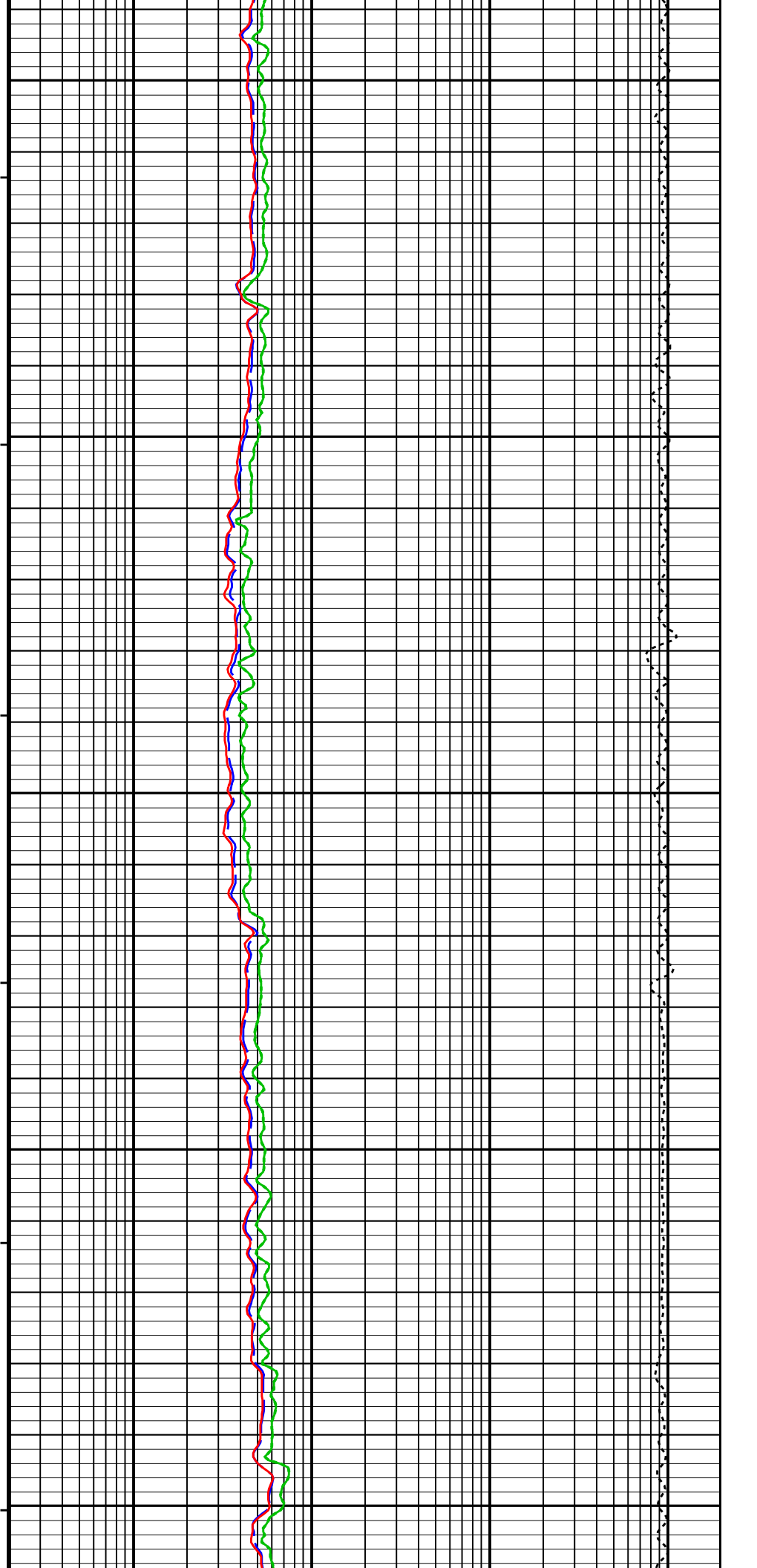


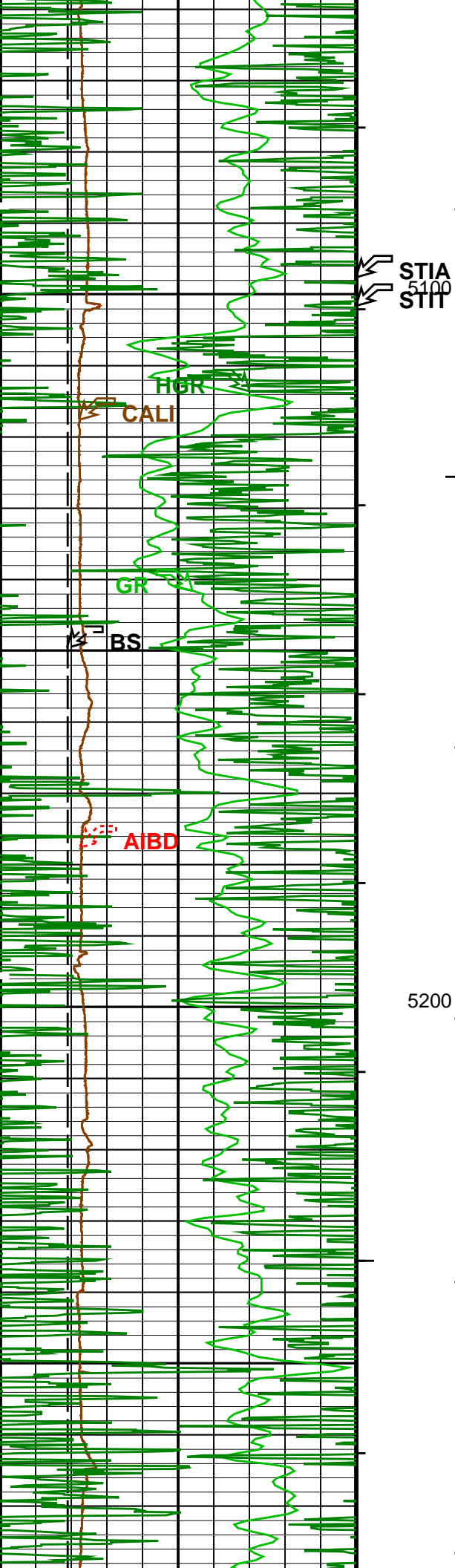




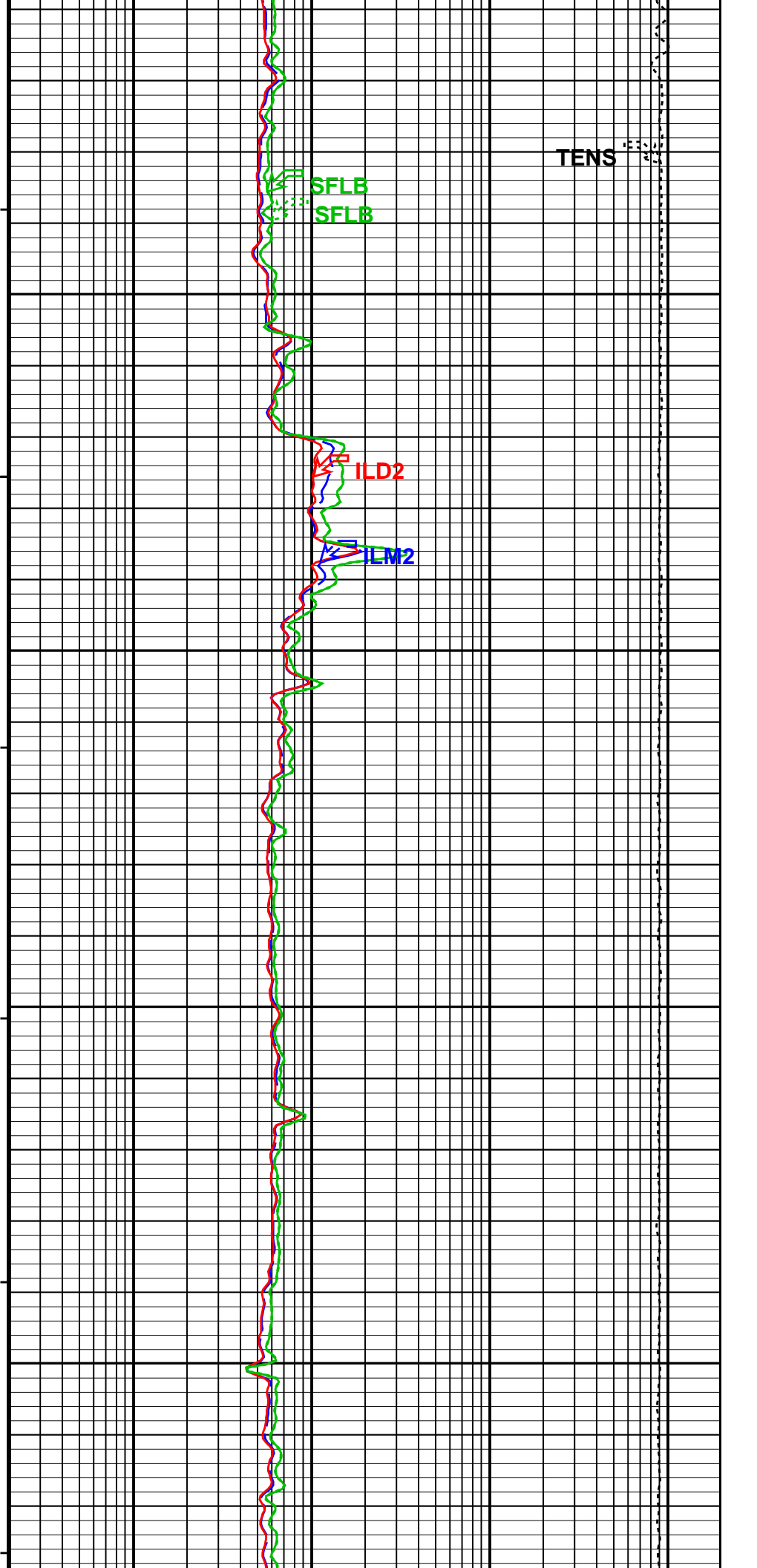
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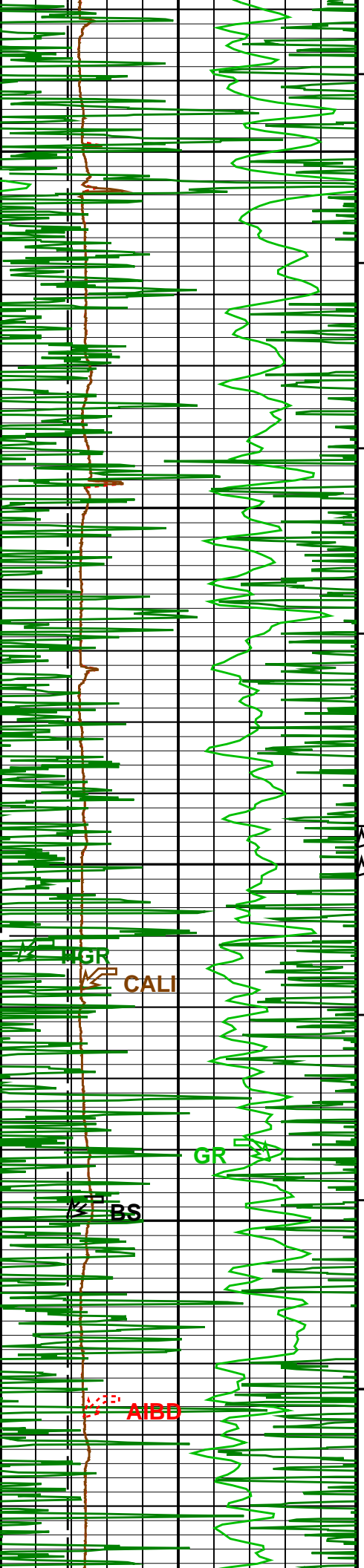
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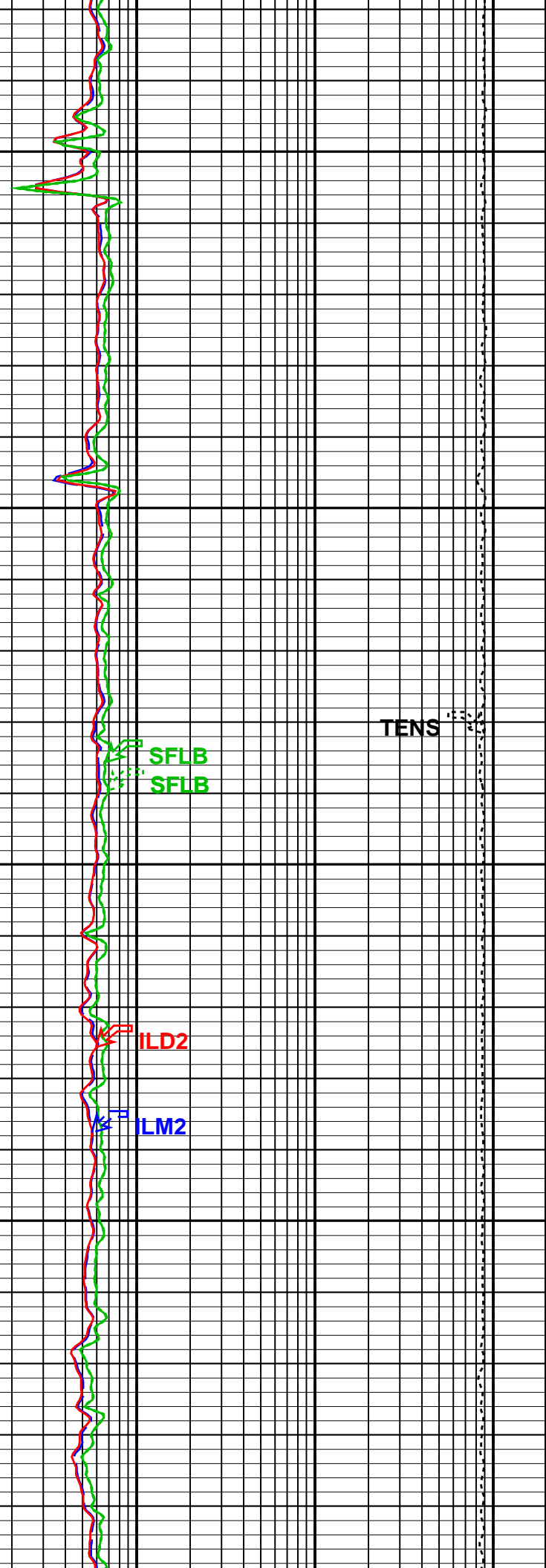
5200





5300

STIA
5400
STII



TENS

AIT Input Bhole Diameter (AIBD) (IN)		Stuck Stretch (STIT) 0 (F) 50	Induction Medium Resistivity (ILM2) (OHMM)	
6	16		0.2	2000
Bit Size (BS) (IN)		Cable Drag From STIA to STIT	Induction Deep Resistivity (ILD2) (OHMM)	
6	16		0.2	2000
Gamma Ray (GR) (GAPI)		Tool/Tot. Drag From D3T to STIA	Borehole Corrected SFL (SFLB) (OHMM)	
0	150		0.2	2000
Caliper (CALI) (IN)			Borehole Corrected SFL (SFLB) (OHMM)	
6	16		0.2	2000
High Resolution Gamma Ray (HGR) (GAPI)			Tension (TENS) (LBF)	
0	100		10000	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	
IDFR-A: iFlex Dual Formation Resistivity Tool			
ABLV	Array Induction Basic Logs Code Version Number	223	
ACEN	Array Induction Tool Centering Flag (in Borehole)	ECCENTERED	
AETP	Array Induction Enable Sonde Error Temp&Pres Corr	TEMP_ON_PRES_ON	
AFRSV	Array Induction Response Set Version for Four ft Resolution	03.00.02.00	
AIGS	Array Induction Select Akima Interpolation Gating	ON	
AIGS_SFL_IDFR	SFL Select Akima Interpolation Gating	ON	
ATRSV	Array Induction Response Set Version for Two ft Resolution	03.00.02.00	
ATSE_IDFR	IDFR Temperature RTD Selection(Sonde Error Correction)	RTD1	
AULV	Array Induction User Level Control	NORMAL	
BHC_SIG_T	BHC Formation Conductivity Input	13R	
BHPRSRC_IDFR	IDFR Pressure Source	BHPR	
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF
DFT_IFLEX	Drilling Fluid Type	WATER	
DO	Depth Offset	14.0	ft
FEXP	Form Factor Exponent	2.000	
FNUM	Form Factor Numerator	1.000	
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR	
GTSE	Generalized Temperature Selection	TEMP	
ISOD	Induction Standoff Outer Diameter	2.250	in
SHT	Surface Hole Temperature	68.000	degF
