

Company: St. Croix Operating, Inc.

Well: Jack Creek #1

Field: Wildcat

County: Washington State: Colorado

Platform Express

Triple Combo

County:	Washington				
Field:	Wildcat				
Location:	SENE				
Well:	Jack Creek #1				
Company:	St. Croix Operating, Inc.				
Location:		SENE	Elev.:	K.B.	4603.00 ft
		2038 FNL 600 FEL		G.L.	4597.00 ft
		Lat/Long: 39.91161/-103.08922		D.F.	4603.00 ft
Permanent Datum:		Ground Level	Elev.:	4597.00 f	
Log Measured From:		Kelly Bushing	6.00 ft	above Perm.Datum	
Drilling Measured From:		Kelly Bushing			
API Serial No.		Section:	Township:	Range:	
05-121-11078		4	2S	51W	

Logging Date 21-Jul-2018

Run Number 1A

Depth Driller 4273.00 ft

Schlumberger Depth 4270.00 ft

Bottom Log Interval 4270.00 ft

Top Log Interval 3100.00 ft

Casing Driller Size @ Depth 8.625 in @ 470.00 ft

Casing Schlumberger 475 ft

Bit Size 7.875 in

Type Fluid In Hole Water

Density 8.8 lbm/gal 43 s

Fluid Loss PH 8.5

MUD 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

RM @ BHT 0.11 @ 130 0.08 @ 130 Pressed

Max Recorded Temperatures 133 degF

Circulation Stopped 21-Jul-2018 11:30:00

Logger on Bottom 21-Jul-2018 16:14:00

Unit Number 9108 Location: Fort Morgan

Recorded By Evan Grzecki

Witnessed By Thomas

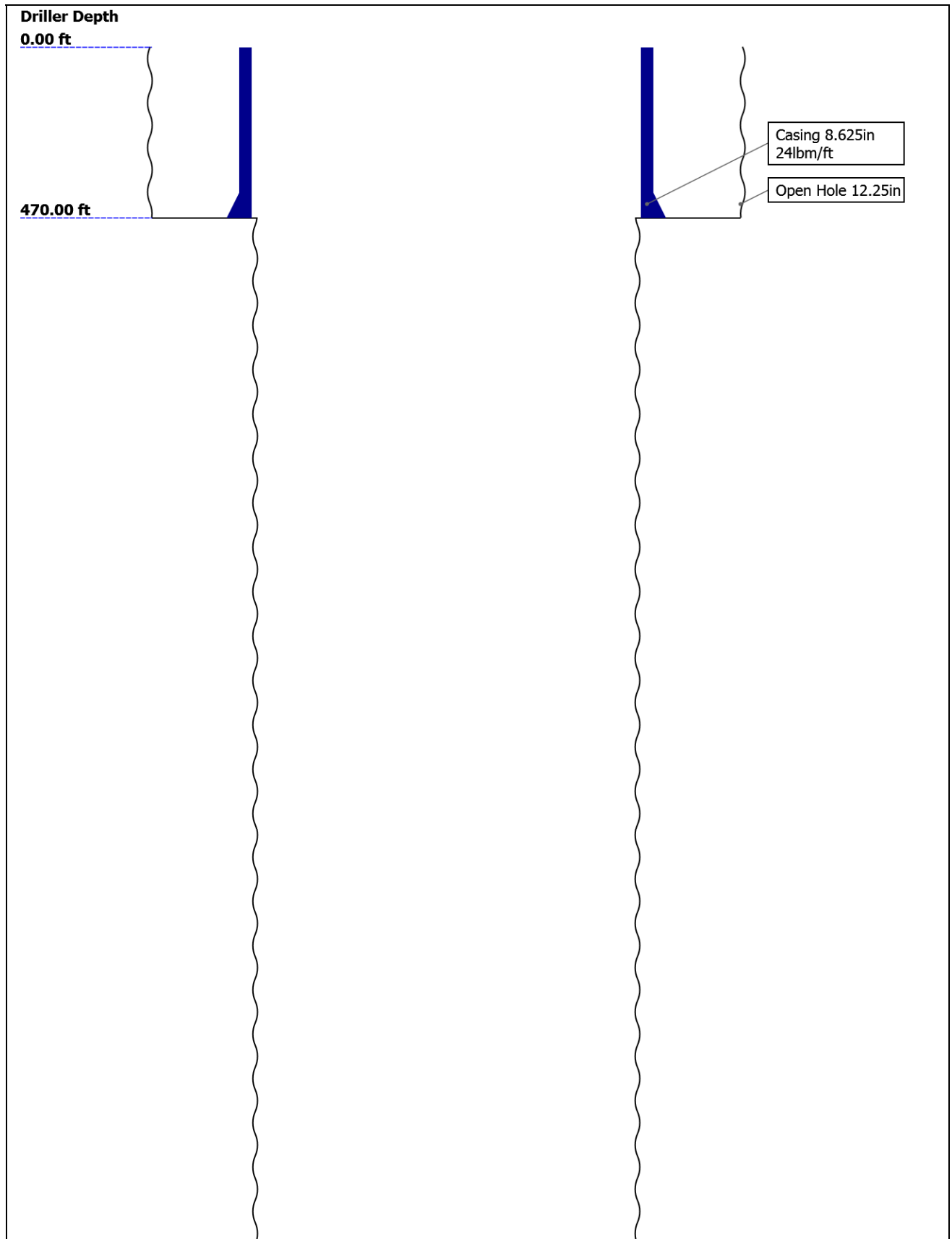
Disclaimer

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Well Sketch

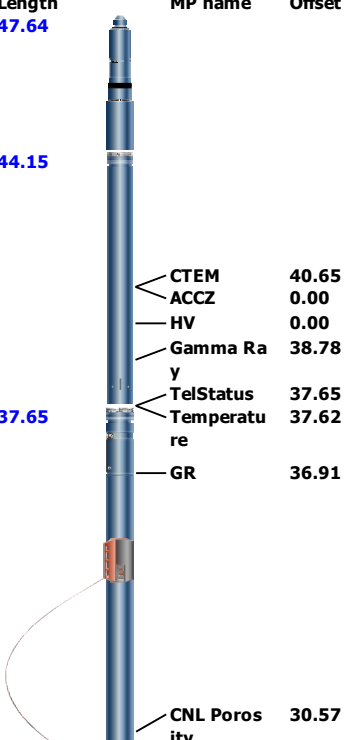


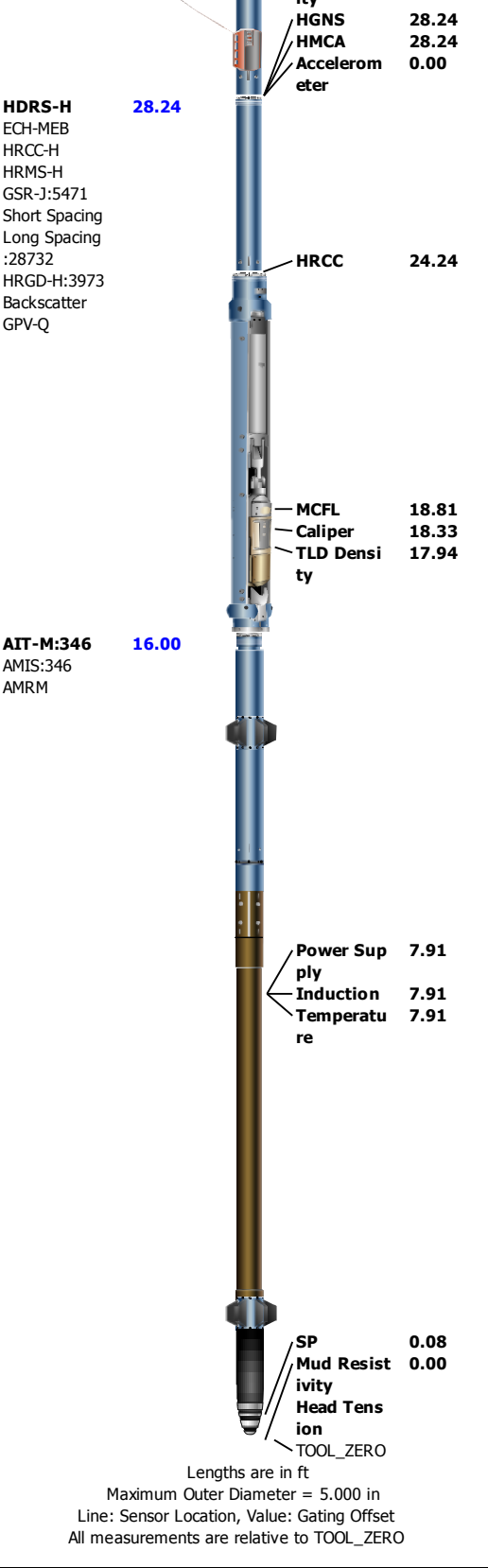


Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	12.25	7.875				
Top Driller (ft)	0	470				
Top Logger (ft)	0	475				
Bottom Driller (ft)	470	4273				
Bottom Logger (ft)	475	4270				
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)	470					
Bottom Logger (ft)	475					

Remarks and Equipment Summary

1A: Toolstring				1A: Remarks
Equip name LEH-QT LEH-QT	Length 47.64	MP name	Offset	Thank you for choosing Schlumberger!
				Logs run for formation evaluation
				Toolstring run slick as per client request
				TD-4050ft -> MATRIX: Sandstone; MDEN: 2.65
				4050ft-3100ft -> MATRIX: Limestone; MDEN: 2.71 g/cc
				Logs correlated to down log
EDTC-B EDTH-B EDTG-A EDTC-B	44.15	CTEM ACCZ HV Gamma Ra y TelStatus Temperatu re GR	40.65 0.00 0.00 38.78 37.65 37.62 36.91	Crew: Gary Lapp, Claude Walz
HGNS-H HGNH NPV-N NSR-F:5070 HMCA-H HACCZ-H:416 8 HGNS-H	37.65	CNL Poros ity	30.57	



