RELIANCE
OILFIELD SERVICES

Pulsed Neutron
Gamma Ray
Casing Collar Log

Company	TEP Rocky Mountain LLC
Well	Federal RWF 324-8
Field	Rulison
County	Garfield
State	Colorado

Company TEP Rocky Mountain LLC
Well Federal RWF 324-8
Field Rulison
County Garfield State Colorado
Location: API #: 05-045-24031
SEC 17 TWP 6S RGE 94W

Other Services
RBL

Permanent Datum	Ground Level	Elevation	6175'
Log Measured From	Kelly Bushing	24 FT	
Drilling Measured From	Kelly Bushing		

Elevation
K.B. 6199'
D.F. ---
G.L. 6175'

Date	13-AUG-2019
Run Number	Two
Depth Driller	9073 FT
Depth Logger	9010 FT
Bottom Logged Interval	9004 FT
Top Log Interval	4833 FT
Open Hole Size	8.750"
Type Fluid	Fresh Water
Density / Viscosity	8.34 lb/gal
Max. Recorded Temp.	---
Estimated Cement Top	---
Time Well Ready	ROA
Time Logger on Bottom	16:20
Equipment Number	HD-0359
Location	Grand Junction, CO
Recorded By	Z.Fisher
Witnessed By	---

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size (in)	Wgt (lbs/Ft)	Grade	Top	Bottom
Surface Casing	9 5/8	36	J-55	Surface	1106 FT
Intermediate #1	4 1/2	11.6	P-110	Surface	9031 FT
Intermediate #2					
Liner					

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Log ran as per customer request
Depth referenced to Reliance Bond Log dated 13-Aug-2019
Log ran from 9004 FT to 4833 FT
Pulsed Neutron Data logged with the Hunter RAS Tool

Thank you for choosing Reliance Oilfield Services, LLC!!

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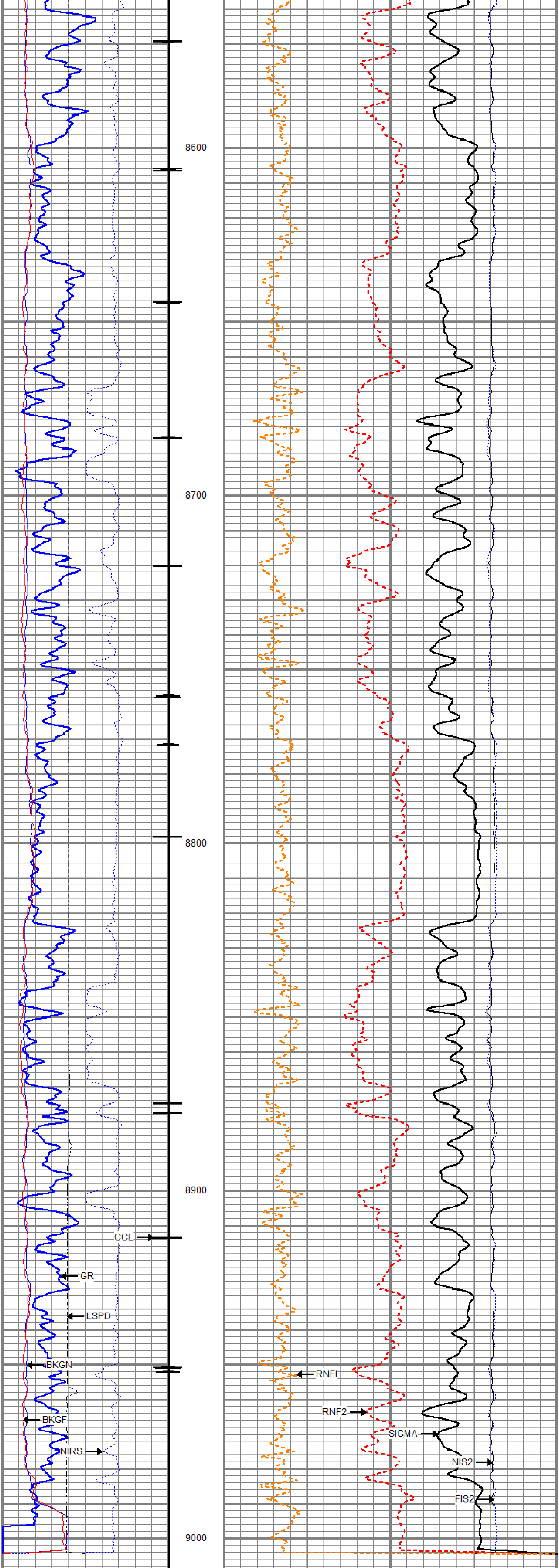
Main Pass

