Schlumberger

Company: St. Croix Operating, Inc.

Well: ROCKY 1

Field: Wildcat

County: Washington State: Colorado

Platform Express

Triple Combo

Location:	NWNW		Elev.:	K.B.	4538.00 ft
	600 FNL & 1100 FWL			G.L.	4533.00 ft
	Lat/Long: 39.81414/-103.00625			D.F.	4538.00 ft
	Permanent Datum:	Ground Level	Elev.:		4533.00 f
	Log Measured From:	Kelly Bushing	5.00 ft		above Perm.Datum
	Drilling Measured From:	Kelly Bushing			

API Serial No.	Section:	Township:	Range:
05-121-11085	8	3S	50W

County: Washington
Field: Wildcat
Location: NWNW
Well: ROCKY 1
Company: St. Croix Operating, Inc.

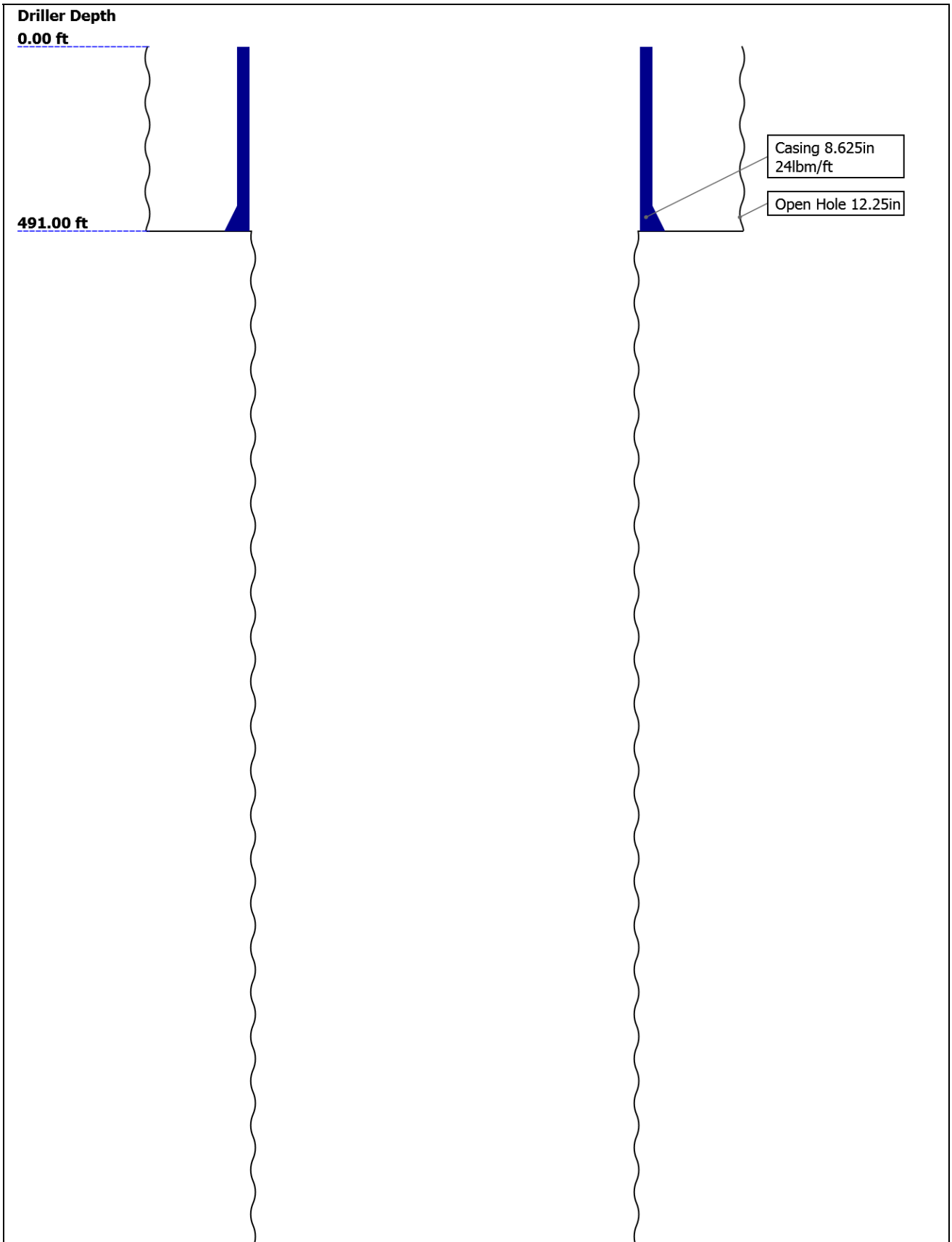
Logging Date			16-Jun-2019			
Run Number			1A			
Depth Driller			4100.00 ft			
Schlumberger Depth			4102.00 ft			
Bottom Log Interval			4102.00 ft			
Top Log Interval			3700.00 ft			
Casing Driller Size @ Depth			8.625 in @ 491.00 ft			
Casing Schlumberger			491 ft			
Bit Size			7.875 in			
Type Fluid In Hole			Water			
MUD	Density	Viscosity	8.8 lbm/gal	38 s		
	Fluid Loss	PH		8.5		
	Source of Sample		Active Tank			
RM @ Meas Temp			0.2 ohm.m @ 68 degF			
RMF @ Meas Temp			0.15 ohm.m @ 68 degF			
RMC @ Meas Temp						
Source RMF	RMC			Pressed		
RM @ BHT	RMF @ BHT		0.07 @ 212	0.05 @ 212		
Max Recorded Temperatures			126 degF			
Circulation Stopped	Time		16-Jun-2019	14:30:00		
Logger on Bottom	Time		16-Jun-2019	20:15:00		
Unit Number	Location:		9115	Fort Morgan		
Recorded By			Evan Grzecki			
Witnessed By			Tom Thomas			

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 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.

Contents

Well Sketch

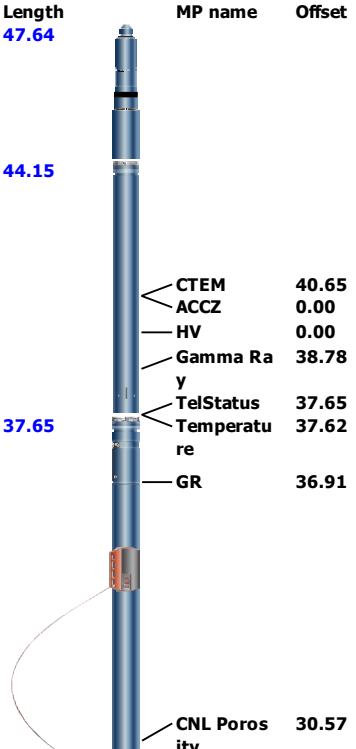

Driller Depth
0.00 ft
491.00 ft
Casing 8.625in
24lbm/ft
Open Hole 12.25in

Borehole Size/Casing/Tubing Record

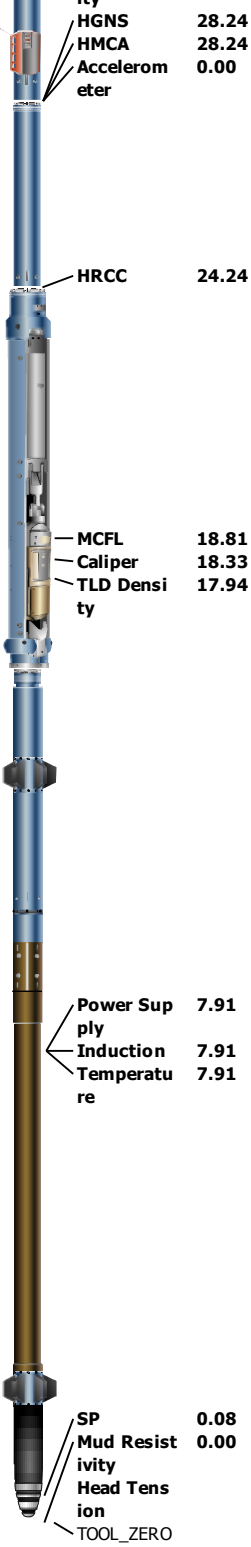
Bit						
Bit Size (in)	12.25	7.875				
Top Driller (ft)	0	491				
Top Logger (ft)	0	492				
Bottom Driller (ft)	491	4100				
Bottom Logger (ft)	492	4102				
Casing						
Size (in)	8.625					
Weight (lbm/ft)	24					
Inner Diameter (in)	8.097					
Grade	N/A					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	491					
Bottom Logger (ft)	491					