ILD-T-B: iFlex Litho Density Tool			
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF
DFT_IFLEX	Drilling Fluid Type	WATER	
DO	Depth Offset	14.0	ft
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
ITGN-B: iFlex Telemetry Gamma Neutron Tool			
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF
DFT_IFLEX	Drilling Fluid Type	WATER	
DO	Depth Offset	14.0	ft
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR	

GTSE	Generalized Temperature Selection	TEMP	68.000	degF
SHT	Surface Hole Temperature			
RWA: Apparent Water Resistivity				
DO	Depth Offset	14.0	ft	
FEXP	Form Factor Exponent	2.000		
FNUM	Form Factor Numerator	1.000		
FEQL: Formation Evaluation Quick Look				
DO	Depth Offset	14.0	ft	
FEXP	Form Factor Exponent	2.000		
FNUM	Form Factor Numerator	1.000		
HOLEV: Integrated Hole/Cement Volume				
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF	
DO	Depth Offset	14.0	ft	
GCSE	Generalized Caliper Selection	CALI		
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg	
GGRD	Geothermal Gradient	0.010	degF/ft	
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR		
GTSE	Generalized Temperature Selection	TEMP		
SHT	Surface Hole Temperature	68.000	degF	
PERT: Preliminary Evaluation – Real Time				
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF	
DO	Depth Offset	14.0	ft	
FEXP	Form Factor Exponent	2.000		
FNUM	Form Factor Numerator	1.000		
GCSE	Generalized Caliper Selection	CALI		
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg	
GGRD	Geothermal Gradient	0.010	degF/ft	
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR		
GTSE	Generalized Temperature Selection	TEMP		
SHT	Surface Hole Temperature	68.000	degF	
STI: Stuck Tool Indicator				
DO	Depth Offset	14.0	ft	
STKT	STI Stuck Threshold	2.500	ft	
TDD	Total Depth – Driller	8702.0	ft	
TDL	Total Depth – Logger	8690.0	ft	
System and Miscellaneous				
BS	Bit Size	7.875	in	
DO	Depth Offset	14.0	ft	
FLEV	Fluid Level	200.0	ft	
MST	Mud Sample Temperature	167.0	degF	
TD	Total Depth	8702.0	ft	

