

Company: St. Croix Operating Inc.

Well: Jack Creek #2

Field: Wildcat

County: Washington State: Colorado

County: Washington
Field: Wildcat
Location: SESE Sec. 4, T2S, R51W
Well: Jack Creek #2
Company: St. Croix Operating Inc.

Platform Express

Caliper

Cement Volume

Location:		SESE Sec. 4, T2S, R51W SHL: 900' FSL & 600' FEL Lat/Long: 39.905070 / -103.089550	Elev.: K.B. 4612.60 ft G.L. 4594.00 ft D.F. 4612.60 ft
Permanent Datum:	Ground Level	Kelly Bushing	18.60 ft above Perm.Datum
Log Measured From:	Kelly Bushing		
Drilling Measured From:	Kelly Bushing		
API Serial No.	Section:	Township:	Range:
05-121-11079	4	2S	51W

Logging Date 18-Dec-2018

Run Number ONE

Depth Driller 4285.00 ft

Schlumberger Depth 4285.00 ft

Bottom Log Interval 4285.00 ft

Top Log Interval 100.00 ft

Casing Driller Size @ Depth 8.625 in @ 503.00 ft

Casing Schlumberger 503.5 ft

Bit Size 7.875 in

Type Fluid In Hole WBM

Density 9.2 lbm/gal 55 s

Fluid Loss PH

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 0.12 @ 118 0.09 @ 118

Max Recorded Temperatures 121 degF

Circulation Stopped 18-Dec-2018 11:15:00

Logger on Bottom 18-Dec-2018 14:53:00

Unit Number 2161

Recorded By Ashley Rosacker

Witnessed By Phillip Wilcox

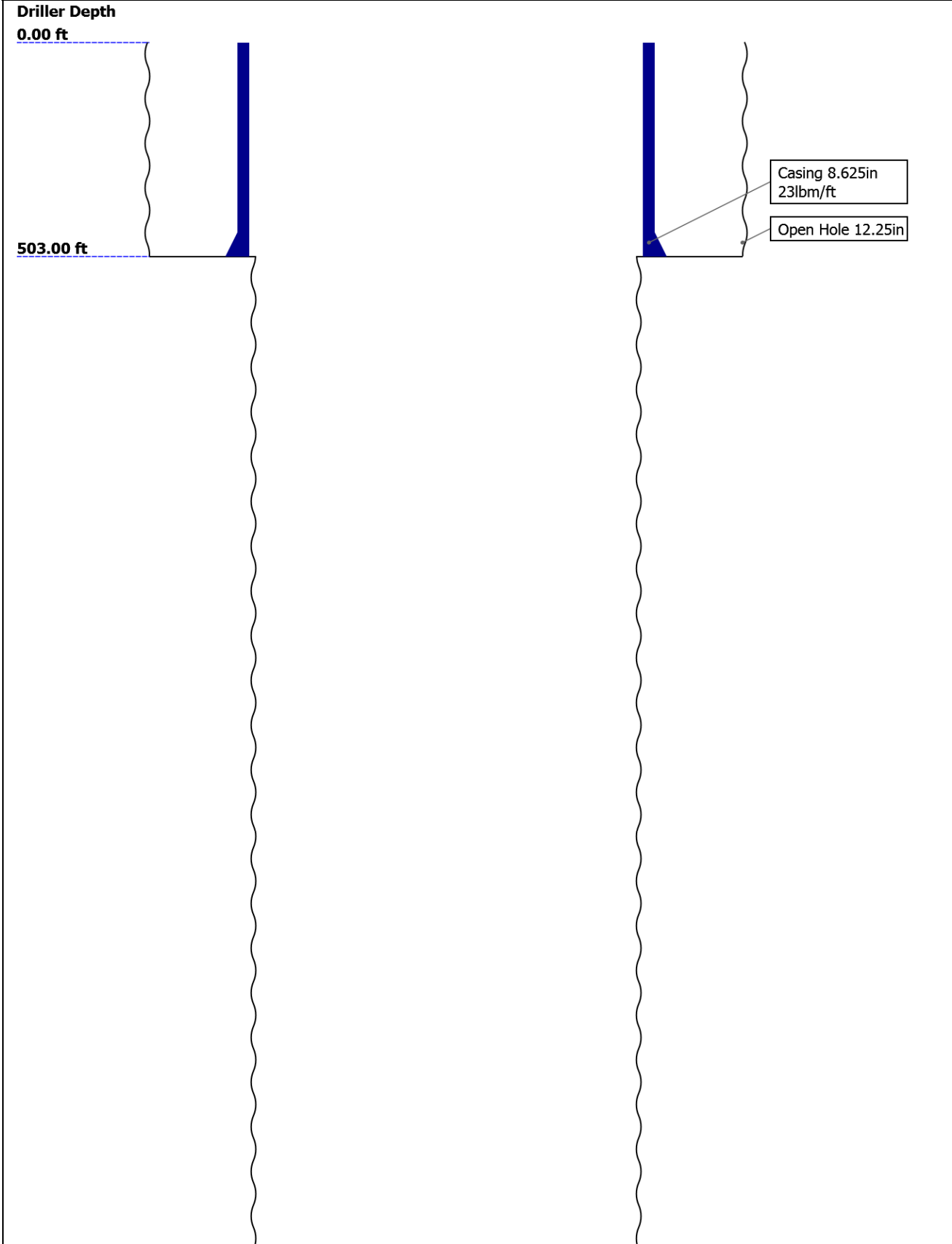
Disclaimer

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Well Sketch






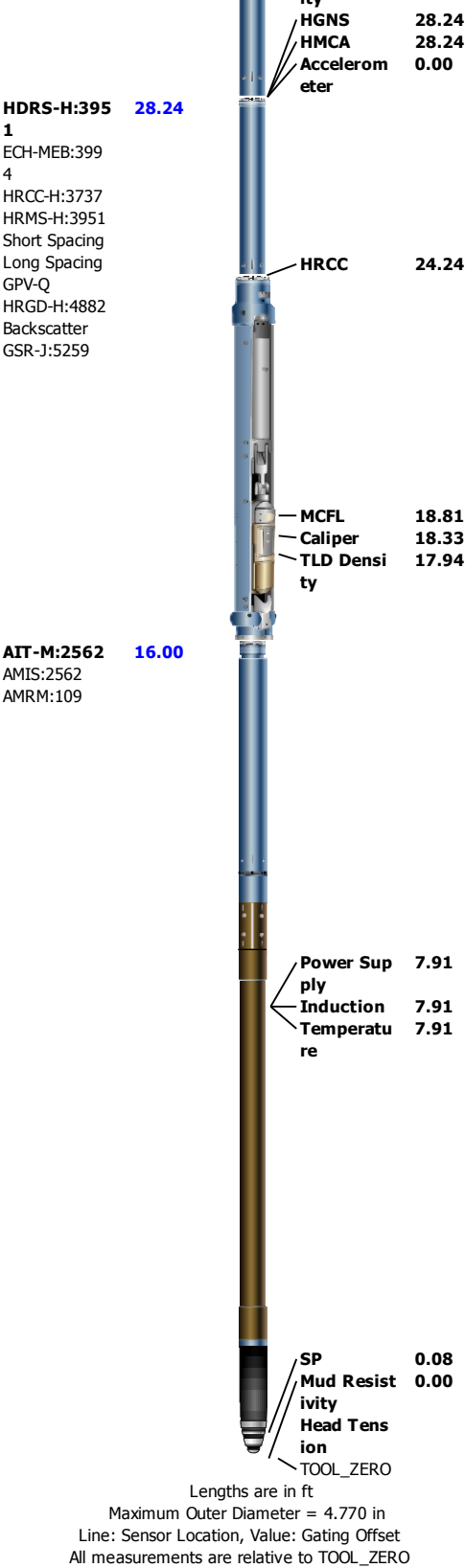


Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	12.25	7.875				
Top Driller (ft)	0	503				
Top Logger (ft)	0	503				
Bottom Driller (ft)	503	4285				
Bottom Logger (ft)	503	4285				
Casing						
Size (in)	8.625					
Weight (lbm/ft)	23					
Inner Diameter (in)	8.122					
Grade	X52					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	503					
Bottom Logger (ft)	503.5					