Remarks and Equipment Summary

1A: Toolstring



1A: Remarks
Thank you for choosing Schlumberger!
Log run for formation evaluation
Toolstring run slick as per client request
TD-3700ft -> MATRIX: Sandstone; MDEN: 2.71g/cc
3700ft-Surface -> MATRIX: Limestone; MDEN: 2.71 g/cc
Logs correlated to down log
Crew: Jon Wallis



Lengths are in ft
Maximum Outer Diameter = 9.000 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

1A

5" Triple Combo

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100
Application Patch	Wireline_Hotfix-Mandatory-2018.2_8.2.108371

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data

1A	Log[3]:Up	Up	101.38 ft	4108.30 ft	16-Jun-2019 8:15:40 PM	16-Jun-2019 9:28:48 PM	ON	2.93 ft	Yes

All depths are referenced to toolstring zero

Log

Company:St. Croix Operating, Inc. Well:ROCKY 1 1A: Log[3]:Up:S002

Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Triple Combo) Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 16-Jun-2019 22:04:51

Channel	Source	Sampling
AT10	AIT-M:AMIS:AMIS	3in
AT30	AIT-M:AMIS:AMIS	3in
AT90	AIT-M:AMIS:AMIS	3in
CALI	HDRS-H:HRCC-H:HRCC-H	1in
DPHZ	HDRS-H:HRMS-H:HRGD-H	2in
GR	HGNS-B:HGNS-B:HGNS-B	6in
NPOR	HGNS-B:HGNS-B:HGNS-B	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
SMIN	HDRS-H:HRMS-H:HRGD-H	2in
SMNO	HDRS-H:HRMS-H:HRGD-H	2in
SP	AIT-M:AMIS:AMIS	6in
STIT	DepthCorrection	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

TIME_1900 - Time Marked every 60.00 (s)

