Company BILL BARRETT CORPORATION
Well GGU JOLLEY 44B-20-691
Field MAMM CREEK
County GARFIELD State CO

**HALLIBURTON**

# ACOUSTIC CEMENT BOND LOG

|  |  |  |  |
|---|---|---|---|
| Company | BILL BARRETT CORPORATION | | |
| Well | GGU JOLLEY 44B-20-691 | | |
| Field | MAMM CREEK | | |
| County | GARFIELD | State | CO |

API No.: 0504519796 Serv #: 8079232
Location: SHL: 1218' FNL & 1323' FEL
BHL: 0460' FNL & 0666' FEL
Sec: 29 Twp: 6S Rge: 91W

Other Services
JUNK BASKET,
GAUGE RING
RMTE

|  |  |  |  |
|---|---|---|---|
| Permanent Datum | GROUND LEVEL | Elevation | 6105' |
| Log Measured From | K.B. , 23 Ft. above perm. datum | | |
| Drilling Measured From | K.B. | | |

Elevation
K.B. 6128'
D.F. 6127'
G.L. 6105'

|  |  |  |  |
|---|---|---|---|
| Date @ Time Logged | 02/APRIL/11 @ 18:00 | Type Fluid in Hole | WATER |
| Run No. | ONE | Density of Fluid | 9.0 PPG |
| Depth - Driller | 7800' | Fluid Level | SURFACE |
| Depth - Logger | 7713' | Cement Top Est. Logged | LOGGED |
| Bottom - Logged Interval | 7705' | Equipment / Location | 10971659 / GJ |
| Top - Log Interval | 2100' | Recorded by | J.ARRASCUE |
| Max. Recorded Temp. | 187 DGF | Witnessed by | GARY ETTER |

| CEMENTING DATA | Surface String | Protection String | Production String | Liner |
|---|---|---|---|---|
| Date / Time Cemented | | | | |
| Primary / Squeeze | | | | |
| Expected Compressive Strength | psi@ hrs | psi@ hrs | psi@ hrs | psi@ hrs |
| Cement Volume | | | | |
| Cement Type / Weight | / | / | / | / |
| Formulation | | | | |
| Mud Type / Mud Wgt. | / | / | / | / |

| Borehole Record | | | | Casing & Tubing Record | | | |
|---|---|---|---|---|---|---|---|
| Run Number | Bit | From | To | Size | Weight | From | To |
| ONE | 14.75" | SURFACE | 738' | 9 5/8" | 36 # | SURFACE | 734' |
| ONE | 7.875" | 738' | 7800' | 4.5" | 11.6 # | SURFACE | 7878' |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

<<< Fold Here >>>

HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHCIH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.

## Comments

HES ACOUSTIC CEMENT BOND LOG PRIMARY LOG FOR THIS WELL.

LOGGED INTERVALS PER CUSTOMER REQUEST
RBT & RMTE RAN IN COMBO
RUN JUNK BASKET & GAUGE RING
SHORT JOINTS : 5233' -5259' & 6422' - 6449'

CREW: S. PARSONS & J.GAY

***THANK YOU FOR USING HALLIBURTON ENERGY SERVICES GRAND JUNCTION, CO***

Service Ticket No. 8079232 API No. 0504519796 PGM Ver 101102_R1

The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

EQUIPMENT DATA

| GAMMA RAY | | CBL | | | | | |
|---|---|---|---|---|---|---|---|
| Run No. | ONE | Run No. | ONE | Run No. | | Run No. | |
| Serial No. | 10002717 | Serial No. | 1119 | Serial No. | | Serial No. | |
| Model No. | GR-PROBE | Model No. | RBT-004 | Model No. | | Model No. | |
| Diameter | 1 11/16" | Diameter | 3 1/8" | Diameter | | Diameter | |

LOGGING DATA

General Data

| Pass | Depths | | Well Head | Speed | Logging Run Comments |
|---|---|---|---|---|---|
| No. | From | To | Pressure | Ft/Min | |
| ONE | 7713' | 2100' | 0 PSI | REC | MAIN PASS |
| | | | | | |

| | GAMMA RAY | | CCL | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pass | Scale | | Scale | | Scale | | Scale | |
| No. | L | R | L | R | L | R | L | L |
| ONE | 0 | 200 | -9 | 1 | | | | |
| | | | | | | | | |

DIRECTIONAL INFORMATION

| | | | | | | |
|---|---|---|---|---|---|---|
| Maximum Deviation | | deg. @ | | KOP | | |

**HALLIBURTON**

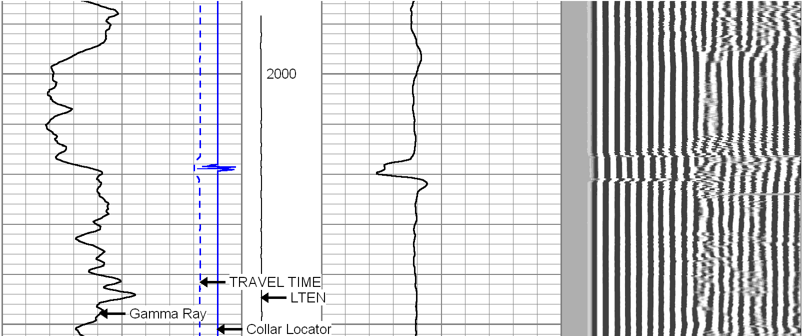
# MAIN LOG SECTION

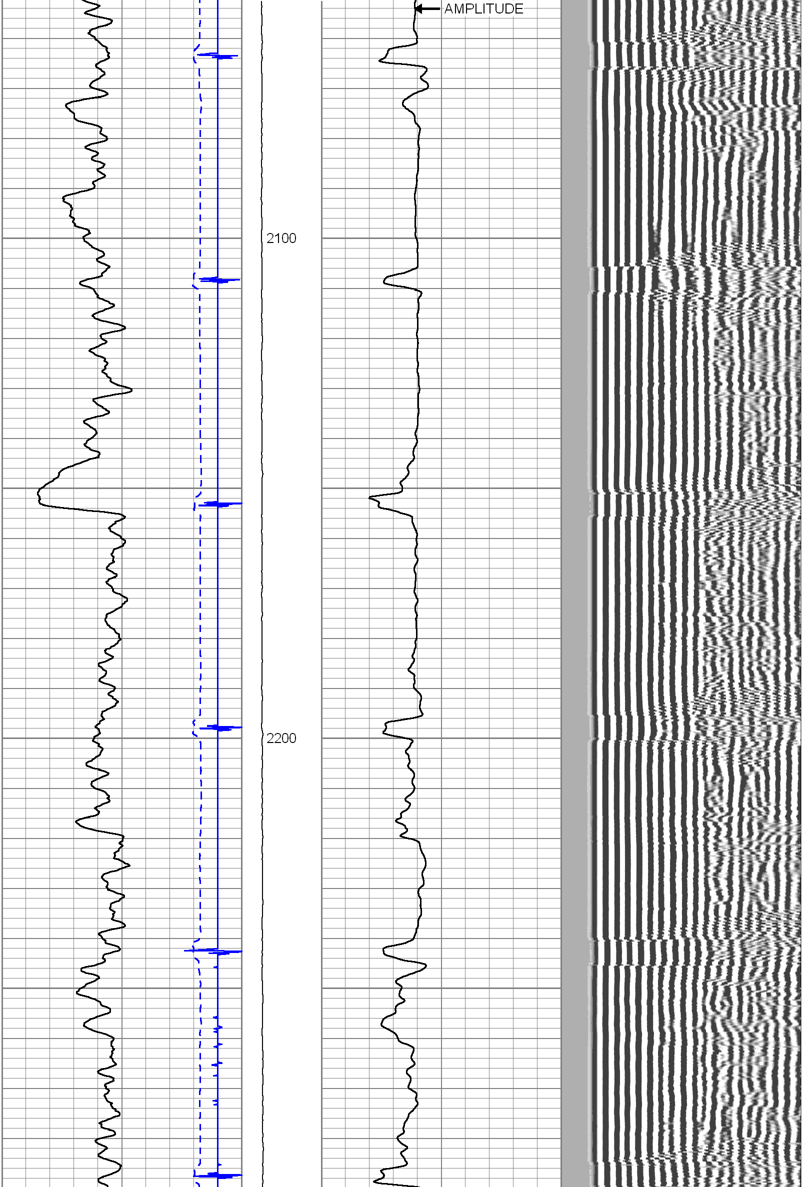
5"=100'

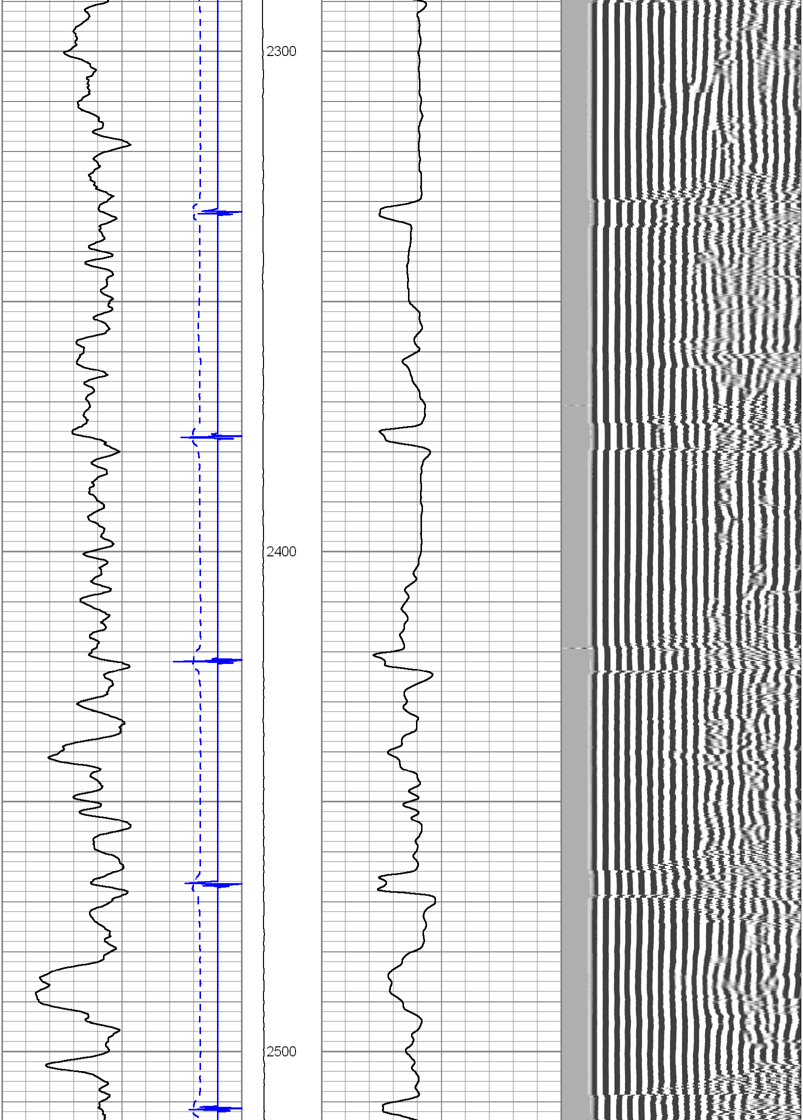
Database File: c:\warrior\data\bill_barrett\ggu_jolley_44b_20_691\gguj_44b_20_691_cbl_rmt.db
Dataset Pathname: MAMM_CREE/GGUJ44B20/run1/MAIN1
Presentation Format: CBL_RB~1
Dataset Creation: Sat Apr 02 19:51:44 2011 by Log Halliburton Casedho
Charted by: Depth in Feet scaled 1:240