Remarks and Equipment Summary

ONE: Toolstring				ONE: Remarks	
Equip name LEH-QT:3076 LEH-QT:3076	Length 47.64		MP name	Offset	Thank you for choosing Schlumberger!
					This is the first log in the well.
					Toolstring run as per toolsketch and client logging program.
					Requested to run the tool slick with no bowspring or standoffs.
EDTC-B:9038 EDTH-B:9046 EDTG-B:79215 EDTC-B:9038	44.15				Matrix: Sandstone - 2.65 from TD to 4050 Limestone - 2.71 from 4050 to CS.
					BHT: 118 degF
					TD: 4282.5 ft Casing Shoe: 503.5 ft
HGNS-H:3730 HGNH:2742 NPV-N NSR-F:5068 HMCA-H HGNS-H:3730 HACCZ-H:1537	37.65				



Depth Summary

ONE

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 20

Tension Device

Type

Serial Number

Calibration Date

Calibrator Serial Number

Number of Calibration Points

CMTD-B/A

0

Logging Cable

Type

Serial Number

Length

Conveyance Type

Rig Type

7-46A-XS

24000.00 ft

Wireline

Land

ONE:Depth Control Parameters

Depth Control Remarks

Log Sequence

Rig Up Length At Surface

Rig Up Length At Bottom

Rig Up Length Correction

Stretch Correction

Tool Zero Check At Surface

First Log In the Well

All Schlumberger depth control policies followed.
IDW used as primary depth reference.
Z-Chart used as secondary depth reference.

ONE

2" Cement Volume

Integration Summary

Output Channel(s)

Output Description

Input Parameter

Output Value

Unit

ICV

Integrated Cement Volume

GCSE_UP_PASS, FCD

732.61

ft3

IHV

Integrated Hole Volume

GCSE_UP_PASS

1358.15

ft3

Pass Summary

Run Name

Pass Objective

Direction

Top

Bottom

Start

Stop

DSC Mode

Depth Shift

Include Parallel Data

ONE

Log[3]:Up

Up

43.65 ft

4299.46 ft

18-Dec-2018 3:06:10 PM

18-Dec-2018 4:27:30 PM

ON

0.00 ft

No

All depths are referenced to toolstring zero

Log

Company:St. Croix Operating Inc.

Well:Jack Creek #2

ONE: Log[3]:Up:S005

Description:

Format: Log (Caliper)

Index Scale: 2 in per 100 ft

Index Unit: ft

Index Type: Measured Depth

Creation Date: 18-Dec-2018 16:39:32

—IHV - Integrated Hole Volume every 100.00 (ft3)

—ICV - Integrated Cement Volume every 100.00 (ft3)

—ICV - Integrated Cement Volume every 10.00 (ft3)

—IHV - Integrated Hole Volume every 10.00 (ft3)

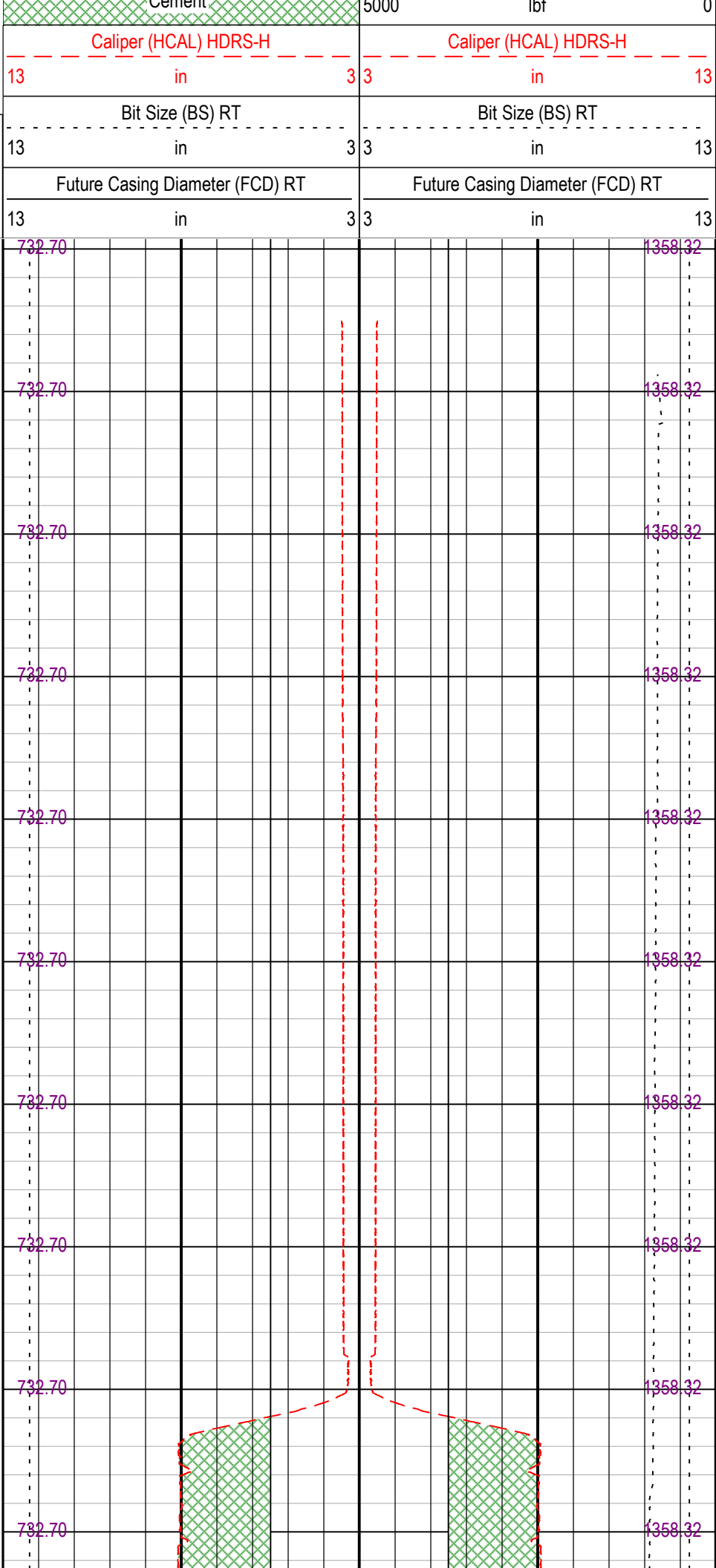
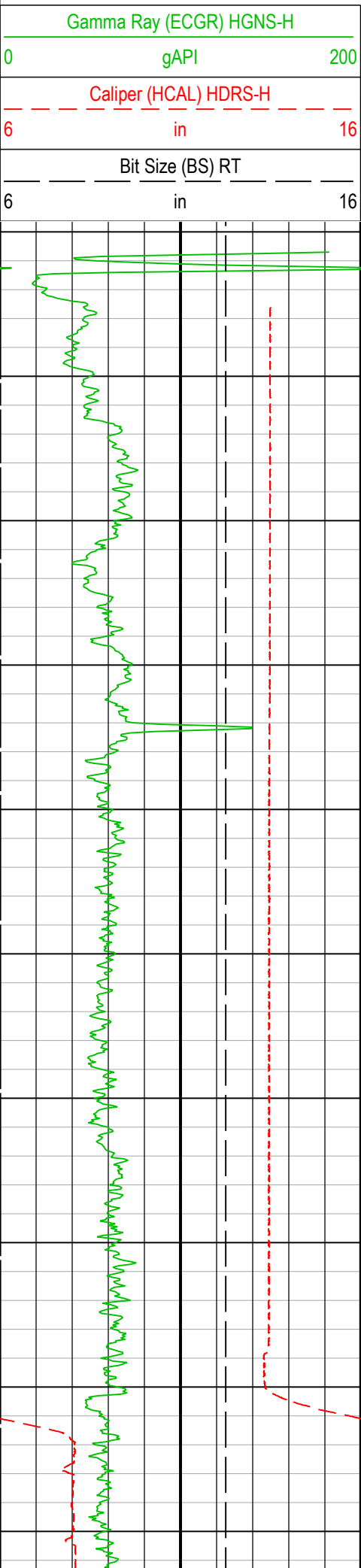
TIME_1900 - Time Marked every 60.00 (s)

