



# COMPENSATED PHOTO DENSITY COMPENSATED DUAL NEUTRON LOG

|                             |                                 |        |   |
|-----------------------------|---------------------------------|--------|---|
| COMPANY                     | CHEVRON U.S.A.                  |        |   |
| WELL                        | FEE 159X                        |        |   |
| FIELD                       | RANGELY WEBER SAND UNIT         |        |   |
| PROVINCE/COUNTY             | RIO BLANCO                      |        |   |
| COUNTRY/STATE               | U.S.A / COLORADO                |        |   |
| LOCATION                    | 2428' FSL & 1253' FWL           |        |   |
| LSD                         | SEC                             | TWP    | RGE   |
|                             | 17                              | 2N     | 102W  |
|                             | Other Services                  |        |   |
|                             | MAI/MFE                         |        |   |
| API Number                  | 05-103-11011                    |        |   |
| Permit Number               | 05-103-11011                    |        |   |
| Permanent Datum             | G.L., Elevation 5333 feet       |        |   |
| Log Measured From K.B.      | @ 22 FEET above Permanent Datum |        |   |
| Drilling Measured From K.B. |                                 |        |   |
| Date                        | 5-SEP-2008                      |        | Elevations:<br>KB 5355.00<br>DF 5354.00<br>GL 5333.00 |
| Run Number                  | ONE                             |        |   |
| Depth Driller               | 6515.00                         | feet   |   |
| Depth Logger                | 6510.00                         | feet   |   |
| First Reading               | 6489.00                         | feet   |   |
| Last Reading                | 6334.00                         | feet   |   |
| Casing Driller              | 6342.00                         | feet   |   |
| Casing Logger               | 6334.00                         | feet   |   |
| Bit Size                    | 6.13                            | inches |   |
| Hole Fluid Type             | SALT BRINE                      |        |   |
| Density / Viscosity         |                                 |        |   |
| PH / Fluid Loss             |                                 |        |   |
| Sample Source               |                                 |        |   |
| Rm @ Measured Temp          |                                 |        |   |
| Rmf @ Measured Temp         |                                 |        |   |
| Rmc @ Measured Temp         |                                 |        |   |
| Source Rmf / Rmc            |                                 |        |   |
| Rm @ BHT                    |                                 |        |   |
| Time Since Circulation      |                                 |        |   |
| Max Recorded Temp           | 162.00                          | deg F  |   |
| Equipment Name              | COMPACT                         |        |   |
| Equipment / Base            | 13144                           | GDUCT  |   |
| Recorded By                 | B. ROSSER                       |        |   |
| Witnessed By                | G. COLLINS                      |        |   |
| Last Title                  | Last Line                       |        | Last Line   |

| BOREHOLE RECORD    |                |                    |                    | Last Edited: 5-SEP-2008 09:58 |
|--------------------|----------------|--------------------|--------------------|-------------------------------|
| Bit Size<br>inches |                | Depth From<br>feet |                    | Depth To<br>feet              |
| 6.125              |                | 6342.00            |                    | 6515.00                       |
| CASING RECORD      |                |                    |                    |                               |
| Type               | Size<br>inches | Depth From<br>feet | Shoe Depth<br>feet | Weight<br>pounds/ft           |
| Surface            | 7.000          | 0.00               | 6342.00            | 23.00                         |

| REMARKS   |
|---|
| TOOLS RUN: MAI, MFE, SKJ, MPD, MDN, MCG, SHA RAN IN COMBINATION.  |
| HARDWARE: MAI: TWO 0.5 INCH STANDOFFS USED.<br>MFE: ONE 0.5 INCH STANDOFF USED.<br>MPD: 8 INCH PROFILE PLATE USED.<br>MDN: DUAL BOWSPRING USED. |
| INDUCTION RAN IN VECTAR REPROCESSED WITH RTAP SCRIPT.   |
| PRESSURE EQUIPMENT USED PER CUSTOMER'S REQUEST.   |
| UNABLE TO GET FLUID SAMPLE TO TEST FOR RESISTIVITY.   |
| 2.68 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY.  |
| 300 FEET OF LOG PROVIDED ABOVE CASING SHOE FOR GAMMA RAY CORRELATION.   |
| ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.   |

COMPLETE WELL INFORMATION NOT AVAILABLE IN FIELD.

TIGHT PULLS, BOREHOLE SIZE AND RUGOSITY WILL AFFECT REPEATABILITY AND DATA QUALITY.

OPERATOR: D. ALVEY.

SERVICE ORDER: #3505027.

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 interpretations, and we shall not, except in the case of gross or wilful 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 in our price schedule.

↓

5 INCH MAIN LOG

↓

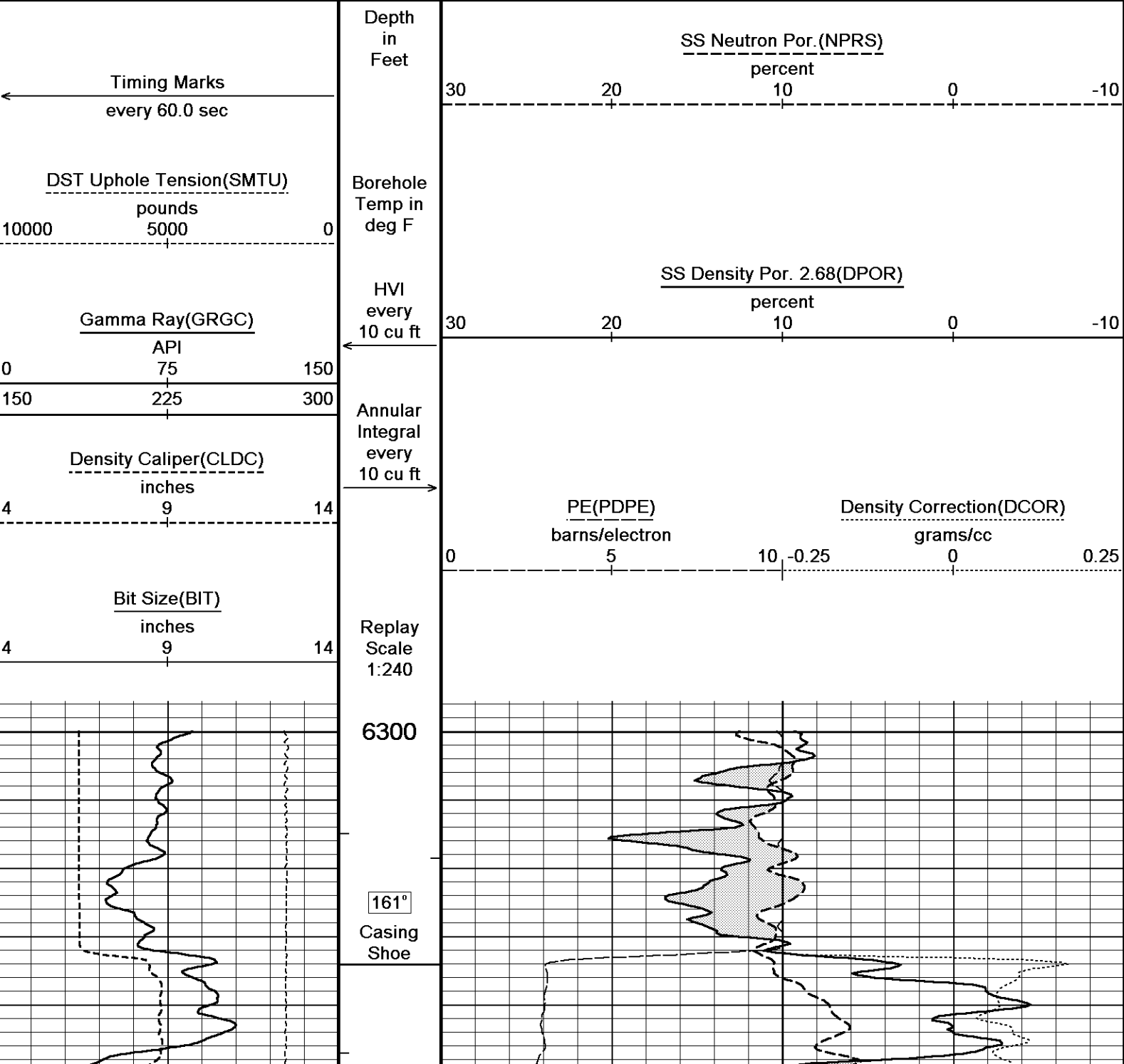
Depth Based Data - Maximum Sampling Increment 10.0cm