Format: AIT_MAIN_5_2ftRes Vertical Scale: 5" per 100' Graphics File Created: 28-Oct-2011 07:27

OP System Version: 18C0-147

IDFR-A	SPC-5020-IFLEX_b	ISFL-A	SPC-5020-IFLEX_b
ILDT-B	SPC-5020-IFLEX_b	ITGN-B	SPC-5020-IFLEX_b

Input DLIS Files

DEFAULT	IDL_SFL_LDL_CNL_014LUP	FN:13	PRODUCER	28-Oct-2011 06:17	8660.0 FT	0.0 FT
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Schlumberger

MAIN RESISTIVITY LOG 5" = 100'

MAXIS Field Log

Company: Kerr Mcgee Oil & Gas Onshore LP Well: Howard 2-32

Input DLIS Files

DEFAULT	IDL_SFL_LDL_CNL_014LUP	FN:13	PRODUCER	28-Oct-2011 06:17	8660.0 FT	0.0 FT
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Integrated Hole/Cement Volume Summary

Hole Volume = 384.48 ft3

Cement Volume = 264.71 ft3 (assuming 4.50 in casing O.D.)

OP System Version: 18C0-147

IDFR-A
ILDT-B

SPC-5020-IFLEX_b
SPC-5020-IFLEX_b

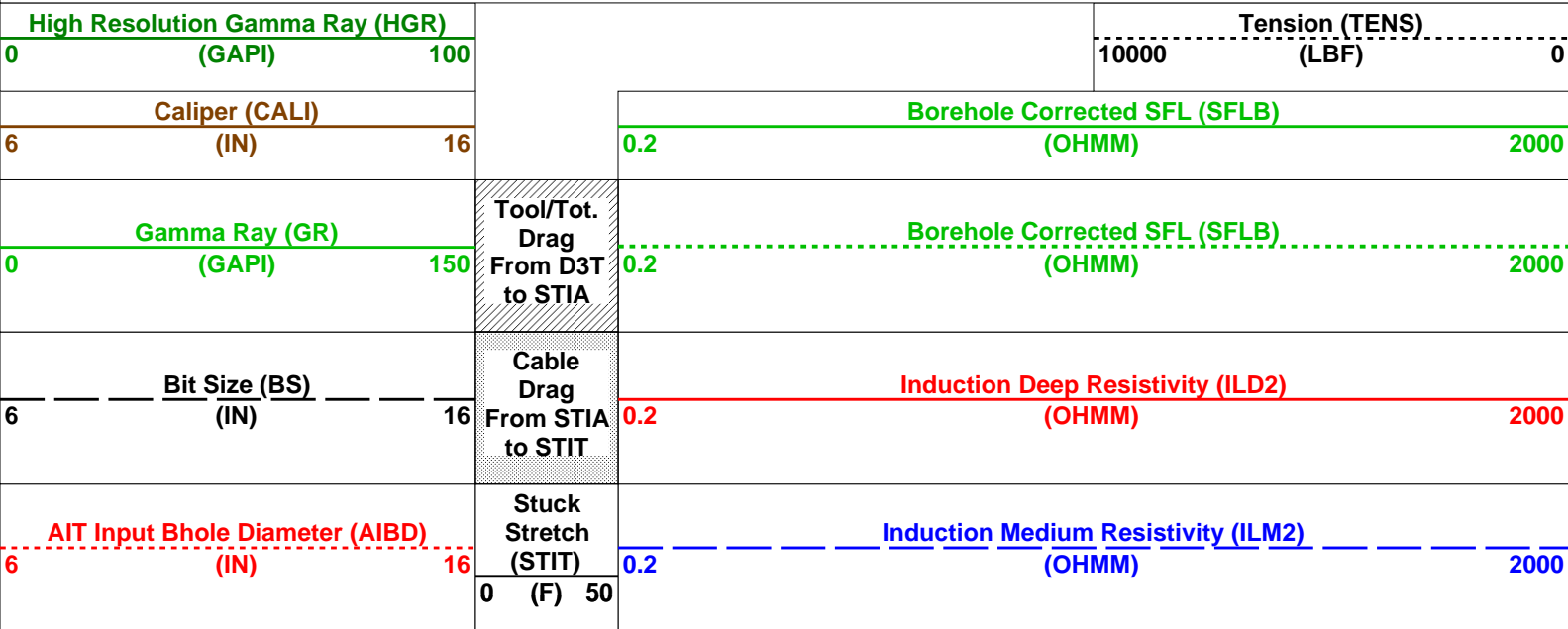
ISFL-A
ITGN-B

SPC-5020-IFLEX_b
SPC-5020-IFLEX_b

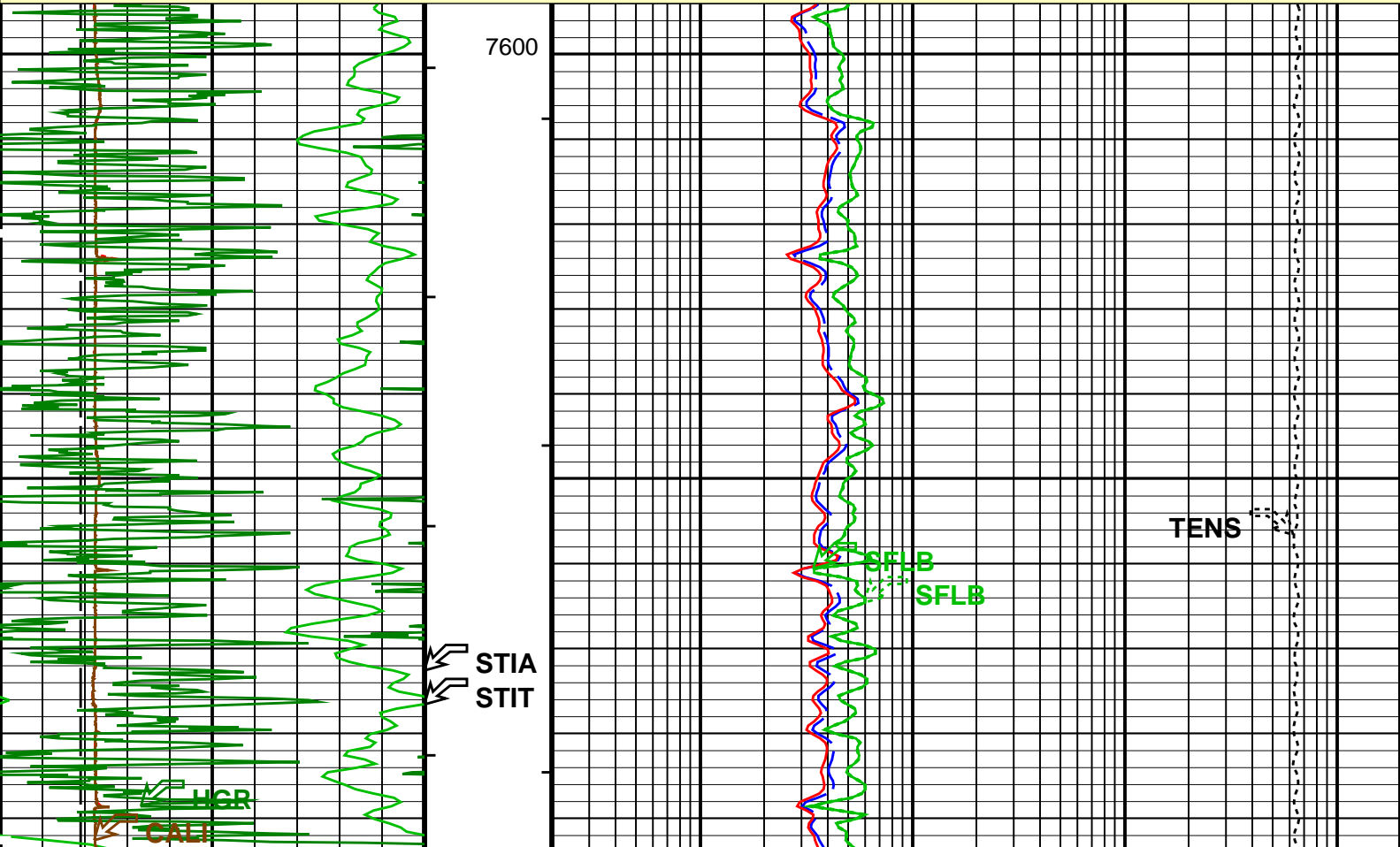
PIP SUMMARY

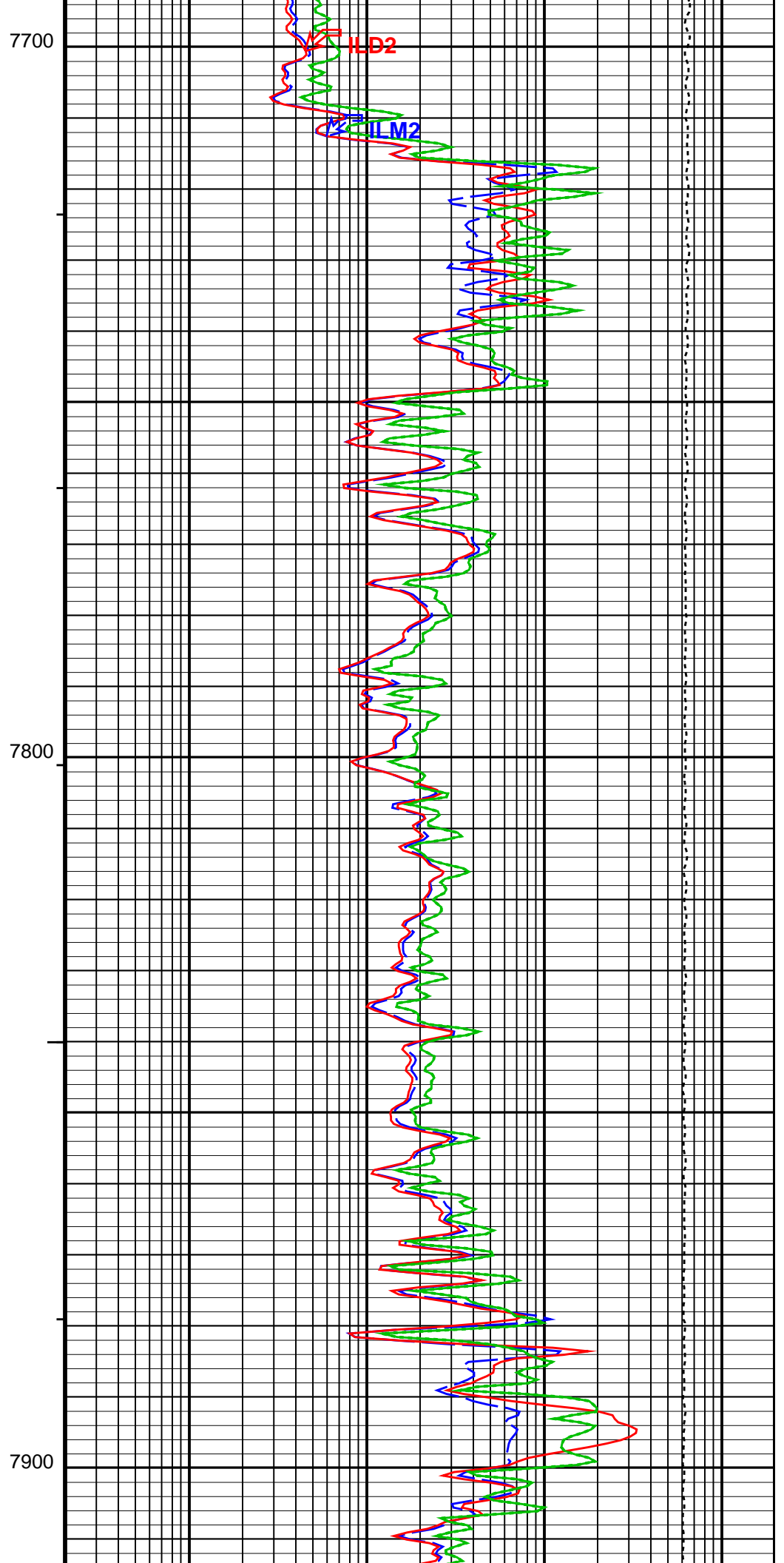
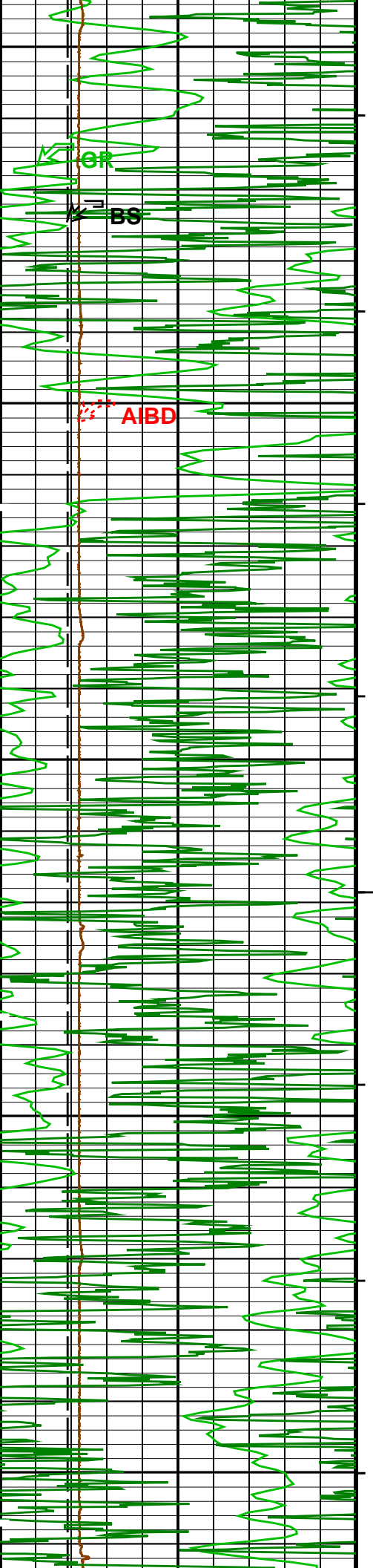
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- └ Integrated Hole Volume Major Pip Every 100 F3
 - └ Integrated Cement Volume Minor Pip Every 10 F3
 - └ Integrated Cement Volume Major Pip Every 100 F3