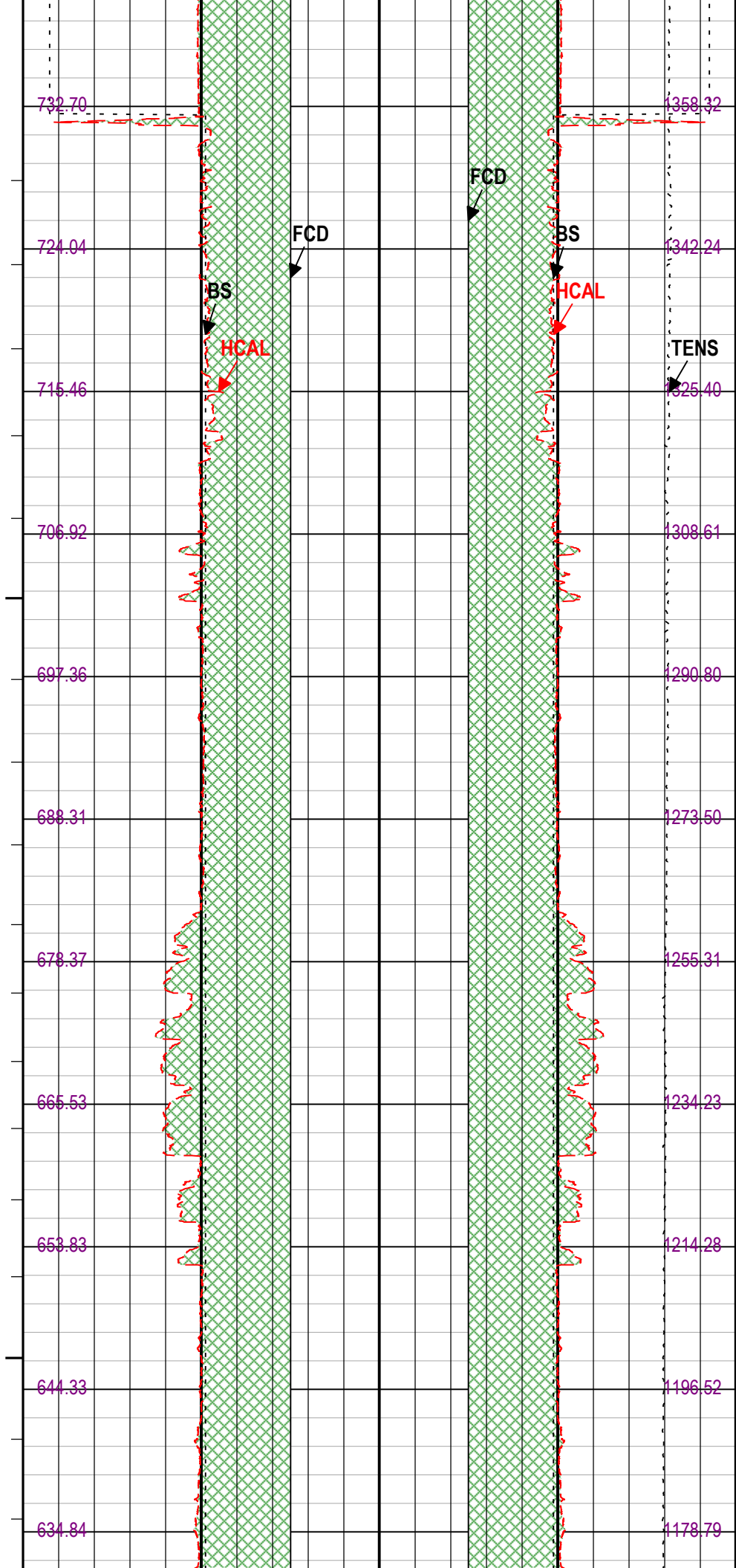
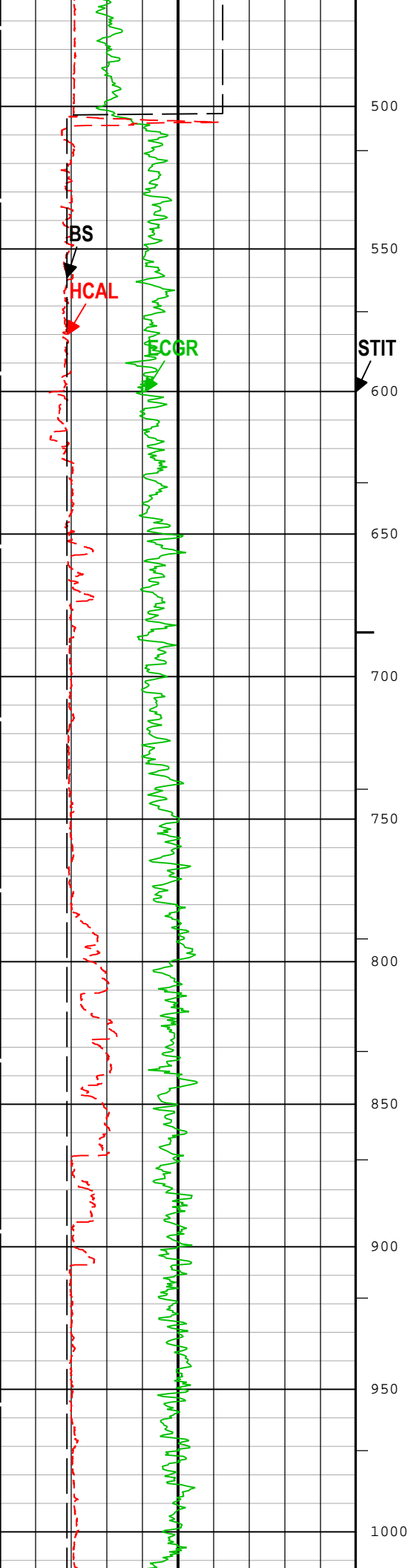
Integrated Cement Volume (ICV) RT
ft3