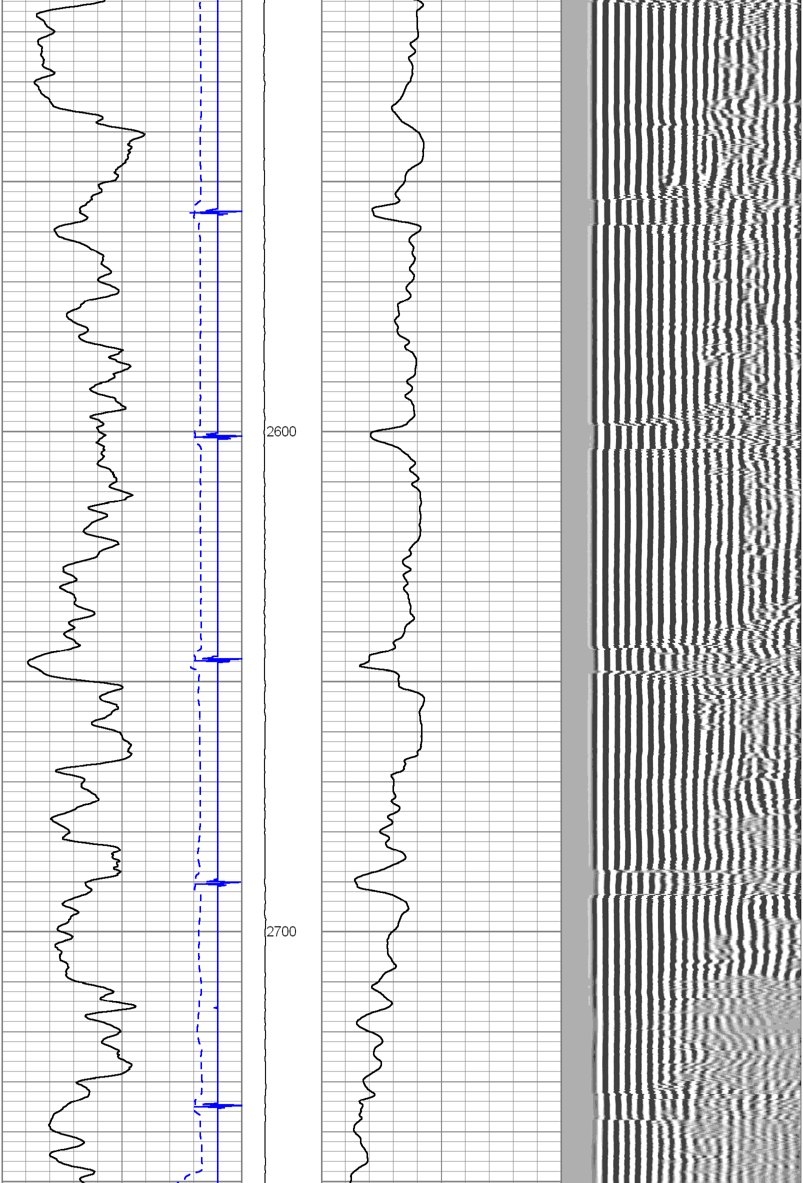
| | | |
|---|---|---|
| 370 TRAVEL TIME (usec) 170 | LTEN | 0 AMP AMPLITUDE (mV) 10 |
| 8100 Collar Locator -900 | 0 (lb) 2500 | 0 AMPLITUDE (mV) 100 |
| 0 Gamma Ray (GAPI) 200 | | |