Gamma Ray Back up

Gamma Ray (ECGR) HGNS-B
0 gAPI 200

Spontaneous Potential (SP) AIT-M
-80 mV 20

Caliper (HCAL) HDRS-H
6 in 16

Stuck Tool Indicator, Total (STIT)
0 ft 50

Synthetic Micro-Inverse Resistivity (HMIN) HDRS-H
0 100 ohm.m

Synthetic Micro-Normal Resistivity (HMNO) HDRS-H
0 100 ohm.m

Array Induction Two Foot Resistivity A10 (AT10) AIT-M
0.2 ohm.m 2000

Array Induction Two Foot Resistivity A30 (AT30) AIT-M
0.2 ohm.m 2000

Array Induction Two Foot Resistivity A90 (AT90) AIT-M
0.2 ohm.m 2000

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H
0 10

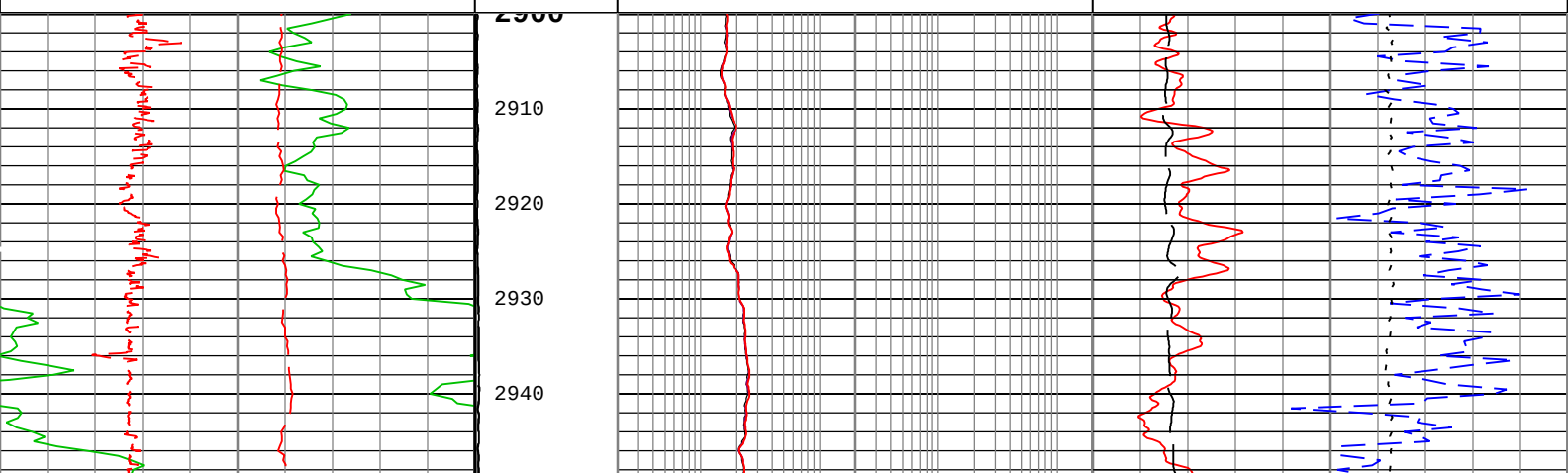
Gas Effect

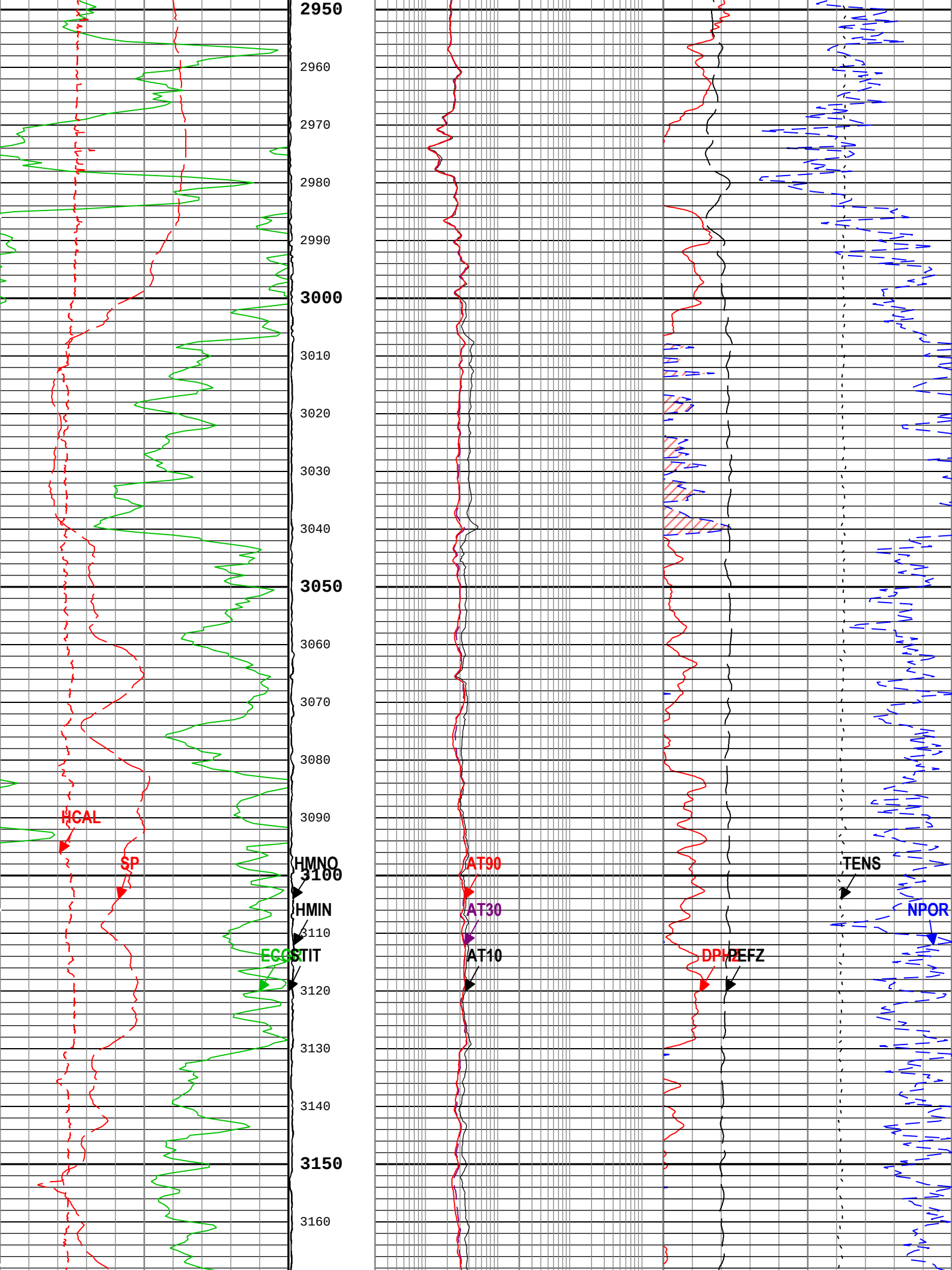
NPOR Backup

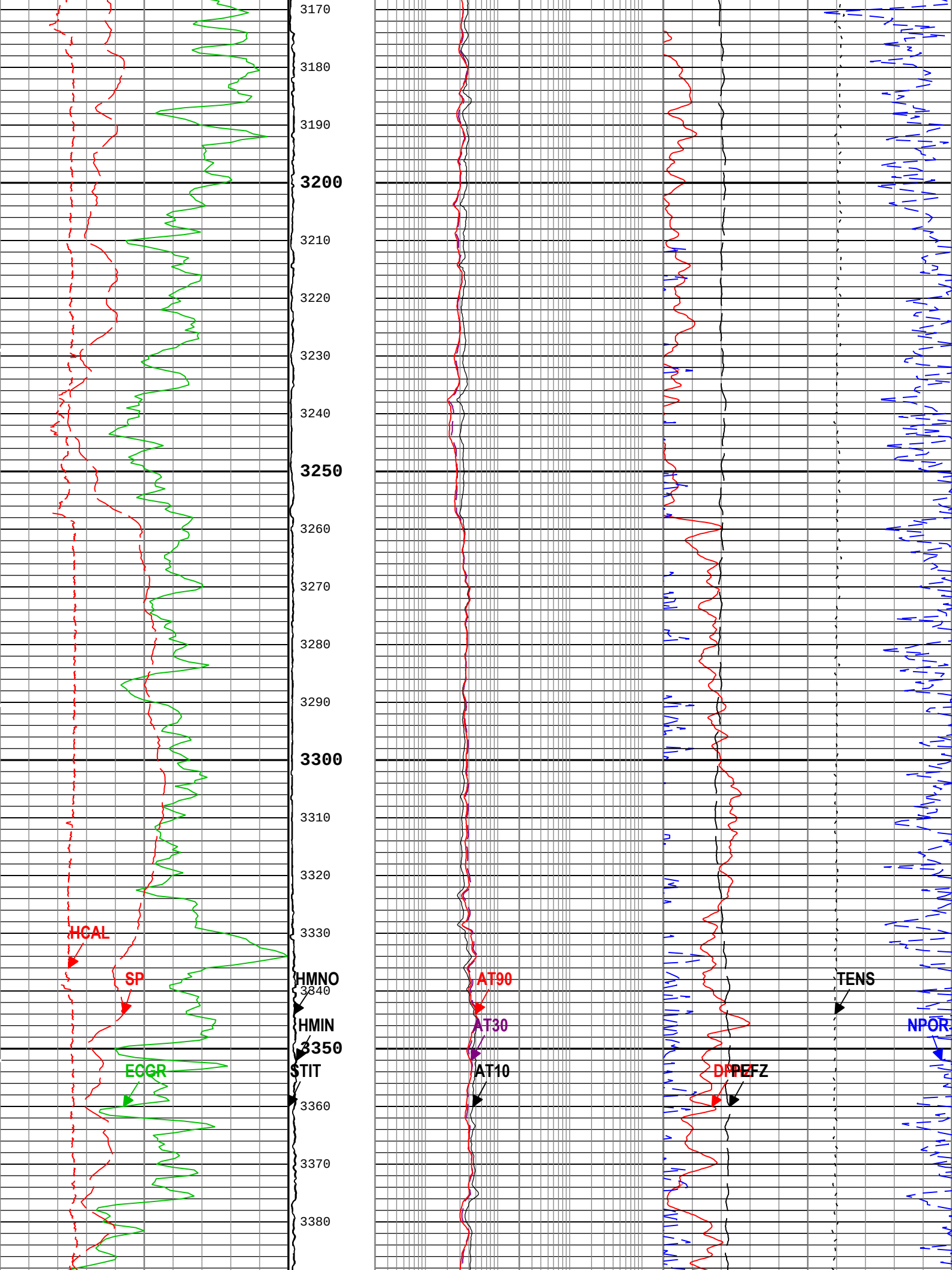
Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3 ft3/ft3 -0.1

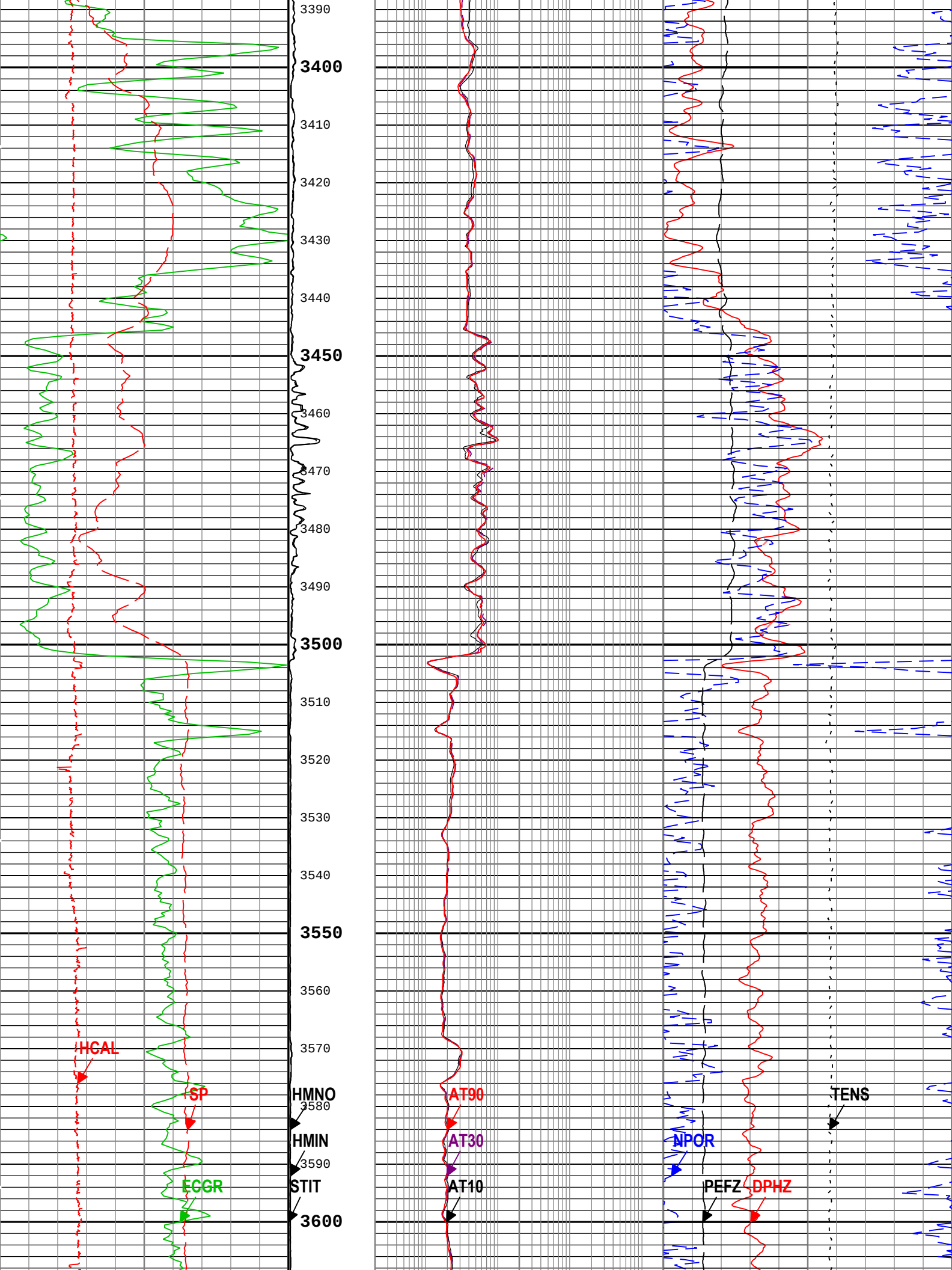
Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-B
0.3 m3/m3 -0.1