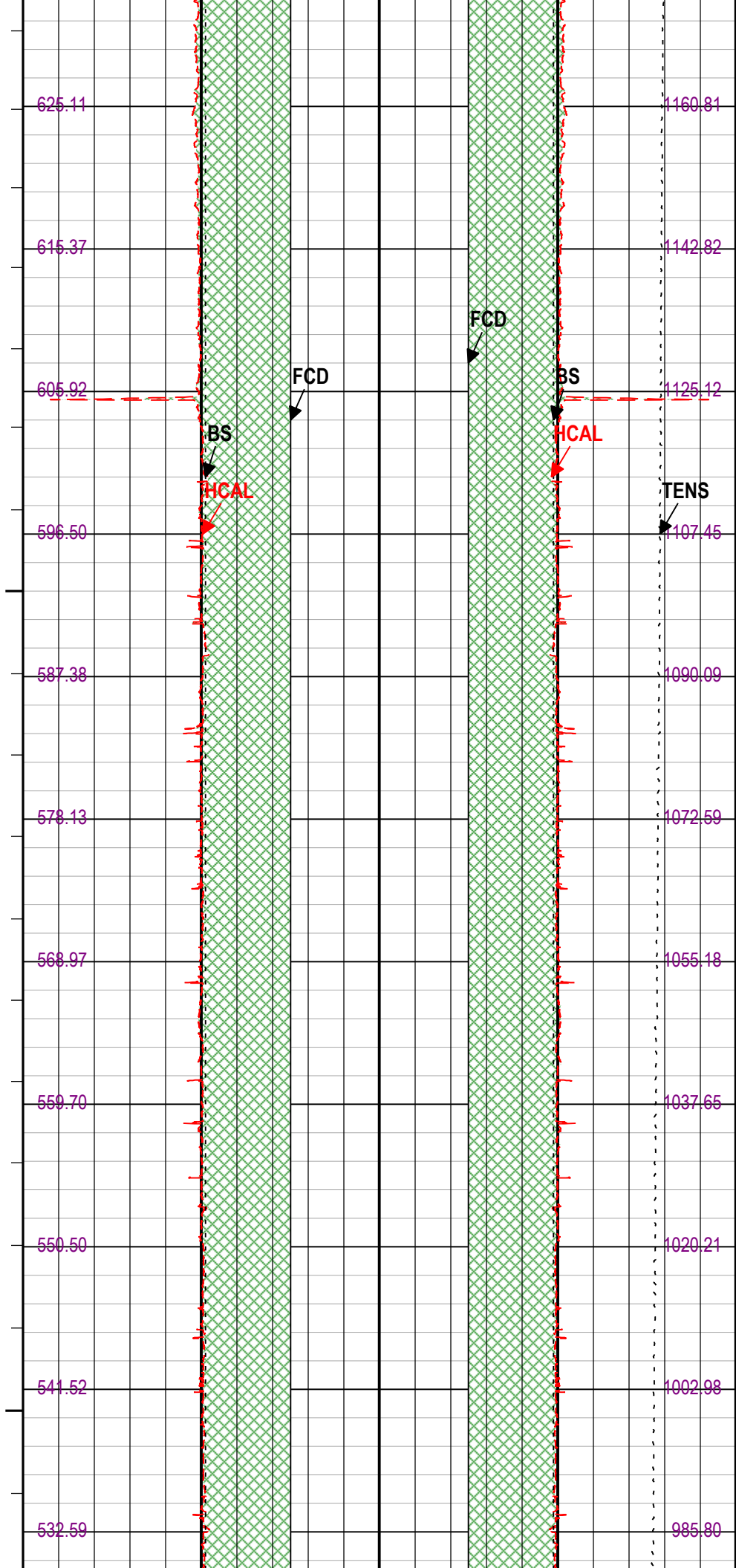
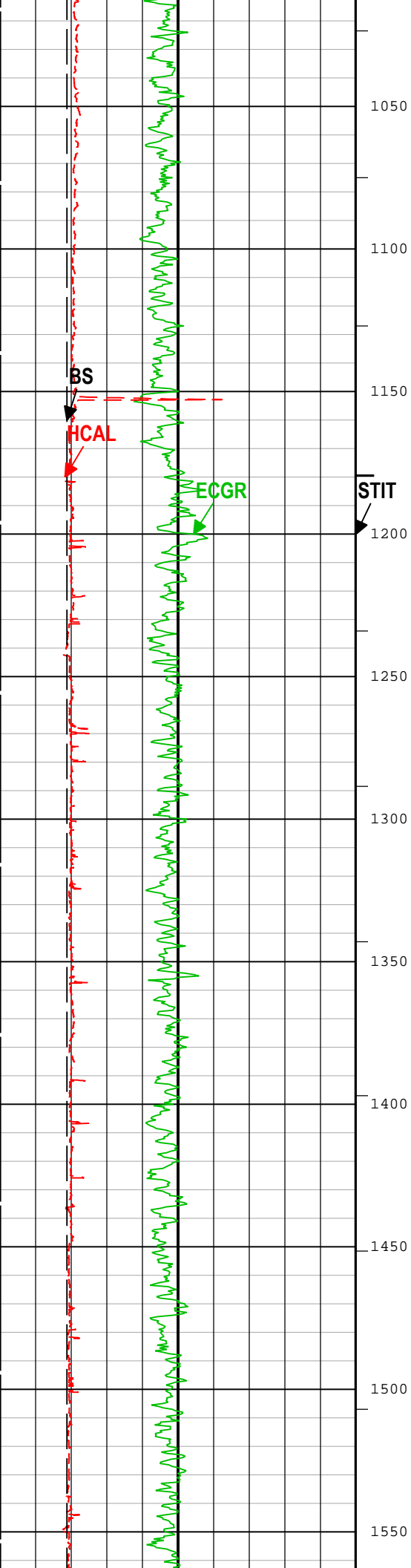
Integrated Hole Volume (IHV) RT
ft3