Depth Summary

	1A		
--	----	--	--

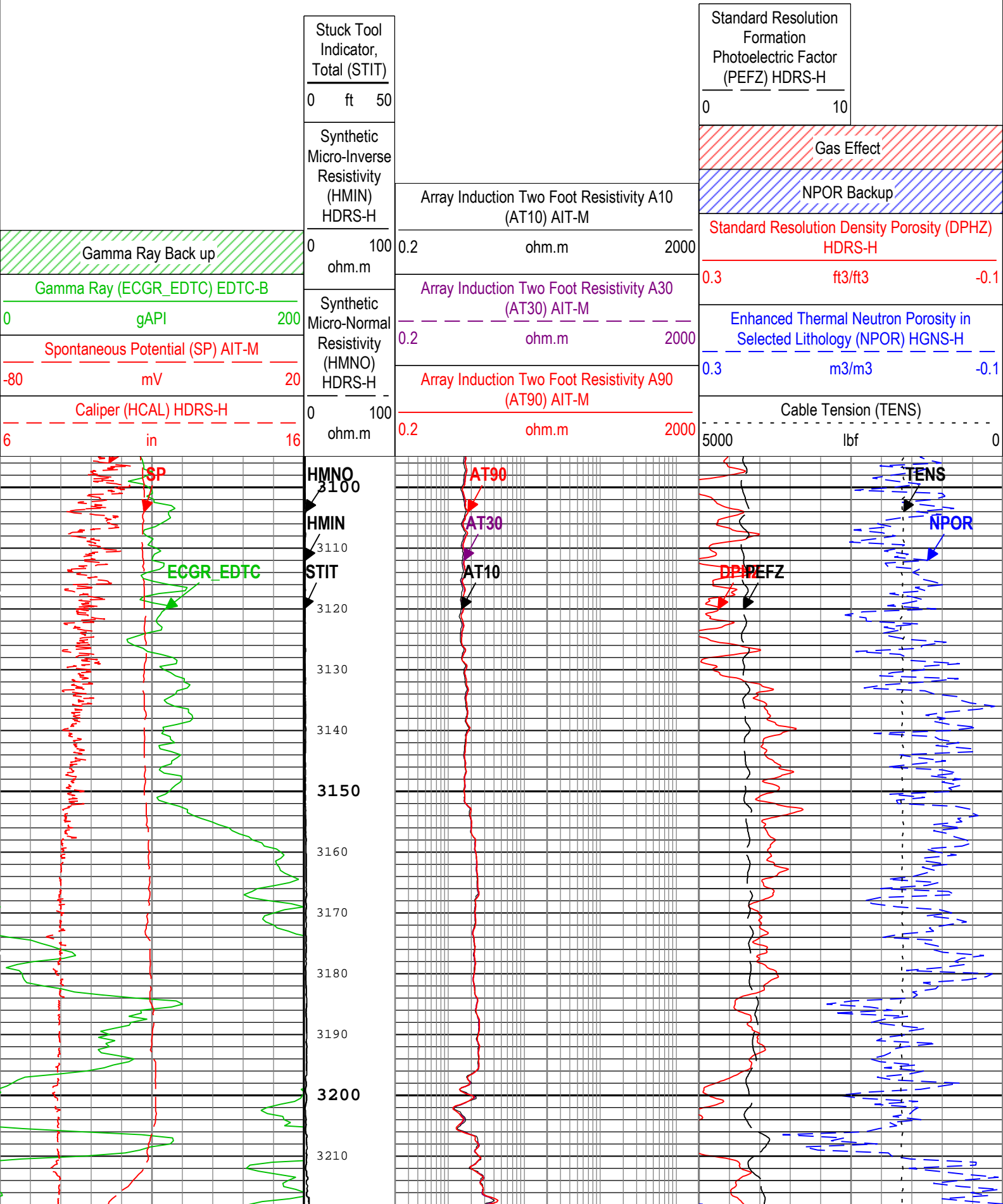
Depth Measuring Device

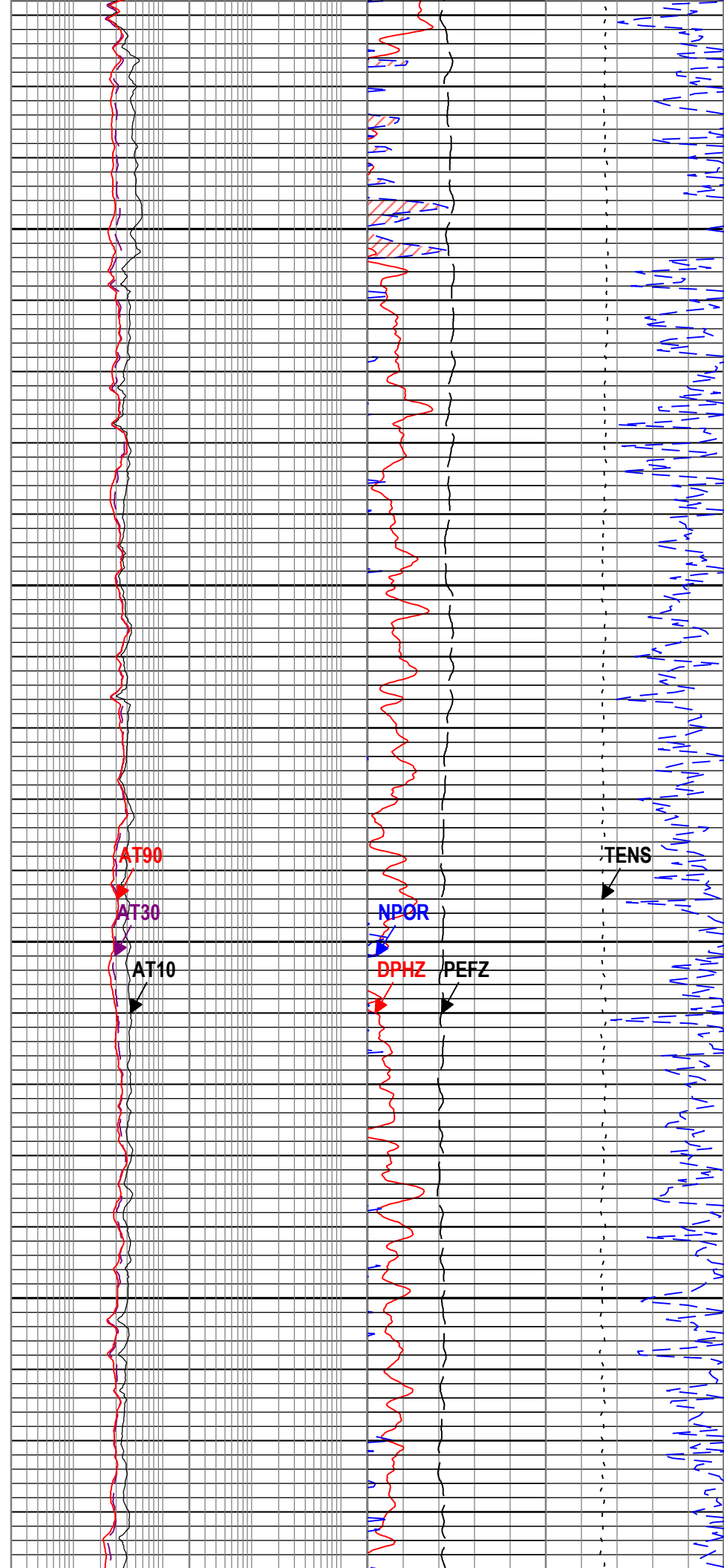
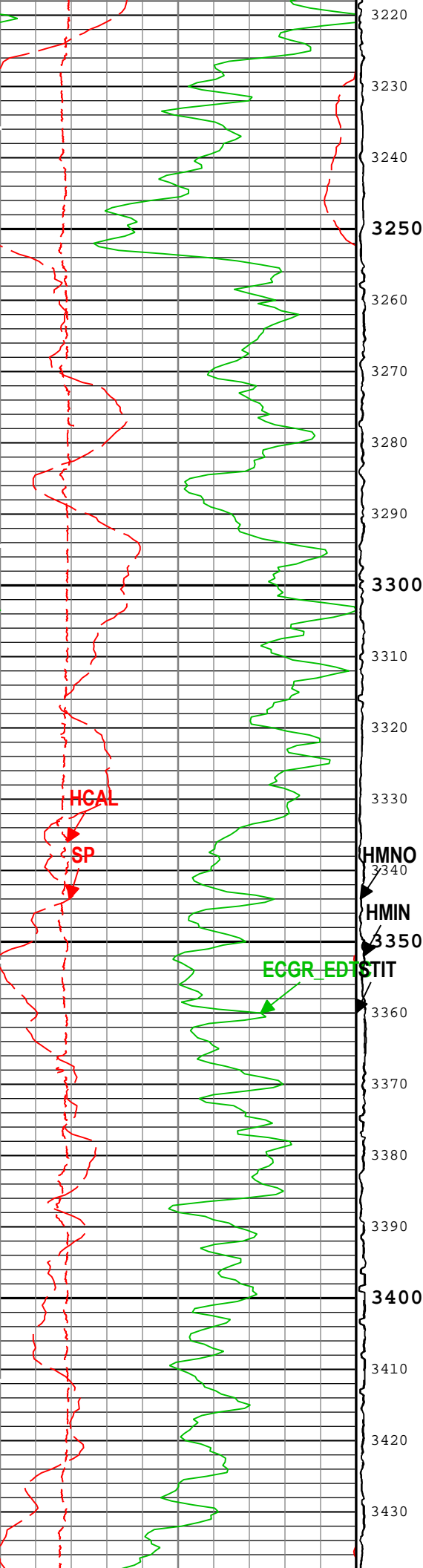
Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		
Wheel Correction 2	0		