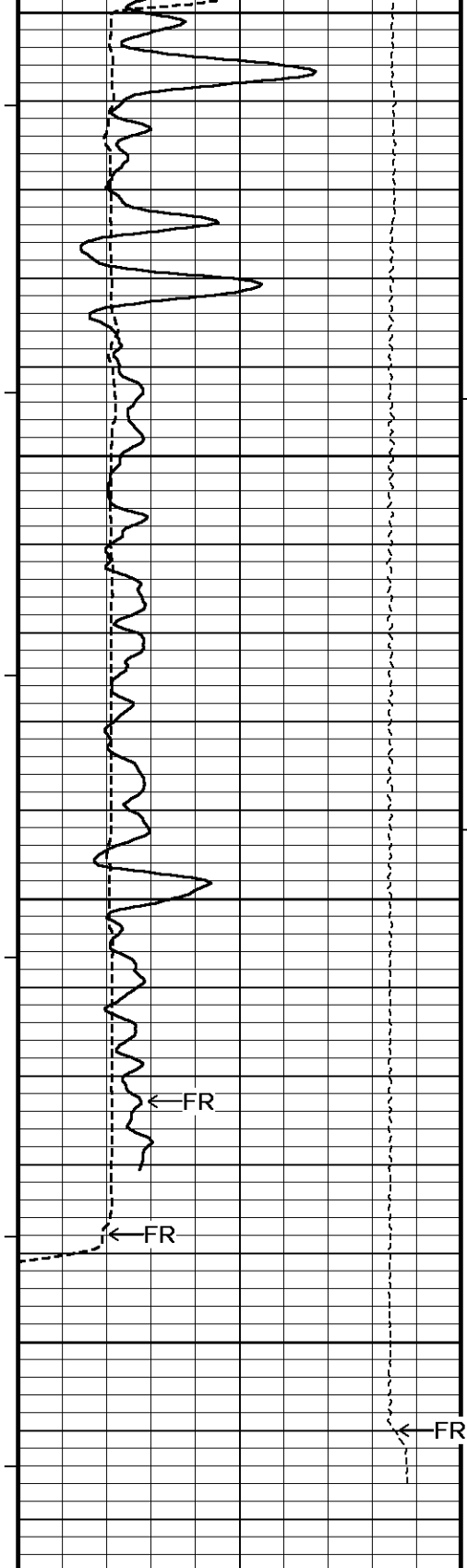
Plotted on 05-SEP-2008 16:36

Filename: C:\DOCUME~1\pateljc\LOCALS~1\Temp\Weatherford PreView...\Chevron Fee 159X\_001.dta

