**RELIANCE** OILFIELD SERVICES

# Pulsed Neutron Gamma Ray Casing Collar Log

Company TEP Rocky Mountain LLC
Well Federal PA 21-24
Field Parachute
County Garfield
State Colorado

Company TEP Rocky Mountain LLC
Well Federal PA 21-24
Field Parachute
County Garfield State Colorado
Location: API # : 05-045-24202
Other Services RBL
SEC 13 TWP 6S RGE 95W
Permanent Datum Ground Level Elevation 6571.1'
Log Measured From Kelly Bushing 24 FT
Drilling Measured From Kelly Bushing
Elevation K.B. 6595.1' D.F. 6594.1' G.L. 6571.1'

| | |
|---|---|
| Date | 24-JUN-2020 |
| Run Number | Two |
| Depth Driller | 10002 FT |
| Depth Logger | 9950 FT |
| Bottom Logged Interval | 9950 FT |
| Top Log Interval | 5877 FT |
| Open Hole Size | 8.750" |
| Type Fluid | Water |
| Density / Viscosity | 8.34 lb/gal |
| Max. Recorded Temp. | --- |
| Estimated Cement Top | --- |
| Time Well Ready | ROA |
| Time Logger on Bottom | 18:05 |
| 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 | 1126 FT |
| Intermediate #1 | 4 1/2 | 11.6 | P-110 | Surface | 9961 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 24-JUN-2020
Log ran from 9950 FT to 5877 FT
Pulsed Neutron Data logged with the Hunter RAS Tool

Thank you for choosing Reliance Oilfield Services, LLC!

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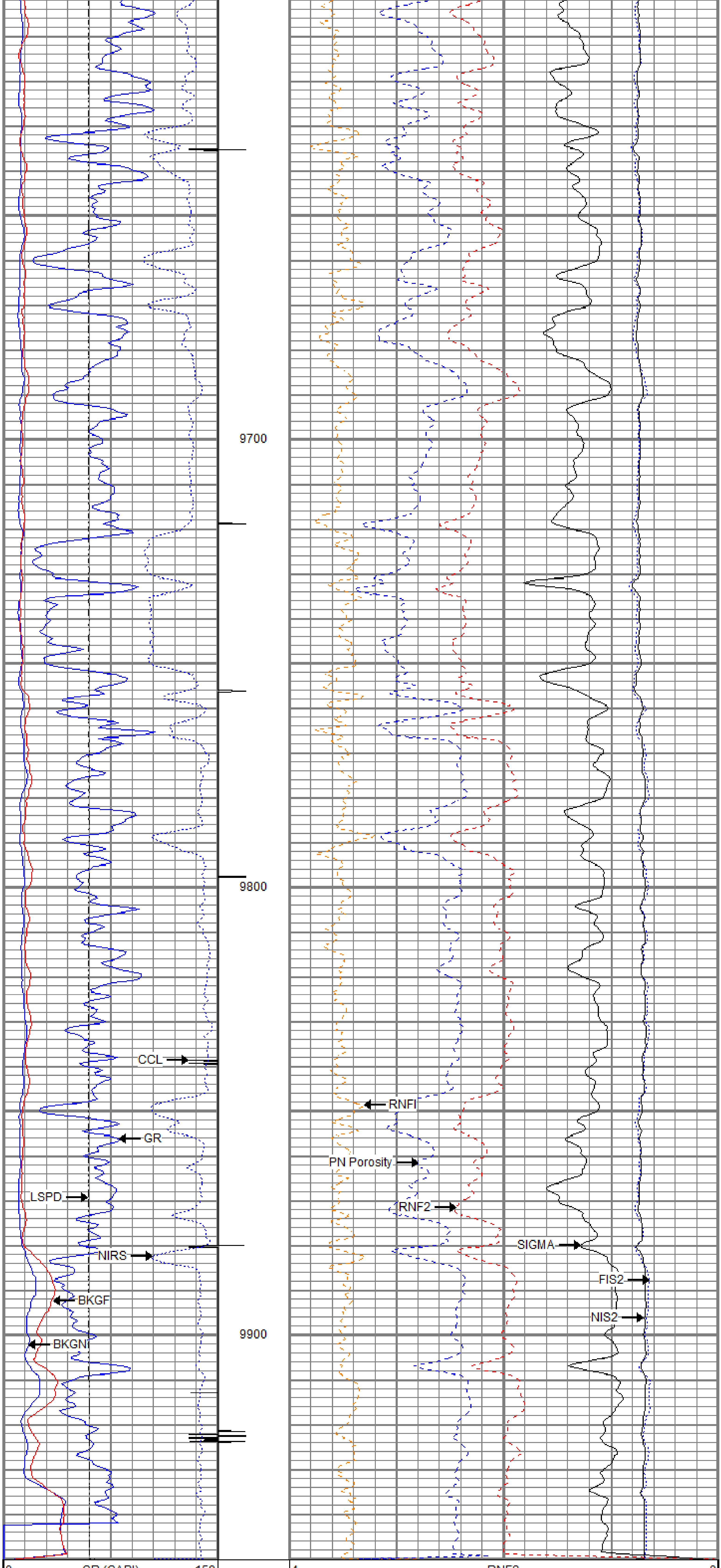
# Main Pass