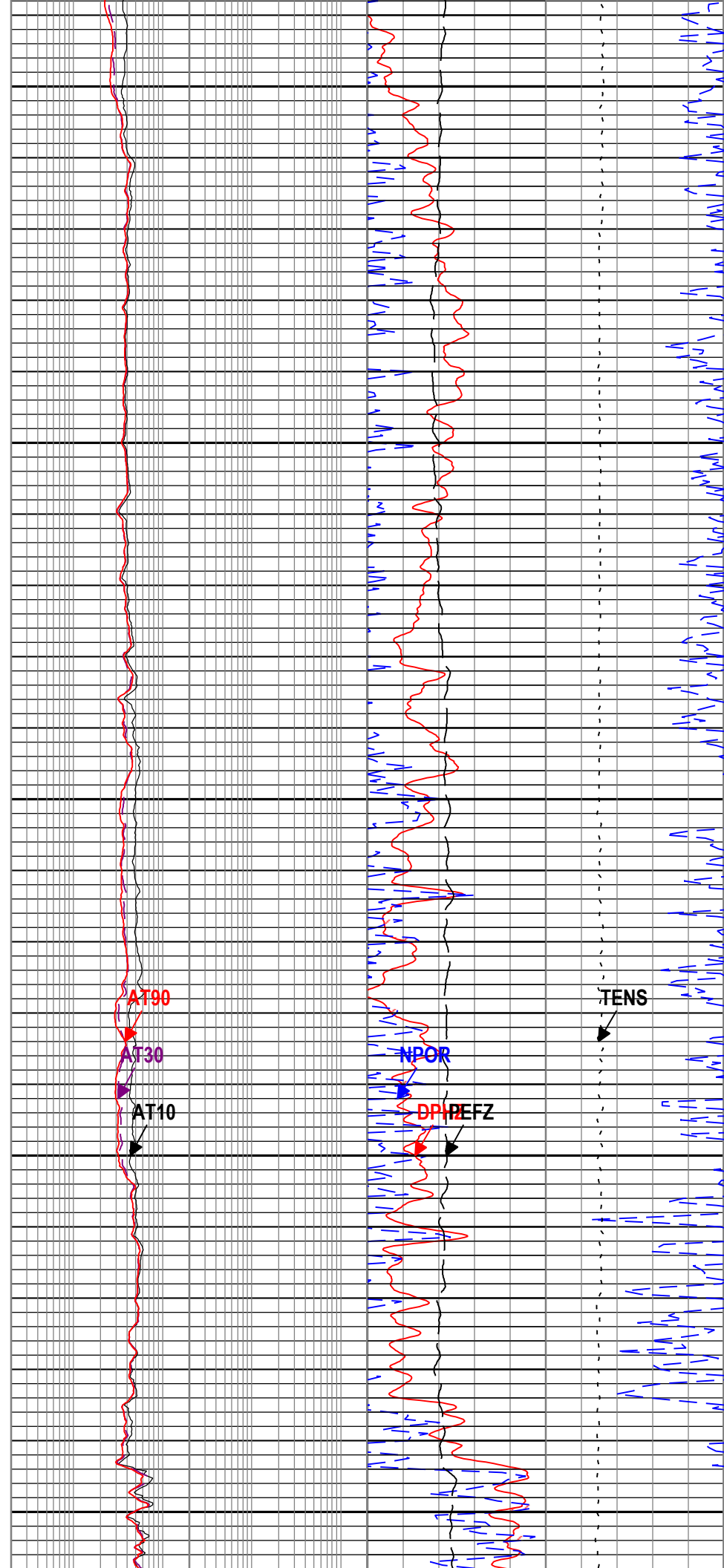
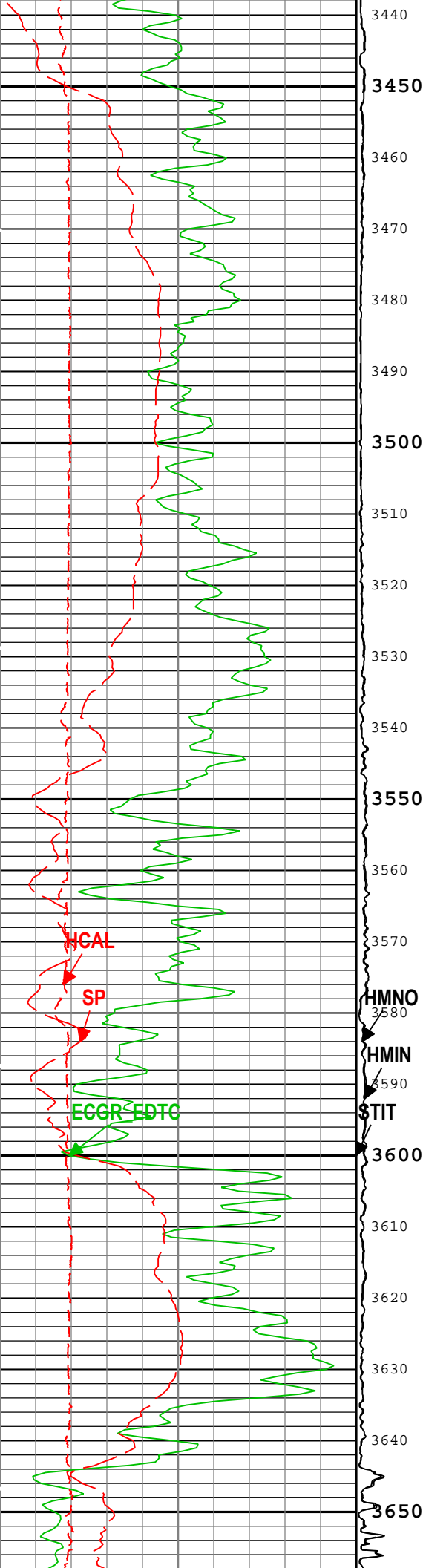
Wheel Correction 2	0								
Tension Device									
Type	CMTD-B/A								
Serial Number									
Calibration Date									
Calibrator Serial Number									
Number of Calibration Points	0								
Logging Cable									
Type	7-46NT-XS								
Serial Number									
Length	24000.00 ft								
Conveyance Type	Wireline								
Rig Type	Drilling Rig								
1A:Depth Control Parameters		Depth Control Remarks							
Log Sequence	First Log In the Well								
Rig Up Length At Surface									
Rig Up Length At Bottom									
Rig Up Length Correction									
Stretch Correction									
Tool Zero Check At Surface									
1A									
5" Triple Combo									
Software Version									
Acquisition System		Version							
Maxwell 2018 SP1		8.1.99839.3100							
Application Patch		Wireline_Hotfix-Mandatory-2018SP1_8.1.102865							
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Log[6]:Up	Up	43.14 ft	4281.79 ft	21-Jul-2018 4:14:35 PM	21-Jul-2018 5:28:06 PM	ON	2.08 ft	No
All depths are referenced to toolstring zero									
Log	Company:St. Croix Operating, Inc. Well:Jack Creek #1 1A: Log[6]:Up:S005								
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: 21-Jul-2018 17:59:59									
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	EDTC-B:EDTC-B:EDTC-B	6in							
NPOR	HGNS-H:HGNS-H:HGNS-H	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							