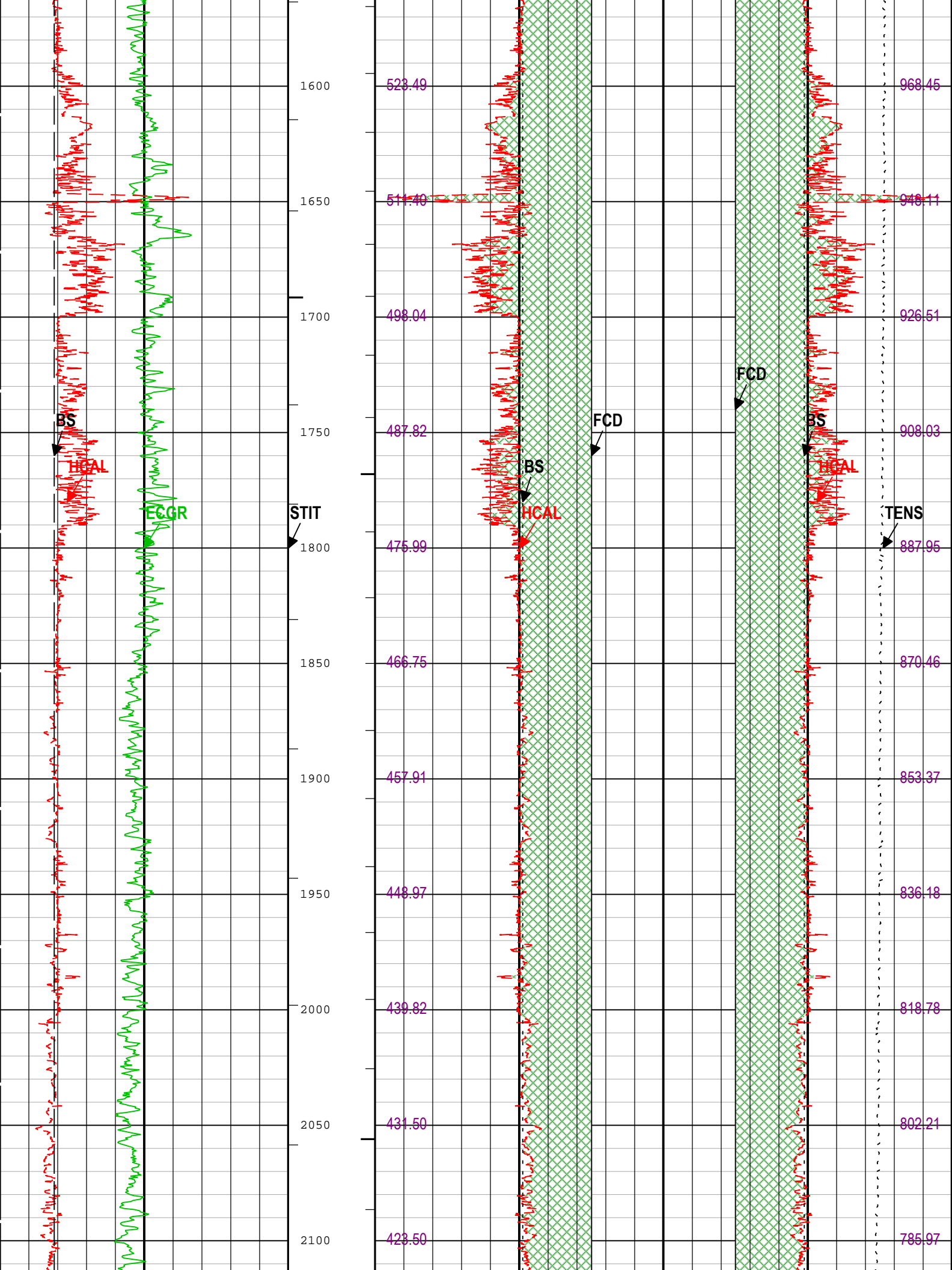
Cement

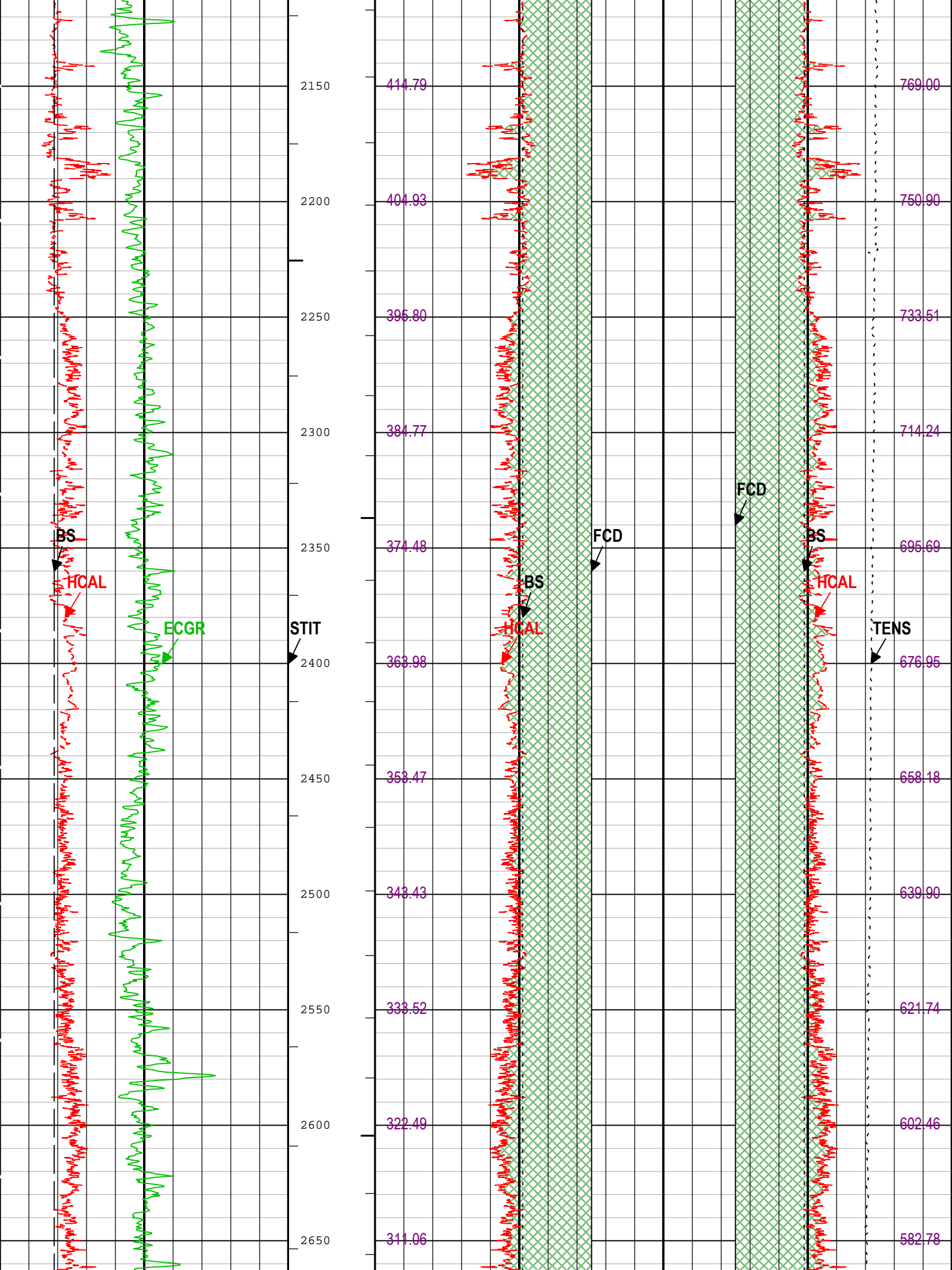