Recorded on 05-SEP-2008 09:18

System Versions: Logged with 8.04.0152 Plotted with 8.01.0172





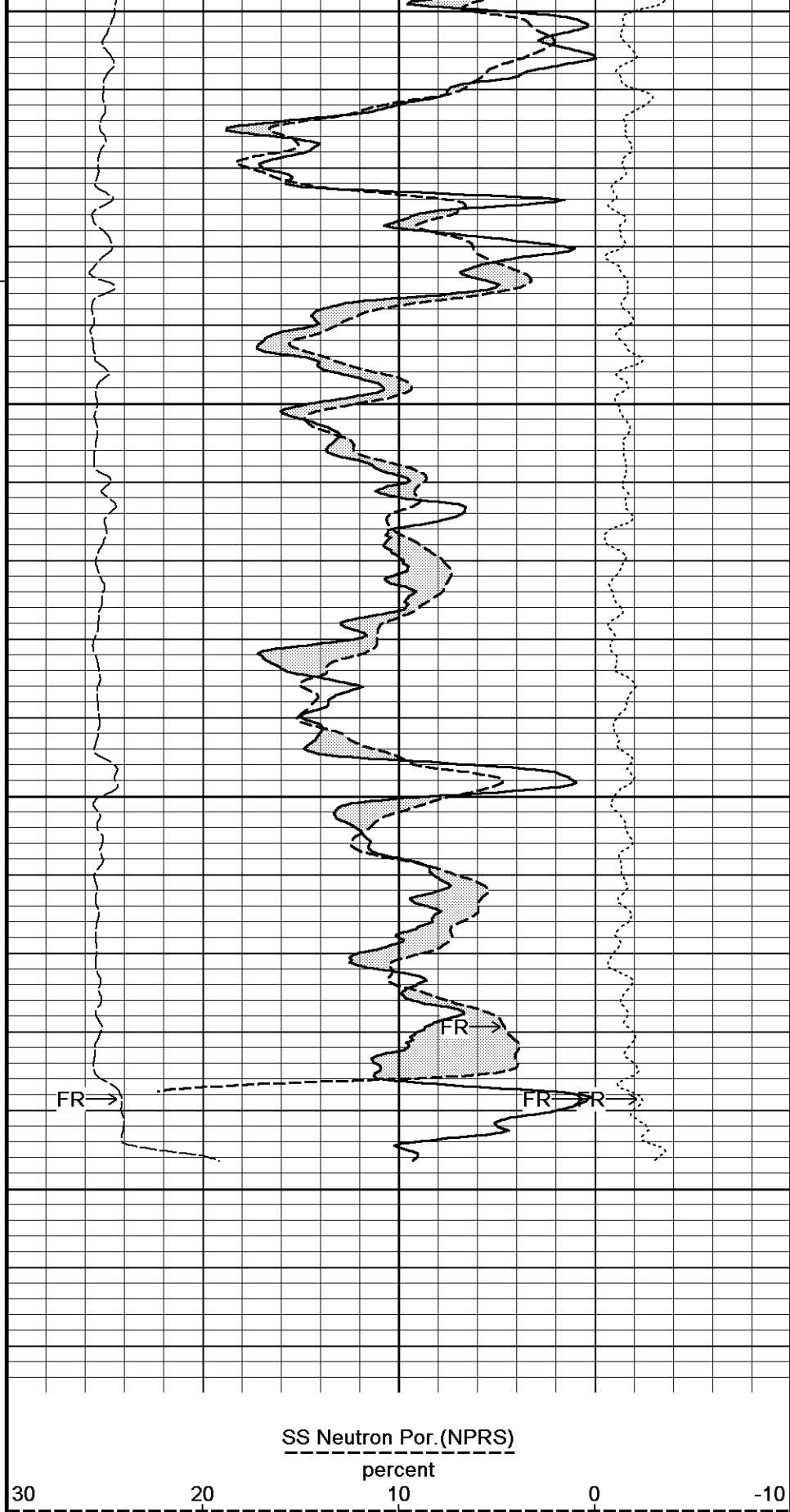
Timing Marks  
every 60.0 sec

DST Uphole Tension(SMTU)  
pounds  
10000 5000 0

6350  
162°  
6400  
162°  
6450  
162°  
6500  
6524  
Depth  
in  
Feet

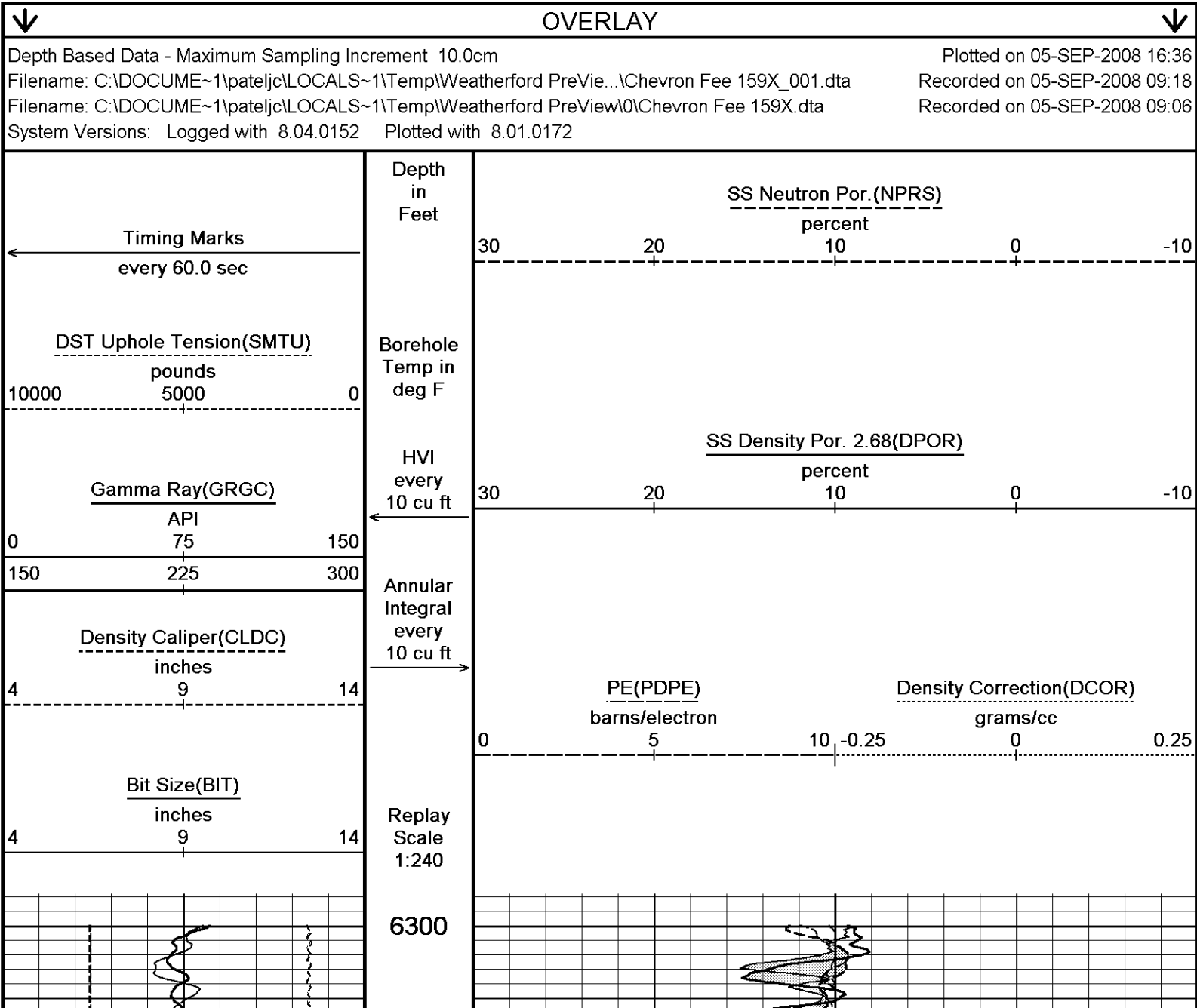
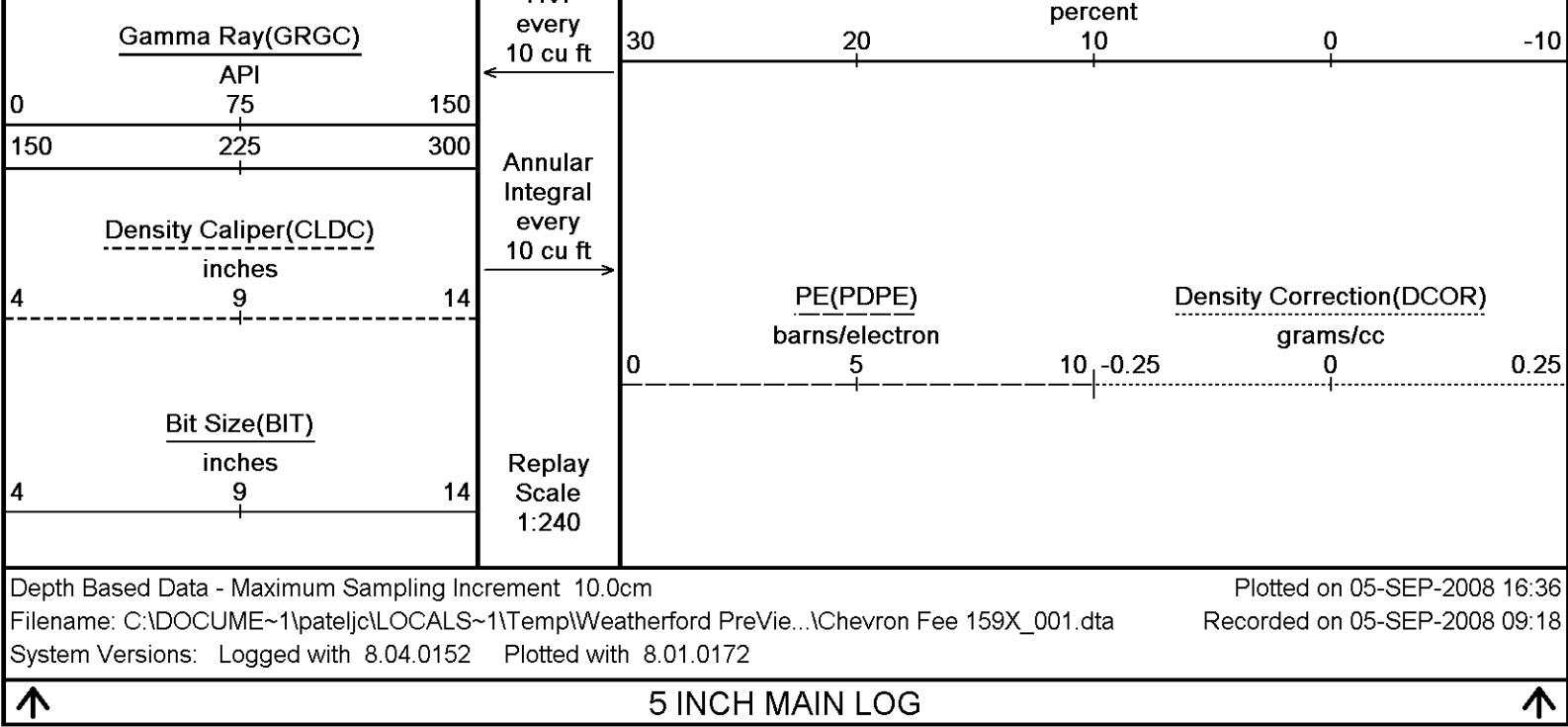
Borehole  
Temp in  
deg F

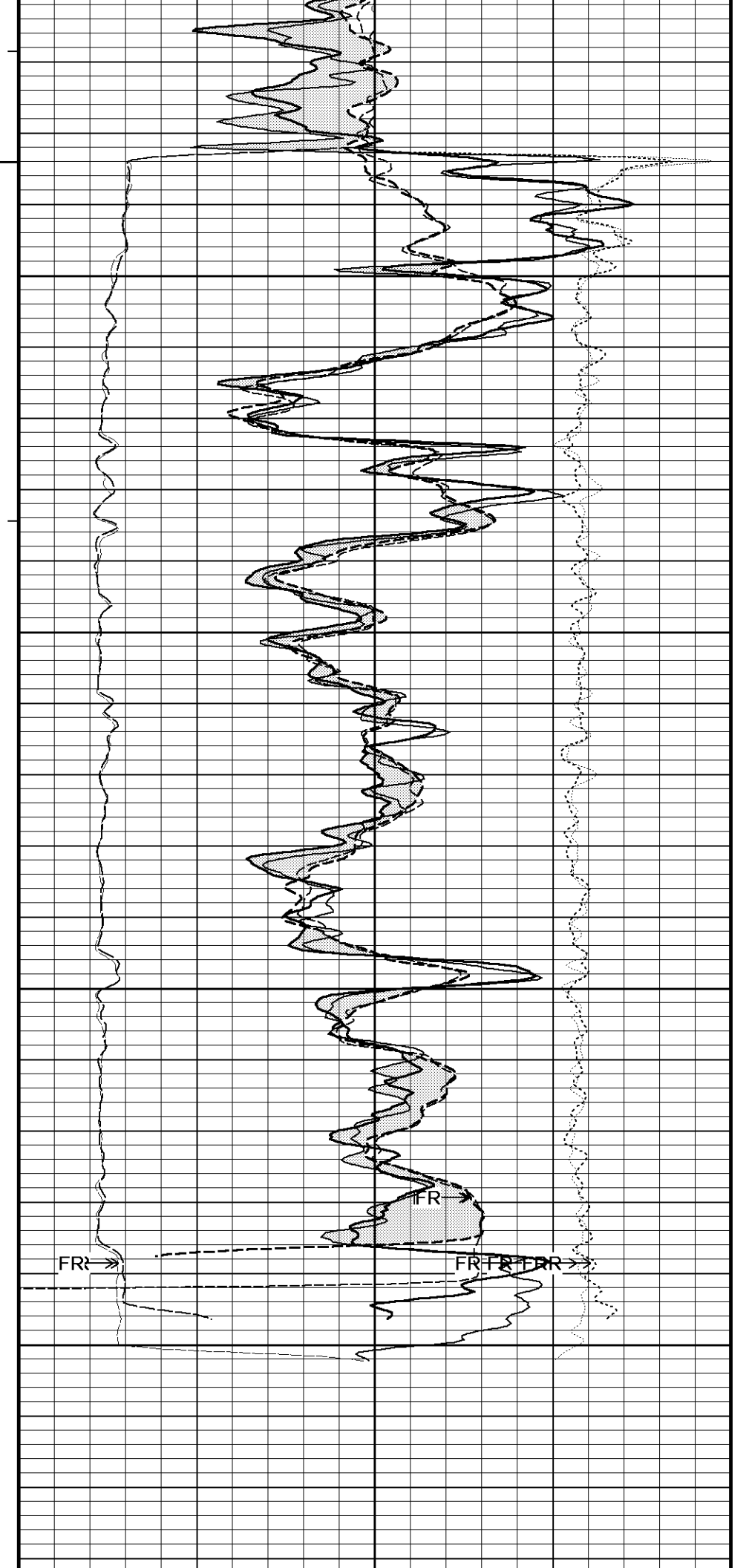
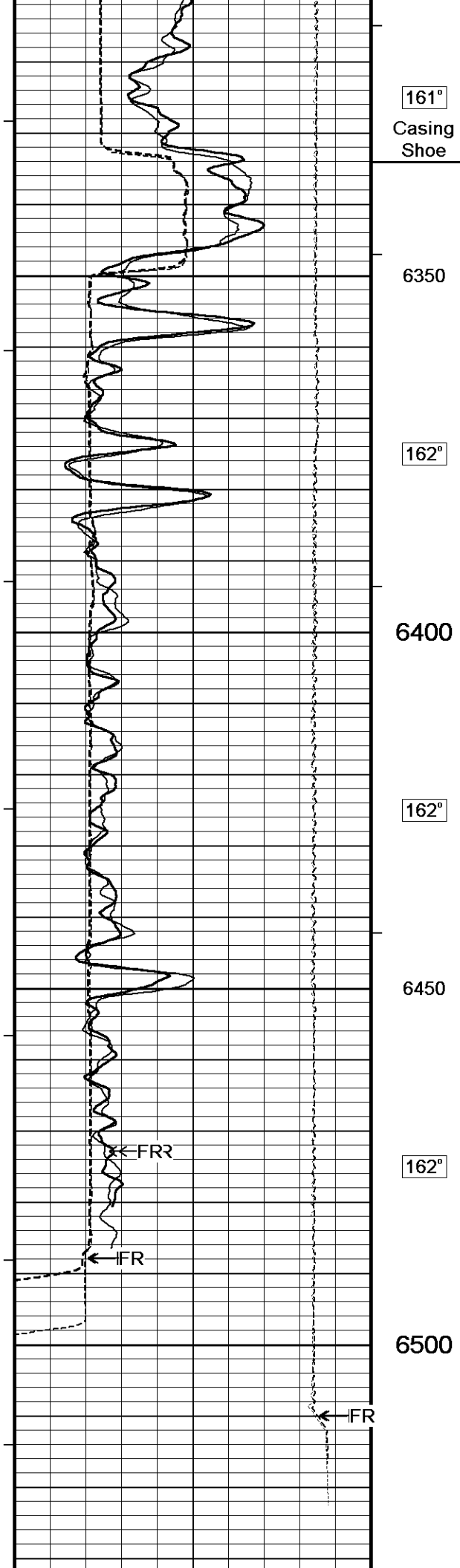
HVI