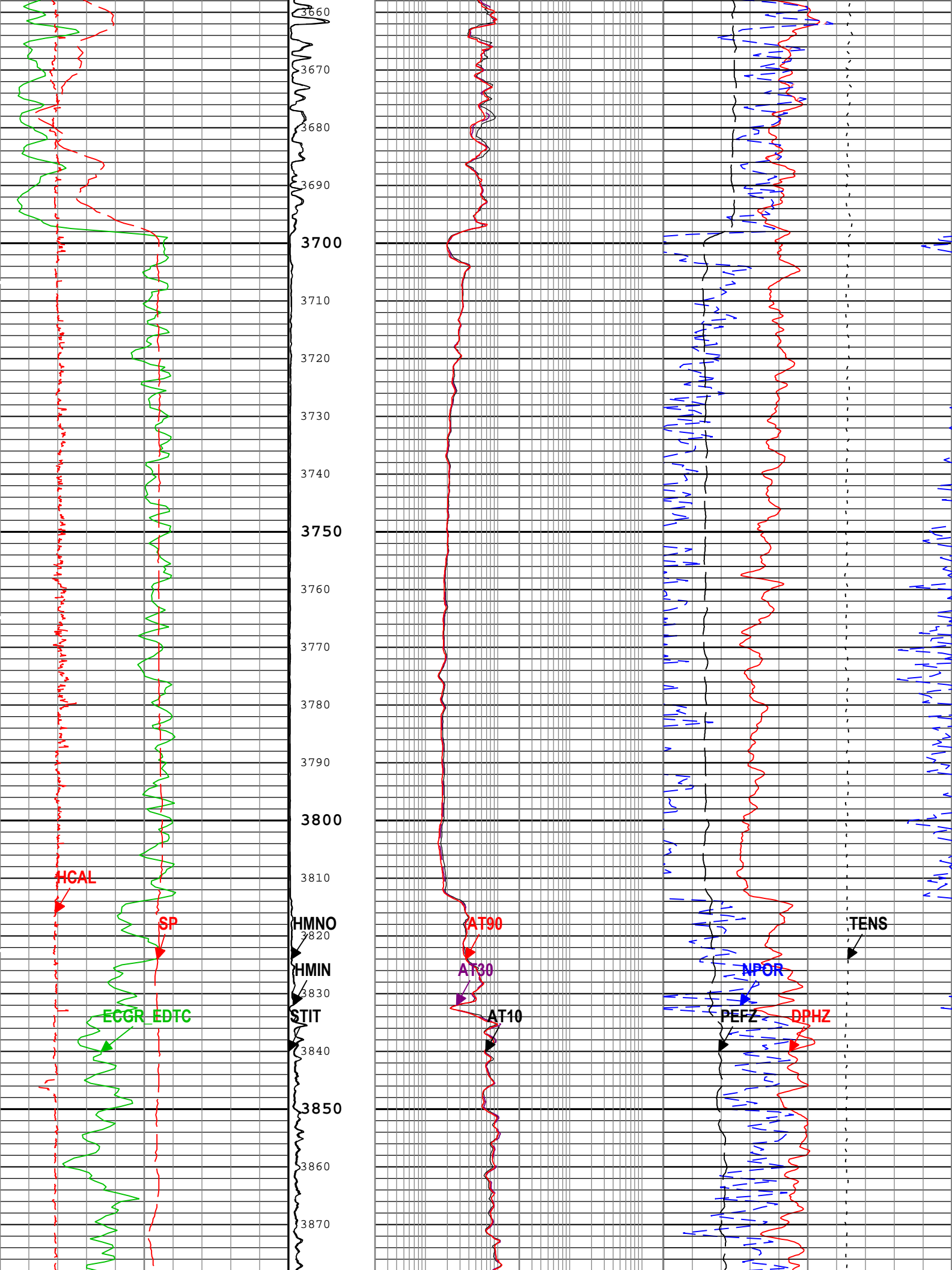
SP AIT-M:AMIS:AMIS 6in
STIT DepthCorrection 6in
TENS WLWorkflow 6in
TIME_1900 WLWorkflow 0.1in