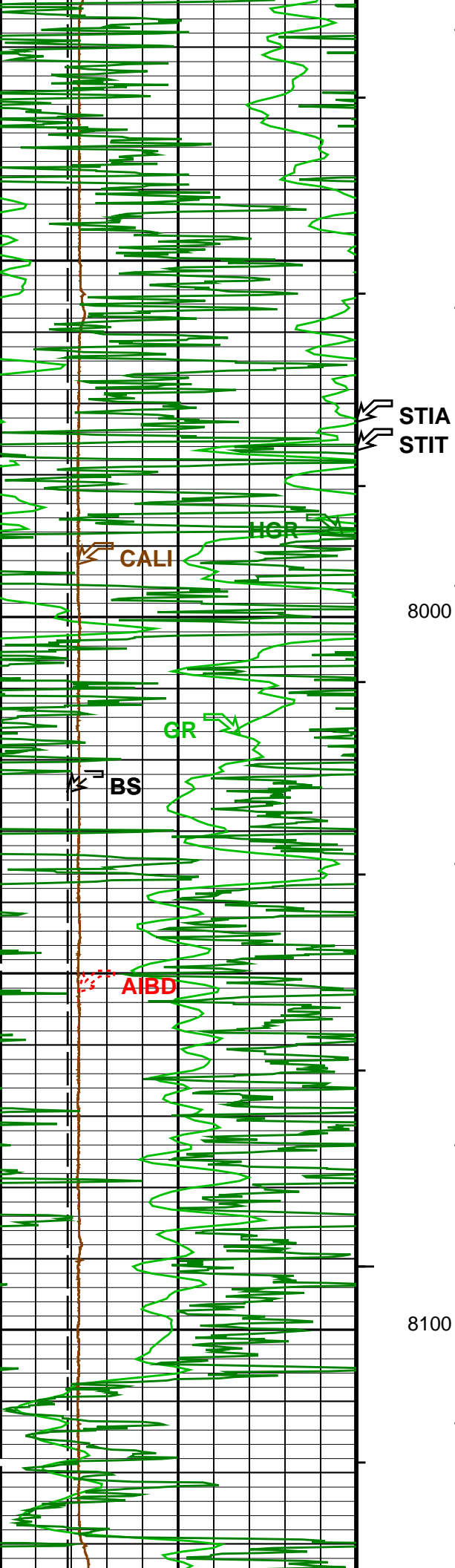
Time Mark Every 60 S



Main Pass: Resistivity 2 ft Vertical Res 5 inch Scale







STIA
STIT

CALI

8000

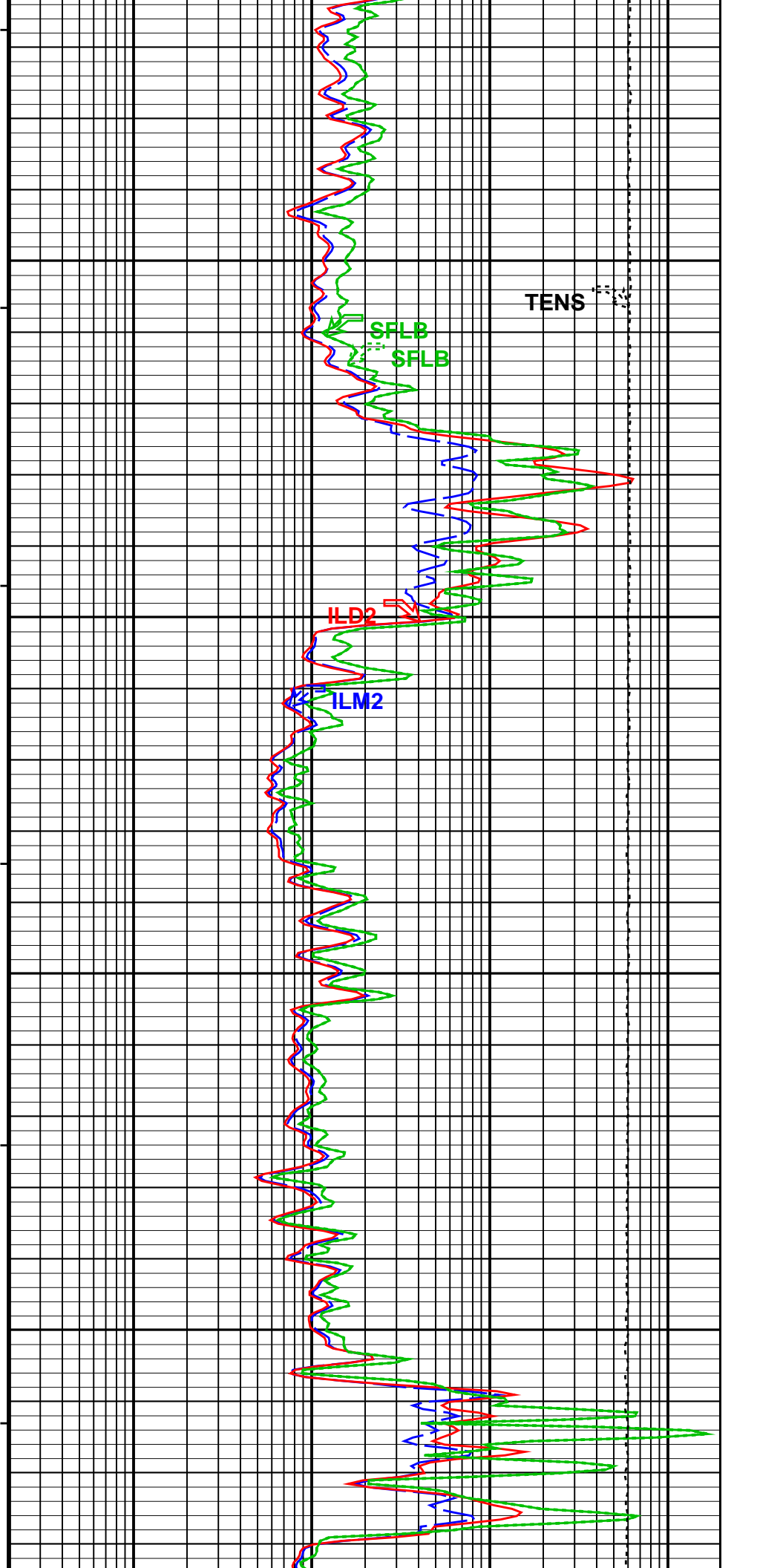
HGR

GR

BS

AIBD

8100

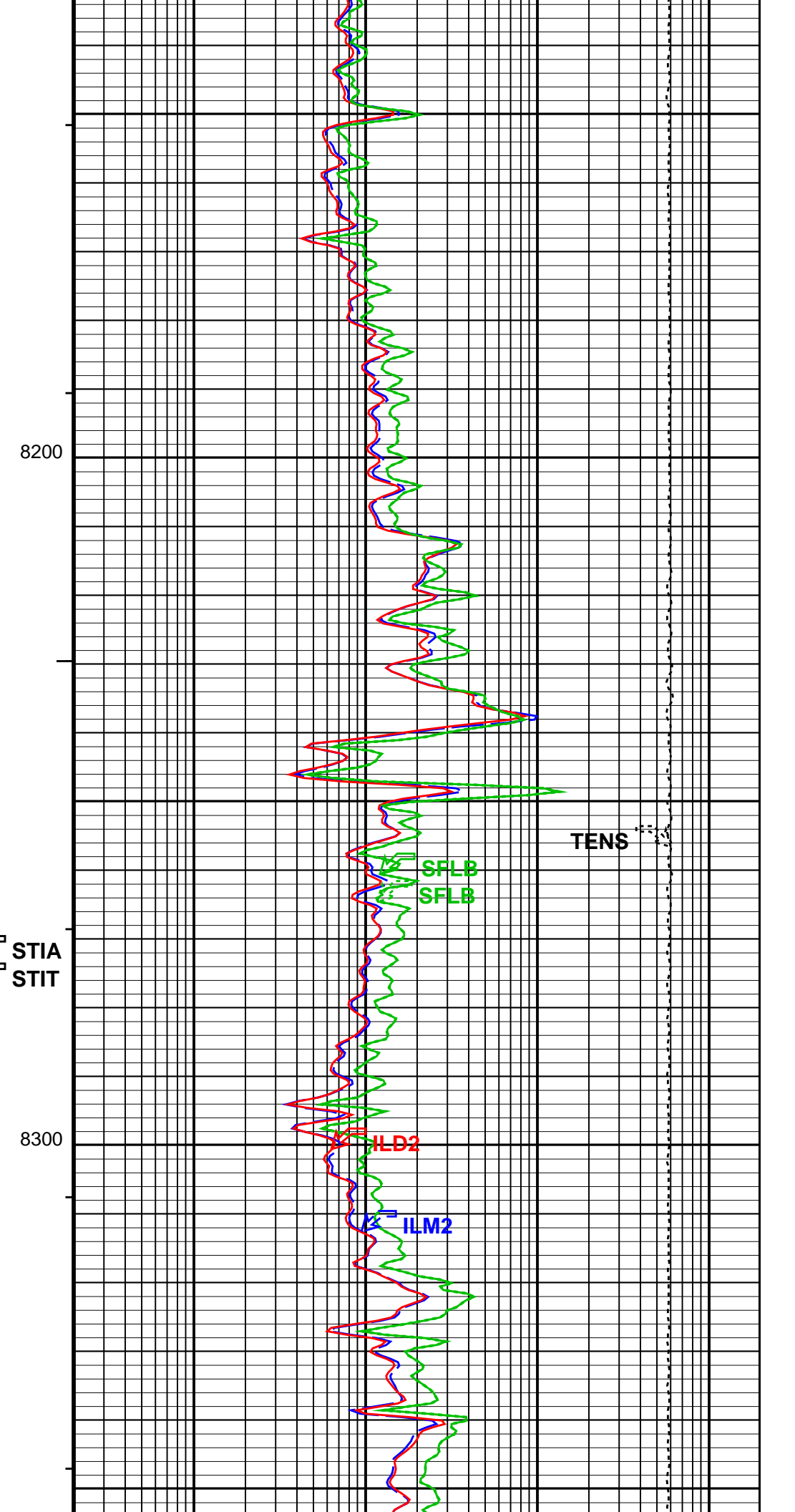
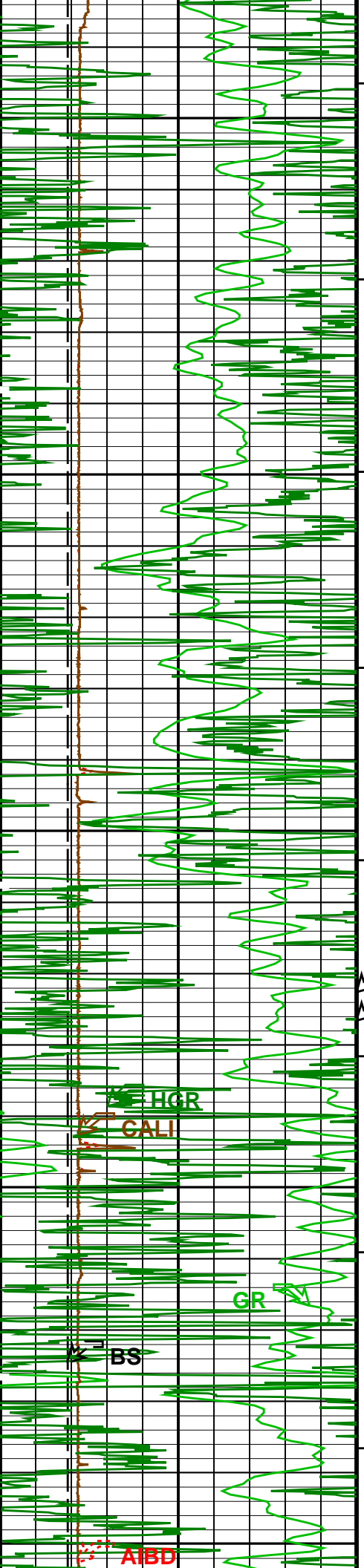