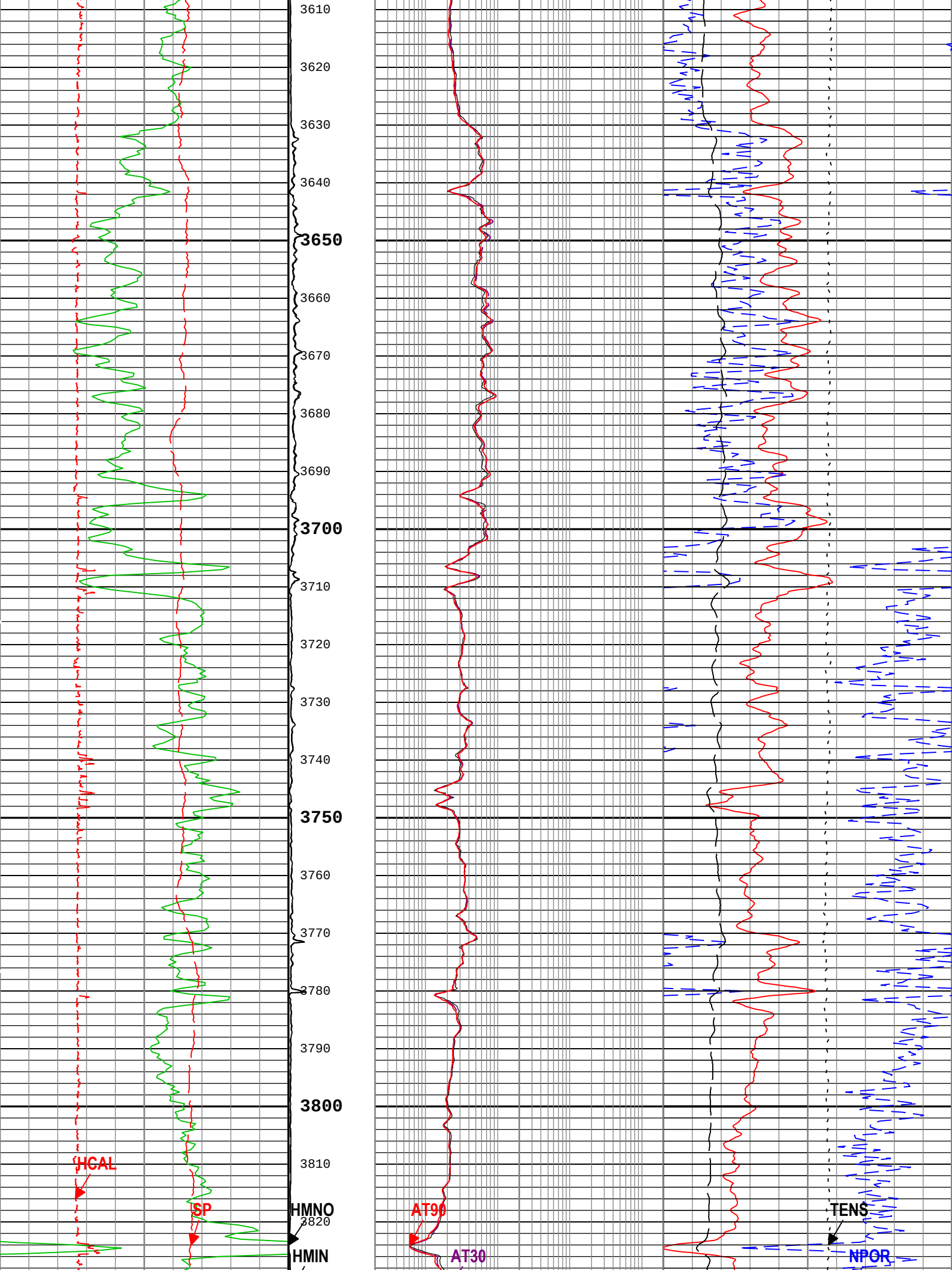
Cable Tension (TENS)
5000 lbf 0

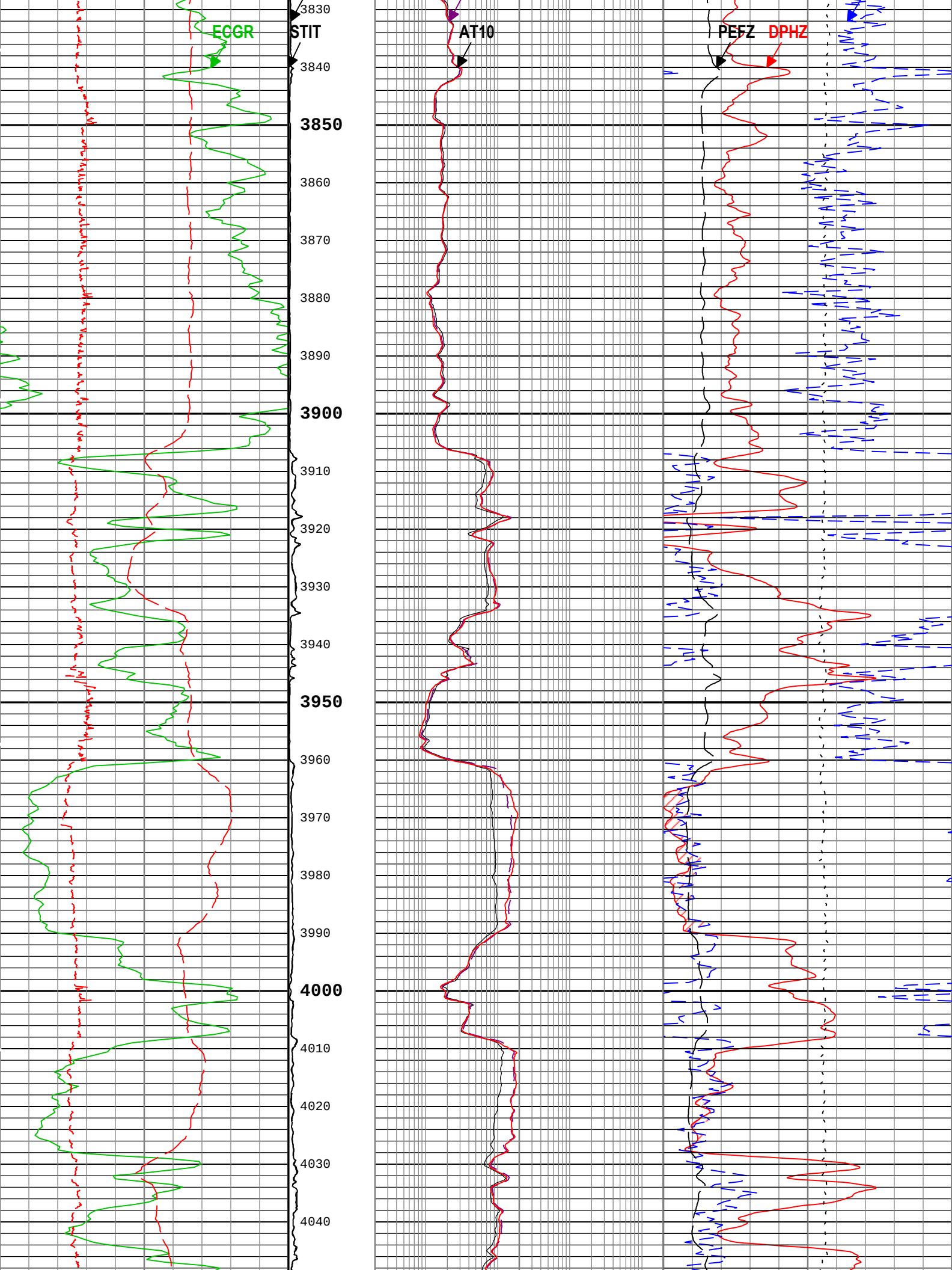


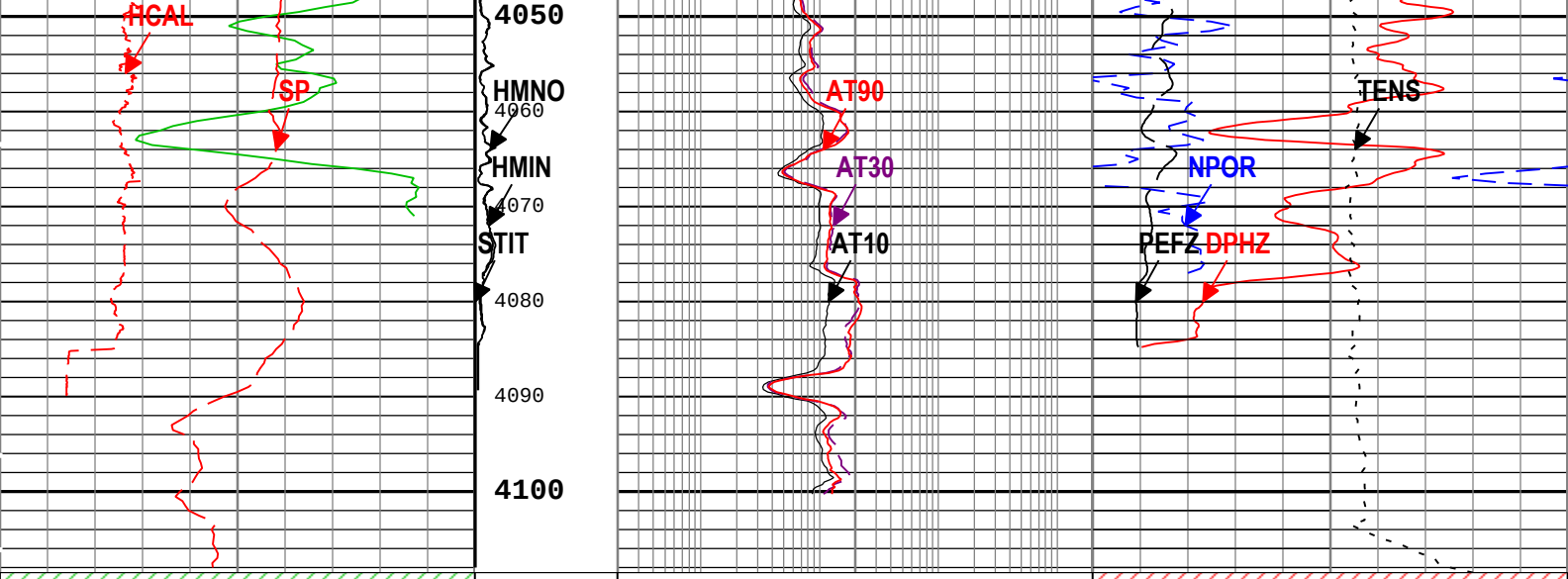

2950
2960
2970
2980
2990
3000
3010
3020
3030
3040
3050
3060
3070
3080
3090
3100
3110
3120
3130
3140
3150
3160
HCAL
SP
HMNO
HMIN
ECGS
TIT
AT90
AT30
AT10
DPHZ
PEFZ
TENS
NPOR


3170
3180
3190
3200
3210
3220
3230
3240
3250
3260
3270
3280
3290
3300
3310
3320
3330
3340
3350
3360
3370
3380
HCAL
SP
ECGR
HMNO
HMIN
STIT
AT90
AT30
AT10
TENS
NPOR
DPHZ
PEFZ


3390
3400
3410
3420
3430
3440
3450
3460
3470
3480
3490
3500
3510
3520
3530
3540
3550
3560
3570
3580
3590
3600
HCAL
SP
ECGR
HMNO
HMIN
STIT
AT90
AT30
AT10
TENS
NPOR
PEFZ
DPHZ


3610
3620
3630
3640
3650
3660
3670
3680
3690
3700
3710
3720
3730
3740
3750
3760
3770
3780
3790
3800
3810
3820
HCAL
SP
HMNO
HMIN
AT90
AT30
TENS
NPOR


ECGR
STIT
AT10
PEFZ
DPHZ
3830
3840
3850
3860
3870
3880
3890
3900
3910
3920
3930
3940
3950
3960
3970
3980
3990
4000
4010
4020
4030
4040



Gamma Ray Back up

Gamma Ray (ECGR) HGNS-B
0 gAPI 200

Spontaneous Potential (SP) AIT-M
-80 mV 20

Caliper (HCAL) HDRS-H
6 in 16

Stuck Tool Indicator, Total (STIT)
0 ft 50

Synthetic Micro-Inverse Resistivity (HMIN) HDRS-H
0 100
ohm.m

Synthetic Micro-Normal Resistivity (HMNO) HDRS-H
0 100
ohm.m

Array Induction Two Foot Resistivity A10 (AT10) AIT-M
0.2 ohm.m 2000

Array Induction Two Foot Resistivity A30 (AT30) AIT-M
0.2 ohm.m 2000

Array Induction Two Foot Resistivity A90 (AT90) AIT-M
0.2 ohm.m 2000

Gas Effect

NPOR Backup

Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3 ft3/ft3 -0.1

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-B
0.3 m3/m3 -0.1

Cable Tension (TENS)
5000 lbf 0

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H
0 10

TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Triple Combo) Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 16-Jun-2019 22:04:51

Channel Processing Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Mud Resistivity	
ASTA	Array Induction Tool Standoff	AIT-M	0.125	in
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BHT	Bottom Hole Temperature	Borehole	212	degF
BS	Bit Size	WLSESSION	7.875	in
BSAL	Borehole Salinity	Borehole	500	ppm
BSCO	Borehole Salinity Correction Option	HGNS-B	Yes	
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0	in
CBLO	Casing Bottom (Logger)	WLSESSION	491	ft
CDEN	Cement Density	HGNS-B	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.8	lbm/gal

DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DHC	Density Hole Correction	HDRS-H	Bit Size	
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	0	ppm
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	CTEM	
HSCO	Hole Size Correction Option	HGNS-B	Yes	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	Depth Zoned	
MDEN	Matrix Density for Density Porosity	Borehole	Depth Zoned	g/cm3
MFST	Mud Filtrate Sample Temperature	Borehole	68	degF
MPOF	MCFL Processing Operation Mode	HDRS-H	On	
MWCO	Mud Weight Correction Option	HGNS-B	Yes	
NPRM	HRDD Nuclear Processing Mode	HDRS-H	Standard Resolution	
RMFS	Resistivity of Mud Filtrate Sample	Borehole	0.15	ohm.m
SP_SHIFT	SP Shift	AIT-M	40	mV
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft
TD	Total Measured Depth	Borehole	4102	ft

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
MATR	LIMESTONE	2900	3700
MATR	SANDSTONE	3700	4108.5
MDEN	2.71	2900	3700
MDEN	2.68	3700	4108.5

All depth are actual.

Tool Control Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
HMCA_BOARD_TYPE	HMCA Board Type	HGNS-B	0	
HRGD_BOARD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

1A

5" Triple Combo

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Log[2]:Up	Up	3850.94 ft	4107.85 ft	16-Jun-2019 8:05:26 PM	16-Jun-2019 8:10:48 PM	ON	2.47 ft	Yes
1A	Log[3]:Up	Up	101.38 ft	4108.30 ft	16-Jun-2019 8:15:40 PM	16-Jun-2019 9:28:48 PM	ON	2.93 ft	Yes

All depths are referenced to toolstring zero

Log

Company:St. Croix Operating, Inc. Well:ROCKY 1

1A: Log[3]:Up:S002

Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Triple Combo RA) Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 16-Jun-2019 22:04:53

TIME_1900 - Time Marked every 60.00 (s)

Main To

Main To Repeat

Repeat To Main

Caliper (HCAL) HDRS-H

6 in 16

Main To Repeat

Repeat To Main

Gamma Ray (ECGR) HGNS-B

0 gAPI 200

Main To Repeat

Repeat To Main

Synthetic Micro-Normal Resistivity (HMNO) HDRS-H

0 100 ohm.m

Main To Repeat

Repeat To Main

Synthetic Micro-Inverse Resistivity (HMIN) HDRS-H

0 100 ohm.m

Main To Repeat

Repeat To Main

Stuck Tool Indicator, Total (STIT)

0 ft 50

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A90 (AT90) AIT-M

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A30 (AT30) AIT-M

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A10 (AT10) AIT-M

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H

0 10

Main To Repeat

Repeat To Main

Cable Tension (TENS)