| | |
|---|---|
| Database File | e:\data\tep\federal pa 21-24\pn\tep_federal pa 21-24_pn_06-24-20.db |
| Dataset Pathname | runSHIFTED/merge1 |
| Presentation Format | ros_pdn_hunter |
| Dataset Creation | Thu Jun 25 10:58:39 2020 |
| Charted by | Depth in Feet scaled 1:240 |

0 GR (GAPI) 150
PN 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 -1
1 PN Porosity (Sandstone) 0
FIS2
0 (cps) 45000
NIS2
0 (cps 100000



0 GR (GAPI) 150
PN 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 -1
1 PN Porosity (Sandstone) 0

FIS2
0 (cps) 45000
NIS2
0 (cps100000

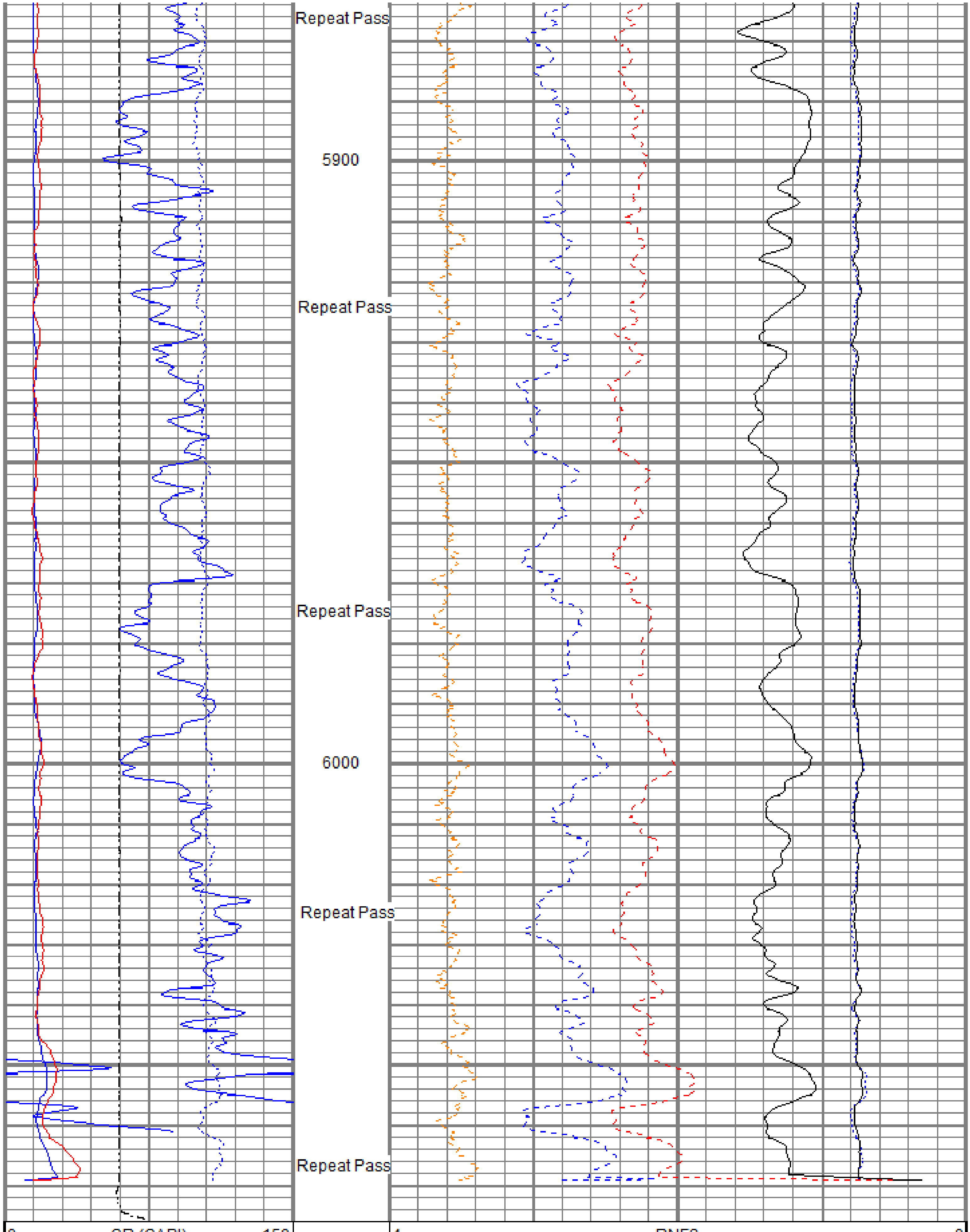