Database File	tep\tep_federal rwf 324-8_pn_08-13-19\processed_tep_federal rwf 324-8_pn_08-13-19_recal.db
Dataset Pathname	SHIFTED/merge1
Presentation Format	ros_pdn_hunter
Dataset Creation	Mon Aug 19 11:03:21 2019
Charted by	Depth in Feet scaled 1:240

Left	Curve	Right
0	GR (GAPI)	150
	Casing Collar Locator	
-100	Line Speed (ft/min)	100
0	NIRS (cps)	400000
0	BKGN (cps)	4000
0	BKGF (cps)	2000
4	RNF2	0
60	SIGMA (cu)	0
4.5	RNFI	0
	FIS2	
0	(cps)	45000
	NIS2	
0	(cps	100000



0	GR (GAPI)	150	4	RNF2	0	
	Casing Collar Locator		60	SIGMA (cu)	0	
-100	Line Speed (ft/min)	100	4.5	RNFI	0	
0	NIRS (cps)	400000				FIS2
0	BKGN (cps)	4000			0	(cps) 45000
0	BKGF (cps)	2000				NIS2
					0	(cps100000

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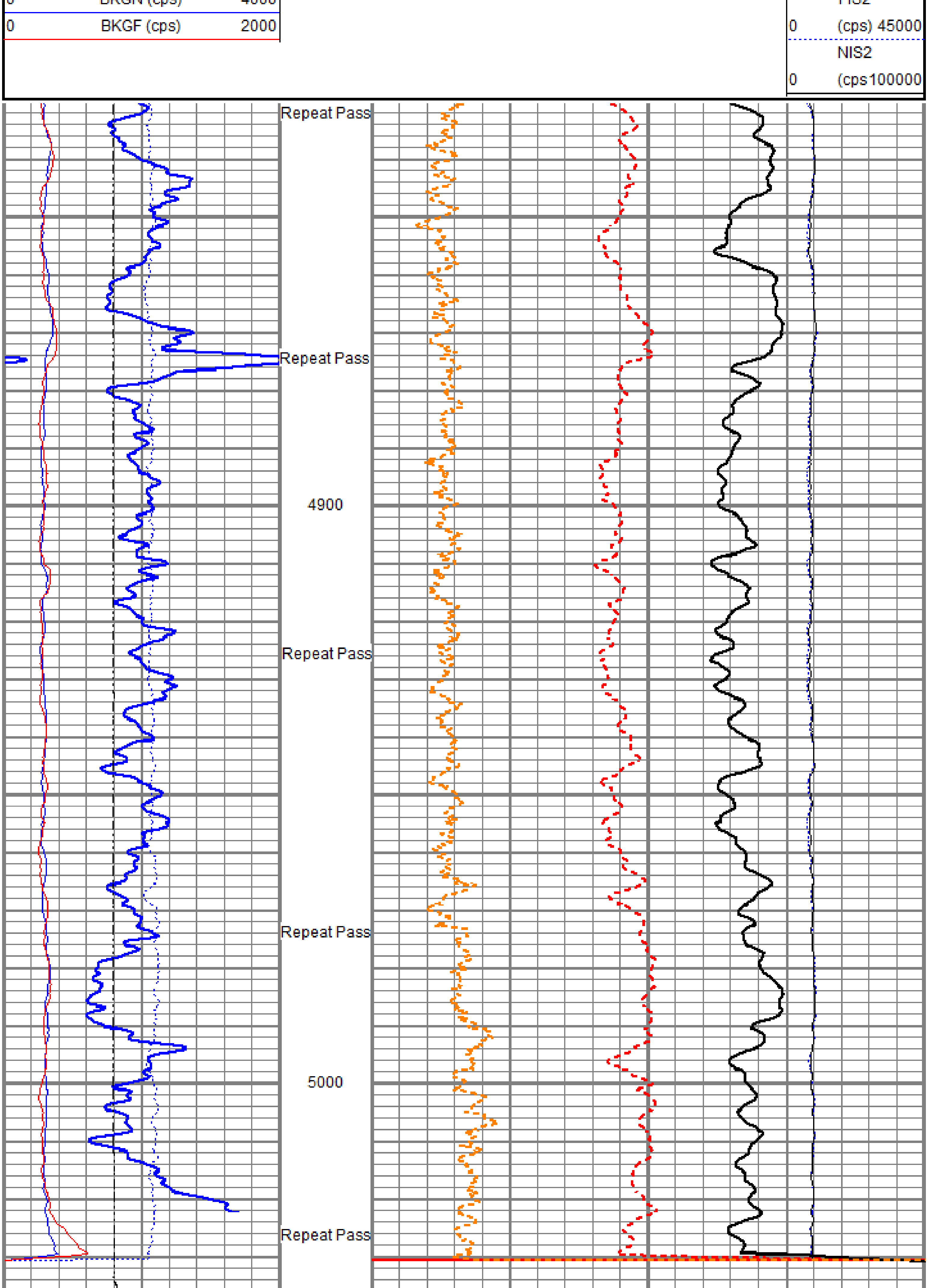
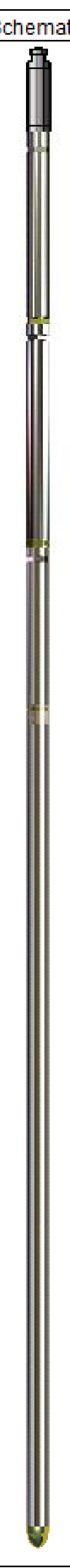
Repeat Pass