5000 lbf 0

Main To Repeat

Repeat To Main

Standard Resolution Density Porosity (DPHZ) HDRS-H

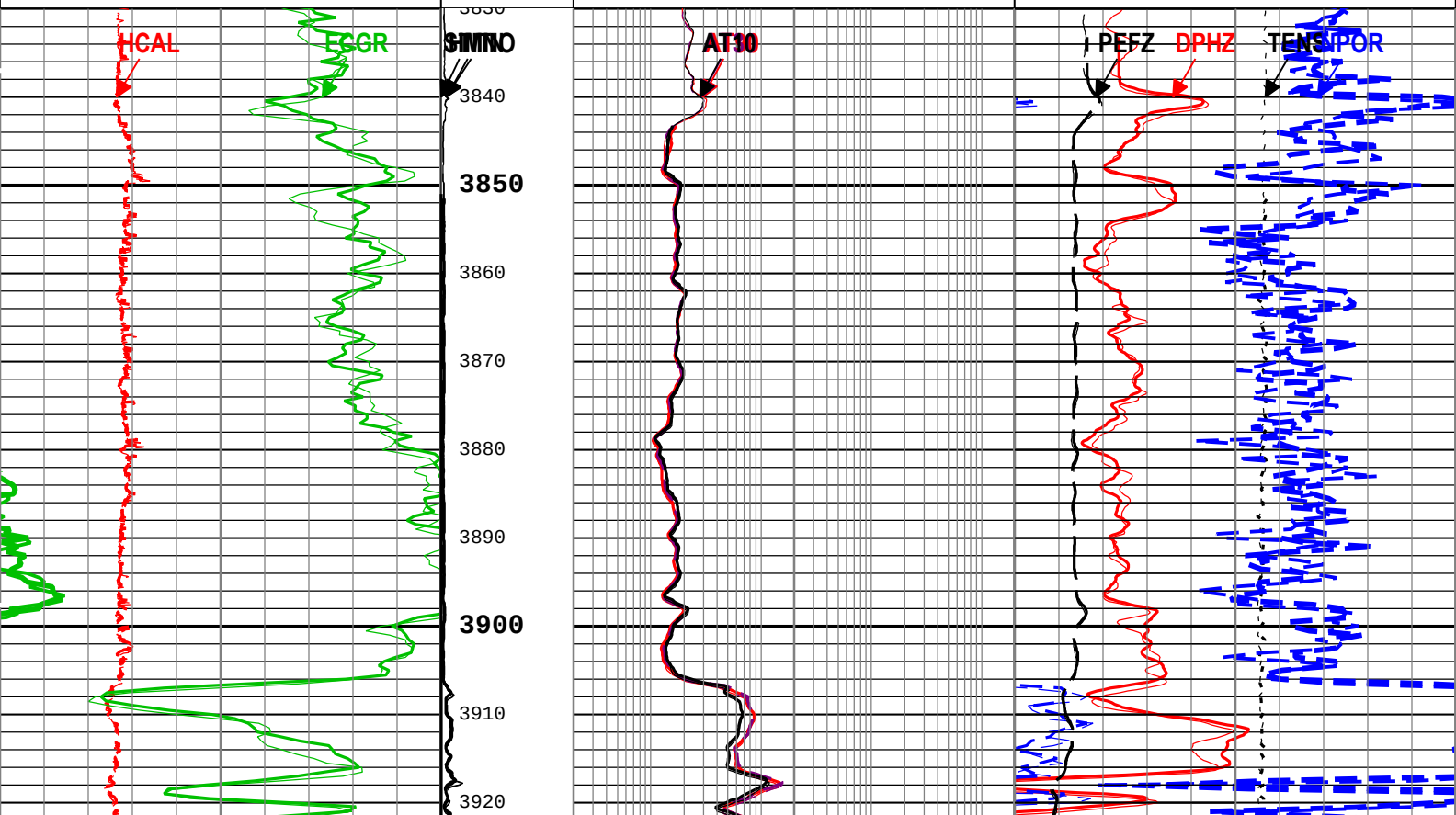
0.3 ft3/ft3 -0.1

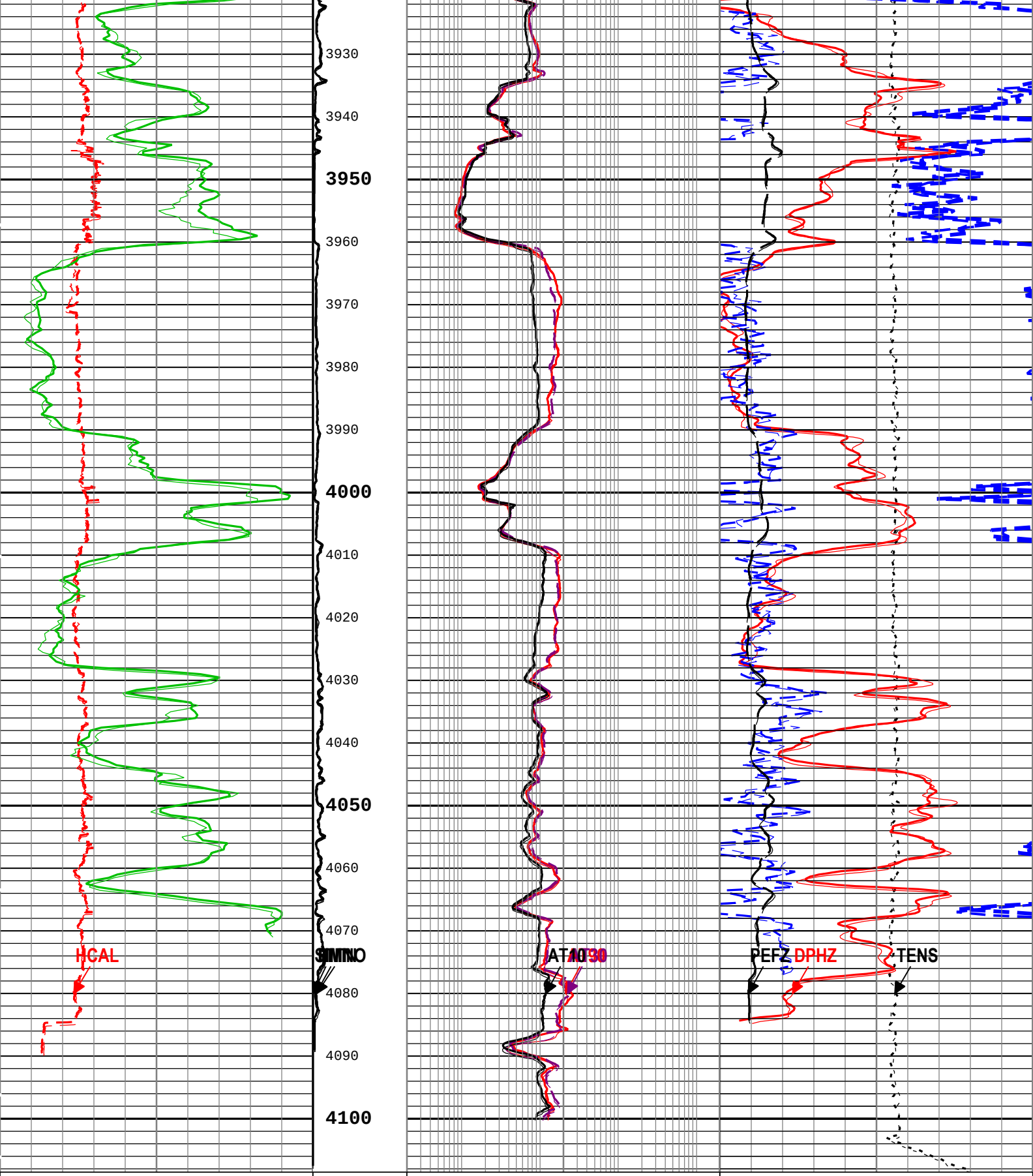
Main To Repeat

Repeat To Main

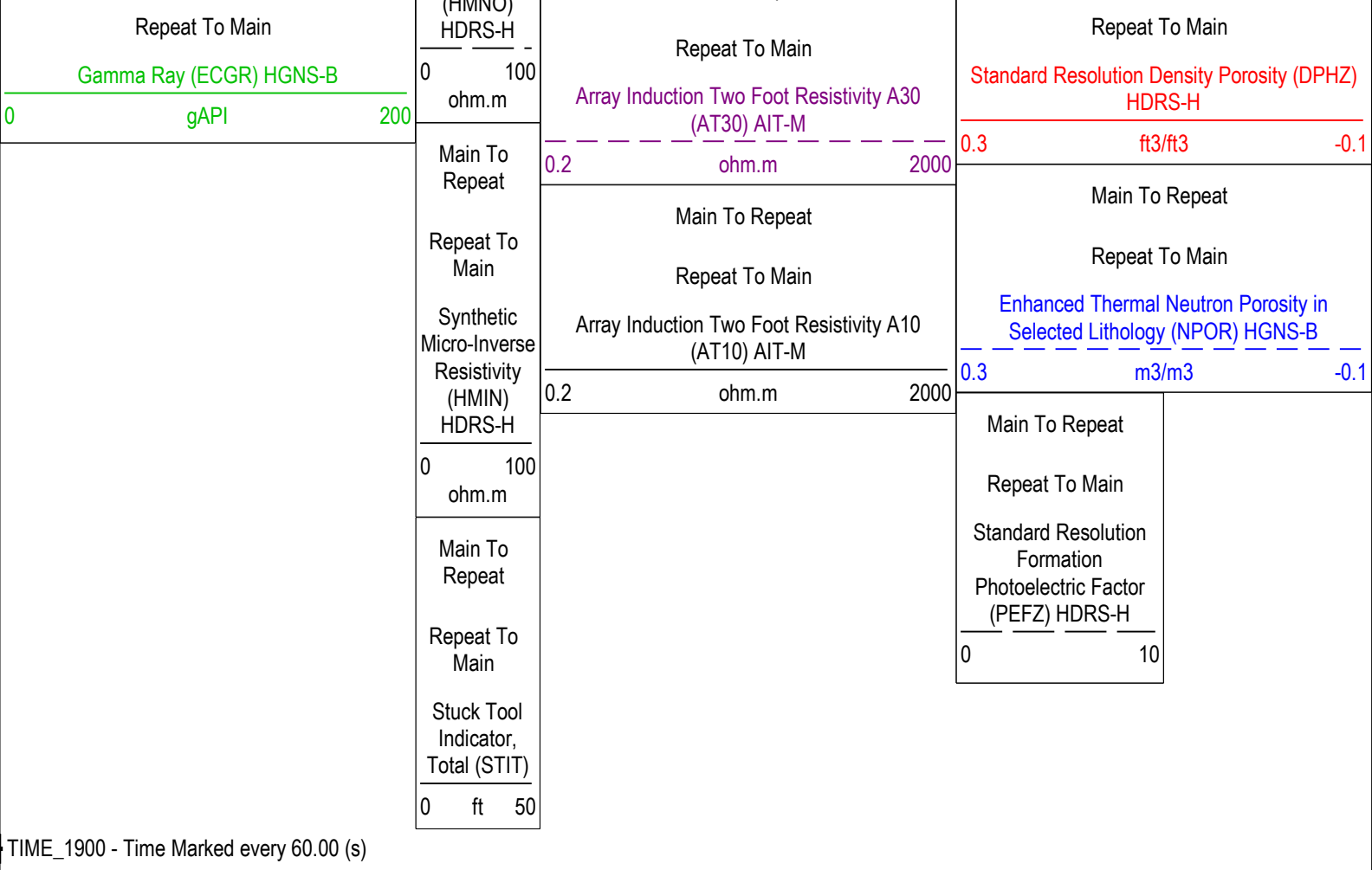
Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-B

0.3 m3/m3 -0.1





Main To Repeat	Main To Repeat	Main To Repeat	Main To Repeat
Repeat To Main	Repeat To Main	Repeat To Main	Repeat To Main
Caliper (HCAL) HDRS-H		Array Induction Two Foot Resistivity A90 (AT90) AIT-M	Cable Tension (TENS)
6 in 16		0.2 ohm.m 2000	5000 lbf 0
Main To Repeat		Main To Repeat	Main To Repeat



TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Triple Combo RA) Index Scale: 5 in per 100 ft Index Unit: ft
Index Type: Measured Depth Creation Date: 16-Jun-2019 22:04:53

Calibration Report

AIT-M (Array Induction Tool - M) Calibration - Run 1A

Primary Equipment :

File code for AIT-MA Sonde Tool Element	AMIS	129

Auxiliary Equipment :

AITM Rm/SP Bottom Nose	AMRM	129

AIT Sonde Calibration - Test Loop Gain

Master (EEPROM): 20:35:50 21-Jan-2019

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Test Loop Gain - 0		Master	1.000	0.950	1.039	1.050
Test Loop Phase - 0	deg	Master	0	-3.000	0.539	3.000
Test Loop Gain - 1		Master	1.000	0.950	1.042	1.050
Test Loop Phase - 1	deg	Master	0	-3.000	0.669	3.000
Test Loop Gain - 2		Master	1.000	0.950	1.016	1.050
Test Loop Phase - 2	deg	Master	0	-3.000	0.045	3.000
Test Loop Gain - 3		Master	1.000	0.950	1.010	1.050
Test Loop Phase - 3	deg	Master	0	-3.000	0.112	3.000
Test Loop Gain - 4		Master	1.000	0.950	0.992	1.050
Test Loop Phase - 4	deg	Master	0	-3.000	0.072	3.000
Test Loop Gain - 5		Master	1.000	0.950	0.982	1.050
Test Loop Phase - 5	deg	Master	0	-3.000	-0.077	3.000