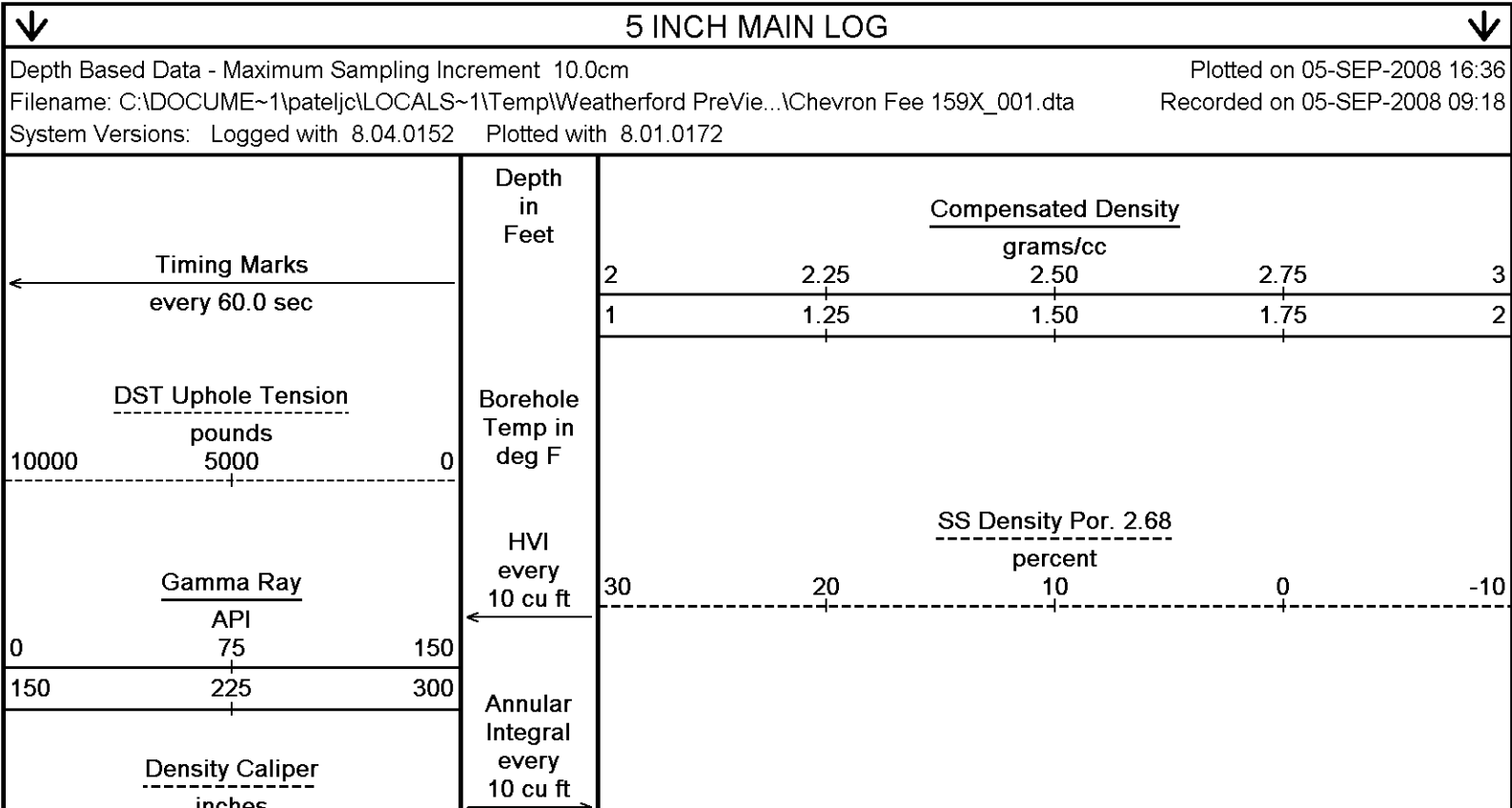
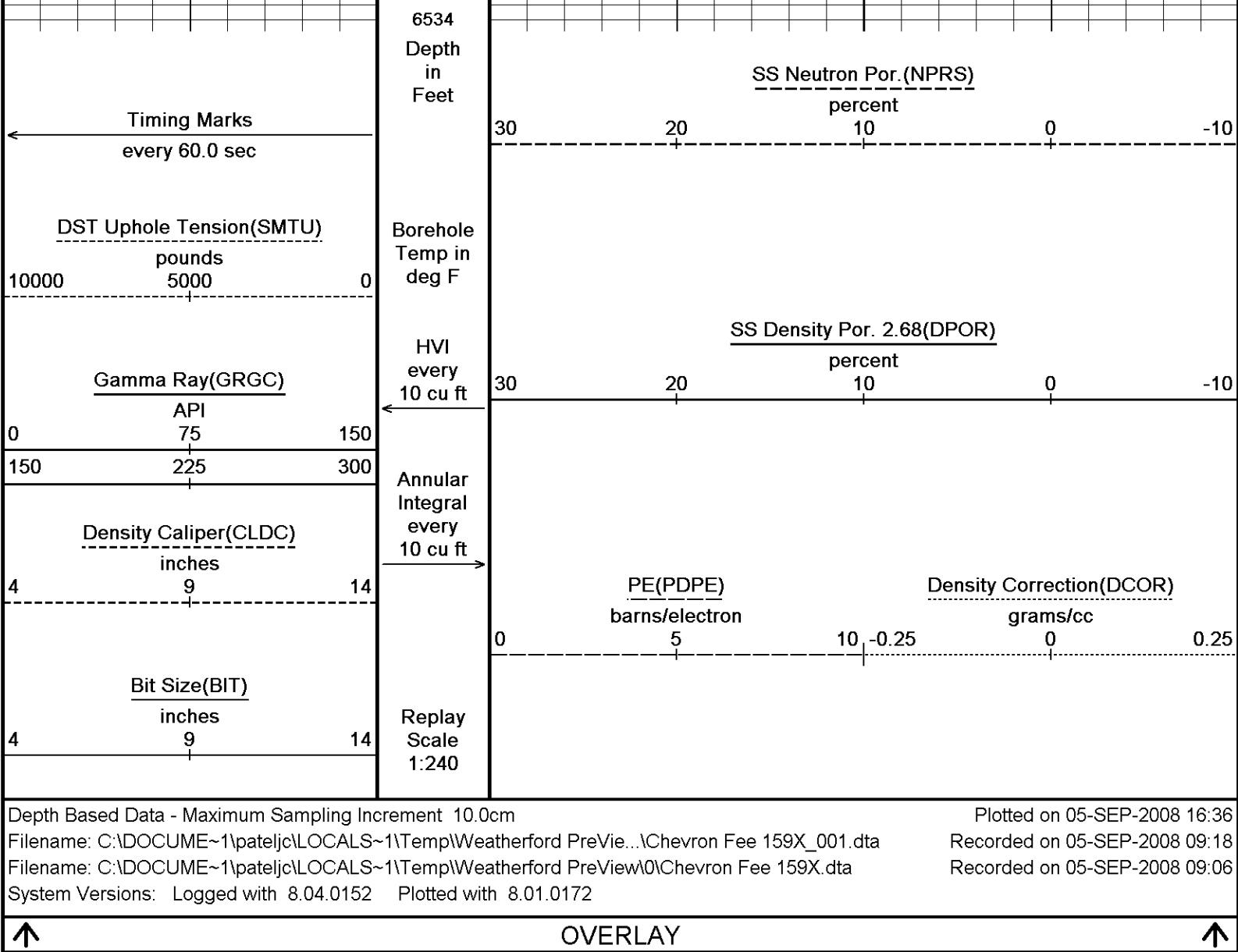