# Repeat Pass

| | |
|---|---|
| Database File | e:\data\tep\federal pa 21-24\pn\tep_federal pa 21-24_pn_06-24-20.db |
| Dataset Pathname | repeat.2 |
| Presentation Format | ros_pdn_hunter |
| Dataset Creation | Wed Jun 24 23:40:15 2020 |
| Charted by | Depth in Feet scaled 1:240 |

0 GR (GAPI) 150
-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 -1
PN Porosity (Sandstone)
1 (Porosity Decimal Fraction) 0

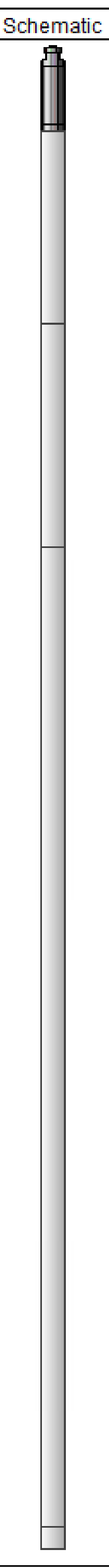
FIS2
0 (cps) 45000
NIS2
0 (cps100000



0 GR (GAPI) 150
-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 -1
PN Porosity (Sandstone)
1 (Porosity Decimal Fraction) 0