Test Loop Gain - 6		Master	1.000	0.950	0.990	1.050
Test Loop Phase - 6	deg	Master	0	-3.000	0.284	3.000
Test Loop Gain - 7		Master	1.000	0.950	1.011	1.050
Test Loop Phase - 7	deg	Master	0	-3.000	-0.005	3.000

AIT Sonde Calibration - Sonde Error Correction

Master (EEPROM): 20:35:50 21-Jan-2019

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Sonde Error Correction Real - 0	mS/m	Master	-----	-231.000	-83.167	119.000
Sonde Error Correction Quad - 0		Master	-----	-2250.000	-316.754	2250.000
Sonde Error Correction Real - 1	mS/m	Master	-----	114.000	167.806	204.000
Sonde Error Correction Quad - 1		Master	-----	-625.000	110.009	625.000
Sonde Error Correction Real - 2	mS/m	Master	-----	66.000	107.589	156.000
Sonde Error Correction Quad - 2		Master	-----	-350.000	-82.171	350.000
Sonde Error Correction Real - 3	mS/m	Master	-----	39.000	58.227	89.000
Sonde Error Correction Quad - 3		Master	-----	-250.000	20.054	250.000
Sonde Error Correction Real - 4	mS/m	Master	-----	15.000	25.302	35.000
Sonde Error Correction Quad - 4		Master	-----	-63.000	7.066	63.000
Sonde Error Correction Real - 5	mS/m	Master	-----	4.000	11.986	24.000
Sonde Error Correction Quad - 5		Master	-----	-50.000	10.548	50.000
Sonde Error Correction Real - 6	mS/m	Master	-----	5.000	9.775	15.000
Sonde Error Correction Quad - 6		Master	-----	-30.000	-2.755	30.000
Sonde Error Correction Real - 7	mS/m	Master	-----	-5.000	-1.574	5.000
Sonde Error Correction Quad - 7		Master	-----	-30.000	-10.719	30.000

AIT Mud Calibration - Mud Calibration Gain

Master (EEPROM): 20:35:50 21-Jan-2019

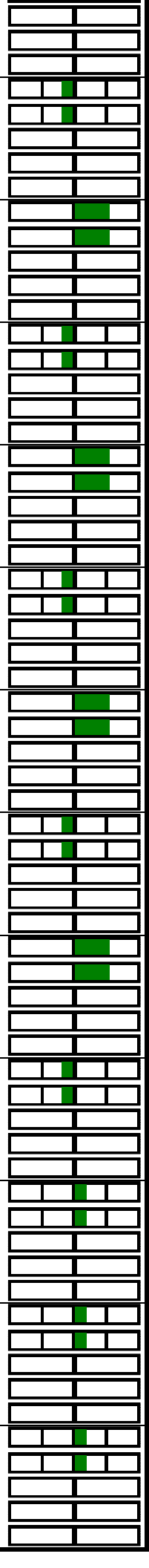
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Coarse Gain		Master	1.000	0.800	0.815	1.200
Fine Gain		Master	1.000	0.800	0.815	1.200