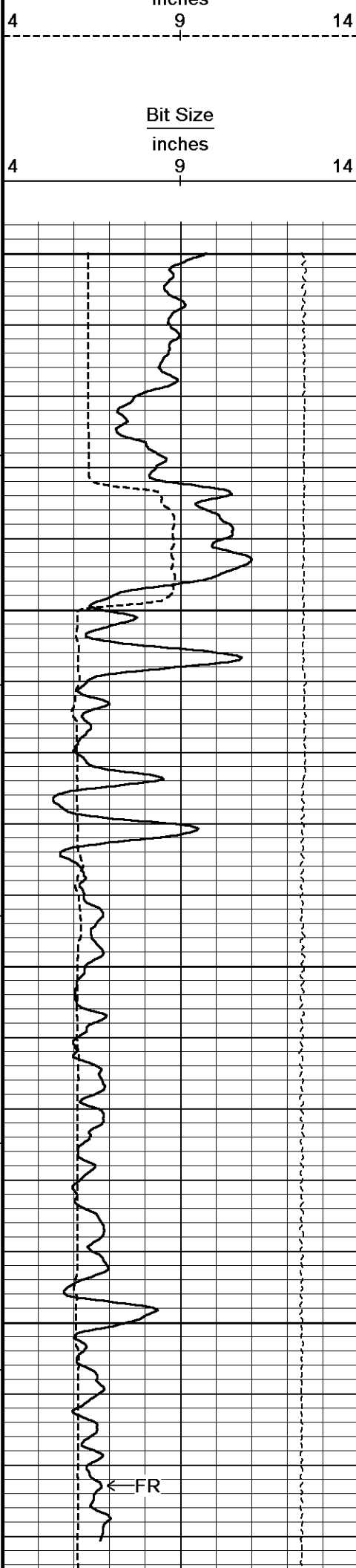
SS Neutron Por. (NPRS)  
percent  
30 20 10 0 -10

SS Density Por. 2.68(DPOR)