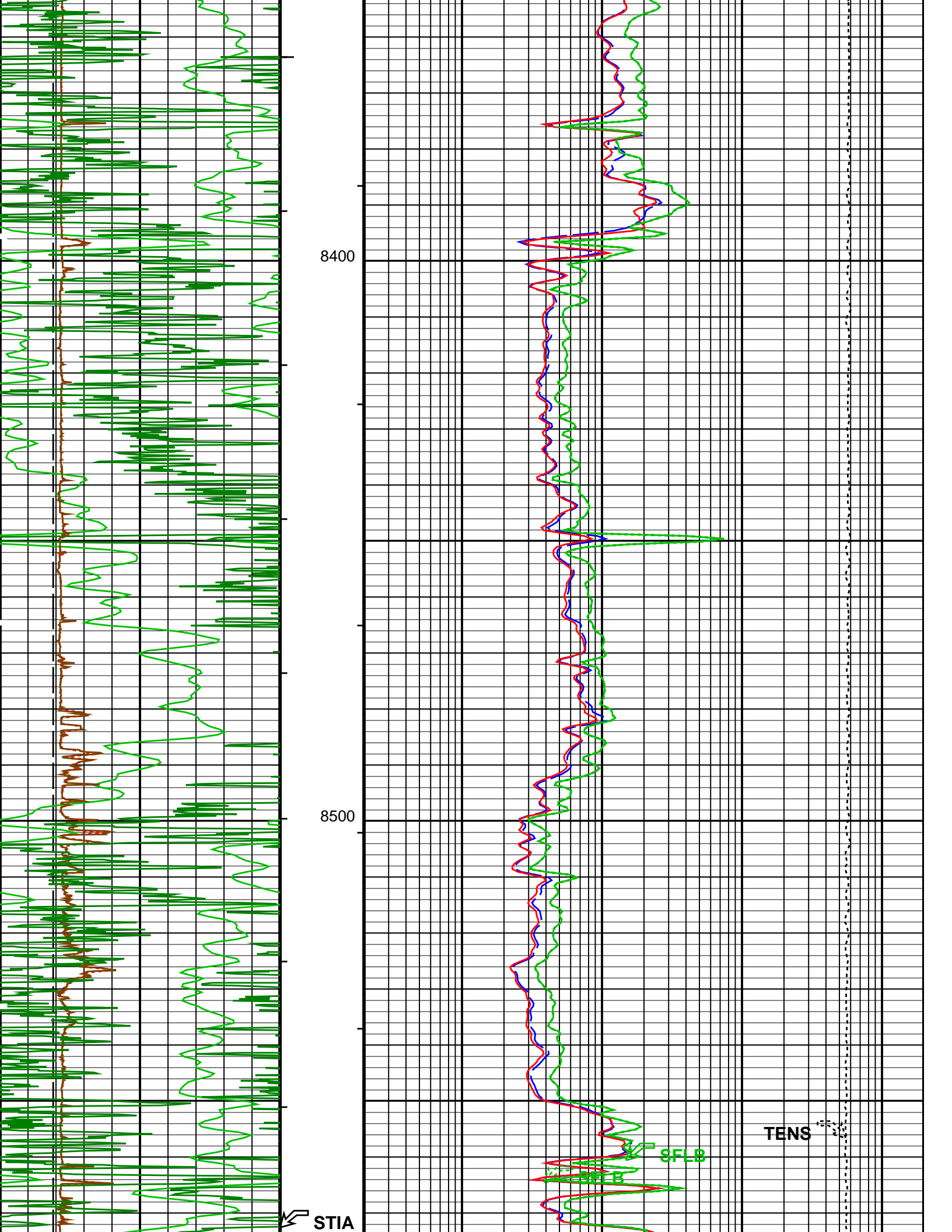
SFLB
SFLB

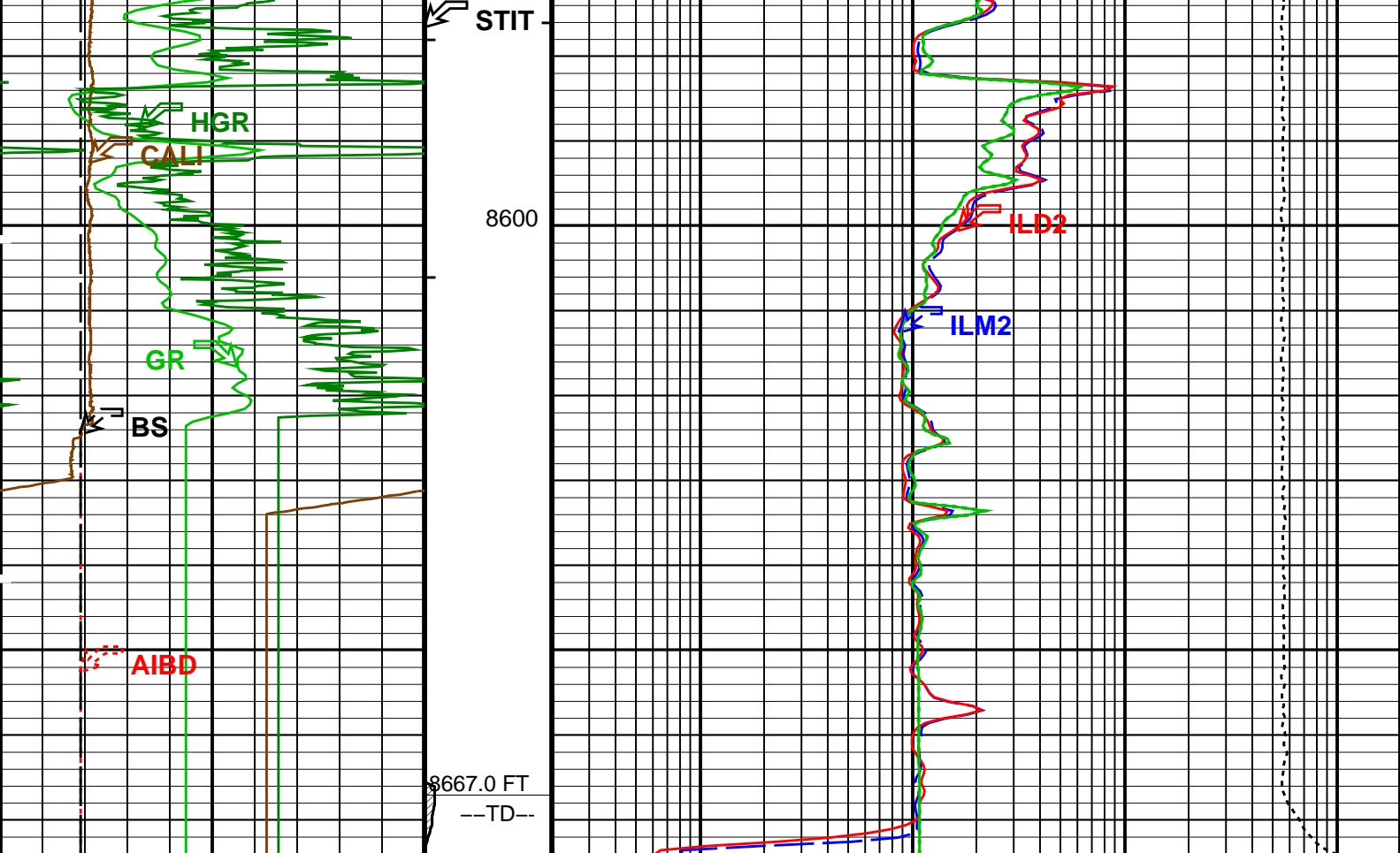
ILD2

ILM2

TENS







Main Pass: Resistivity 2 ft Vertical Res 5 inch Scale

AIT Input Bhole Diameter (AIBD) (IN)		Stuck Stretch (STIT) (F)	Induction Medium Resistivity (ILM2) (OHMM)	
6	16	0 50	0.2	2000
Bit Size (BS) (IN)		Cable Drag From STIA to STIT	Induction Deep Resistivity (ILD2) (OHMM)	
6	16		0.2	2000
Gamma Ray (GR) (GAPI)		Tool/Tot. Drag From D3T to STIA	Borehole Corrected SFL (SFLB) (OHMM)	
0	150		0.2	2000
Caliper (CALI) (IN)			Borehole Corrected SFL (SFLB) (OHMM)	
6	16		0.2	2000
High Resolution Gamma Ray (HGR) (GAPI)			Tension (TENS) (LBF)	
0	100		10000	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
-----------	-------------	-------

IDFR-A: iFlex Dual Formation Resistivity Tool

ABLV	Array Induction Basic Logs Code Version Number	223
ACEN	Array Induction Tool Centering Flag (in Borehole)	ECCENTERED
AETP	Array Induction Enable Sonde Error Temp&Pres Corr	TEMP ON PRES ON