AIT Electronics Check - Thru Calibration Check

Master (EEPROM): 20:35:50 21-Jan-2019 Before (Measured): 20:50:55 13-Jun-2019 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Thru Cal Mag - 0	V	Master	-----	0.366	0.622	0.854
		Before	-----	0.366	0.622	0.854
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.000	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 0	deg	Master	-----	137.000	-174.143	-103.000
		Before	-----	137.000	-174.173	-103.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.030	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 1	V	Master	-----	0.762	1.276	1.778
		Before	-----	0.762	1.276	1.778
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.000	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 1	deg	Master	-----	136.000	-175.242	-104.000
		Before	-----	136.000	-175.275	-104.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.033	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 2	V	Master	-----	0.372	0.632	0.868
		Before	-----	0.372	0.632	0.868
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.000	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 2	deg	Master	-----	132.000	-178.822	-108.000
		Before	-----	132.000	-178.856	-108.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.034	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 3	V	Master	-----	0.420	0.715	0.980
		Before	-----	0.420	0.715	0.980
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.000	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 3	deg	Master	-----	131.000	-179.595	-109.000
		Before	-----	131.000	-179.631	-109.000

		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.036	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 4	V	Master	-----	0.804	1.338	1.876
		Before	-----	0.804	1.339	1.876
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.001	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 4	deg	Master	-----	125.000	174.179	-115.000
		Before	-----	125.000	174.136	-115.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.043	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 5	V	Master	-----	1.176	1.945	2.744
		Before	-----	1.176	1.946	2.744
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.001	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 5	deg	Master	-----	122.000	172.534	-118.000
		Before	-----	122.000	172.485	-118.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.049	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 6	V	Master	-----	1.176	1.942	2.744
		Before	-----	1.176	1.943	2.744
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.001	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 6	deg	Master	-----	121.000	172.576	-119.000
		Before	-----	121.000	172.529	-119.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.047	-----
		After-Before	-----	-----	-----	-----
Thru Cal Mag - 7	V	Master	-----	0.846	1.396	1.974
		Before	-----	0.846	1.396	1.974
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.000	-----
		After-Before	-----	-----	-----	-----
Thru Cal Phase - 7	deg	Master	-----	115.000	171.775	-125.000
		Before	-----	115.000	171.699	-125.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-0.076	-----
		After-Before	-----	-----	-----	-----
SPA Zero	mV	Master		-50.000	-0.117	50.000
		Before		-50.000	-0.103	50.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.014	-----
		After-Before	-----	-----	-----	-----
SPA Plus	mV	Master		941.000	990.569	1040.000
		Before		941.000	990.827	1040.000
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.258	-----
		After-Before	-----	-----	-----	-----
Temperature Zero	V	Master		-0.050	0.000	0.050
		Before		-0.050	0.000	0.050
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.000	-----
		After-Before	-----	-----	-----	-----
Temperature Plus	V	Master		0.870	0.918	0.960
		Before		0.870	0.918	0.960
		After	-----	-----	-----	-----
		Before-Master	-----	-----	0.000	-----
		After-Before	-----	-----	-----	-----



HDRS-H (HILT Density and Rxo Sonde, 150 degC) Calibration - Run 1A

Primary Equipment :

HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	4747
HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	4828

Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	
HRDD Long Spacing Detector	Long Spacing	28649
HRDD Short Spacing Detector	Short Spacing	
Cesium 137 Gamma-Ray Logging Source	GSR-J	5471
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	4747
HILT High-Resolution Mechanical Sonde, 150 degC	HRMS-H	

Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)	8.00
Large Ring Size (Caliper Calibration Large Ring)	12.00

HDRS Density Calibration - Inversion Results

Master (EEPROM): 16:22:24 15-May-2019

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Rho Aluminum	g/cm3	Master	2.596	2.586	2.602	2.606
Rho Magnesium	g/cm3	Master	1.686	1.676	1.688	1.696
Pe Aluminum		Master	2.570	2.470	2.579	2.670
Pe Magnesium		Master	2.650	2.550	2.581	2.750

HDRS Density Calibration - Deviation Summary

Master (EEPROM): 16:22:24 15-May-2019

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Average Deviation	%	Master	0	-0.6000	0.4477	0.6000
BS Max Deviation	%	Master	0	-1.6000	1.4584	1.6000
SS Average Deviation	%	Master	0	-1.0000	0.7723	1.0000
SS Max Deviation	%	Master	0	-2.5000	1.2877	2.5000
LS Average Deviation	%	Master	0	-1.5000	0.9001	1.5000
LS Max Deviation	%	Master	0	-3.5000	2.4176	3.5000

HDRS Density Calibration - Background Summary

Master (EEPROM): 16:22:24 15-May-2019

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Window Ratio		Master			0.7377	
BS Window Sum	1/s	Master			23866	
SS Window Ratio		Master			0.4853	
SS Window Sum	1/s	Master			9993	
LS Window Ratio		Master			0.3030	
LS Window Sum	1/s	Master			1174	

HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 16:22:24 15-May-2019

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS PM High Voltage	V	Master		1000	1553	2400
SS PM High Voltage	V	Master		1000	1491	2400
LS PM High Voltage	V	Master		1000	1279	2400

HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM): 16:22:24 15-May-2019

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Crystal Resolution	%	Master		5.00	12.15	25.00
SS Crystal Resolution	%	Master		5.00	9.39	20.00
LS Crystal Resolution	%	Master		5.00	8.42	20.00

HGNS-B (HILT Gamma-Ray and Neutron Sonde, 125 degC) Calibration - Run 1A

Primary Equipment :

HILT Gamma-Ray and Neutron Sonde, 125 degC	HGNS-B	1855

Auxiliary Equipment :

HGNS Accelerometer, 125 degC	HACCZ-B	659
AmBe Neutron Logging Source	NSR-F	5070

Calibration Parameter :

Water Temperature (Calibration Tank Water Temperature)	70.0
Housing Size (Thermal Housing Size)	3.38
JIG-BKG (Jig minus background reference)	165

HGNS Accelerometer Calibration - Accelerometer Accumulations

Before:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
AZ Vertical Measurement - 0	ft/s2	Before	-----	-----	-----	-----

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 18:00:00 14-Dec-1998

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Accelerometer Manufacturer		Master			Sunstrand	
Accelerometer Reference Temperature	degF	Master		30.2	68.0	122.0
Accelerometer Coefficients - 0		Master	-----	-----	3999.000	-----
Accelerometer Coefficients - 1		Master	-----	-----	1.550	-----
Accelerometer Coefficients - 2		Master	-----	-----	0.051	-----
Accelerometer Coefficients - 3		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 4		Master	-----	-----	2.181	-----
Accelerometer Coefficients - 5		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 6		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 7		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 8		Master	-----	-----	295.900	-----
Accelerometer Coefficients - 9		Master	-----	-----	0.998	-----

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 15:19:00 20-Mar-2019 Before (Measured): 20:48:42 13-Jun-2019 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Near Zero Measurement	1/s	Master	0	5.0	27.4	40.0
		Before	0	5.0	27.9	40.0
		After	-----	-----	-----	-----
		Before-Master	-----	-4.1	0.5	4.1
		After-Before	-----	-----	-----	-----
Far Zero Measurement	1/s	Master	0	5.0	30.3	40.0
		Before	0	5.0	26.8	40.0
		After	-----	-----	-----	-----
		Before-Master	-----	-4.5	-3.5	4.5
		After-Before	-----	-----	-----	-----
Near Plus Measurement	1/s	Master	6031.0	4700.0	5058.0	6900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Far Plus Measurement	1/s	Master	2793.0	1900.0	2099.0	2900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Near Corrected Plus Measurement	1/s	Master		4700.0	5182.0	6900.0
		Before	-----	-----	-----	-----
		After	-----	-----	-----	-----
		Before-Master	-----	-----	-----	-----
		After-Before	-----	-----	-----	-----
Far Corrected Plus Measurement	1/s	Master		1900.0	2165.0	2900.0

		Before	-----	-----	-----	-----	
		After	-----	-----	-----	-----	
		Before-Master	-----	-----	-----	-----	
		After-Before	-----	-----	-----	-----	

HGNS Gamma-Ray Calibration - Gamma-Ray Accumulations

Before (Measured): 20:58:29 13-Jun-2019 After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before	30.0	0	81.1	120.0	
		After	-----	-----	-----	-----	
		After-Before	-----	-----	-----	-----	
RGR Plus Measurement	gAPI	Before	185.4	157.1	164.0	206.3	
		After			NOT DONE		
		After-Before	-----	-----	-----	-----	
GR Calibration Gain		Before	0.89	0.80	1.01	1.05	
		After	-----	-----	-----	-----	
		After-Before	-----	-----	-----	-----	

Company:	St. Croix Operating, Inc.
Well:	ROCKY 1
Field:	Wildcat
County:	Washington
State:	Colorado

Schlumberger

Platform Express
Triple Combo