Database File tep\tep_federal rwf 324-8_pn_08-13-19\processed_tep_federal rwf 324-8_pn_08-13-19_recal.db
Dataset Pathname Repeat.4
Presentation Format ros_pdn_hunter
Dataset Creation Sat Aug 17 10:17:40 2019
Charted by Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150	4	RNF2	0	
-100	Line Speed (ft/min)	100	60	SIGMA (cu)	0	
0	NIRS (cps)	400000	4.5	RNFI	0	
0	BKGN (cps)	4000				FIS2
0	BKGF (cps)	2000			0	(cps) 45000
						NIS2
					0	(cps100000



0	Gamma Ray (GAPI)	150	4	RNF2	0	
-100	Line Speed (ft/min)	100	60	SIGMA (cu)	0	
0	NIRS (cps)	400000	4.5	RNFI	0	
0	BKGN (cps)	4000				FIS2
0	BKGF (cps)	2000			0	(cps) 45000
						NIS2
					0	(cps100000

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb
			Titan CHD-16875 GO Titan 1-11/16" Assembled Electric Cable Head w/ 1" Fishing Neck	1.03	1.69	5.40
TCUTEMP TCUVOLT	14.69 14.69		HWS_TCU-002 (001704) HWS Telemetry Control Unit (TCU002)	2.30	1.69	10.87
GCL_CCL GCL_GR	13.97 12.50		HWS_GCL-001 (001475) HWS Gamma Ray Collar Locator (1.6875")	2.69	1.69	13.40
Long Far Near Anci	6.25 6.25 6.25 6.25		HWS_RAS-RAS002 (003040) Hunter Well Science Pulsed Neutron Tool	11.75	1.69	55.82
			HWS_TBN-001 (001725) HWS Terminator Bull Nose (1.6875")	0.25	1.69	0.99

Dataset: processed_tep_federal rwf 324-8_pn_08-13-19_recal.db: field/well/run1/Main.4
Total length: 18.02 ft
Total weight: 86.48 lb
O.D.: 1.69 in

Calibration Report

Database File c:\programdata\warrior\data\tep\tep_federal rwf 324-8_pn_08-13-19\processed_tep_federal rwf 324-8_pn_08
Dataset Pathname Main.4
Dataset Creation Sat Aug 17 10:15:53 2019

RAS Calibration Report

Calibration Date: Thu Aug 15 06:49:22 2019

Meas #: 003040

Water Tank

Description	Curve	Standard	Mean	Dev
Sigma Near	SIGN	23.1	24.1	0.18
Sigma Far	SIGF	22.8	23.5	0.20
Ratio Near-Long Capture	RNL2	5.79	7.46	0.05
Ratio Near-Long Burst	RNLB	6.49	7.78	0.04
Ratio Near-Far Capture	RNF2	1.85	2.04	0.01
Ratio Near-Far Burst	RNFB	2.03	2.19	0.01
Spectral Hydrogen Index	HIS2	12.84	13.86	0.22
Carbon-Oxygen Ratio	CORS	1.34	1.85	0.07
Ratio Burst-Capture Near	RNBC	1.46	1.68	0.01
Ratio Burst-Capture Far	RFBC	1.50	1.61	0.01

Hydrocarbon Tank

Description	Curve	Standard	Mean	Dev
Sigma Near	SIGN	25.7	27.8	0.27
Sigma Far	SIGF	25.1	26.1	0.23
Ratio Near-Long Capture	RNL2	1.78	3.38	0.02
Ratio Near-Long Burst	RNLB	2.57	5.01	0.02
Ratio Near-Far Capture	RNF2	0.98	1.32	0.01
Ratio Near-Far Burst	RNFB	1.30	1.68	0.01
Spectral Hydrogen Index	HIS2	16.68	19.26	0.36
Carbon-Oxygen Ratio	CORS	1.51	2.05	0.06
Ratio Burst-Capture Near	RNBC	2.23	2.37	0.02
Ratio Burst-Capture Far	RFBC	2.09	2.09	0.02

Gamma Ray Calibration Report

Serial Number:	001475	
Tool Model:	001	
Performed:	Fri Oct 19 14:55:00 2018	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	
Calibrator Reading:	1.0	
Sensitivity:	1.0000	GAPI/

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