Replay  
Scale  
1:240

6300

161°  
Casing  
Shoe

6350

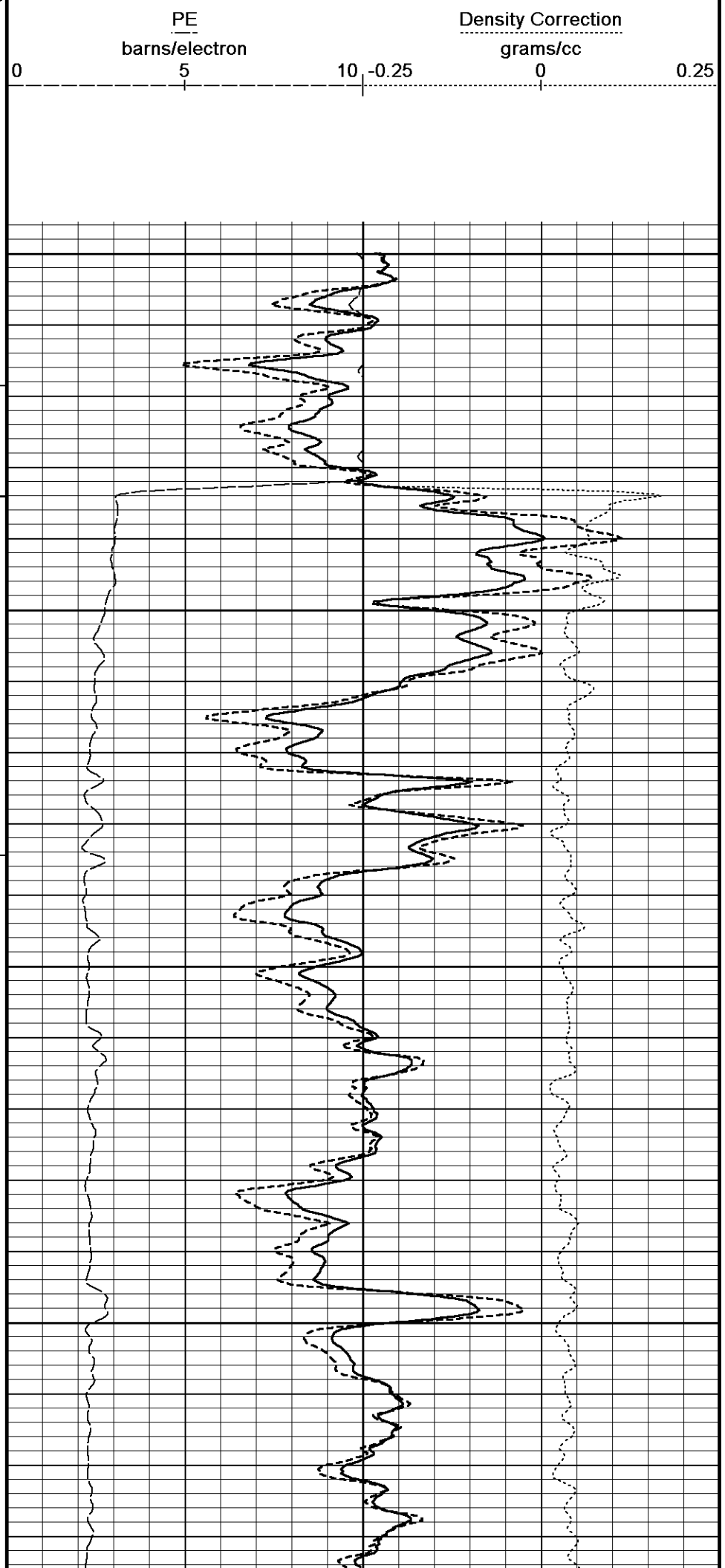
162°

6400

162°

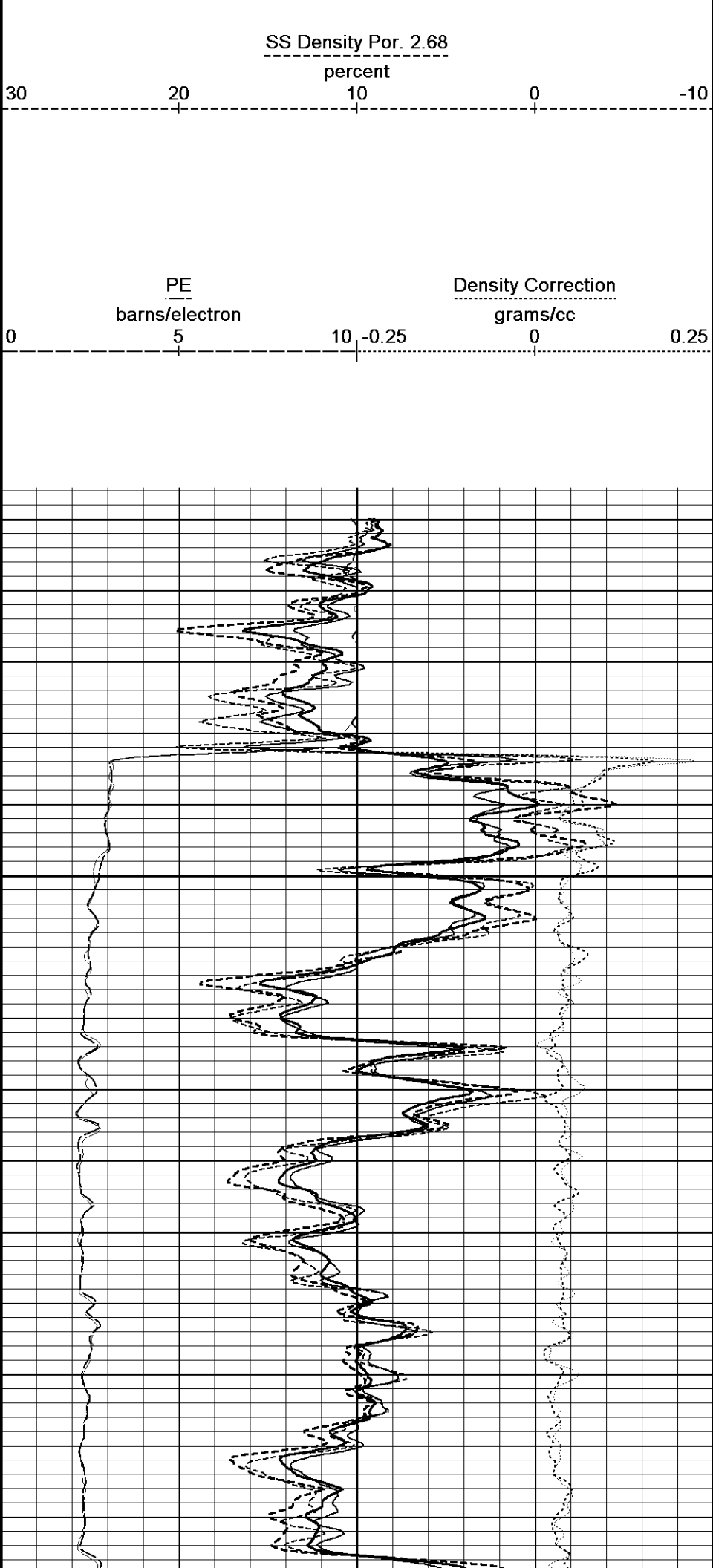
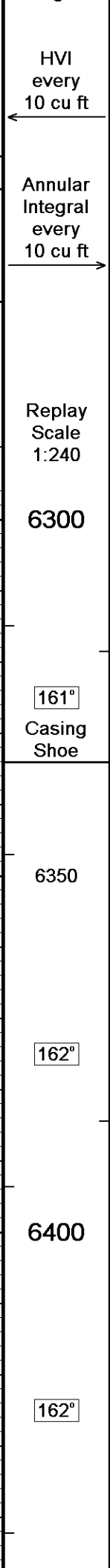
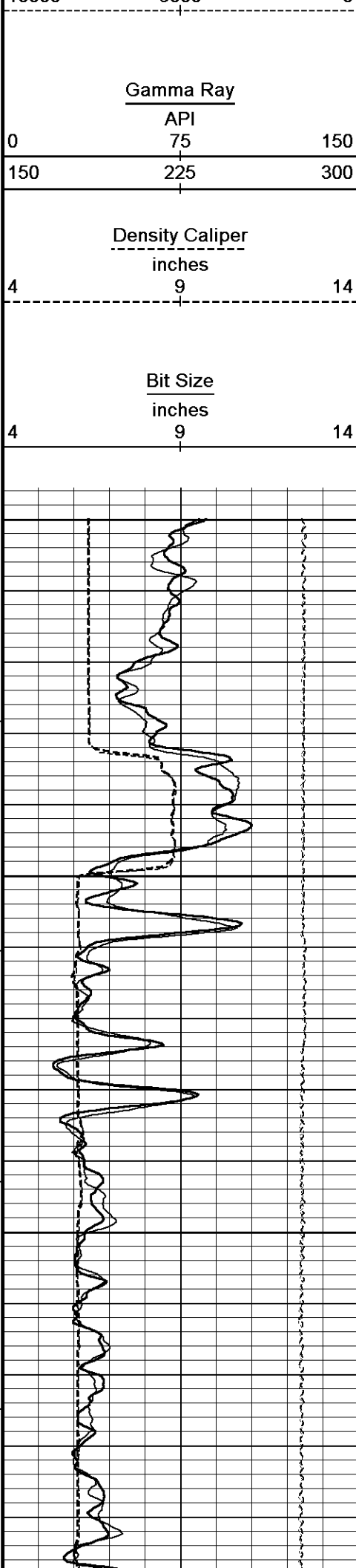
6450

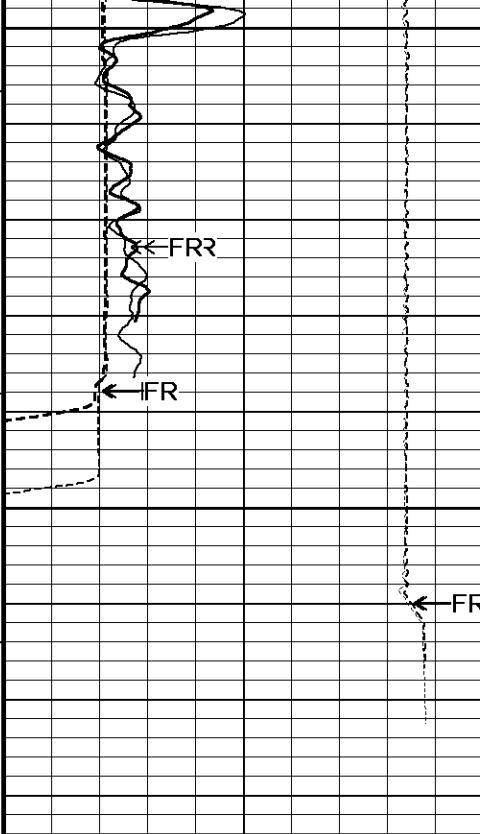
162°



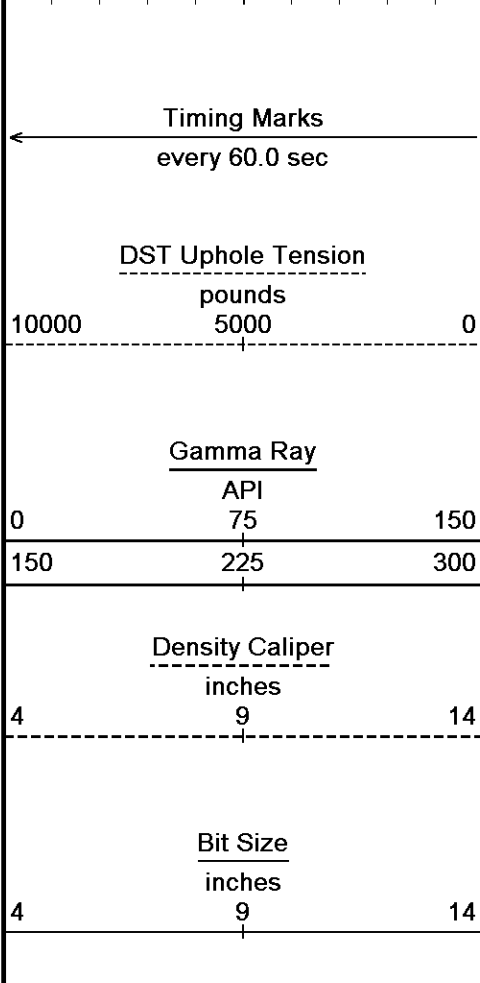
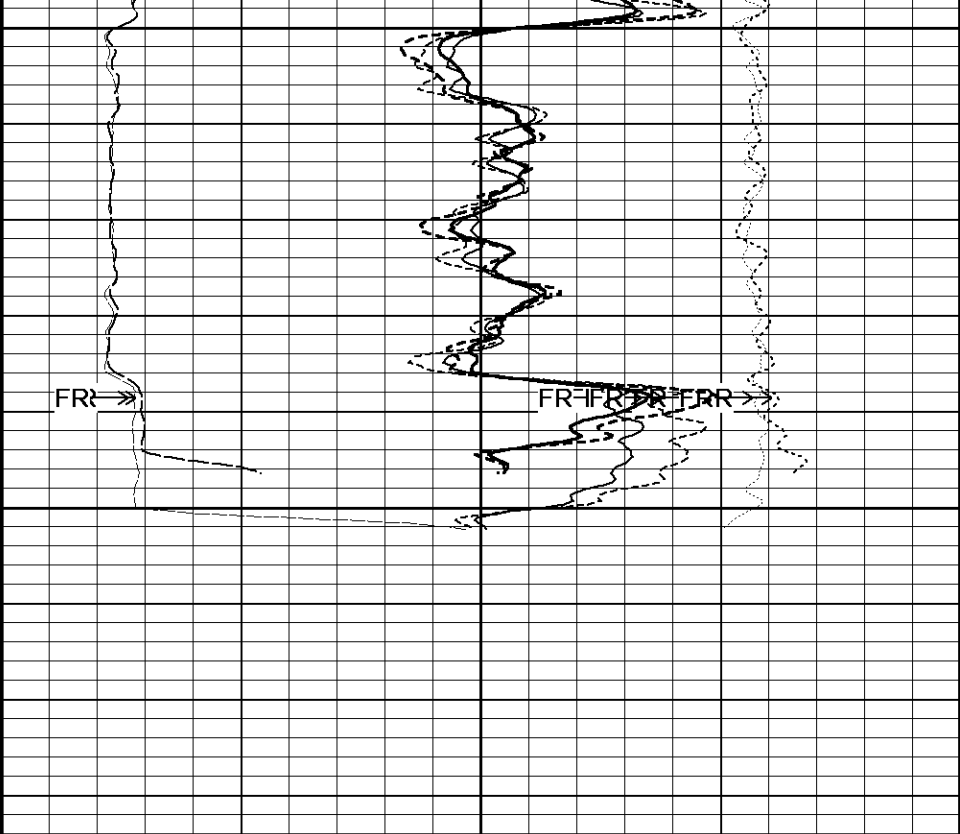