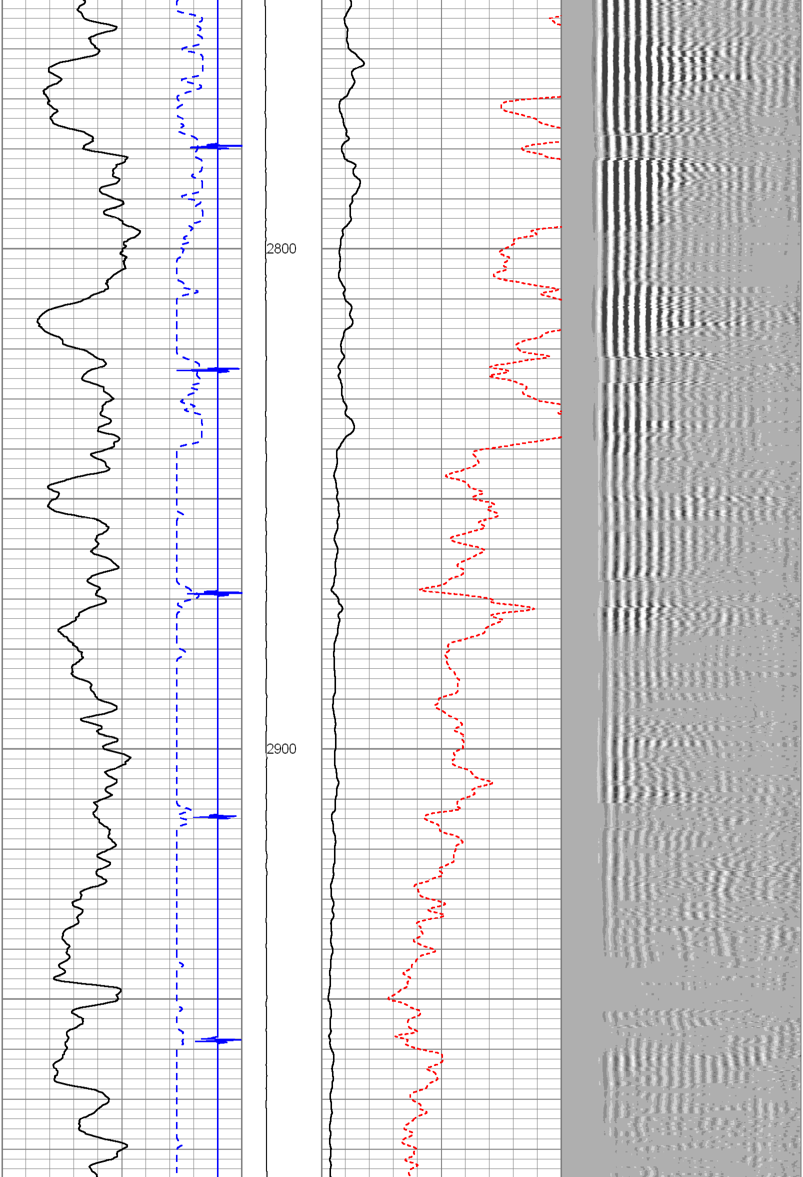
200 MSG 1200

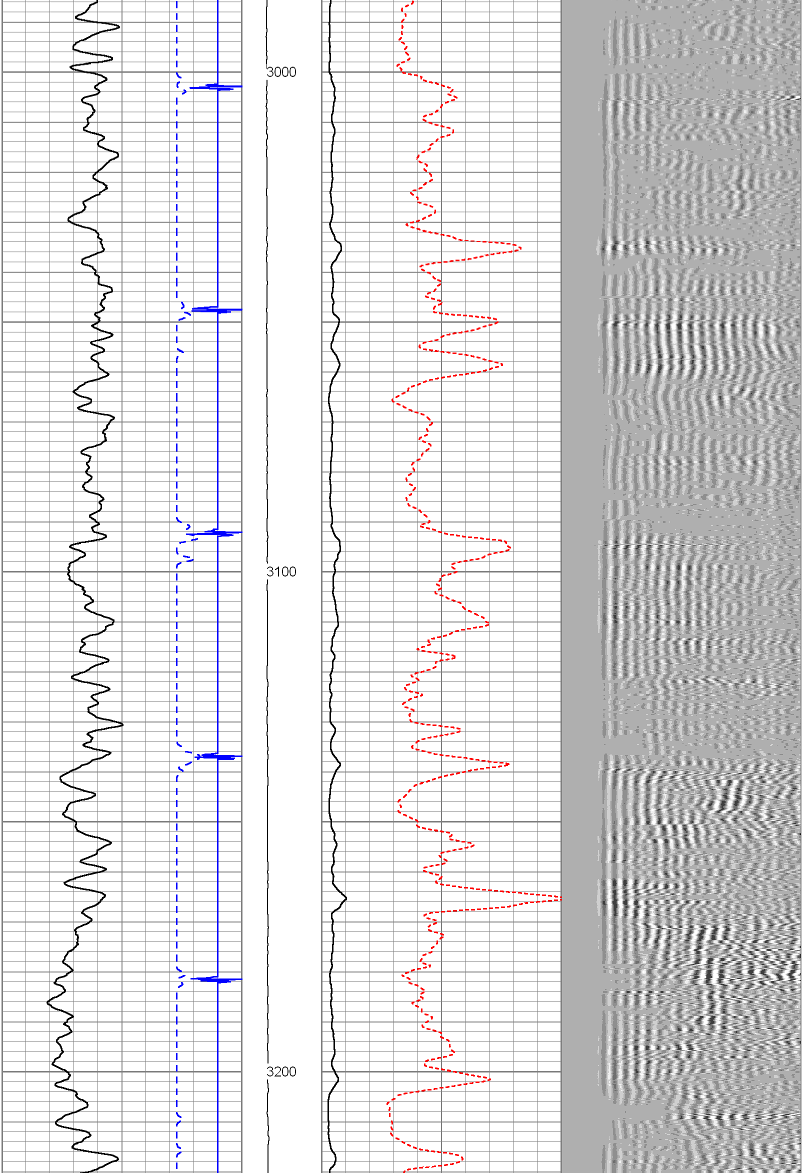


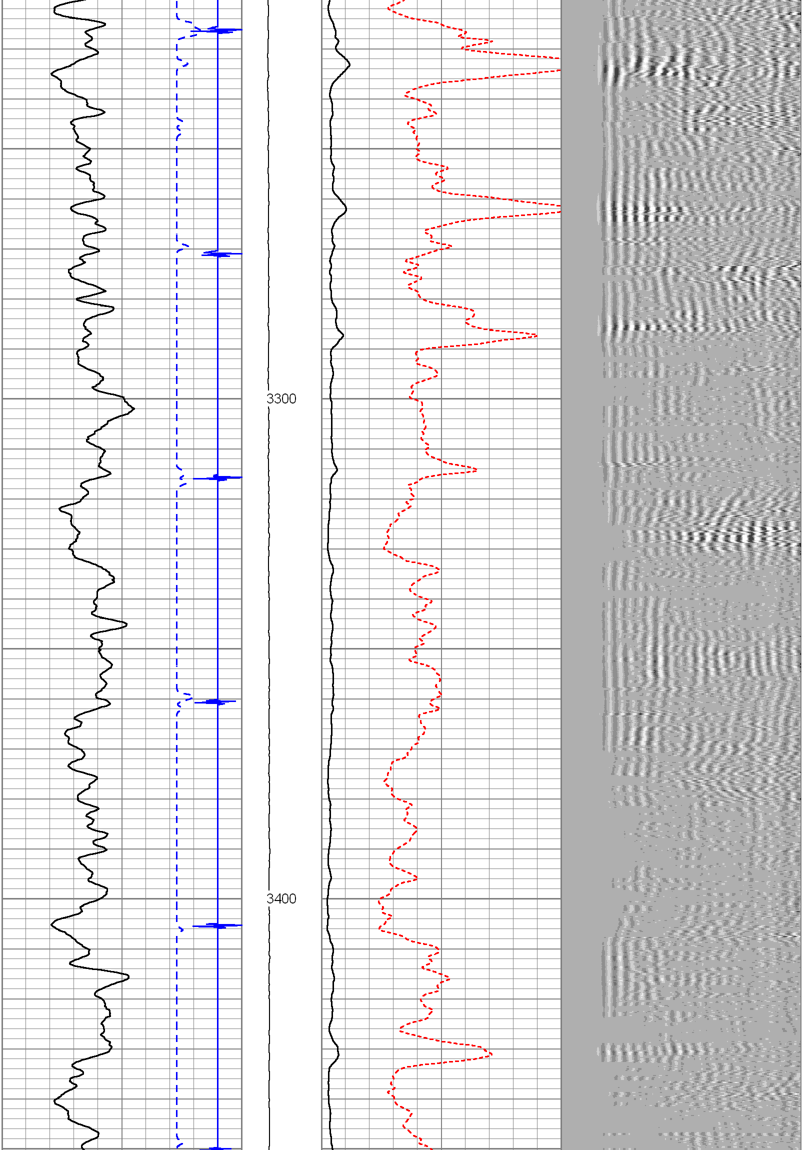


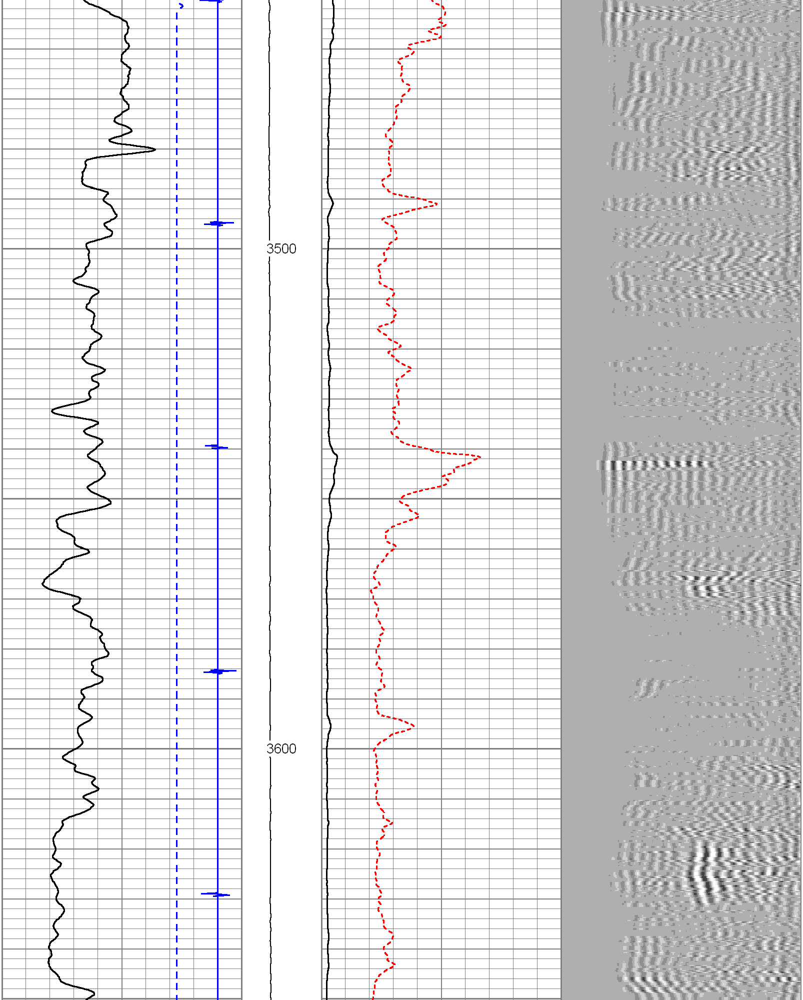


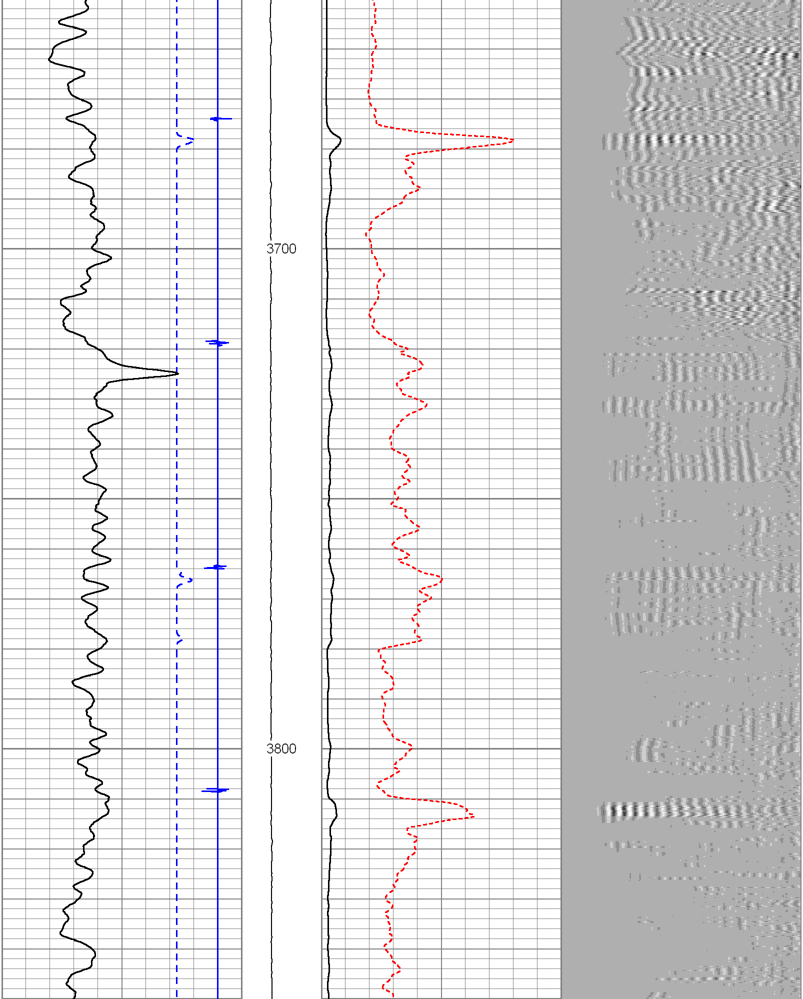


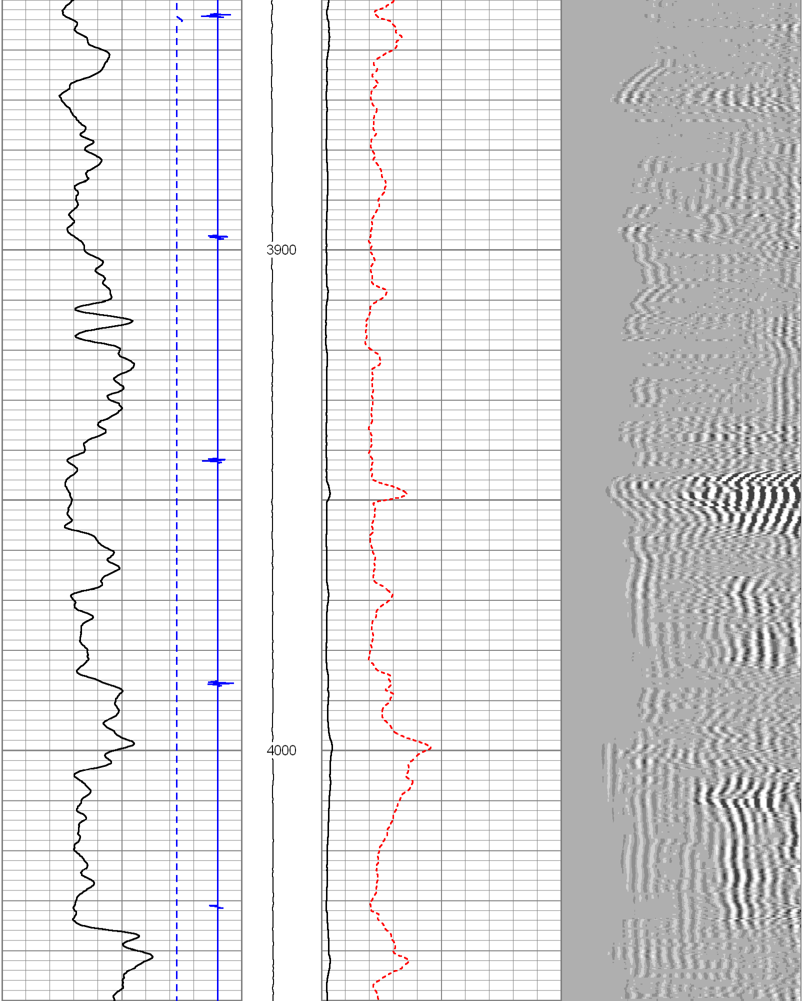


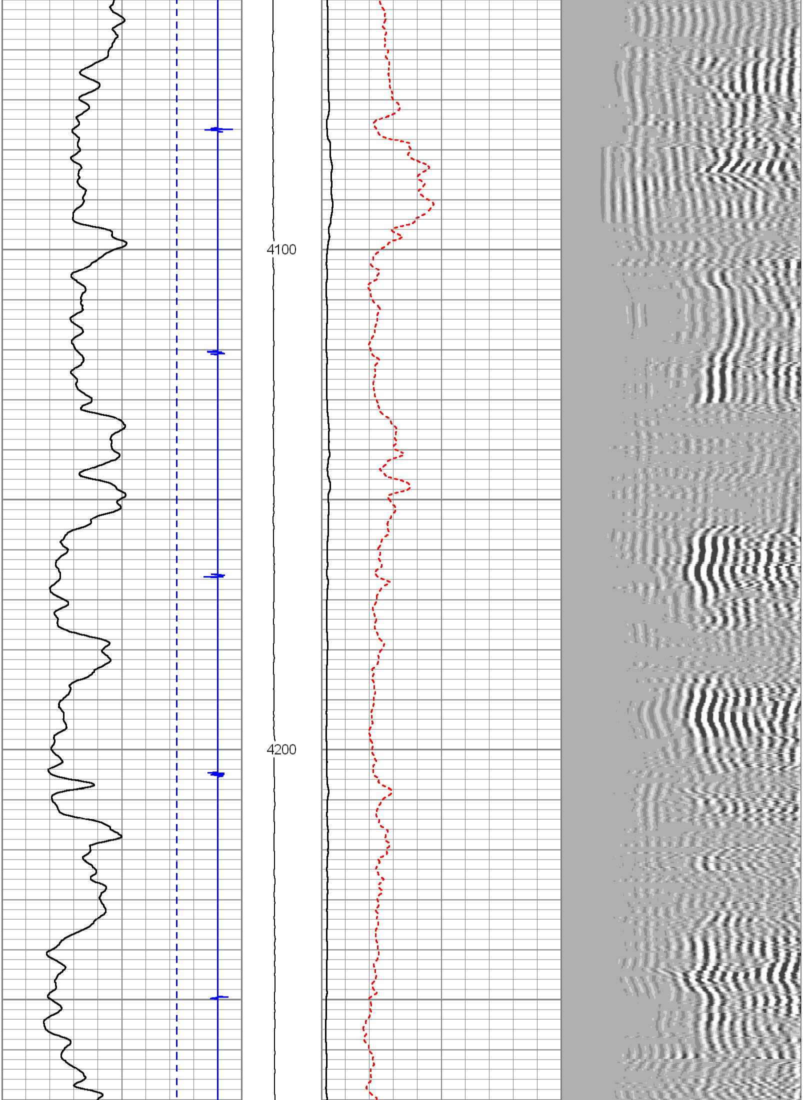


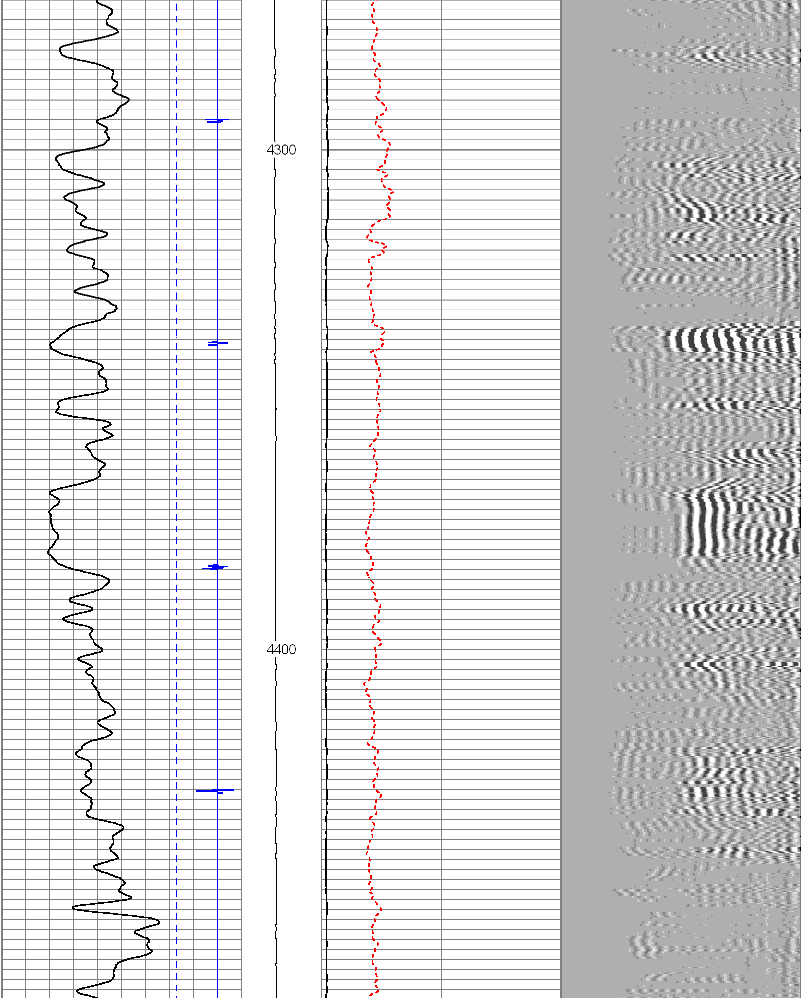


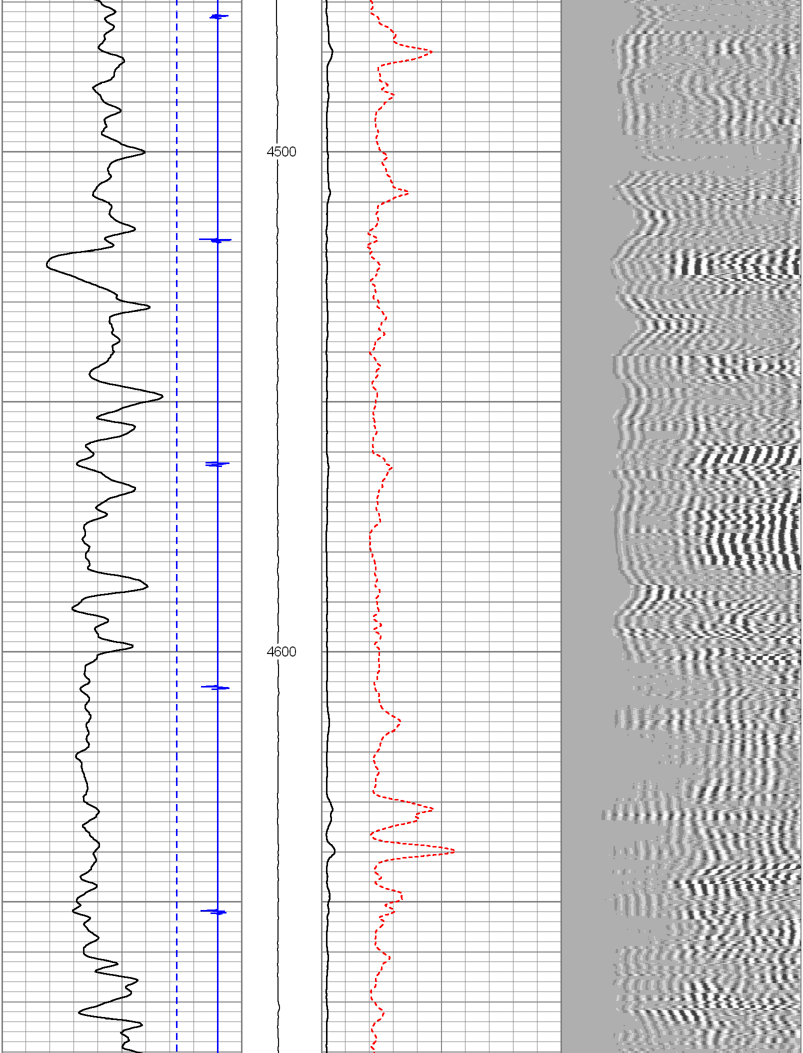


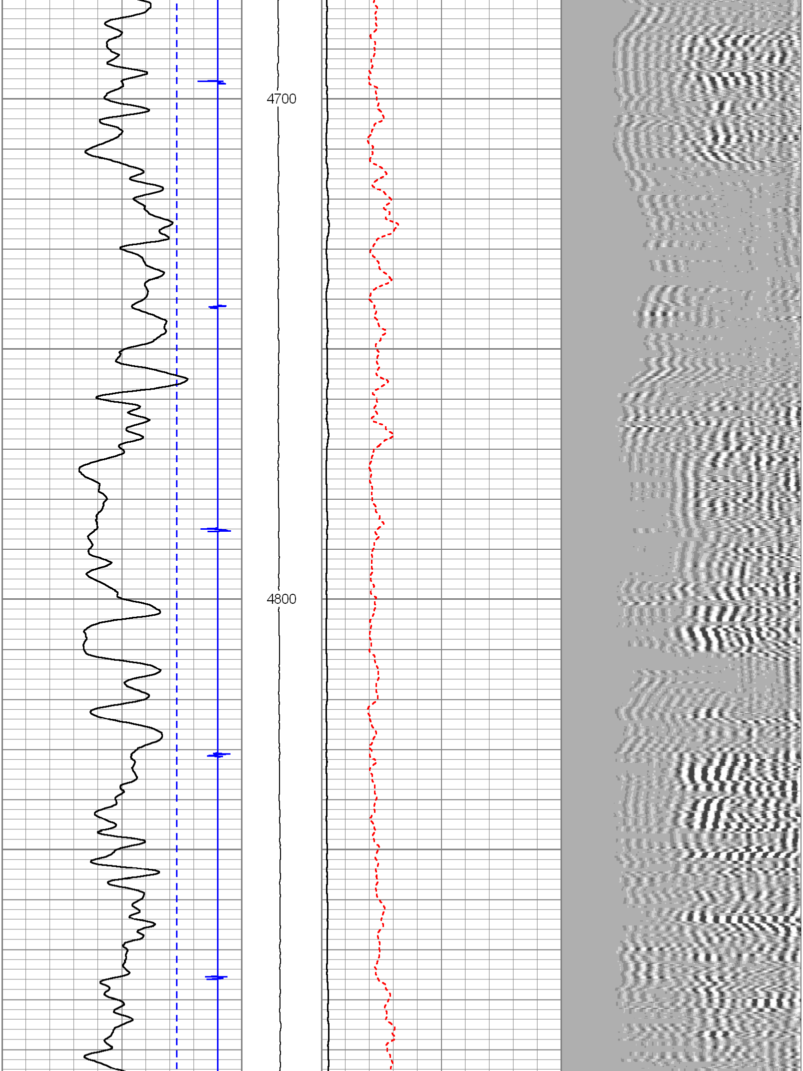


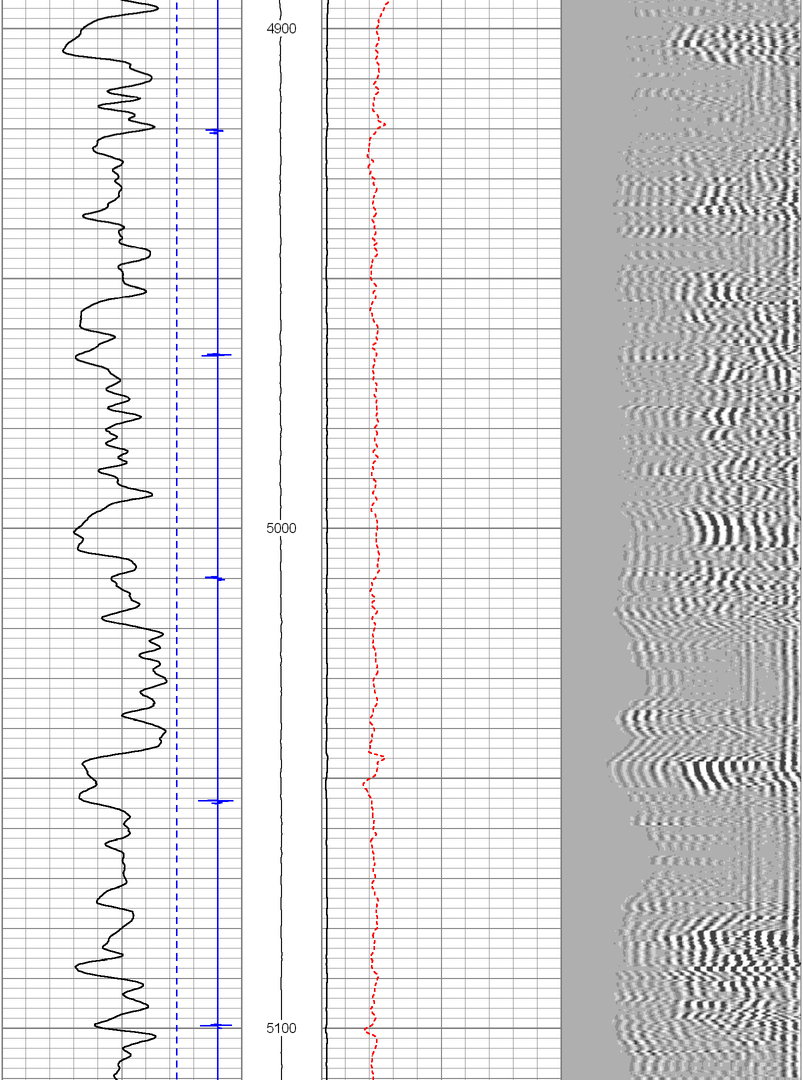


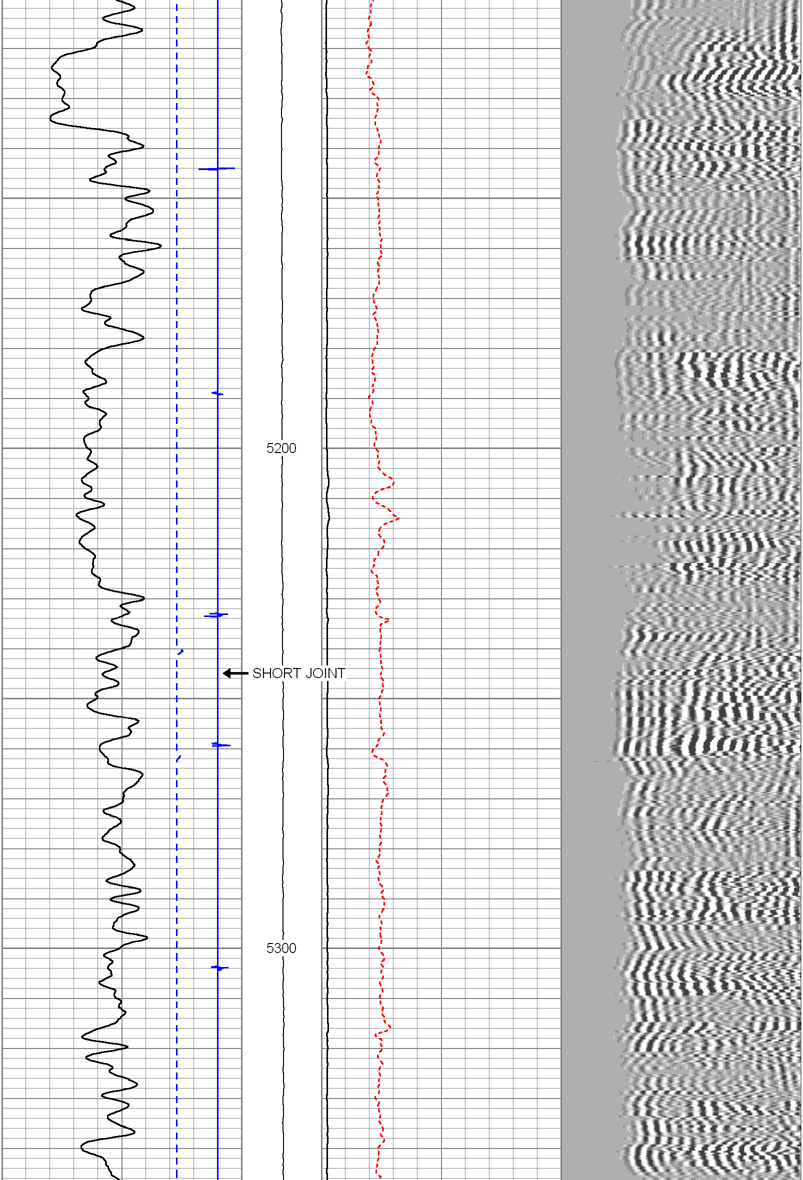