FIS2
0 (cps) 45000
NIS2
0 (cps100000

| Sensor | Offset (ft) | Schematic | Description | Length (ft) | O.D. (in) | Weight (lb) |
|---|---|---|---|---|---|---|
| | |  | Titan CHD-16875 GO<br>Titan 1-11/16" Assembled Electric Cable Head w/ 1" Fishing Neck | 1.03 | 1.69 | 5.40 |
| TCUTEMP<br>TCUVOLT | 14.69<br>14.69 | | HWS_TCU-002 (001705)<br>HWS Telemetry Control Unit (TCU002) | 2.30 | 1.69 | 10.87 |
| GCL_CCL<br>GCL_GR | 13.97<br>12.50 | | HWS_GCL-001 (000262)<br>HWS Gamma Ray Collar Locator (1.6875") | 2.69 | 1.69 | 13.40 |
| Long<br>Far<br>Near<br>Anci | 6.25<br>6.25<br>6.25<br>6.25 | | HWS_RAS-RAS002 (003040)<br>Hunter Well Science Pulsed Neutron Tool | 11.75 | 1.69 | 55.82 |
| LOCTIM<br>UTCTIM | 0.00<br>0.00 | | HWS_TBN-001 (001724)<br>HWS Terminator Bull Nose (1.6875") | 0.25 | 1.69 | 0.99 |

| | |
|---|---|
| Dataset: | tep_federal pa 21-24_pn_06-24-20.db: field/well/run1/main.2 |
| Total length: | 18.02 ft |
| Total weight: | 86.48 lb |
| O.D.: | 1.69 in |

## Calibration Report

| | |
|---|---|
| Database File | e:\data\tep\federal pa 21-24\pn\tep_federal pa 21-24_pn_06-24-20.db |
| Dataset Pathname | main.2 |
| Dataset Creation | Wed Jun 24 23:34:20 2020 |

### RAS Calibration Report

Calibration Date: Wed Jul 11 14:55 2020

Meas #: 003041

### Water Tank

| Description | Curve | Standard | Mean | Dev |
|---|---|---|---|---|
| Sigma Near | SIGN | 23.1 | 24.1 | 0.23 |
| Sigma Far | SIGF | 22.8 | 23.5 | 0.27 |
| Ratio Near-Long Capture | RNL2 | 5.79 | 6.45 | 0.04 |
| Ratio Near-Long Burst | RNLB | 6.49 | 6.87 | 0.04 |
| Ratio Near-Far Capture | RNF2 | 1.85 | 2.01 | 0.01 |
| Ratio Near-Far Burst | RNFB | 2.03 | 2.16 | 0.01 |
| Spectral Hydrogen Index | HIS2 | 12.84 | 12.61 | 0.16 |
| Carbon-Oxygen Ratio | CORS | 1.34 | 1.30 | 0.05 |
| Ratio Burst-Capture Near | RNBC | 1.46 | 1.73 | 0.01 |
| Ratio Burst-Capture Far | RFBC | 1.50 | 1.67 | 0.01 |

### Hydrocarbon Tank

| Description | Curve | Standard | Mean | Dev |
|---|---|---|---|---|
| Sigma Near | SIGN | 25.7 | 26.8 | 0.25 |
| Sigma Far | SIGF | 25.1 | 25.5 | 0.45 |
| Ratio Near-Long Capture | RNL2 | 1.78 | 2.98 | 0.02 |
| Ratio Near-Long Burst | RNLB | 2.57 | 4.38 | 0.02 |
| Ratio Near-Far Capture | RNF2 | 0.98 | 1.30 | 0.01 |
| Ratio Near-Far Burst | RNFB | 1.30 | 1.64 | 0.01 |
| Spectral Hydrogen Index | HIS2 | 16.68 | 17.41 | 0.28 |
| Carbon-Oxygen Ratio | CORS | 1.51 | 1.54 | 0.04 |
| Ratio Burst-Capture Near | RNBC | 2.23 | 2.46 | 0.02 |
| Ratio Burst-Capture Far | RFBC | 2.09 | 2.18 | 0.02 |

### Gamma Ray Calibration Report

| | | |
|---|---|---|
| Serial Number: | 000262 | |
| Tool Model: | 001 | |
| Performed: | (Not Performed) | |
| Calibrator Value: | 1.0 | GAPI |
| Background Reading: | 0.0 | |
| Calibrator Reading: | 1.0 | |
| Sensitivity: | 1.0000 | GAPI/ |

| | |
|---|---|
| Company | TEP Rocky Mountain LLC |
| Well | Federal PA 21-24 |
| Field | Parachute |
| County | Garfield |
| State | Colorado |