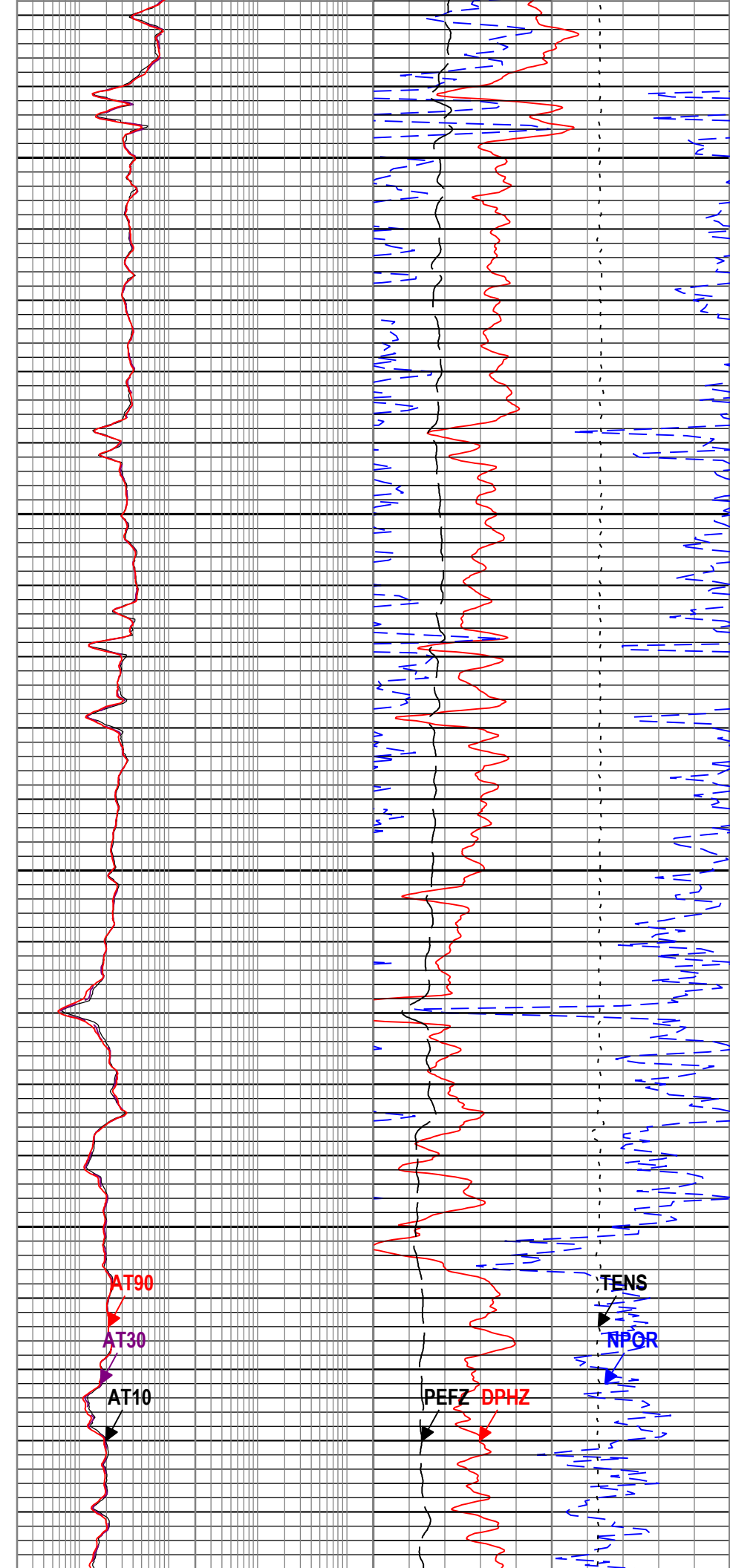
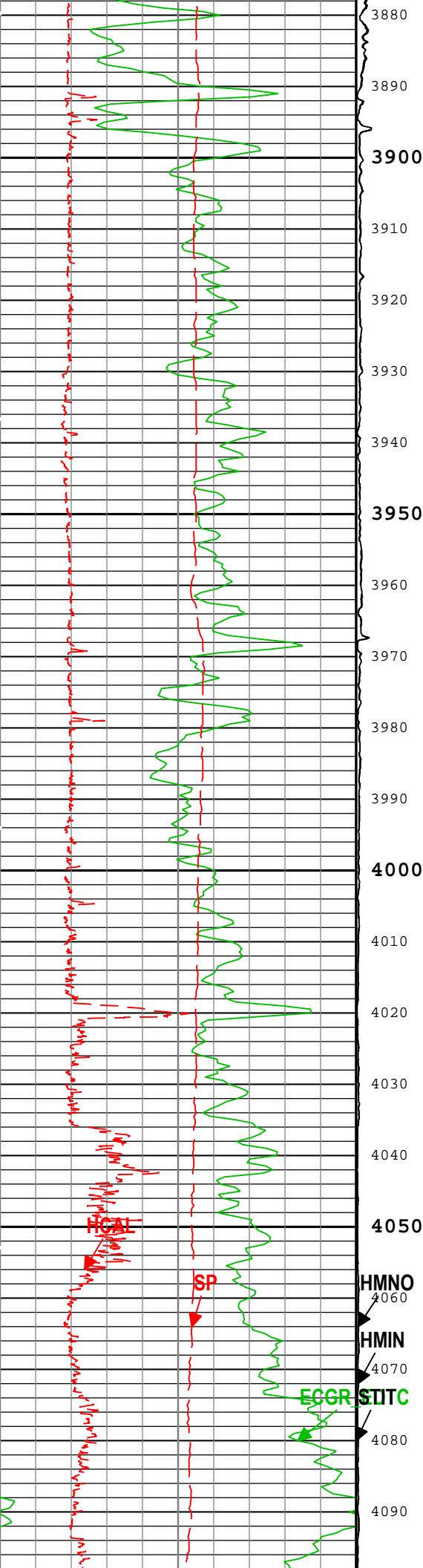
TIME_1900 - Time Marked every 60.00 (s)