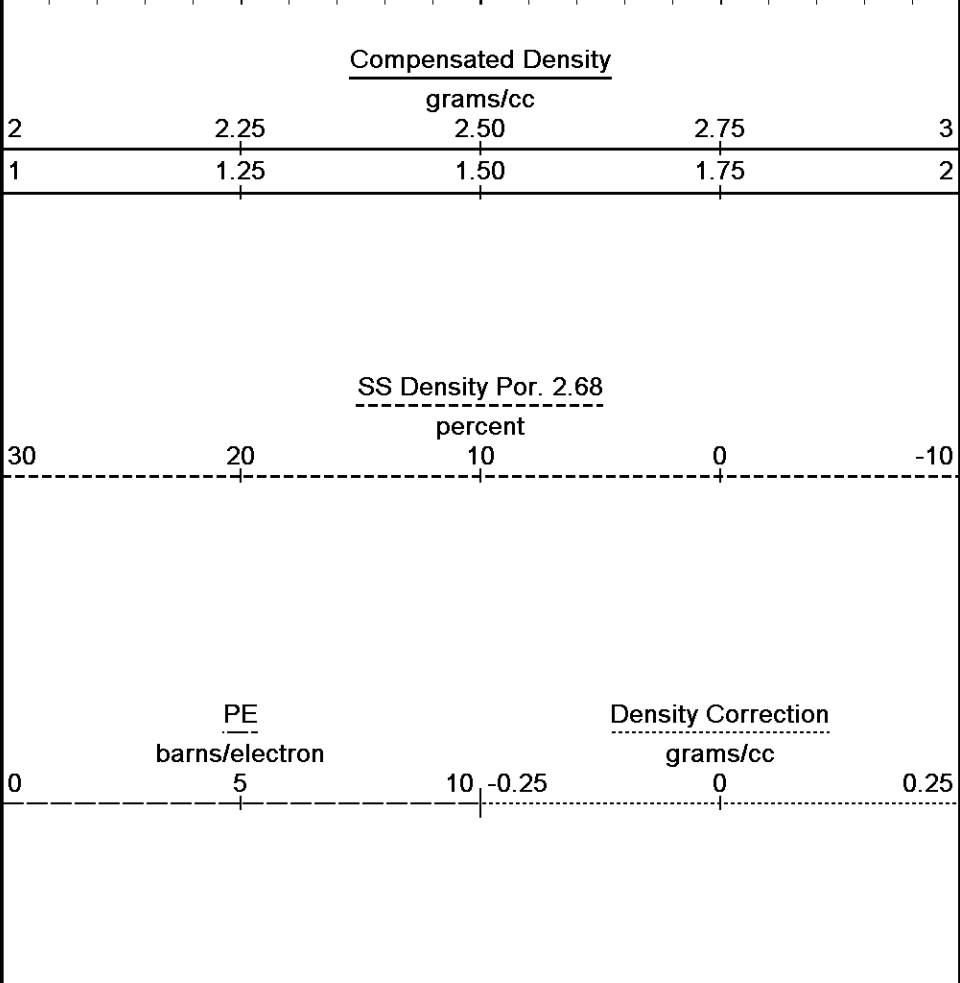




6450  
162°  
6500



6534  
Depth  
in  
Feet  
  
Borehole  
Temp in  
deg F  
  
HVI  
every  
10 cu ft  
  
Annular  
Integral  
every  
10 cu ft  
  
Replay  
Scale  
1:240



Depth Based Data - Maximum Sampling Increment 10.0cm  
Filename: C:\DOCUME~1\pateljc\LOCALS~1\Temp\Weatherford PreView...Chevron Fee 159X\_001.dta  
Filename: C:\DOCUME~1\pateljc\LOCALS~1\Temp\Weatherford PreView\0Chevron Fee 159X.dta  
System Versions: Logged with 8.04.0152 Plotted with 8.01.0172  
Plotted on 05-SEP-2008 16:36  
Recorded on 05-SEP-2008 09:18  
Recorded on 05-SEP-2008 09:06

## BEFORE SURVEY CALIBRATION

C:\DOCUME~1\pateljc\LOCALS~1\Temp\Weatherford PreView\0\Chevron Fee 159X.dta

## General Constants All 000

Last Edited on 5-SEP-2008,08:37

## General Parameters

|                             |          |            |
|-----------------------------|----------|------------|
| Mud Resistivity             | 1.000    | ohm-metres |
| Mud Resistivity Temperature | 75.000   | degrees F  |
| Water Level                 | 0.000    | feet       |
| Density/Neutron Processing  | Wet Hole |            |

## Hole/Annular Volume and Differential Caliper Parameters

|                                  |                 |        |
|----------------------------------|-----------------|--------|
| HVOL Caliper 1                   | Density Caliper |        |
| HVOL Caliper 2                   | None            |        |
| Annular Volume Diameter          | 4.500           | inches |
| Caliper for Differential Caliper | None            |        |

## Rwa Parameters

|                  |                        |
|------------------|------------------------|
| Porosity used    | Sandstone Density Por. |
| Resistivity used | Deep Induction         |
| RWA Constant A   | 1.000                  |
| RWA Constant M   | 2.000                  |

## Down-hole Tension Calibration SMS 000

Field Calibration on 22-MAY-2008 14:28

| Reading No | Measured | Calibrated (lbs) |
|------------|----------|------------------|
| 1          | 14709.72 | 0.00             |
| 2          | 15445.97 | 318.00           |

## High Resolution Temperature Calibration MCG 221

Field Calibration on 4-SEP-2008,14:46

|       | Measured | Calibrated(Deg F) |
|-------|----------|-------------------|
| Lower | 50.00    | 50.00             |
| Upper | 75.00    | 75.00             |

## High Resolution Temperature Constants MCG 221

|                   |    |
|-------------------|----|
| Pre-filter Length | 11 |
|-------------------|----|

## SP Calibration MCG 221

Field Calibration on 4-SEP-2008,14:46

|             | Measured | Calibrated (mV) |
|-------------|----------|-----------------|
| Reference 1 | 100.7    | 100.0           |
| Reference 2 | -100.0   | -100.5          |

## Gamma Calibration MCG 221

Field Calibration on 4-SEP-2008 14:32

|                    | Measured | Calibrated (API) |
|--------------------|----------|------------------|
| Background         | 70       | 47               |
| Calibrator (Gross) | 840      | 566              |
| Calibrator (Net)   | 770      | 519              |

## Gamma Constants MCG 221

Last Edited on 5-SEP-2008,08:35

|                               |                 |
|-------------------------------|-----------------|
| Gamma Calibrator Number       | GRCC-119        |
| Mud Density                   | 1.00 gm/cc      |
| Caliper Source for Processing | Density Caliper |
| Tool Position                 | Eccentred       |
| Concentration of KCl          | 0.00 kppm       |

## Neutron Calibration MDN 078

Base Calibration on 24-AUG-2008 15:30

Field Check on 4-SEP-2008 14:46

## Base Calibration

|       | Measured |     | Calibrated (cps) |     |
|-------|----------|-----|------------------|-----|
|       | Near     | Far | Near             | Far |
| Ratio | 3163     | 97  | 3714             | 110 |
|       | 32.519   |     | 33.764           |     |

## Field Calibrator at Base

|       | Calibrated (cps) |      |
|-------|------------------|------|
| Ratio | 2234             | 3304 |
|       | 0.676            |      |