AFRSV	Array Induction Response Set Version for Four ft Resolution	03.00.02.00	TEMP_ON_PRES_ON
AIGS	Array Induction Select Akima Interpolation Gating	ON	
AIGS_SFL_IDFR	SFL Select Akima Interpolation Gating	ON	
ATRSV	Array Induction Response Set Version for Two ft Resolution	03.00.02.00	
ATSE_IDFR	IDFR Temperature RTD Selection(Sonde Error Correction)	RTD1	
AULV	Array Induction User Level Control	NORMAL	
BHC_SIG_T	BHC Formation Conductivity Input	13R	
BHPRSRC_IDFR	IDFR Pressure Source	BHPR	
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF
DFT_IFLEX	Drilling Fluid Type	WATER	
DO	Depth Offset	14.0	ft
FEXP	Form Factor Exponent	2.000	
FNUM	Form Factor Numerator	1.000	
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR	
GTSE	Generalized Temperature Selection	TEMP	
ISOD	Induction Standoff Outer Diameter	2.250	in
SHT	Surface Hole Temperature	68.000	degF
ILDT-B: iFlex Litho Density Tool			
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF
DFT_IFLEX	Drilling Fluid Type	WATER	
DO	Depth Offset	14.0	ft
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
ITGN-B: iFlex Telemetry Gamma Neutron Tool			
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF
DFT_IFLEX	Drilling Fluid Type	WATER	
DO	Depth Offset	14.0	ft
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
RWA: Apparent Water Resistivity			
DO	Depth Offset	14.0	ft
FEXP	Form Factor Exponent	2.000	
FNUM	Form Factor Numerator	1.000	
FEQL: Formation Evaluation Quick Look			
DO	Depth Offset	14.0	ft
FEXP	Form Factor Exponent	2.000	
FNUM	Form Factor Numerator	1.000	
HOLEV: Integrated Hole/Cement Volume			
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF
DO	Depth Offset	14.0	ft
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
PERT: Preliminary Evaluation – Real Time			
BHT	Bottom Hole Temperature (used in calculations)	177.0	degF
DO	Depth Offset	14.0	ft
FEXP	Form Factor Exponent	2.000	
FNUM	Form Factor Numerator	1.000	
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0.000	deg
GGRD	Geothermal Gradient	0.010	degF/ft
GRSE	Generalized Mud Resistivity Selection	AMF_IDFR	
GTSE	Generalized Temperature Selection	TEMP	
SHT	Surface Hole Temperature	68.000	degF
STI: Stuck Tool Indicator			
DO	Depth Offset	14.0	ft
STKT	STI Stuck Threshold	2.500	ft
TDD	Total Depth – Driller	8702.0	ft
TDL	Total Depth – Logger	8690.0	ft
System and Miscellaneous			
BS	Bit Size	7.875	in
DO	Depth Offset	14.0	ft
FLEV	Fluid Level	200.0	ft
MST	Mud Sample Temperature	167.0	degF
TD	Total Depth	8702.0	ft

IDFR-A ILDT-B	SPC-5020-IFLEX_b SPC-5020-IFLEX_b	ISFL-A ITGN-B	SPC-5020-IFLEX_b SPC-5020-IFLEX_b
Input DLIS Files			
DEFAULT	IDL_SFL_LDL_CNL_014LUP	FN:13	PRODUCER 28-Oct-2011 06:17 8660.0 FT 0.0 FT



BEFORE CALIBRATIONS

MAXIS Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
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iFlex Dual Formation Resistivity Tool Wellsite Calibration – Test Loop Gain Correction

Master: 13-Sep-2011 3:28

Test Loop Gain Correctio – 0	0	0.9956	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 1	0	0.9948	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 2	0	0.9533	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 0	0	1.351	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 1	0	0.8422	N/A	N/A	N/A	N/A	V
Test Loop Gain Correctio – 2	0	0.08421	N/A	N/A	N/A	N/A	V

iFlex Dual Formation Resistivity Tool Wellsite Calibration – Sonde Error Correction

Master: 13-Sep-2011 3:28

R Sonde Error Correction – 0	0	286.0	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 1	0	48.82	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction – 2	0	32.67	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 0	0	-23.11	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 1	0	-52.16	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction – 2	0	36.05	N/A	N/A	N/A	N/A	MM/M

iFlex Dual Formation Resistivity Tool Wellsite Calibration – Mud Gain Correction

Master: 13-Sep-2011 3:28

Mud Gain – Coarse Mud Gain – C	1.000	0.9188	N/A	N/A	N/A	N/A
Mud Gain – Fine Mud Gain – Fin	1.000	0.9142	N/A	N/A	N/A	N/A

iFlex Dual Formation Resistivity Tool Wellsite Calibration – Mud Gain Correction

Master: 13-Sep-2011 3:28

Mud Gain – Coarse Mud Gain – C	1.000	0.9188	N/A	N/A	N/A	N/A
Mud Gain – Fine Mud Gain – Fin	1.000	0.9142	N/A	N/A	N/A	N/A

iFlex Litho Density Tool Wellsite Calibration – Detector Calibration

Master: 2-Sep-2011 22:45 Before: 15-Sep-2011 11:46

SS Window 1 Count Rate Master	1140	1215	1198	N/A	N/A	N/A	CPS
SS Window 2 Count Rate Master	1470	1542	1517	N/A	N/A	N/A	CPS
SS Window 3 Count Rate Master	760.0	790.8	770.6	N/A	N/A	N/A	CPS
SS Window 4 Count Rate Master	770.0	803.8	784.5	N/A	N/A	N/A	CPS
LS Window 1 Count Rate Master	79.00	82.73	79.80	N/A	N/A	N/A	CPS
LS Window 2 Count Rate Master	94.00	95.09	91.88	N/A	N/A	N/A	CPS
LS Window 3 Count Rate Master	280.0	276.1	269.4	N/A	N/A	N/A	CPS
LS Window 4 Count Rate Master	146.0	147.5	145.4	N/A	N/A	N/A	CPS

iFlex Litho Density Tool Wellsite Calibration – Detector Calibration

Master: 2-Sep-2011 22:45

SS Window 1 Count Rate Water L	27000	25780	N/A	N/A	N/A	N/A	CPS
SS Window 2 Count Rate Water L	23000	21280	N/A	N/A	N/A	N/A	CPS
SS Window 3 Count Rate Water L	13400	12360	N/A	N/A	N/A	N/A	CPS
SS Window 4 Count Rate Water L	11800	10980	N/A	N/A	N/A	N/A	CPS
LS Window 1 Count Rate Water L	1210	1133	N/A	N/A	N/A	N/A	CPS
LS Window 2 Count Rate Water L	1600	1414	N/A	N/A	N/A	N/A	CPS
LS Window 3 Count Rate Water L	2100	1910	N/A	N/A	N/A	N/A	CPS

LS Window 4 Count Rate Water L	530.0	496.1	N/A	N/A	N/A	N/A	CPS
iFlex Litho Density Tool Wellsite Calibration – Detector Calibration							
Master: 2–Sep–2011 22:45							
SS Window 1 Count Rate Water H	23000	17890	N/A	N/A	N/A	N/A	CPS
SS Window 2 Count Rate Water H	22000	18570	N/A	N/A	N/A	N/A	CPS
SS Window 3 Count Rate Water H	12800	10900	N/A	N/A	N/A	N/A	CPS
SS Window 4 Count Rate Water H	11300	9767	N/A	N/A	N/A	N/A	CPS
LS Window 1 Count Rate Water H	950.0	742.7	N/A	N/A	N/A	N/A	CPS
LS Window 2 Count Rate Water H	1380	1134	N/A	N/A	N/A	N/A	CPS
LS Window 3 Count Rate Water H	2000	1692	N/A	N/A	N/A	N/A	CPS
LS Window 4 Count Rate Water H	500.0	452.8	N/A	N/A	N/A	N/A	CPS
iFlex Litho Density Tool Wellsite Calibration – Detector Calibration							
Master: 2–Sep–2011 22:45							
SS Window 1 Count Rate Magnesi	28000	19650	N/A	N/A	N/A	N/A	CPS
SS Window 2 Count Rate Magnesi	24000	20640	N/A	N/A	N/A	N/A	CPS
SS Window 3 Count Rate Magnesi	13500	11430	N/A	N/A	N/A	N/A	CPS
SS Window 4 Count Rate Magnesi	11000	9486	N/A	N/A	N/A	N/A	CPS
LS Window 1 Count Rate Magnesi	5400	3637	N/A	N/A	N/A	N/A	CPS
LS Window 2 Count Rate Magnesi	6900	5526	N/A	N/A	N/A	N/A	CPS
LS Window 3 Count Rate Magnesi	8500	7253	N/A	N/A	N/A	N/A	CPS
LS Window 4 Count Rate Magnesi	1500	1303	N/A	N/A	N/A	N/A	CPS
iFlex Telemetry Gamma Neutron Tool Wellsite Calibration – Background							
Master: 3–Sep–2011 1:14 Before: 15–Sep–2011 11:48							
Near Thermal Count Rate Master	27.00	28.55	27.30	N/A	N/A	N/A	CPS
Far Thermal Count Rate Master	10.00	10.82	10.51	N/A	N/A	N/A	CPS
Epithermal Count Rate Master B	27.00	27.79	28.07	N/A	N/A	N/A	CPS
iFlex Telemetry Gamma Neutron Tool Wellsite Calibration – Tank Measurement							
Master: 3–Sep–2011 1:14							
Near Thermal Count Rate Tank M	7978	8017	N/A	N/A	N/A	N/A	CPS
Far Thermal Count Rate Tank Me	2847	2856	N/A	N/A	N/A	N/A	CPS
Epithermal Count Rate Tank Mea	813.0	815.0	N/A	N/A	N/A	N/A	CPS

iFlex Dual Formation Resistivity Tool / Equipment Identification

Primary Equipment:

iFlex Resistivity Mud Sensor

iFlex Dual Formation Resistivity Sonde

IRMS – A

6

IDRS – A



6



Auxiliary Equipment:

iFlex Dual Formation Resistivity Tool Wellsite Calibration						
Test Loop Gain Correction						
Idx	Value	Test Loop Gain Correction Magnitude			Value	Test Loop Gain Correction Phase V
0	0.9956				1.351	
		0.9000 (Minimum)	1.000 (Nominal)	1.100 (Maximum)		–3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
1	0.9948				0.8422	
		0.9000 (Minimum)	1.000 (Nominal)	1.100 (Maximum)		–3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
2	0.9533				0.08421	
		0.9000 (Minimum)	1.000 (Nominal)	1.100 (Maximum)		–3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)