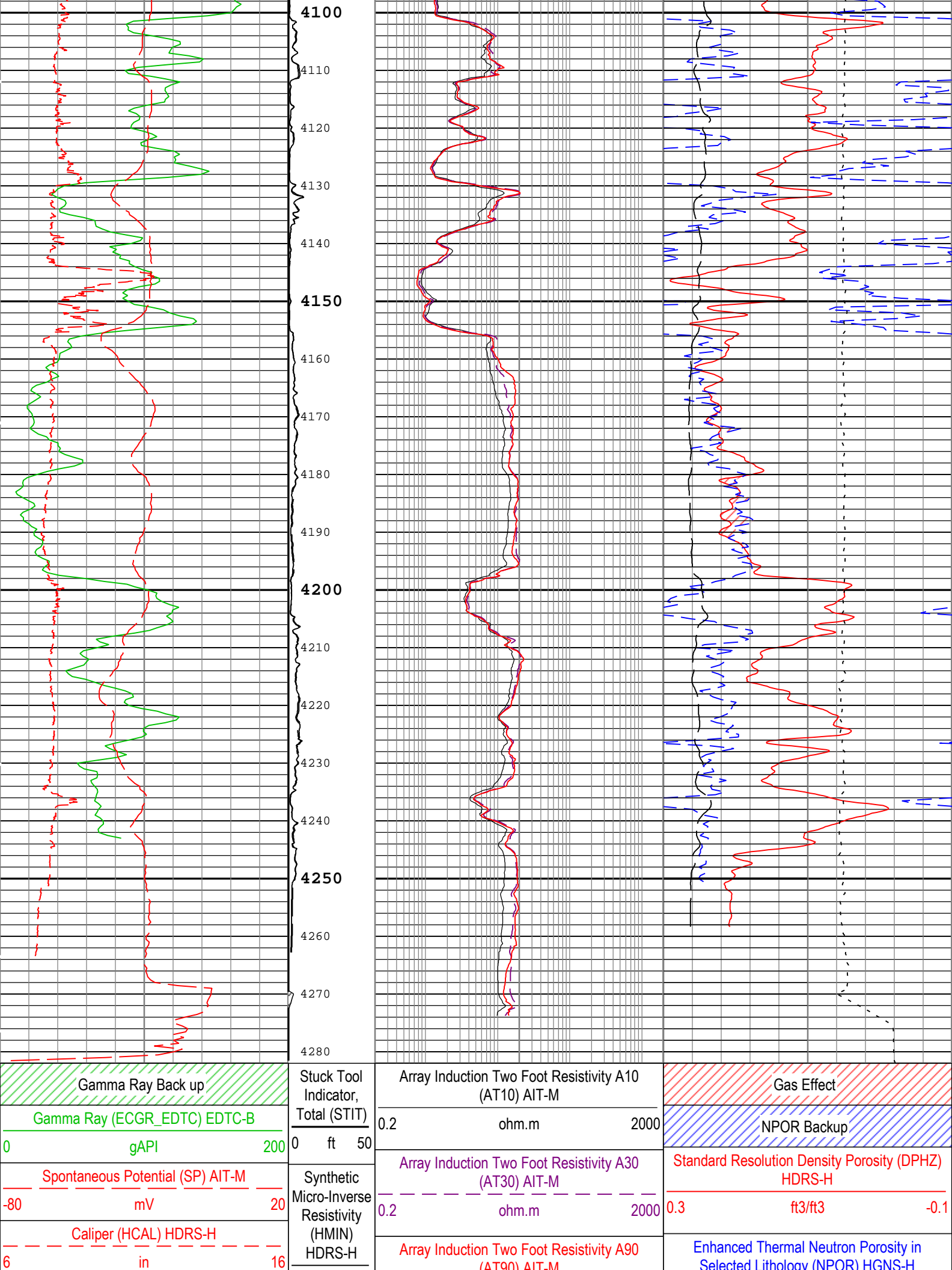












	0100 ohm.m	(AIT-M) 0.2ohm.m2000	0.3m3/m3-0.1
	Synthetic Micro-Normal Resistivity (HMNO) HDRS-H 0100 ohm.m		Cable Tension (TENS) ----- 5000lbf0
			Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H
			010

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: 21-Jul-2018 17:59:59

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
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BHT	Bottom Hole Temperature	Borehole	130	degF
BS	Bit Size	WLSESSION	7.875	in
BSAL	Borehole Salinity	Borehole	0	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0	in
CBLO	Casing Bottom (Logger)	WLSESSION	475	ft
CDEN	Cement Density	EDTC-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-H	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	
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	50	mV
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft
TD	Total Measured Depth	Borehole	4273	ft

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
MATR	LIMESTONE	3095	4050
MATR	SANDSTONE	4050	4282

MDEN	2.71	3095	4050
MDEN	2.65	4050	4282
All depth are actual.			

Tool Control Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
HMCA_BOARD_TYPE	HMCA Board Type	HGNS-H	1	
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[5]:Up	Up	4021.97 ft	4278.08 ft	21-Jul-2018 3:59:11 PM	21-Jul-2018 4:08:48 PM	ON	1.76 ft	No
1A	Log[6]:Up	Up	43.14 ft	4281.79 ft	21-Jul-2018 4:14:35 PM	21-Jul-2018 5:28:06 PM	ON	2.08 ft	No