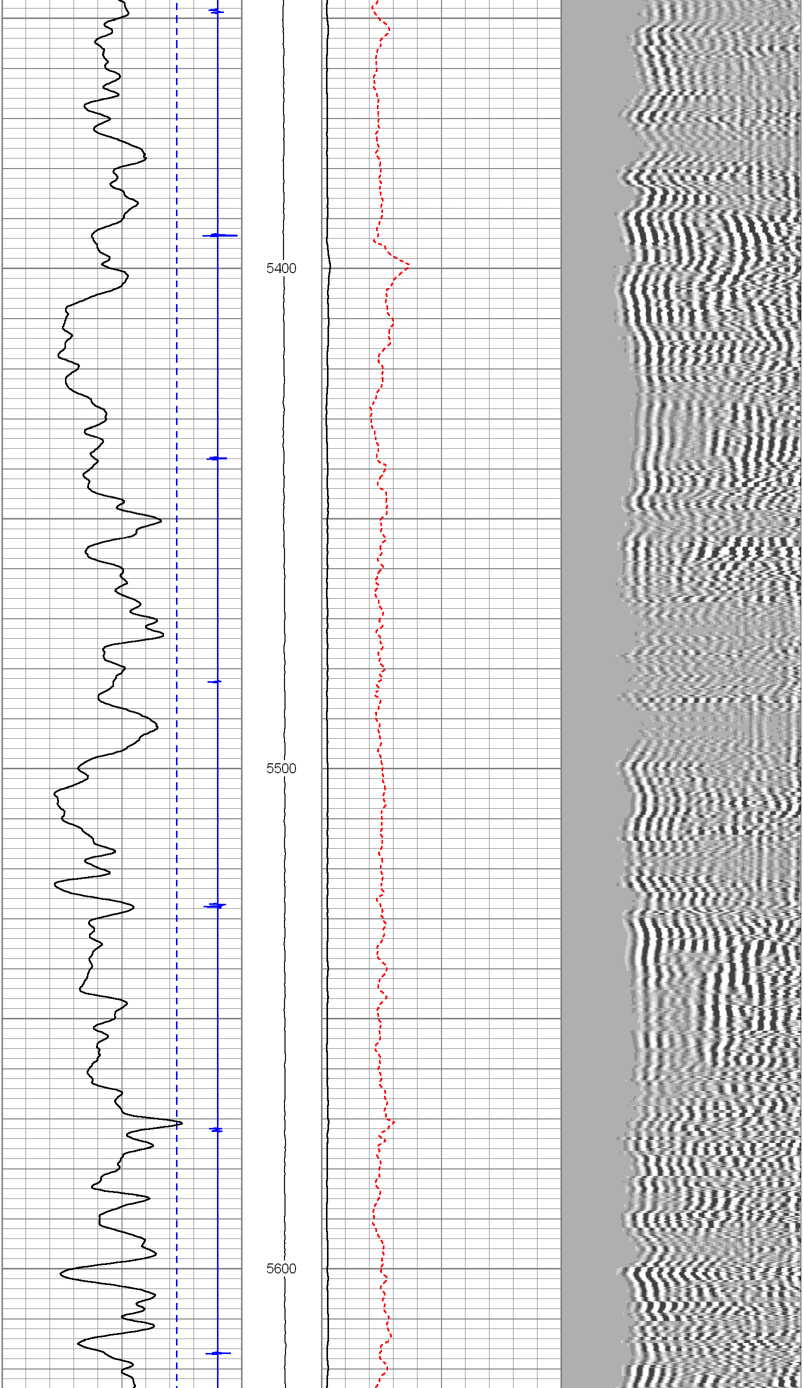


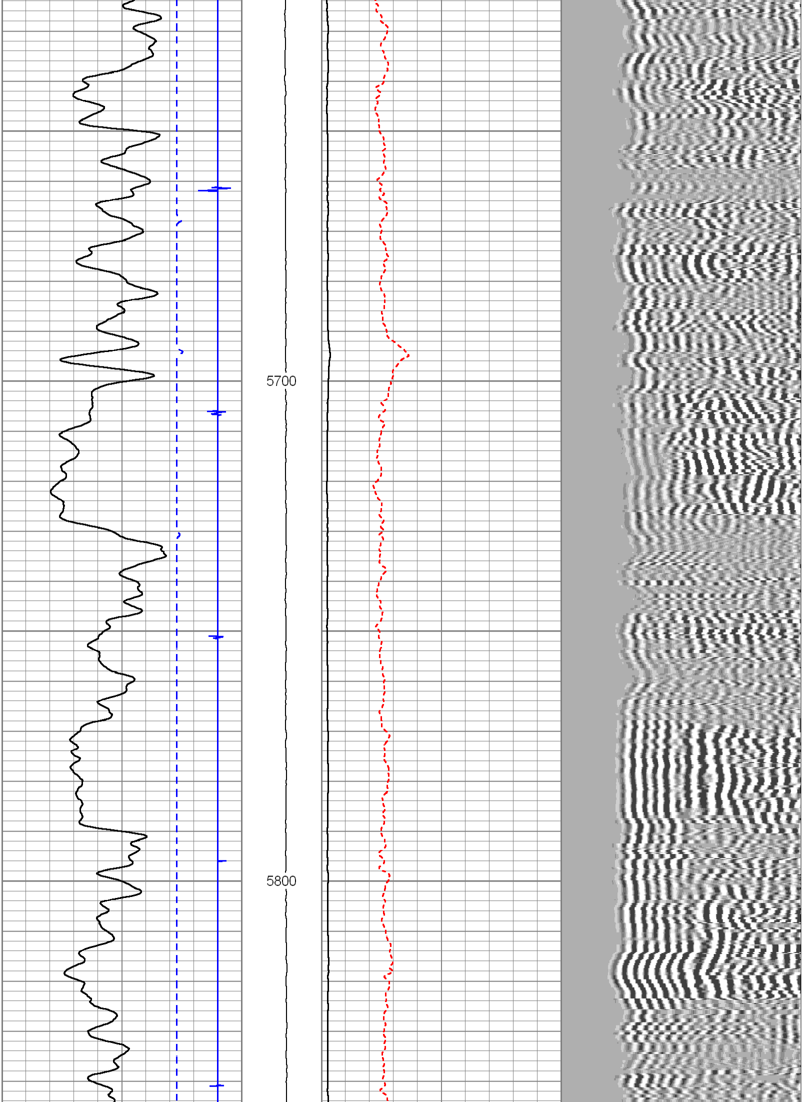


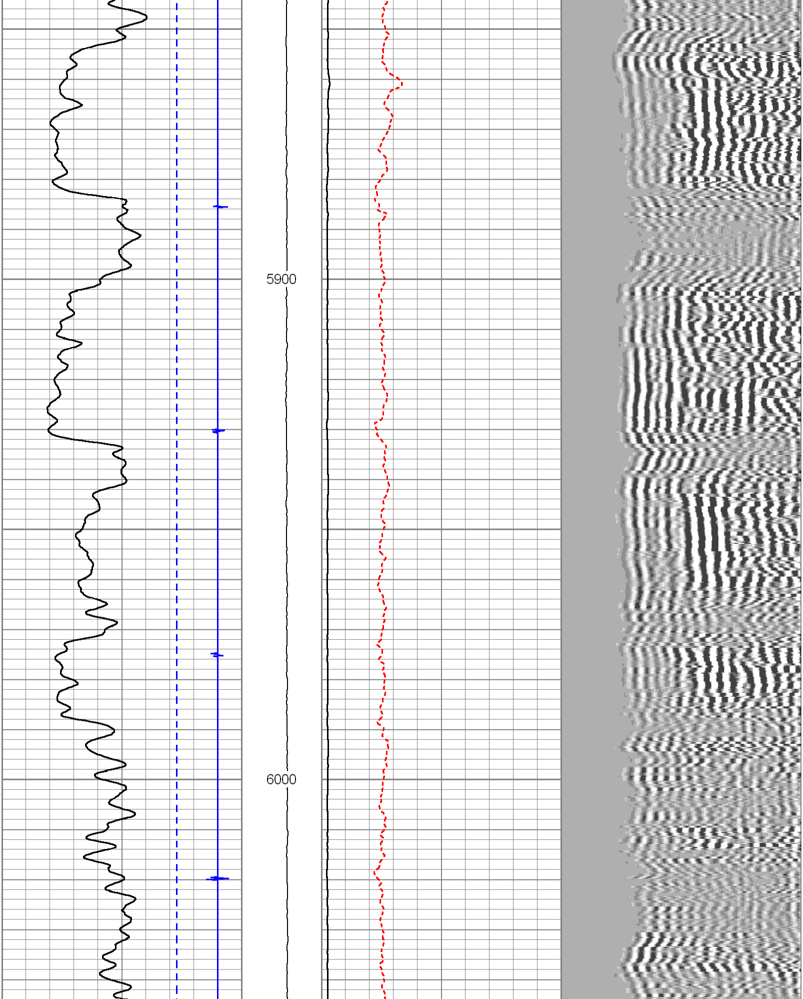


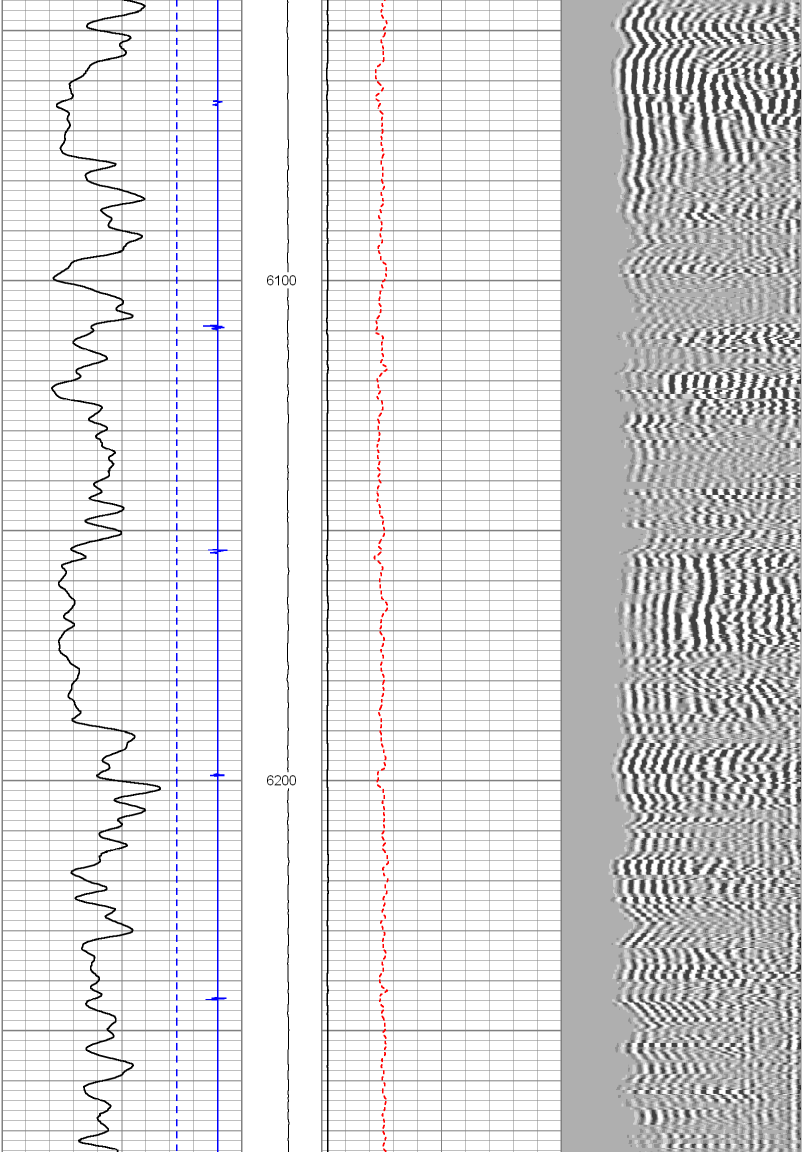


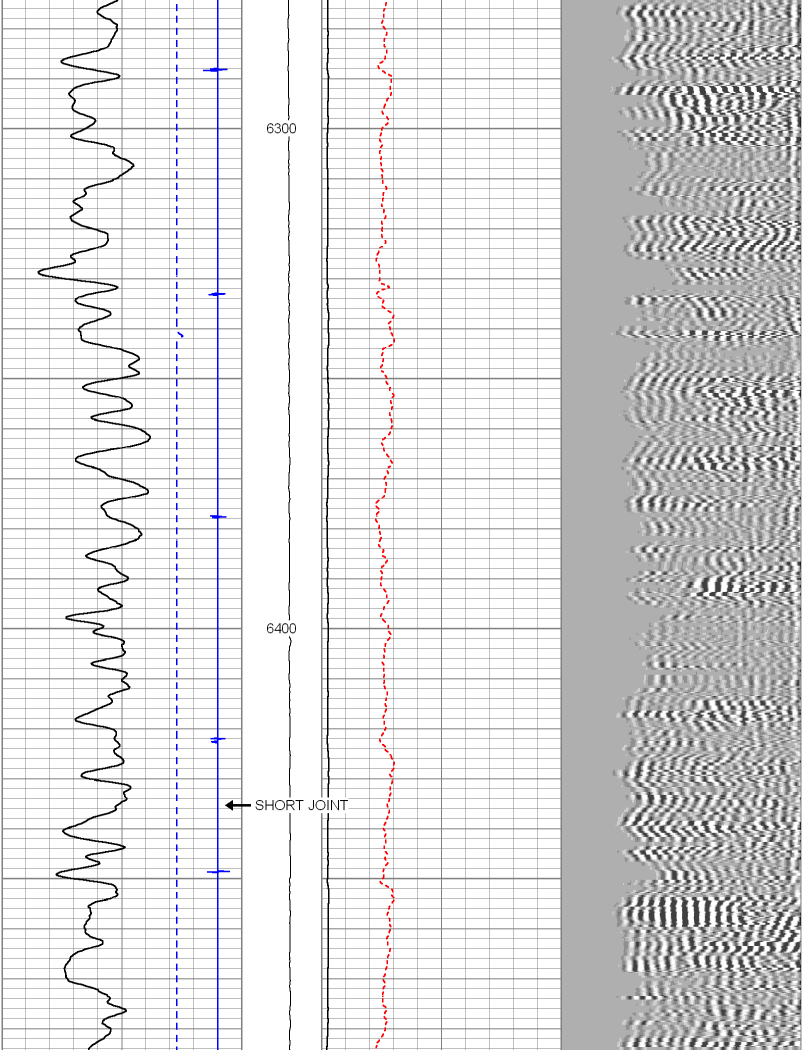


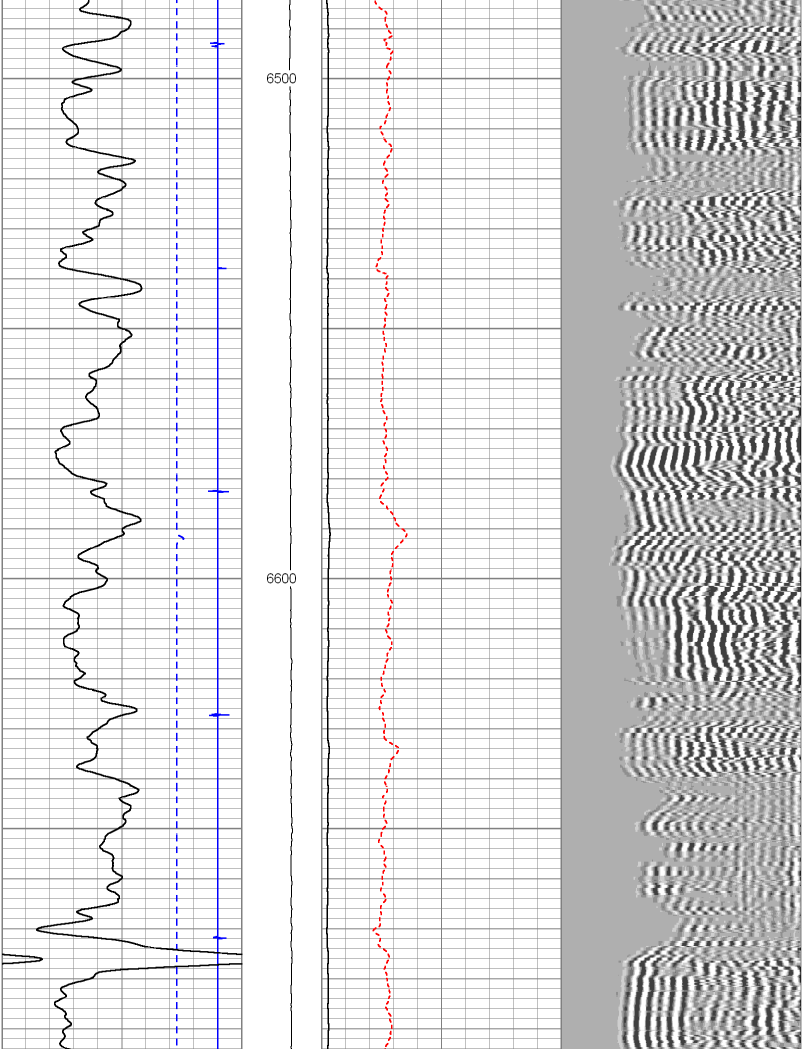


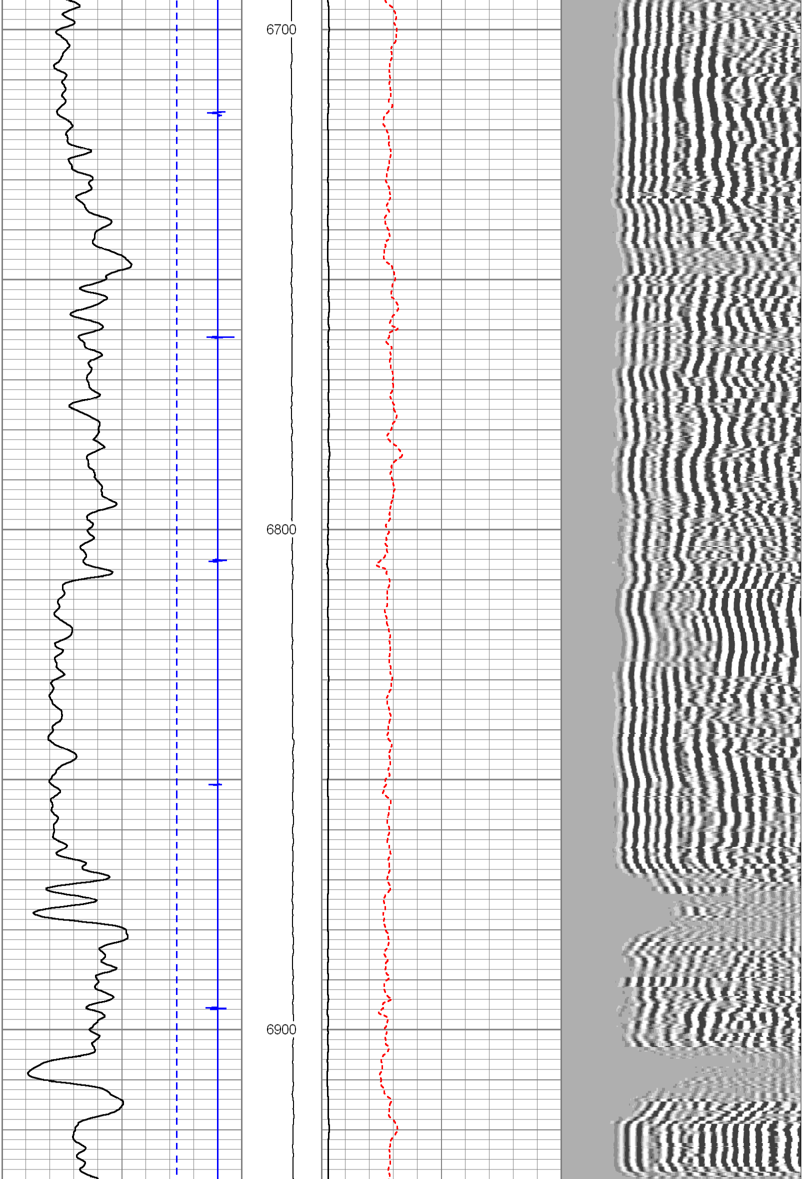


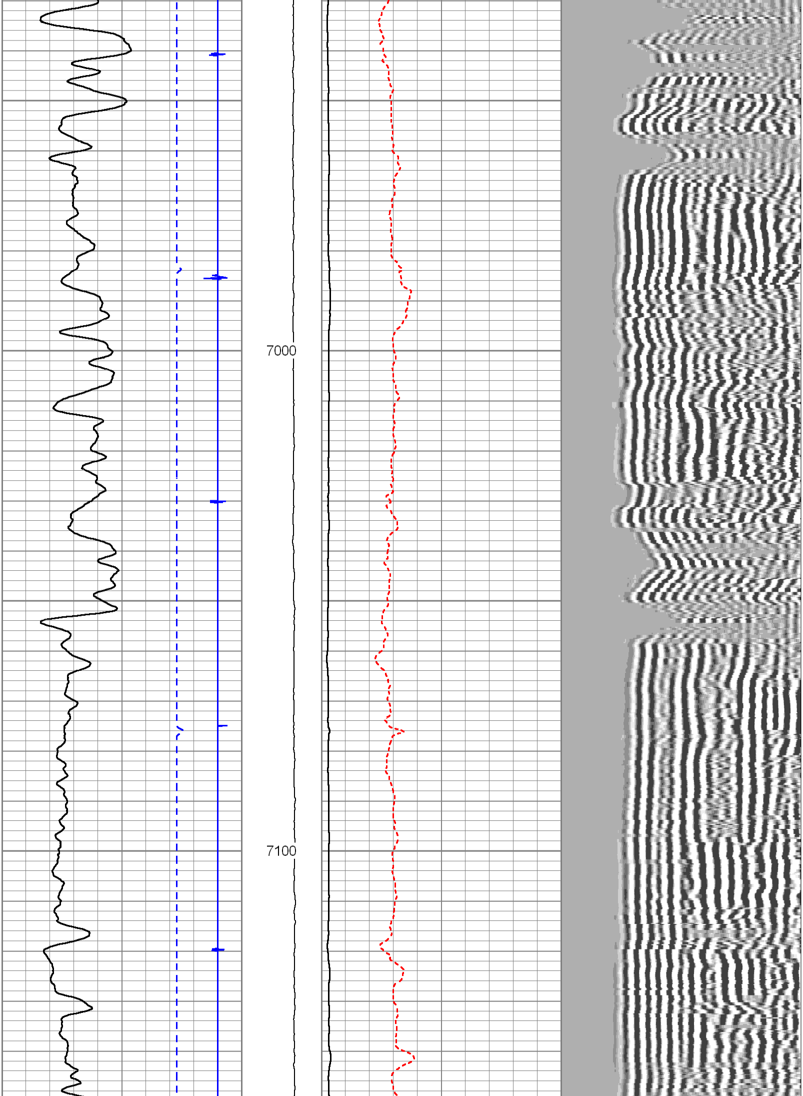


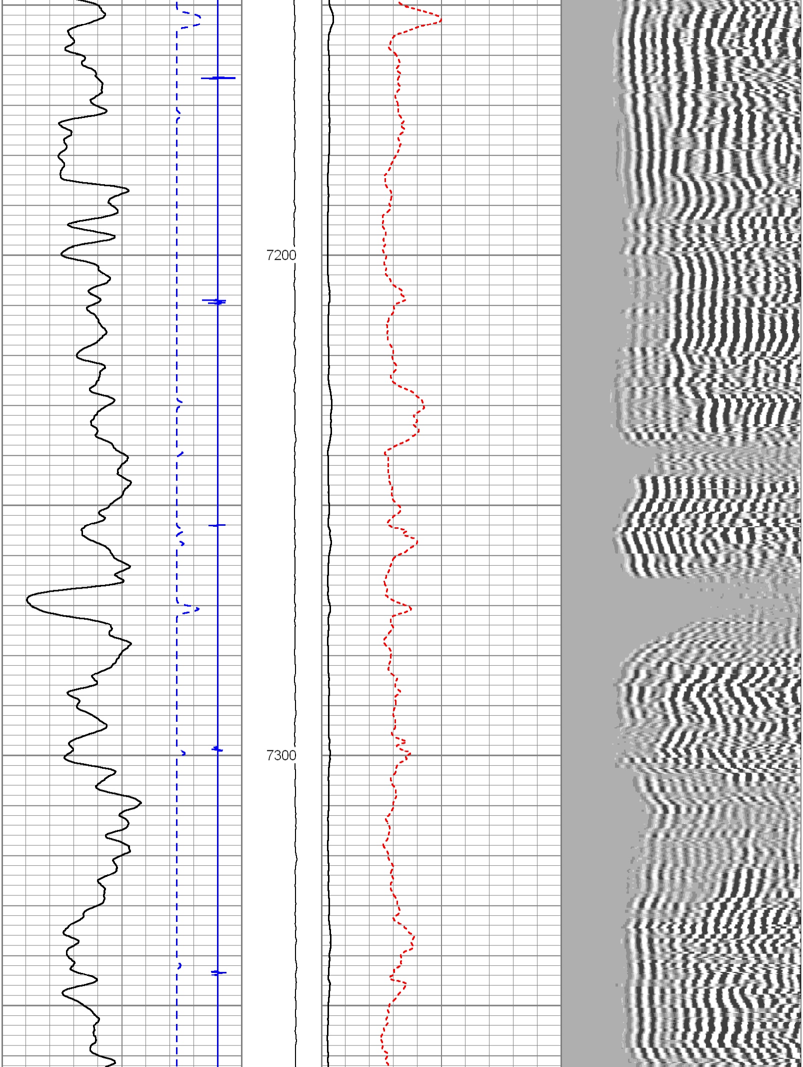


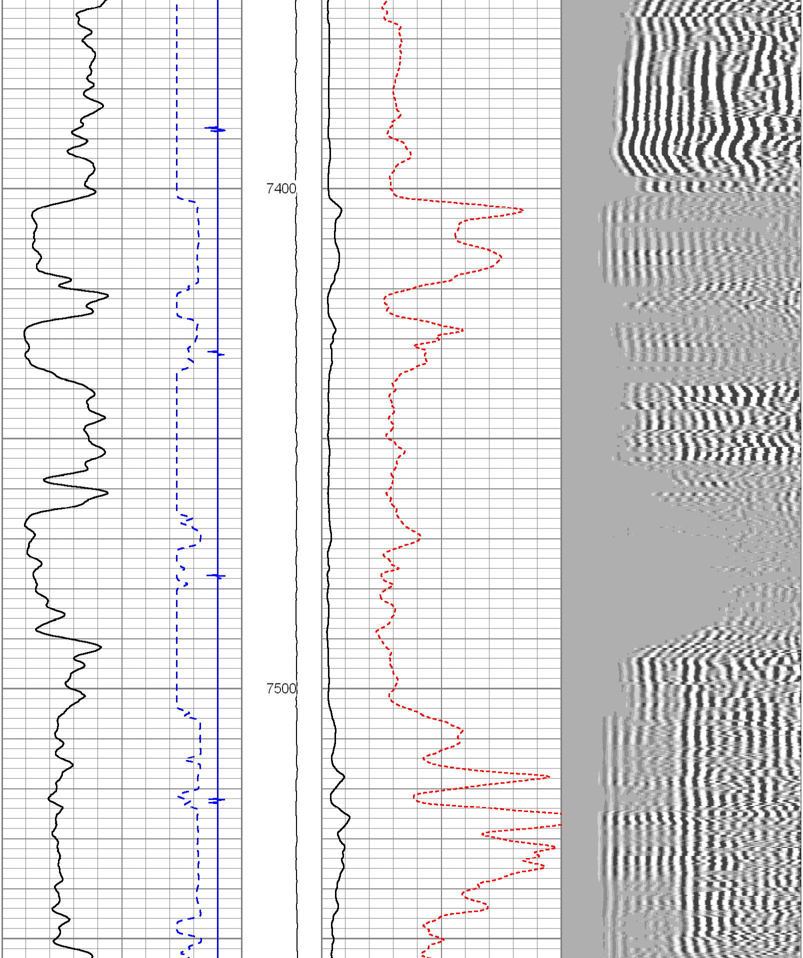


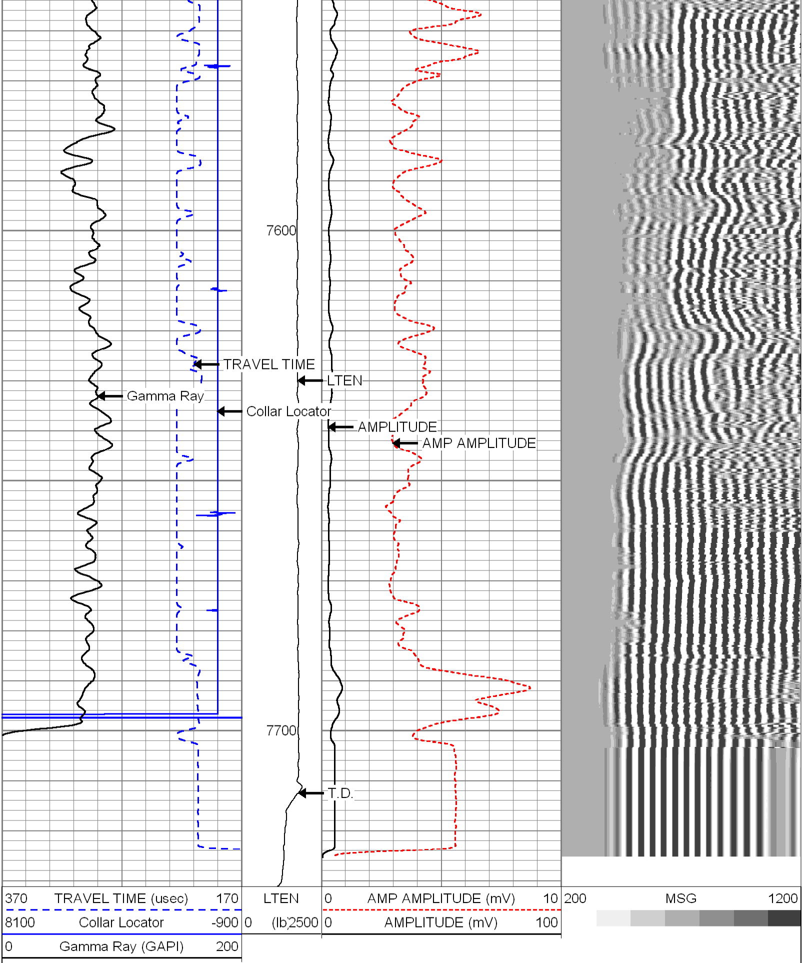