Cable Tension (TENS)

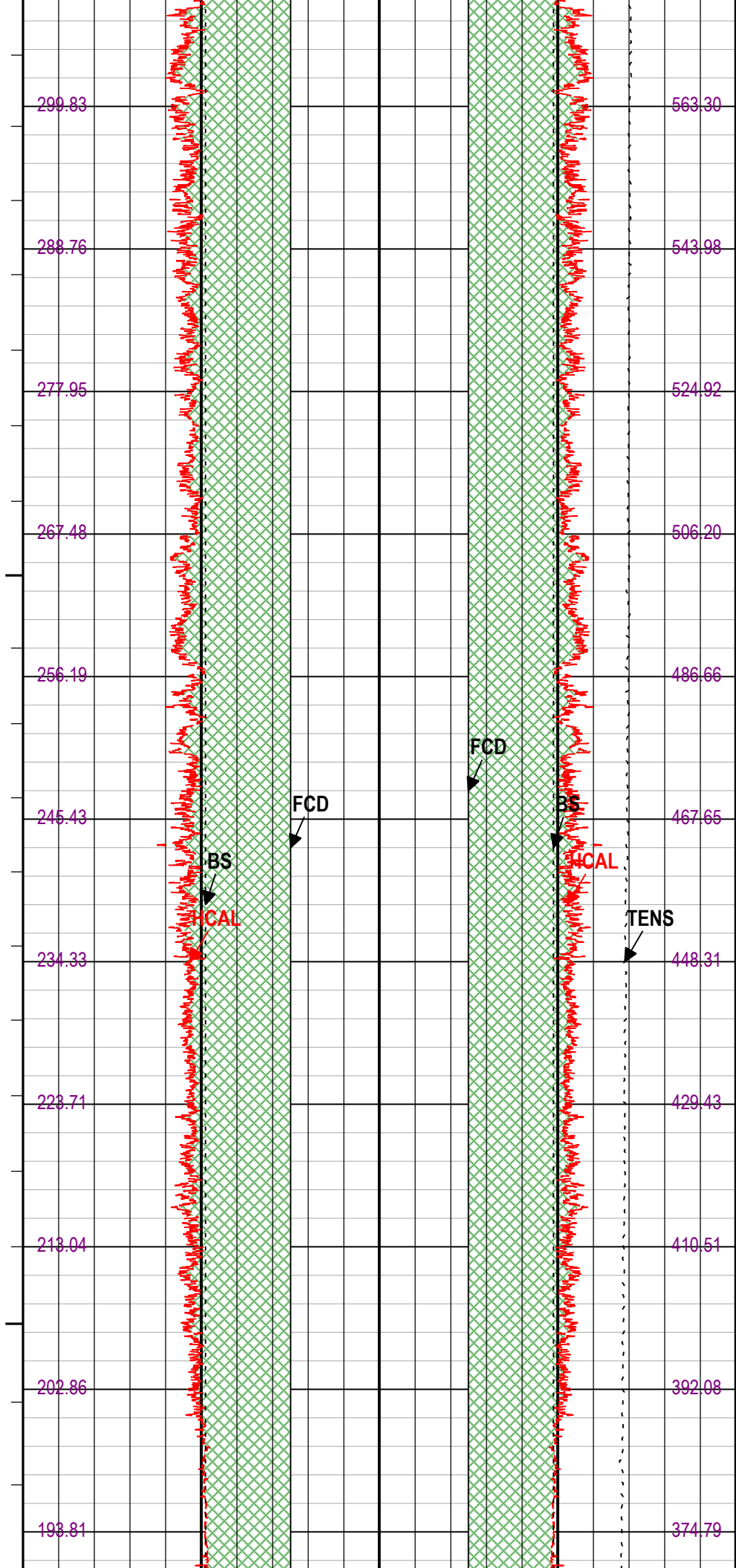
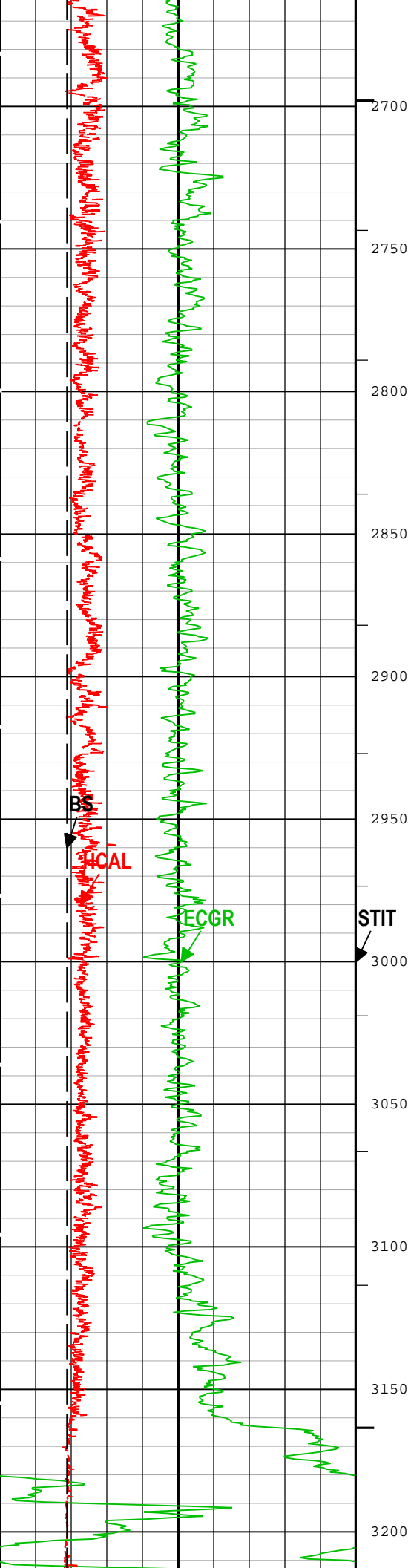