All depths are referenced to toolstring zero

Log

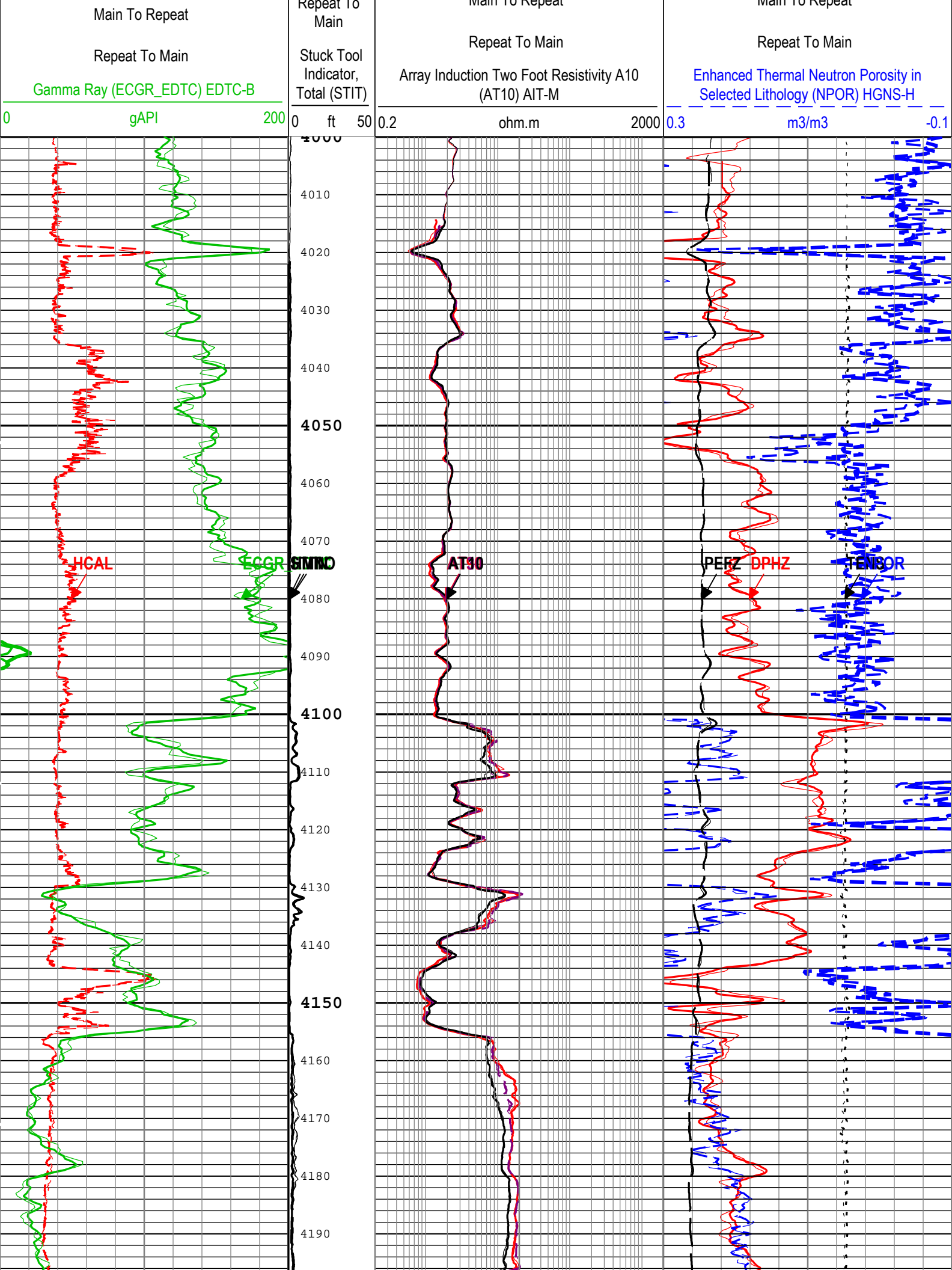
Company:St. Croix Operating, Inc. Well:Jack Creek #1

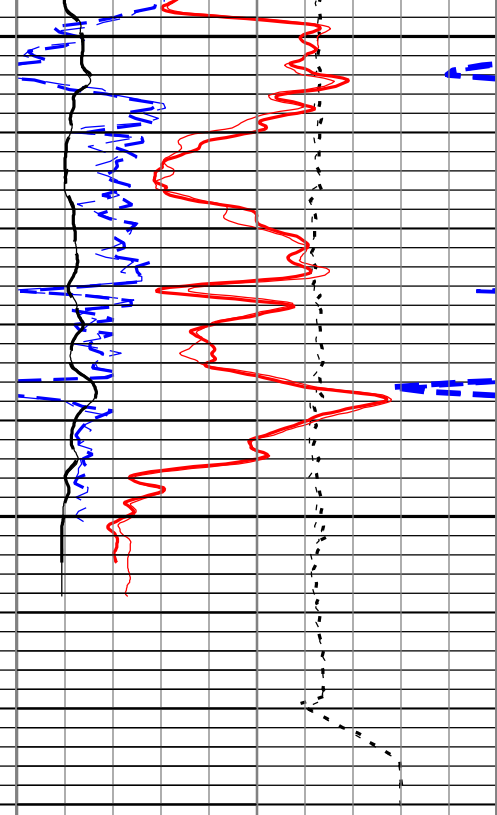
1A: Log[6]:Up:S005

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: 21-Jul-2018 18:00:01

TIME_1900 - Time Marked every 60.00 (s)

<div><div>Main To Repeat</div><div>Repeat To Main</div><div>Synthetic Micro-Normal Resistivity (HMNO) HDRS-H</div><div>0100 ohm.m</div></div>	<div><div>Main To Repeat</div><div>Repeat To Main</div><div>Array Induction Two Foot Resistivity A90 (AT90) AIT-M</div><div>0.2ohm.m2000</div></div>	<div><div>Main To Repeat</div><div>Repeat To Main</div><div>Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H</div><div>010</div></div>
<div><div>Main To Repeat</div><div>Repeat To Main</div><div>Caliper (HCAL) HDRS-H</div><div>6in16</div></div>	<div><div>Main To Repeat</div><div>Repeat To Main</div><div>Array Induction Two Foot Resistivity A30 (AT30) AIT-M</div><div>0.2ohm.m2000</div></div>	<div><div>Main To Repeat</div><div>Repeat To Main</div><div>Standard Resolution Density Porosity (DPHZ) HDRS-H</div><div>0.3ft3ft3-0.1</div></div>





<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Caliper (HCAL) HDRS-H</div> <div> <div>6</div> <div>in</div> <div>16</div> </div> </div> </div>	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Synthetic Micro-Normal Resistivity (HMNO) HDRS-H</div> <div> <div>0</div> <div>100</div> <div>ohm.m</div> </div> </div> </div>	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Array Induction Two Foot Resistivity A90 (AT90) AIT-M</div> <div> <div>0.2</div> <div>ohm.m</div> <div>2000</div> </div> </div> </div>	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Cable Tension (TENS)</div> <div> <div>5000</div> <div>lbf</div> <div>0</div> </div> </div> </div>
<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Gamma Ray (ECGR_EDTC) EDTC-B</div> <div> <div>0</div> <div>gAPI</div> <div>200</div> </div> </div> </div>	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Synthetic Micro-Inverse Resistivity (HMIN) HDRS-H</div> <div> <div>0</div> <div>100</div> <div>ohm.m</div> </div> </div> </div>	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Array Induction Two Foot Resistivity A30 (AT30) AIT-M</div> <div> <div>0.2</div> <div>ohm.m</div> <div>2000</div> </div> </div> </div>	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Standard Resolution Density Porosity (DPHZ) HDRS-H</div> <div> <div>0.3</div> <div>ft3/ft3</div> <div>-0.1</div> </div> </div> </div>
	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Stuck Tool Indicator, Total (STIT)</div> <div> <div>0</div> <div>ft</div> <div>50</div> </div> </div> </div>	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Array Induction Two Foot Resistivity A10 (AT10) AIT-M</div> <div> <div>0.2</div> <div>ohm.m</div> <div>2000</div> </div> </div> </div>	<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H</div> <div> <div>0.3</div> <div>m3/m3</div> <div>-0.1</div> </div> </div> </div>
		<div> <div>Main To Repeat</div> <div>Repeat To Main</div> <div> <div>Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H</div> <div> <div>0</div> <div>10</div> </div> </div> </div>	