**HALLIBURTON**

# MAIN LOG SECTION

5"=100'

HALLIBURTON

# REPEAT LOG SECTION

5"=100'

| | |
|---|---|
| Database File: | c:\warrior\data\bill_barrett\ggu_jolley_44b_20_691\gguj_44b_20_691_cbl_rmt.db |
| Dataset Pathname: | MAMM_CREE/GGUJ44B20/run1/REPEAT2 |
| Presentation Format: | CBL_RB~1 |
| Dataset Creation: | Sat Apr 02 19:35:17 2011 by Log Halliburton Casedho |
| Charted by: | Depth in Feet scaled 1:240 |

370 TRAVEL TIME (usec) 170

8100 Collar Locator -900

0 Gamma Ray (GAPI) 200

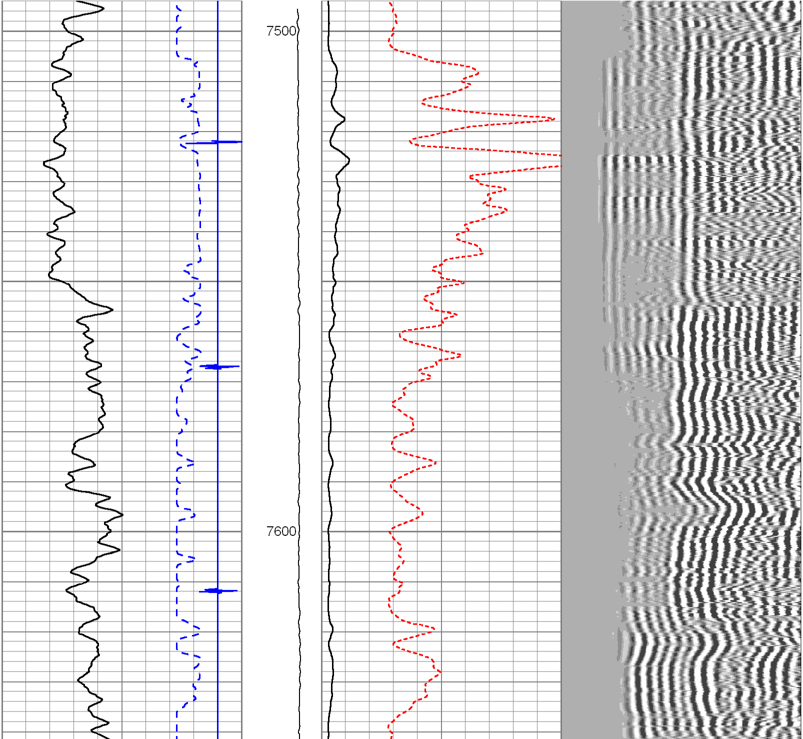