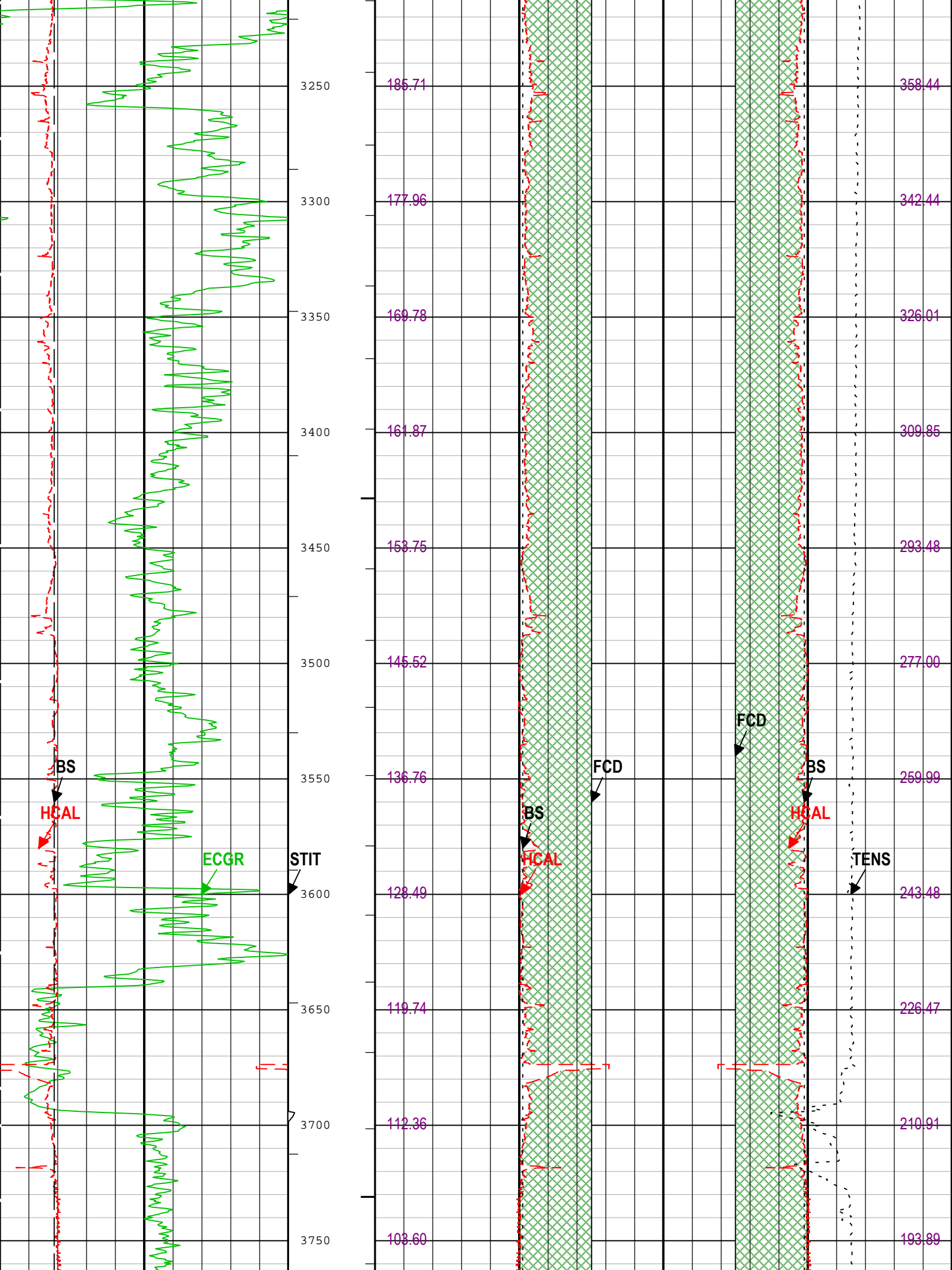


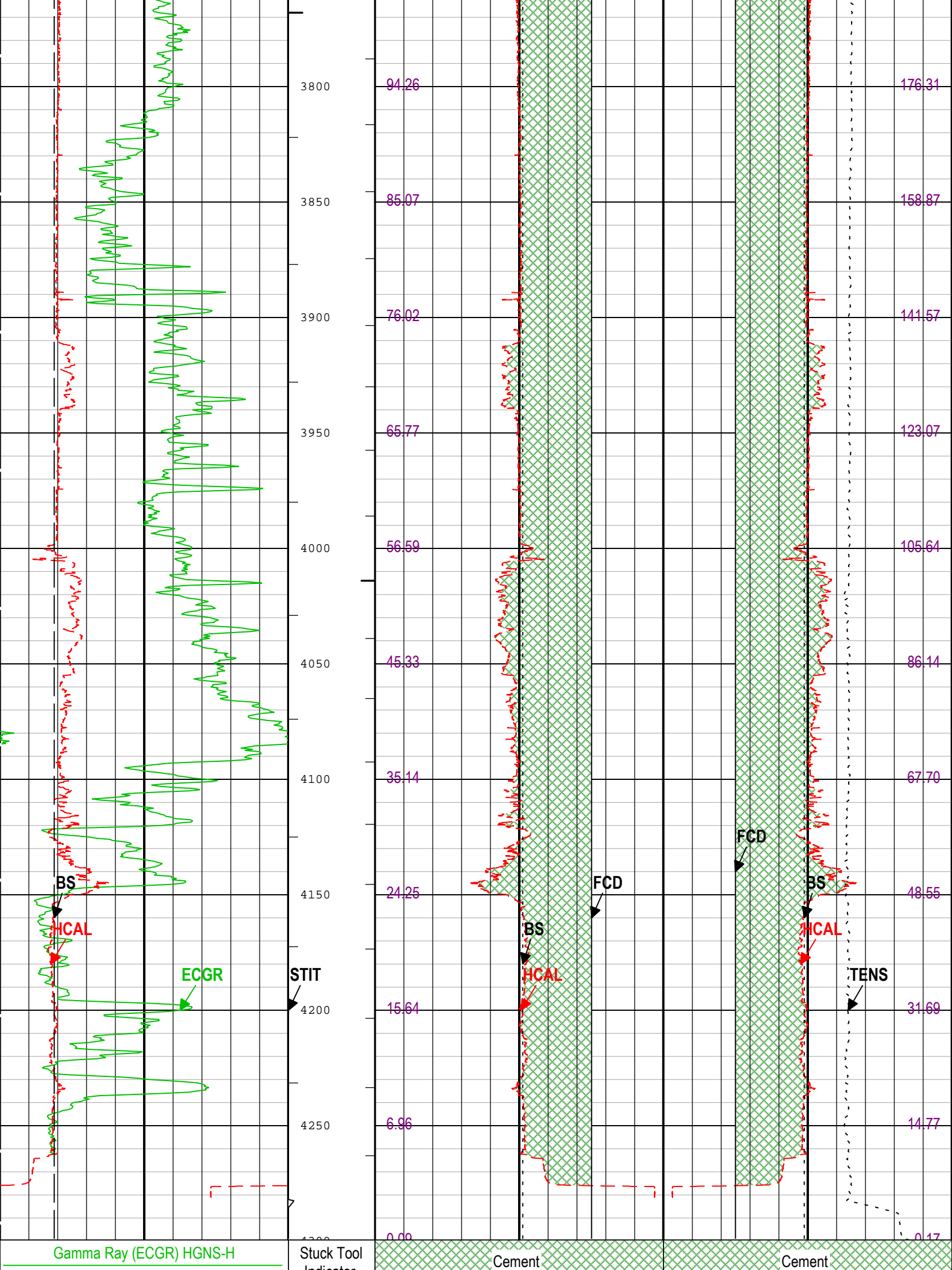












TIME_1900 - Time Marked every 60.00 (s)

—|IHV - Integrated Hole Volume every 10.00 (ft3)

|—ICV - Integrated Cement Volume every 10.00 (ft3)

|—ICV - Integrated Cement Volume every 100.00 (ft3)

—|IHV - Integrated Hole Volume every 100.00 (ft3)

Channel Processing Parameters	
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Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.516	in
CBLO	Casing Bottom (Logger)	WLSESSION	503.5	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	8.625	in
DFD	Drilling Fluid Density	Borehole	9.2	lbm/gal
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
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	
TD	Total Measured Depth	Borehole	4282.5	ft

Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	0	503
BS	7.875	503	4285

Tool Control Parameters	
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Parameter	Description	Tool	Value	Unit
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Calibration Report

Primary Equipment :			
File code for AIT-MA Sonde Tool Element	AMIS	2562	

Acknowledgements

AIT Sonde Calibration - Test Loop Gain

Master (EEPROM): 21:49:28 10-Mar-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Test Loop Gain - 0		Master	1.000	0.950	1.014	1.050	
Test Loop Phase - 0	deg	Master	0	-3.000	0.524	3.000	
Test Loop Gain - 1		Master	1.000	0.950	1.013	1.050	
Test Loop Phase - 1	deg	Master	0	-3.000	0.644	3.000	
Test Loop Gain - 2		Master	1.000	0.950	1.015	1.050	
Test Loop Phase - 2	deg	Master	0	-3.000	0.108	3.000	
Test Loop Gain - 3		Master	1.000	0.950	1.009	1.050	
Test Loop Phase - 3	deg	Master	0	-3.000	0.144	3.000	
Test Loop Gain - 4		Master	1.000	0.950	0.993	1.050	
Test Loop Phase - 4	deg	Master	0	-3.000	0.110	3.000	
Test Loop Gain - 5		Master	1.000	0.950	0.989	1.050	
Test Loop Phase - 5	deg	Master	0	-3.000	-0.056	3.000	
Test Loop Gain - 6		Master	1.000	0.950	1.000	1.050	
Test Loop Phase - 6	deg	Master	0	-3.000	0.278	3.000	
Test Loop Gain - 7		Master	1.000	0.950	1.014	1.050	
Test Loop Phase - 7	deg	Master	0	-3.000	-0.041	3.000	

AIT Sonde Calibration - Sonde Error Correction

Master (EEPROM): 21:49:28 10-Mar-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Sonde Error Correction Real - 0	mS/m	Master	----	-231.000	-90.511	119.000	
Sonde Error Correction Quad - 0		Master	----	-2250.000	-12.770	2250.000	
Sonde Error Correction Real - 1	mS/m	Master	----	114.000	165.326	204.000	
Sonde Error Correction Quad - 1		Master	----	-625.000	-75.327	625.000	
Sonde Error Correction Real - 2	mS/m	Master	----	66.000	104.659	156.000	
Sonde Error Correction Quad - 2		Master	----	-350.000	63.282	350.000	
Sonde Error Correction Real - 3	mS/m	Master	----	39.000	55.423	89.000	
Sonde Error Correction Quad - 3		Master	----	-250.000	51.642	250.000	
Sonde Error Correction Real - 4	mS/m	Master	----	15.000	26.570	35.000	
Sonde Error Correction Quad - 4		Master	----	-63.000	-29.986	63.000	
Sonde Error Correction Real - 5	mS/m	Master	----	4.000	11.103	24.000	
Sonde Error Correction Quad - 5		Master	----	-50.000	-16.905	50.000	
Sonde Error Correction Real - 6	mS/m	Master	----	5.000	6.462	15.000	
Sonde Error Correction Quad - 6		Master	----	-30.000	-8.061	30.000	
Sonde Error Correction Real - 7	mS/m	Master	----	-5.000	-4.924	5.000	
Sonde Error Correction Quad - 7		Master	----	-30.000	-0.292	30.000	

AIT Mud Calibration - Mud Calibration Gain

Master (EEPROM): 21:49:28 10-Mar-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Coarse Gain		Master	1.000	0.800	1.024	1.200	
Fine Gain		Master	1.000	0.800	1.030	1.200	

AIT Electronics Check - Thru Calibration Check

Master (EEPROM): 21:49:28 10-Mar-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Thru Cal Mag - 0	V	Master	----	0.366	0.641	0.854	
Thru Cal Phase - 0	deg	Master	----	137.000	-175.189	-103.000	
Thru Cal Mag - 1	V	Master	----	0.762	1.314	1.778	
Thru Cal Phase - 1	deg	Master	----	136.000	-176.305	-104.000	
Thru Cal Mag - 2	V	Master	----	0.372	0.651	0.868	
Thru Cal Phase - 2	deg	Master	----	132.000	-179.892	-108.000	
Thru Cal Mag - 3	V	Master	----	0.420	0.736	0.980	
Thru Cal Phase - 3	deg	Master	----	131.000	179.337	-109.000	
Thru Cal Mag - 4	V	Master	----	0.804	1.375	1.876	
Thru Cal Phase - 4	deg	Master	----	125.000	173.125	-115.000	
Thru Cal Mag - 5	V	Master	----	1.176	2.005	2.744	