Master: 13–Sep–2011 3:28

iFlex Dual Formation Resistivity Tool Wellsite Calibration						
Sonde Error Correction						
Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M
0	286.0				–23.11	
		0 (Minimum)	150.0 (Nominal)	300.0 (Maximum)		–900.0 (Minimum) 0 (Nominal) 900.0 (Maximum)
1	48.82				–52.16	
		0 (Minimum)	45.00 (Nominal)	90.00 (Maximum)		–300.0 (Minimum) 0 (Nominal) 300.0 (Maximum)
2	32.67				36.05	
		0 (Minimum)	15.00 (Nominal)	30.00 (Maximum)		–150.0 (Minimum) 0 (Nominal) 150.0 (Maximum)




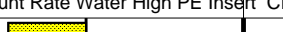


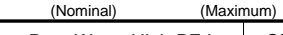
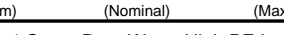
iFlex Dual Formation Resistivity Tool Wellsite Calibration							
Mud Gain Correction							
Phase	Mud Gain – Coarse	Mud Gain – Coarse	Value	Phase	Mud Gain – Fine	Mud Gain – Fine	Value
Master			0.9188	Master			0.9142
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
Master: 13-Sep-2011 3:28							

iFlex Dual Formation Resistivity Tool Wellsite Calibration							
Mud Gain Correction							
Phase	Mud Gain – Coarse		Value	Phase	Mud Gain – Fine		Value
Master			0.9188	Master			0.9142
	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
Master: 13-Sep-2011 3:28							

iFlex Litho Density Tool / Equipment Identification			
Primary Equipment:			
Mechanical Control Sonde	IMCS – A	33	
Gamma Gamma Logging Source	GGLS – C		
Powered Density Pad	IPDP – A	33	
Caliper Electronics Cartridge	ICEC – B	33	
Auxiliary Equipment:			

iFlex Litho Density Tool Wellsite Calibration																	
Detector Calibration																	
Phase 1 Window 1 Count Rate Master Bkgd CPS Value					Phase 2 Window 2 Count Rate Master Bkgd CPS Value					Phase 3 Window 3 Count Rate Master Bkgd CPS Value							
Master					1215	Master					1542	Master					
Before					1198	Before					1517	Before					
730.0		1140		1370		990.0		1470		1720		490.0		760.0		900.0	
(Minimum)		(Nominal)		(Maximum)		(Minimum)		(Nominal)		(Maximum)		(Minimum)		(Nominal)		(Maximum)	
Phase 4 Window 4 Count Rate Master Bkgd CPS Value					Phase 5 Window 1 Count Rate Master Bkgd CPS Value					Phase 6 Window 2 Count Rate Master Bkgd CPS Value							
Master					803.8	Master					82.73	Master					
Before					784.5	Before					79.80	Before					
480.0		770.0		940.0		47.00		79.00		99.00		54.00		94.00		121.0	
(Minimum)		(Nominal)		(Maximum)		(Minimum)		(Nominal)		(Maximum)		(Minimum)		(Nominal)		(Maximum)	
Phase 7 Window 3 Count Rate Master Bkgd CPS Value					Phase 8 Window 4 Count Rate Master Bkgd CPS Value												
Master					276.1	Master										147.5	
Before					269.4	Before										145.4	
150.0		280.0		360.0		83.00		146.0		190.0							
(Minimum)		(Nominal)		(Maximum)		(Minimum)		(Nominal)		(Maximum)							
Master: 2-Sep-2011 22:45								Before: 15-Sep-2011 11:46									

iFlex Litho Density Tool Wellsite Calibration											
Detector Calibration											
SS Window 1 Count Rate Water Low PE Insert CP Value				SS Window 2 Count Rate Water Low PE Insert CP Value				SS Window 3 Count Rate Water Low PE Insert CP Value			
Master			25780	Master			21280	Master			12360
18000 (Minimum)	27000 (Nominal)	30000 (Maximum)		16000 (Minimum)	23000 (Nominal)	25000 (Maximum)		9800 (Minimum)	13400 (Nominal)	14500 (Maximum)	
SS Window 4 Count Rate Water Low PE Insert CP Value				PS Window 1 Count Rate Water Low PE Insert CP Value				PS Window 2 Count Rate Water Low PE Insert CP Value			
Master			10980	Master			1133	Master			1414
8600 (Minimum)	11800 (Nominal)	12900 (Maximum)		820.0 (Minimum)	1210 (Nominal)	1400 (Maximum)		1050 (Minimum)	1600 (Nominal)	1800 (Maximum)	
PS Window 3 Count Rate Water Low PE Insert CP Value				PS Window 4 Count Rate Water Low PE Insert CP Value							
Master			1910	Master			496.1				
1450 (Minimum)	2100 (Nominal)	2400 (Maximum)		380.0 (Minimum)	530.0 (Nominal)	580.0 (Maximum)					
Master: 2-Sep-2011 22:45											

iFlex Litho Density Tool Wellsite Calibration														
Detector Calibration														
SP Window 1 Count Rate Water High PE Insert C/F Value				SP Window 2 Count Rate Water High PE Insert C/F Value				SP Window 3 Count Rate Water High PE Insert C/F Value						
Master				17890	Master				18570	Master				10900
16000 (Minimum) 23000 (Nominal) 26000 (Maximum)				15000 (Minimum) 22000 (Nominal) 24000 (Maximum)				9300 (Minimum) 12800 (Nominal) 13900 (Maximum)						
SP Window 4 Count Rate Water High PE Insert C/F Value				LP Window 1 Count Rate Water High PE Insert C/F Value				LP Window 2 Count Rate Water High PE Insert C/F Value						
Master				9767	Master				742.7	Master				1134
8200 (Minimum) 11300 (Nominal) 12400 (Maximum)				640.0 (Minimum) 950.0 (Nominal) 1100 (Maximum)				930.0 (Minimum) 1380 (Nominal) 1600 (Maximum)						
LP Window 3 Count Rate Water High PE Insert C/F Value				LP Window 4 Count Rate Water High PE Insert C/F Value										
Master				1692	Master							452.8		
1350 (Minimum) 2000 (Nominal) 2300 (Maximum)				360.0 (Minimum) 500.0 (Nominal) 550.0 (Maximum)										
Master: 2-Sep-2011 22:45														

iFlex Litho Density Tool Wellsite Calibration																
Detector Calibration																
Phase	1 Count Rate	Magnesium Low	PE Insert	CPS	SS	Phase	2 Count Rate	Magnesium Low	PE Insert	CPS	SS	Phase	3 Count Rate	Magnesium Low	PE Insert	CPS
Master	<div><div></div></div>			19650		Master	<div><div></div></div>			20640		Master	<div><div></div></div>			11430
	19000 (Minimum)	28000 (Nominal)		31000 (Maximum)			17000 (Minimum)	24000 (Nominal)		27000 (Maximum)			9900 (Minimum)	13500 (Nominal)		14700 (Maximum)
Phase	4 Count Rate	Magnesium Low	PE Insert	CPS	LS	Phase	1 Count Rate	Magnesium Low	PE Insert	CPS	LS	Phase	2 Count Rate	Magnesium Low	PE Insert	CPS
Master	<div><div></div></div>			9486		Master	<div><div></div></div>			3637		Master	<div><div></div></div>			5526
	8000 (Minimum)	11000 (Nominal)		12000 (Maximum)			3600 (Minimum)	5400 (Nominal)		6200 (Maximum)			4600 (Minimum)	6900 (Nominal)		8000 (Maximum)
Phase	3 Count Rate	Magnesium Low	PE Insert	CPS	LS	Phase	4 Count Rate	Magnesium Low	PE Insert	CPS	LS					
Master	<div><div></div></div>			7253		Master	<div><div></div></div>			1303						
	5700 (Minimum)	8500 (Nominal)		9900 (Maximum)			1030 (Minimum)	1500 (Nominal)		1800 (Maximum)						
Master: 2-Sep-2011 22:45																

ITNS – B	21
NNLS – C	6017
ITNH – B	21
PSTC – A	
PSC – ATS	
PSC –	

iFlex Telemetry Gamma Neutron Tool Wellsite Calibration									
Background									
Phase	Thermal Count Rate	Master Bkgd	CPS	Value	Phase	Thermal Count Rate	Master Bkgd	CPS	Value
After					After				
Master				28.55	Master				10.82
Before				27.30	Before				10.51
	20.00 (Minimum)	27.00 (Nominal)	40.00 (Maximum)			7.000 (Minimum)	10.00 (Nominal)	17.00 (Maximum)	
Master: 3-Sep-2011 1:14					Before: 15-Sep-2011 11:48				

iFlex Telemetry Gamma Neutron Tool Wellsite Calibration											
Tank Measurement						Epithermal Measurement					
Phase	Thermal	Count Rate	Tank Meas	CPS	Value	Phase	Thermal	Count Rate	Tank Meas	CPS	Value
Master					8017	Master					2856
	7322 (Minimum)	7978 (Nominal)	8580 (Maximum)				746.0 (Minimum)	813.0 (Nominal)	881.0 (Maximum)		815.0

Master: 3-Sep-2011 1:14

Company: **Kerr Mcgee Oil & Gas Onshore LP**



Well: **Howard 2-32**

Field: **Wattenberg #90750**

County: **Weld**

State: **Colorado**

Platform Express – IFLEX
Induction