LTEN

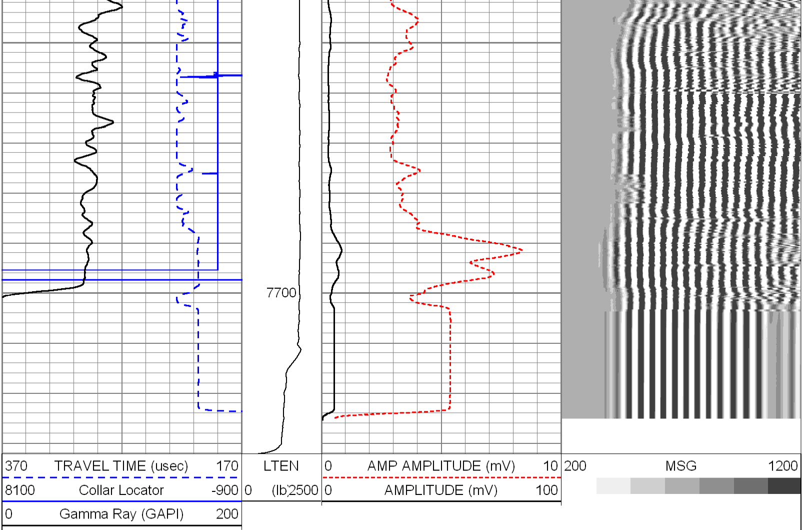
0 (lb) 2500

0 AMP AMPLITUDE (mV) 10

0 AMPLITUDE (mV) 100

200 MSG 1200





**HALLIBURTON**

# REPEAT LOG SECTION

5"=100'

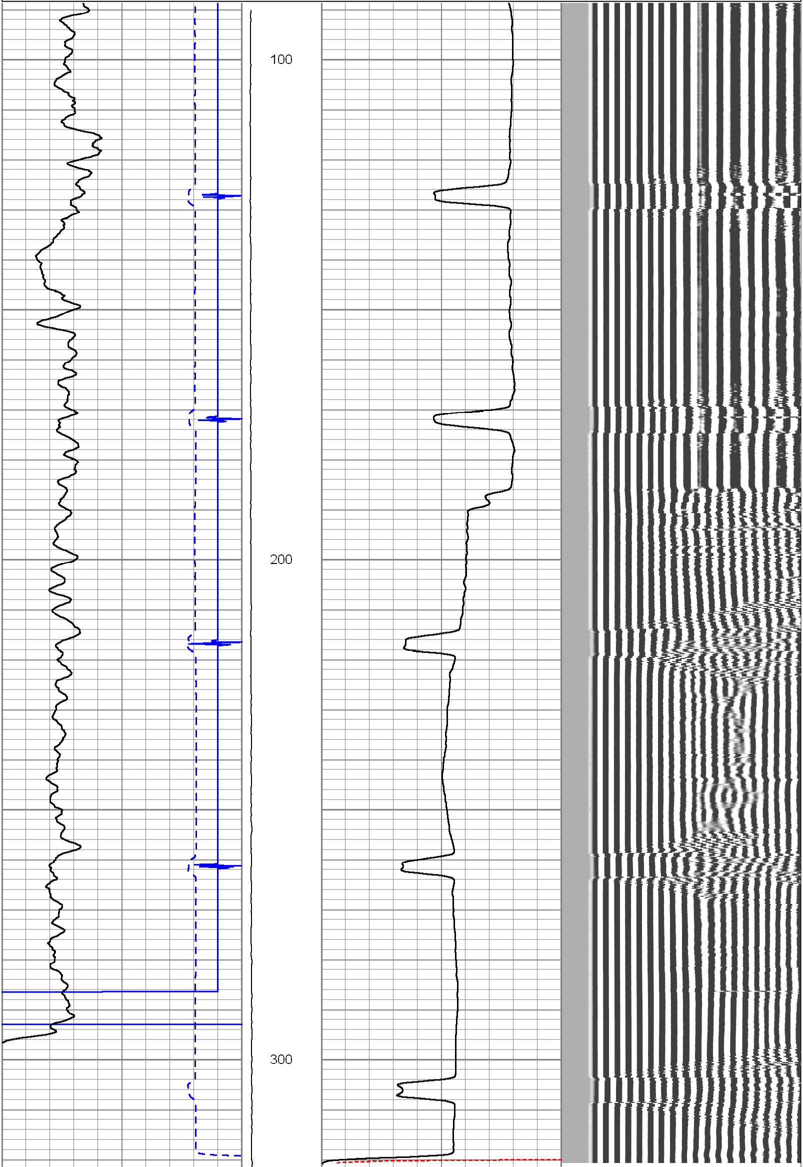
**HALLIBURTON**

# FREE PIPE LOG SECTION

5"=100'

| | |
|---|---|
| Database File: | c:\warrior\data\bill_barrett\ggu_jolley_44b_20_691\gguj_44b_20_691_cbl_rmt.db |
| Dataset Pathname: | MAMM_CREE/GGUJ44B20/run1/F_PIPE1 |
| Presentation Format: | CBL_RB~1 |
| Dataset Creation: | Sat Apr 02 18:11:01 2011 by Log Halliburton Casedho |
| Charted by: | Depth in Feet scaled 1:240 |

| | | | |
|---|---|---|---|
| 370 TRAVEL TIME (usec) 170 | LTEN | 0 AMP AMPLITUDE (mV) 10 | 200 MSG 1200 |
| 8100 Collar Locator -900 | 0 (lb) 2500 | 0 AMPLITUDE (mV) 100 | |
| 0 Gamma Ray (GAPI) 200 | | | |



| | | | |
|---|---|---|---|
| 370 TRAVEL TIME (usec) 170 | LTEN | 0 AMP AMPLITUDE (mV) 10 | 200 MSG 1200 |
| 8100 Collar Locator -900 | 0 (lb) 2500 | 0 AMPLITUDE (mV) 100 | |
| 0 Gamma Ray (GAPI) 200 | | | |