Thru Cal Phase - 5	deg	Master	-----	122.000	171.443	-118.000	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Mag - 6	V	Master	-----	1.176	2.005	2.744	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Phase - 6	deg	Master	-----	121.000	171.455	-119.000	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Mag - 7	V	Master	-----	0.846	1.442	1.974	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Phase - 7	deg	Master	-----	115.000	170.747	-125.000	<div><div></div><div></div><div></div><div></div><div></div></div>
SPA Zero	mV	Master		-50.000	0.350	50.000	<div><div></div><div></div><div></div><div></div><div></div></div>
SPA Plus	mV	Master		941.000	990.193	1040.000	<div><div></div><div></div><div></div><div></div><div></div></div>
Temperature Zero	V	Master		-0.050	0.000	0.050	<div><div></div><div></div><div></div><div></div><div></div></div>
Temperature Plus	V	Master		0.870	0.918	0.960	<div><div></div><div></div><div></div><div></div><div></div></div>

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

Primary Equipment :

HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	3737
HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	4882

Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	
HRDD Long Spacing Detector	Long Spacing	
HRDD Short Spacing Detector	Short Spacing	
Cesium 137 Gamma-Ray Logging Source	GSR-J	5259
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	3737
HILT High-Resolution Mechanical Sonde, 150 degC	HRMS-H	3951

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): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
Rho Aluminum	g/cm3	Master	2.596	2.586	2.597	2.606	<div><div></div><div></div><div></div><div></div><div></div></div>
Rho Magnesium	g/cm3	Master	1.686	1.676	1.686	1.696	<div><div></div><div></div><div></div><div></div><div></div></div>
Pe Aluminum		Master	2.570	2.470	2.541	2.670	<div><div></div><div></div><div></div><div></div><div></div></div>
Pe Magnesium		Master	2.650	2.550	2.641	2.750	<div><div></div><div></div><div></div><div></div><div></div></div>

HDRS Density Calibration - Deviation Summary

Master (EEPROM): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
BS Average Deviation	%	Master	0	-0.6000	0.4193	0.6000	<div><div></div><div></div><div></div><div></div><div></div></div>
BS Max Deviation	%	Master	0	-1.6000	0.9056	1.6000	<div><div></div><div></div><div></div><div></div><div></div></div>
SS Average Deviation	%	Master	0	-1.0000	0.4058	1.0000	<div><div></div><div></div><div></div><div></div><div></div></div>
SS Max Deviation	%	Master	0	-2.5000	1.0526	2.5000	<div><div></div><div></div><div></div><div></div><div></div></div>
LS Average Deviation	%	Master	0	-1.5000	0.6786	1.5000	<div><div></div><div></div><div></div><div></div><div></div></div>
LS Max Deviation	%	Master	0	-3.5000	1.5928	3.5000	<div><div></div><div></div><div></div><div></div><div></div></div>

HDRS Density Calibration - Background Summary

Master (EEPROM): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
BS Window Ratio		Master	1.0000		0.7416		<div><div></div><div></div><div></div><div></div><div></div></div>
BS Window Sum	1/s	Master	1		27426		<div><div></div><div></div><div></div><div></div><div></div></div>
SS Window Ratio		Master	1.0000		0.4741		<div><div></div><div></div><div></div><div></div><div></div></div>
SS Window Sum	1/s	Master	1		10068		<div><div></div><div></div><div></div><div></div><div></div></div>
LS Window Ratio		Master	1.0000		0.2938		<div><div></div><div></div><div></div><div></div><div></div></div>
LS Window Sum	1/s	Master	1		1135		<div><div></div><div></div><div></div><div></div><div></div></div>

HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
BS PM High Voltage	V	Master		1000	1493	2400	<div><div></div><div></div><div></div><div></div><div></div></div>
SS PM High Voltage	V	Master		1000	1484	2400	<div><div></div><div></div><div></div><div></div><div></div></div>
LS PM High Voltage	V	Master		1000	1739	2400	<div><div></div><div></div><div></div><div></div><div></div></div>

HDRS Density Calibration - Crystal Quality Resolutions							
Master (EEPROM):		15:52:40 09-Dec-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
BS Crystal Resolution	%	Master		5.00	10.59	25.00	
SS Crystal Resolution	%	Master		5.00	8.79	20.00	
LS Crystal Resolution	%	Master		5.00	9.28	20.00	

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

Primary Equipment :

HILT Gamma-Ray and Neutron Sonde, 150 degC HGNS-H 3730

Auxiliary Equipment :

HGNS Accelerometer, 150 degC HACCZ-H 1537
AmBe Neutron Logging Source NSR-F 5068

Calibration Parameter :

Water Temperature (Calibration Tank Water Temperature) 65.0
Housing Size (Thermal Housing Size) 3.37
JIG-BKG

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM):		00:00:00 15-Mar-2002					
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	----	----	-530.200	----	
Accelerometer Coefficients - 1		Master	----	----	-13.060	----	
Accelerometer Coefficients - 2		Master	----	----	-0.001	----	
Accelerometer Coefficients - 3		Master	----	----	0.000	----	
Accelerometer Coefficients - 4		Master	----	----	2.722	----	
Accelerometer Coefficients - 5		Master	----	----	0.000	----	
Accelerometer Coefficients - 6		Master	----	----	0.000	----	
Accelerometer Coefficients - 7		Master	----	----	0.000	----	
Accelerometer Coefficients - 8		Master	----	----	298.900	----	
Accelerometer Coefficients - 9		Master	----	----	1.007	----	

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM):		21:32:32 07-Nov-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Near Zero Measurement	1/s	Master	0	5.0	28.5	40.0	
Far Zero Measurement	1/s	Master	0	5.0	27.4	40.0	
Near Plus Measurement	1/s	Master	6031.0	4700.0	5307.0	6900.0	
Far Plus Measurement	1/s	Master	2793.0	1900.0	2180.0	2900.0	
Near Corrected Plus Measurement	1/s	Master		4700.0	5299.0	6900.0	
Far Corrected Plus Measurement	1/s	Master		1900.0	2163.0	2900.0	

EDTC-B (Enhanced Digital Telemetry Cartridge - Version B) Calibration - Run ONE

Primary Equipment :

EDTC-B EDTC-B 9038

Calibration Parameter :

Plus Reference

EDTC-B Memory Data - EDTC-B Memory Data

Master (EEPROM):		14:30:48 18-Dec-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Initial PMT HV	V	Master			1574.000		
Accelerometer Serial Number		Master			1206		
Accelerometer Coefficients - 0		Master	----	----	2.970E+000	----	
Accelerometer Coefficients - 1		Master	----	----	1.998E-004	----	

Accelerometer Coefficients - 2		Master	----	----	6.002E-007	----		
Accelerometer Coefficients - 3		Master	----	----	-3.225E-008	----		
Accelerometer Coefficients - 4		Master	----	----	8.128E-010	----		
Accelerometer Coefficients - 5		Master	----	----	-6.221E-012	----		
Accelerometer Coefficients - 6		Master	----	----	1.615E-014	----		
Accelerometer Coefficients - 7		Master	----	----	-4.416E-003	----		
Accelerometer Coefficients - 8		Master	----	----	4.347E-005	----		
Accelerometer Coefficients - 9		Master	----	----	-4.540E-008	----		
Accelerometer Coefficients - 10		Master	----	----	5.842E-013	----		
Accelerometer Coefficients - 11		Master	----	----	-1.668E-012	----		
Gamma-Ray Detector Serial Number		Master			79215			

Company: St. Croix Operating Inc.

Schlumberger

Well: Jack Creek #2

Field: Wildcat

County:	Washington
State:	Colorado
Platform Express	
Caliper	
Cement Volume	