Calibration Report**AIT-M (Array Induction Tool - M) Calibration - Run 1A****Primary Equipment :**

File code for AIT-MA Sonde Tool Element

AMIS

346

AIT Electronics Check - Thru Calibration Check

Before (Measured): 04:18:35 21-Jul-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Thru Cal Mag - 0	V	Before	-----	0.366	0.623	0.854	
Thru Cal Phase - 0	deg	Before	-----	137.000	-164.307	-103.000	
Thru Cal Mag - 1	V	Before	-----	0.762	1.276	1.778	
Thru Cal Phase - 1	deg	Before	-----	136.000	-165.384	-104.000	
Thru Cal Mag - 2	V	Before	-----	0.372	0.633	0.868	
Thru Cal Phase - 2	deg	Before	-----	132.000	-168.919	-108.000	
Thru Cal Mag - 3	V	Before	-----	0.420	0.714	0.980	
Thru Cal Phase - 3	deg	Before	-----	131.000	-169.675	-109.000	
Thru Cal Mag - 4	V	Before	-----	0.804	1.338	1.876	
Thru Cal Phase - 4	deg	Before	-----	125.000	-175.775	-115.000	
Thru Cal Mag - 5	V	Before	-----	1.176	1.951	2.744	
Thru Cal Phase - 5	deg	Before	-----	122.000	-177.433	-118.000	
Thru Cal Mag - 6	V	Before	-----	1.176	1.950	2.744	
Thru Cal Phase - 6	deg	Before	-----	121.000	-177.407	-119.000	
Thru Cal Mag - 7	V	Before	-----	0.846	1.403	1.974	
Thru Cal Phase - 7	deg	Before	-----	115.000	-178.208	-125.000	
SPA Zero	mV	Before		-50.000	0.095	50.000	
SPA Plus	mV	Before		941.000	990.903	1040.000	
Temperature Zero	V	Before		-0.050	0.000	0.050	
Temperature Plus	V	Before		0.870	0.918	0.960	

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

HILT High-Resolution Control Cartridge, 150 degC

HRCC-H

HILT Resistivity Gamma-Ray Density Device, 150 degC

HRGD-H

3973

Auxiliary Equipment :

HRDD Backscatter Detector

Backscatter

HRDD Long Spacing Detector

Long Spacing

28732

HRDD Short Spacing Detector

Short Spacing

Cesium 137 Gamma-Ray Logging Source

GSR-J

5471

HILT High-Resolution Control Cartridge, 150 degC

HRCC-H

HILT High-Resolution Mechanical Sonde, 150 degC

HRMS-H

Calibration Parameter :

Small Ring Size

Large Ring Size

HDRS Density Calibration - Inversion Results

Master (EEPROM): 17:27:48 15-Jul-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Rho Aluminum	g/cm3	Master	2.596	2.586	2.604	2.606	
Rho Magnesium	g/cm3	Master	1.686	1.676	1.687	1.696	
Pe Aluminum		Master	2.570	2.470	2.591	2.670	
Pe Magnesium		Master	2.650	2.550	2.564	2.750	

HDRS Density Calibration - Deviation Summary

Master (EEPROM): 17:27:48 15-Jul-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Average Deviation	%	Master	0	-0.6000	0.4799	0.6000	
BS Max Deviation	%	Master	0	-1.6000	1.3212	1.6000	
SS Average Deviation	%	Master	0	-1.0000	0.8929	1.0000	
SS Max Deviation	%	Master	0	-2.5000	1.8617	2.5000	
LS Average Deviation	%	Master	0	-1.5000	1.3096	1.5000	
LS Max Deviation	%	Master	0	-3.5000	2.7904	3.5000	

HDRS Density Calibration - Background Summary

Master (EEPROM):		17:27:48 15-Jul-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Window Ratio		Master	1.0000		0.7378		
BS Window Sum	1/s	Master	1		22130		
SS Window Ratio		Master	1.0000		0.4838		
SS Window Sum	1/s	Master	1		9630		
LS Window Ratio		Master	1.0000		0.3074		
LS Window Sum	1/s	Master	1		1080		

HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM):		17:27:48 15-Jul-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS PM High Voltage	V	Master		1000	1460	2400	
SS PM High Voltage	V	Master		1000	1718	2400	
LS PM High Voltage	V	Master		1000	1207	2400	

HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM):		17:27:48 15-Jul-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Crystal Resolution	%	Master		5.00	10.71	25.00	
SS Crystal Resolution	%	Master		5.00	9.45	20.00	
LS Crystal Resolution	%	Master		5.00	8.18	20.00	

HGNS-H (HILT Gamma-Ray and Neutron Sonde, 150 degC) Calibration - Run 1A

Primary Equipment :			
HILT Gamma-Ray and Neutron Sonde, 150 degC		HGNS-H	
Auxiliary Equipment :			
HGNS Accelerometer, 150 degC		HACCZ-H	4168
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			

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM):		18:00:00 14-Jul-2005					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Accelerometer Manufacturer		Master			QAT_160		
Accelerometer Reference Temperature	degF	Master		30.2	77.0	122.0	
Accelerometer Coefficients - 0		Master	----	----	1582.500	----	
Accelerometer Coefficients - 1		Master	----	----	35.100	----	
Accelerometer Coefficients - 2		Master	----	----	-0.047	----	
Accelerometer Coefficients - 3		Master	----	----	-0.001	----	
Accelerometer Coefficients - 4		Master	----	----	2.739	----	
Accelerometer Coefficients - 5		Master	----	----	0.000	----	
Accelerometer Coefficients - 6		Master	----	----	0.000	----	
Accelerometer Coefficients - 7		Master	----	----	0.000	----	
Accelerometer Coefficients - 8		Master	----	----	298.400	----	
Accelerometer Coefficients - 9		Master	----	----	0.991	----	

HGNS Neutron Calibration - HGNS Neutron Accumulations

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Near Zero Measurement	1/s	Master	0	5.0	25.3	40.0		
Far Zero Measurement	1/s	Master	0	5.0	28.3	40.0		
Near Plus Measurement	1/s	Master	6031.0	4700.0	5016.0	6900.0		
Far Plus Measurement	1/s	Master	2793.0	1900.0	2126.0	2900.0		
Near Corrected Plus Measurement	1/s	Master		4700.0	5016.0	6900.0		
Far Corrected Plus Measurement	1/s	Master		1900.0	2114.0	2900.0		

Company: St. Croix Operating, Inc.

Schlumberger

Well: Jack Creek #1

Field: Wildcat

County:	Washington
State:	Colorado
Platform Express	
Triple Combo	