**HALLIBURTON**

# FREE PIPE LOG SECTION

5"=100'

## Calibration Report

Database File: c:\warrior\data\bill_barrett\ggu_jolley_44b_20_691\gguj_44b_20_691_cbl_rmt.db
Dataset Pathname: MAMM_CREE/GGUJ44B20/run1/MAIN1
Dataset Creation: Sat Apr 02 19:51:44 2011 by Log Halliburton Casedho

## Segmented Cement Bond Log Calibration Report

| | | |
|---|---|---|
| Serial Number: | 1119 | |
| Tool Model: | 004 | |
| Calibration Casing Diameter: | 4.500 | in |
| Calibration Depth: | 191.783 | ft |

Master Calibration, performed Sat Apr 02 18:08:19 2011:

| | Raw (v) | | Calibrated (mv) | | Results | |
|---|---|---|---|---|---|---|
| | Zero | Cal | Zero | Cal | Gain | Offset |
| 3FT | 0.022 | 1.199 | 2.000 | 81.196 | 67.263 | 0.532 |
| 5FT | 0.009 | 0.932 | 2.000 | 81.196 | 85.798 | 1.267 |
| S1 | 0.028 | 1.085 | 0.000 | 100.000 | 94.584 | -2.656 |
| S2 | 0.031 | 1.278 | 0.000 | 100.000 | 80.188 | -2.503 |
| S3 | 0.026 | 1.014 | 0.000 | 100.000 | 101.127 | -2.592 |
| S4 | 0.025 | 1.009 | 0.000 | 100.000 | 101.596 | -2.508 |
| S5 | 0.026 | 1.029 | 0.000 | 100.000 | 99.726 | -2.593 |
| S6 | 0.027 | 1.104 | 0.000 | 100.000 | 92.873 | -2.485 |
| S7 | 0.027 | 1.179 | 0.000 | 100.000 | 86.839 | -2.379 |
| S8 | 0.027 | 1.201 | 0.000 | 100.000 | 85.130 | -2.256 |

## Calibration Report

Serial Number: 1119
Tool Model: 004
Performed:

| | Reference (degF) | Reading () |
|---|---|---|
| Low: | 0.000 | 0.000 |
| High: | 1.000 | 1.000 |
| | Gain = 1.000 | Offset= 0.000 |

## Reservoir Monitor Tool Elite Calibration Report

Serial-Model: U070-A

Shop Calibration Performed: Fri Apr 01 12:49:31 2011

Linearity Results (Generator Off)

Near Detector 5 Peaks Found

| Channel | Amplitude | FWHM |
|---|---|---|
| 52.39 | 0.00982 | 5.05 |
| 94.84 | 0.00433 | 5.47 |
| 107.35 | 0.00780 | 7.38 |
| 135.16 | 0.00027 | 7.88 |
| 182.53 | 0.00063 | 8.64 |
| 0.00 | 0.00000 | 0.00 |
| 0.00 | 0.00000 | 0.00 |
| 0.00 | 0.00000 | 0.00 |
| 0.00 | 0.00000 | 0.00 |
| 0.00 | 0.00000 | 0.00 |

Near Detector

H Position 52.39  C Position 107.35  FE Position 182.53

Linearity Correction 3.76

Far Detector 7 Peaks Found

| Channel | Amplitude | FWHM |
|---|---|---|
| 52.45 | 0.01449 | 5.16 |
| 96.23 | 0.00182 | 4.16 |
| 108.98 | 0.00698 | 7.35 |
| 138.38 | 0.00018 | 5.04 |
| 151.74 | 0.00053 | 8.43 |
| 184.39 | 0.00065 | 7.54 |
| 197.87 | 0.00105 | 9.81 |
| 0.00 | 0.00000 | 0.00 |
| 0.00 | 0.00000 | 0.00 |
| 0.00 | 0.00000 | 0.00 |

Far Detector

H Position 52.45  C Position 108.98  FE Position 184.39

Linearity Correction 3.01

Carbon/Oxygen Mode

Stabilization

| | Reading | Range |
|---|---|---|
| GENV | 75.95 | 70 - 100 Volts |
| RAW ITCR2 | 3443 | 3000 - 3500 CPS |

Near Detector

| | Channel | Expected | Amplitude | FWHM | Tol |
|---|---|---|---|---|---|
| H | 45 | 52 | 0.0342 | 4.95 | <6.00 |
| FE | 197 | 198 | 0.0978 | ---- | ---- |

NGAIN = 0.964   NZOFF = 8.832

Far Detector

| | Channel | Expected | Amplitude | FWHM | Tol |
|---|---|---|---|---|---|
| H | 49 | 52 | 0.0447 | 5.21 | <6.50 |
| FE | 202 | 198 | 0.0943 | ---- | ---- |

FGAIN = 0.967   FZOFF = 5.582

| | Result | Expected |
|---|---|---|
| COIR2 | 0.440 | 0.41 - 0.47 |
| LIRI2 | 1.410 | 1.20 - 1.60 |
| TCCR2 | 4088 | 3000 - 5000 CPS |
| ITCR2 | 3350 | 3000 - 3500 CPS |

Capture Mode

Stabilization

| | Reading | Range |
|---|---|---|
| GENV | 81.83 | 70 - 100 Volts |
| FCAP | 10142 | 9500 - 10500 CPS |

| Result | Logged | Expected Value | Diff. | Tol. | Units |
|---|---|---|---|---|---|
| Ratio Normalizer | 5.17 | 4.90 | 0.27 | +/- 0.40 | |
| Ratio Inel Norm | 1.09 | 1.00 | 0.09 | +/- 0.15 | |
| Near Spaced Count | 9915 | 8100 - 13000 | | | CPS |
| Far Spaced Count | 9957 | 9000 - 11000 | | | CPS |
| Sigma Form Near | 23.62 | 23.50 | 0.12 | +/- 1.00 | C.U. |
| Sigma Bore Near | 77.32 | 77.00 | 0.32 | +/- 5.00 | C.U. |
| Sigma Form Far | 22.36 | 22.40 | -0.04 | +/- 0.50 | C.U. |
| Ratio Near/Far | 1.00 | 1.05 | -0.05 | +/- 0.15 | |
| Ratio N/F Inel | 1.70 | 1.81 | -0.11 | +/- 0.25 | |
| Near Error | 0.71 | <5.00 | | | |
| Far Error | 1.12 | <5.00 | | | |
| Near Background | 109 | <500 | | | |
| Far Background | 122 | <200 | | | |
| Near Resolving Time | 0.956 | 0.00 - 2.00 | | | |
| Far Resolving Time | 0.958 | 0.00 - 2.00 | | | |

## Calibration Software Modules

| | |
|---|---|
| PNLS Module | 2010.9.24.0 |
| RMTE Module | 2010.10.1.1 |

## Gamma Ray Calibration Report

Type / Serial: 001 / 10002717

SHOP CALIBRATION Sat Apr 02 08:47:19 2011

| | Counts/Sec. | Gain | Offset | Jig | Units |
|---|---|---|---|---|---|
| Background | 38.5 | | | | cps |
| Calibrator | 189.8 | | | | cps |
| | | 1.5196 | | | GAPI/cps |

PRIMARY VERIFICATION Sat Apr 02 08:51:11 2011

| | Counts/Sec. | Gain | Offset | Jig | Units |
|---|---|---|---|---|---|
| Background | 58.6 | | | | cps |
| Calibrator | 288.5 | | | | cps |
| Difference | | | | 230.0 | GAPI |

BEFORE SURVEY VERIFICATION

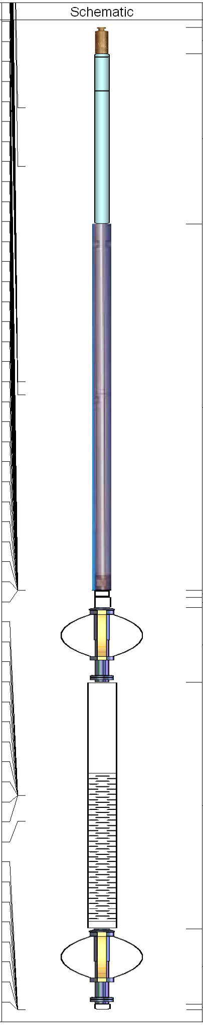
| | Counts/Sec. | Gain | Offset | Jig | Units |
|---|---|---|---|---|---|
| Background | 0.0 | | | | cps |
| Calibrator | 0.0 | | | | cps |
| Difference | | | | 0.0 | GAPI |

AFTER SURVEY VERIFICATION

| | Counts/Sec. | Gain | Offset | Jig | Units |
|---|---|---|---|---|---|
| Background | 0.0 | | | | cps |
| Calibrator | 0.0 | | | | cps |
| Difference | | | | 0.0 | GAPI |

| Sensor | Offset (ft) |
|---|---|
| REPV | 16.11 |
| REPI | 16.11 |
| GENV | 16.11 |
| GENI | 16.11 |
| ISV | 16.11 |
| ISI | 16.11 |
| IONI | 16.11 |
| LSHV | 16.11 |
| SSHV | 16.11 |
| ROMTEMP | 16.11 |
| FLASKTEMP | 16.11 |
| CNTL | 16.11 |
| GNCTL | 16.11 |
| SPECSTAT | 16.11 |
| FSTAT | 16.11 |
| REPV | 16.11 |
| REPI | 16.11 |
| GENV | 16.11 |
| GENI | 16.11 |
| ISV | 16.11 |
| ISI | 16.11 |
| IONI | 16.11 |
| LSHV | 16.11 |
| SSHV | 16.11 |
| ROMTEMP | 16.11 |
| FLASKTEMP | 16.11 |
| CNTL | 16.11 |
| GNCTL | 16.11 |
| SPECSTAT | 16.11 |
| FSTAT | 16.11 |
| WVF3FT | 8.24 |
| WVFS1 | 8.24 |
| WVFS2 | 8.24 |
| WVFS3 | 8.24 |
| WVFS4 | 8.24 |
| WVFS5 | 8.24 |
| WVFS6 | 8.24 |
| WVFS7 | 8.24 |
| WVFS8 | 8.24 |
| CBLTEMP | 8.24 |
| CBLROT | 8.24 |
| WVF5FT | 7.24 |
| LLMTEN | 0.00 |
| XHUTEMP | 0.00 |
| XHUCURR | 0.00 |
| XHUVOLT | 0.00 |
| XHUSTAT | 0.00 |
| TSTAMP | 0.00 |
| ITEMPX | 0.00 |
| HVOLTX | 0.00 |

Schematic



| Description | Len (ft) | OD (in) | Wt (lb) |
|---|---|---|---|
| STND_CH<br>1.4375 IN CABLE HEAD | 1.00 | 1.44 | 1.00 |
| TTTCU-001 (10002717)<br>Through Tubing Telemetry Cartridge - Ultrawire | 6.55 | 1.69 | 33.00 |
| RMTE-A (U070)<br>RMTE | 14.06 | 2.13 | 77.00 |
| GoxSondex<br>Go Box x Sondex Pin CrossOver | 0.27 | 1.69 | 1.00 |
| AUH-001 (000001)<br>Adaptor Ultrawire/Halliburton | 0.38 | 1.69 | 3.00 |
| CENT-Probe (PT_MONO2)<br>Probe 2 3/4 Centralizer | 2.88 | 2.75 | 35.00 |
| RBT-004 (1119)<br>Radial Bond Tool (UW 3 1/8) | 9.47 | 3.13 | 140.00 |
| CENT-Probe (PTS_MONO)<br>Probe 2 3/4 Centralizer | 2.88 | 2.75 | 35.00 |
| BUL-006 (000002)<br>Bullnose Terminator | 0.22 | 1.69 | 1.20 |

| | |
|---|---|
| Dataset: | gguj_44b_20_691_cbl_rmt.db: MAMM_CREE/GGUJ44B20/run1/MAIN1 |
| Total Length: | 37.73 ft |
| Total Weight: | 326.20 lb |
| O.D. | 3.13 in |

| | |
|---|---|
| Company | BILL BARRETT CORPORATION |
| Well | GGU JOLLEY 44B-20-691 |
| Field | MAMM CREEK |
| County | GARFIELD |
| State | CO |

HALLIBURTON

## ACOUSTIC CEMENT BOND LOG