## Field Check

| Calibrated (cps) |
|------------------|
|------------------|

Ratio

0.678

## Neutron Constants MDN 078

Last Edited on 5-SEP-2008,08:34

|                                 |                 |           |
|---------------------------------|-----------------|-----------|
| Neutron Source Id               | P31115B         |           |
| Neutron Jig Number              | NJ5299          |           |
| Epithermal Neutron              | No              |           |
| Caliper Source for Processing   | Density Caliper |           |
| Stand-off                       | 0.00            | inches    |
| Mud Density                     | 1.00            | gm/cc     |
| Limestone Sigma                 | 7.10            | cu        |
| Sandstone Sigma                 | 7.00            | cu        |
| Dolomite Sigma                  | 4.70            | cu        |
| Formation Pressure Source       | None            |           |
| Formation Pressure              | N/A             | kpsi      |
| Temperature Source              | None            |           |
| Temperature                     | N/A             | degrees F |
| Mud Salinity                    | 0.00            | kppm      |
| Formation Fluid Salinity Source | None            |           |
| Formation Fluid Salinity        | N/A             | kppm      |
| Barite Mud Correction           | Not Applied     |           |

## Caliper Calibration MPD 230

Base Calibration on 9-AUG-2008 20:24

Field Calibration on 4-SEP-2008,14:39

|                  |          |                      |
|------------------|----------|----------------------|
| Base Calibration |          |                      |
| Reading No       | Measured | Calibrator Size (in) |
| 1                | 15679    | 3.99                 |
| 2                | 24224    | 5.97                 |
| 3                | 32816    | 7.96                 |
| 4                | 41200    | 9.87                 |
| 5                | 50384    | 11.92                |
| 6                | N/A      | N/A                  |

|                       |                     |
|-----------------------|---------------------|
| Field Calibration     |                     |
| Measured Caliper (in) | Actual Caliper (in) |
| 5.98                  | 5.97                |

## Photo Density Calibration MPD 230

Base Calibration on 29-AUG-2008 19:39

Field Check on 4-SEP-2008 14:39

|                     |       |          |                  |       |
|---------------------|-------|----------|------------------|-------|
| Density Calibration |       |          |                  |       |
| Base Calibration    |       |          |                  |       |
|                     |       | Measured | Calibrated (sdu) |       |
|                     | Near  | Far      | Near             | Far   |
| Reference 1         | 41540 | 14223    | 53115            | 19186 |
| Reference 2         | 19317 | 2797     | 25020            | 2536  |

|                     |        |        |
|---------------------|--------|--------|
| Field Check at Base | 1622.4 | 1805.5 |
|---------------------|--------|--------|

|             |        |        |
|-------------|--------|--------|
| Field Check | 1619.2 | 1795.7 |
|-------------|--------|--------|

|                  |       |          |            |       |
|------------------|-------|----------|------------|-------|
| PE Calibration   |       |          |            |       |
| Base Calibration |       |          |            |       |
|                  | WS    | Measured | Calibrated |       |
|                  |       | WH       | Ratio      | Ratio |
| Background       | 293   | 1432     |            |       |
| Reference 1      | 14676 | 41296    | 0.361      | 0.320 |
| Reference 2      | 5384  | 19115    | 0.288      | 0.272 |

|                     |       |        |
|---------------------|-------|--------|
| Field Check at Base | 293.3 | 1431.7 |
|---------------------|-------|--------|

|             |       |        |
|-------------|-------|--------|
| Field Check | 292.9 | 1432.7 |
|-------------|-------|--------|

## Density Constants MPD 230

Last Edited on 5-SEP-2008,08:34

|                                |                 |
|--------------------------------|-----------------|
| Density Source Id              | P15771B         |
| Nylon Calibrator Number        | DNC-E-507       |
| Aluminium/Fe Calibrator Number | DAC-E-507       |
| Density Shoe Profile           | 8 inch          |
| Caliper Source for Processing  | Density Caliper |

|                               |             |       |
|-------------------------------|-------------|-------|
| PE Correction to Density      | Not Applied |       |
| Mud Density                   | 1.00        | gm/cc |
| Mud Density Z/A Correction    | 1.11        |       |
| Mud Filtrate Density          | 1.00        | gm/cc |
| Dry Hole Mud Filtrate Density | 1.00        | gm/cc |
| DNCT                          | 0.00        | gm/cc |
| CRCT                          | 0.00        | gm/cc |
| Density Z/A Correction        | Advanced    |       |
| Matrix Density (gm/cc)        | Depth (ft)  |       |
| 2.68                          | 0.00        |       |
| 0.00                          | 0.00        |       |
| 0.00                          | 0.00        |       |
| 0.00                          | 0.00        |       |
| 0.00                          | 0.00        |       |
| 0.00                          | 0.00        |       |
| 0.00                          | 0.00        |       |
| 0.00                          | 0.00        |       |

|                        |          |                                       |
|------------------------|----------|---------------------------------------|
| FE Calibration MFE 102 |          | Base Calibration on 17-AUG-2008 14:11 |
|                        |          | Field Check on 4-SEP-2008 14:33       |
| Base Calibration       |          |                                       |
|                        | Measured | Calibrated (ohm-m)                    |
| Reference 1            | 0.0      | 0.0                                   |
| Reference 2            | 966.3    | 126.8                                 |
| Base Check             |          | 280.2                                 |
| Field Check            |          | 280.3                                 |

|                                  |                          |                                  |
|----------------------------------|--------------------------|----------------------------------|
| FE Constants MFE 102             |                          | Last Edited on 29-AUG-2008,09:53 |
| Caliper Source for FE correction | Density Caliper          |                                  |
| Rm Source for FE correction      | Temperature Corr         |                                  |
| Temp. for Rm Corr.               | MCG External Temperature |                                  |
| Stand-off                        | 0.5                      | inches                           |

|   |          |                                       |
|---|----------|---------------------------------------|
| High Resolution Temperature Calibration MAI 210 |          | Field Calibration on 4-SEP-2008,14:24 |
|   | Measured | Calibrated(Deg F)                     |
| Lower   | 50.00    | 50.00                                 |
| Upper   | 75.00    | 75.00                                 |

|   |    |                                  |
|---|----|----------------------------------|
| High Resolution Temperature Constants MAI 210 |    | Last Edited on 10-APR-2007,14:32 |
| Pre-filter Length                             | 11 |                                  |

|                               |                     |          |                      |                                       |  |
|-------------------------------|---------------------|----------|----------------------|---------------------------------------|--|
| Induction Calibration MAI 210 |                     |          |                      | Base Calibration on 21-AUG-2008,12:05 |  |
|                               |                     |          |                      | Field Check on 4-SEP-2008 14:22       |  |
| Base Calibration              |                     |          |                      |                                       |  |
| Test Loop Calibration         |                     | Measured |                      | Calibrated (mmho/m)                   |  |
| Channel                       | Low                 | High     | Low                  | High                                  |  |
| 1                             | 17.4                | 480.3    | 9.3                  | 966.2                                 |  |
| 2                             | 6.5                 | 380.8    | 7.6                  | 821.4                                 |  |
| 3                             | 3.7                 | 263.5    | 5.2                  | 566.0                                 |  |
| 4                             | 2.0                 | 132.0    | 2.6                  | 279.2                                 |  |
| Array Temperature             |                     | 68.7     | Deg F                |                                       |  |
|                               |                     |          |                      |                                       |  |
| Channel                       | Base Check (mmho/m) |          | Field Check (mmho/m) |                                       |  |
|                               | Low                 | High     | Low                  | High                                  |  |
| 1                             | 10.6                | 3787.6   | 10.6                 | 3786.8                                |  |
| 2                             | 28.0                | 3548.9   | 27.9                 | 3548.4                                |  |
| 3                             | 26.2                | 3009.8   | 26.2                 | 3009.7                                |  |
| 4                             | 18.7                | 2098.5   | 18.7                 | 2098.6                                |  |
| Deep                          | 16.1                | 1949.9   | 16.1                 | 1950.2                                |  |
| Medium                        | 38.2                | 3950.7   | 38.2                 | 3950.4                                |  |
| Shallow                       | 41.7                | 5275.0   | 41.7                 | 5273.8                                |  |
| Array Temperature             |                     | 68.0     | 67.9                 | Deg F                                 |  |

|                             |        |                                 |
|-----------------------------|--------|---------------------------------|
| Induction Constants MAI 210 |        | Last Edited on 5-SEP-2008,08:34 |
| Induction Model             | VECTAR |                                 |

|                                   |                          |            |
|-----------------------------------|--------------------------|------------|
| Caliper for Borehole Corr.        | Density Caliper          |            |
| Hole Size for Borehole Correction | N/A                      | inches     |
| Stand-off                         | 0.50                     | inches     |
| Number of Fins on Stand-off       | N/A                      |            |
| Stand-off Fin Width               | 0.5000                   | inches     |
| Borehole Corr. Rm Source          | Temperature Corr         |            |
| Temp. for Rm Corr.                | MCG External Temperature |            |
| Squasher Start                    | 0.0020                   | mhos/metre |

#### Borehole Normalisation

|      |        |      |        |
|------|--------|------|--------|
| DRM1 | 0.0000 | DRC1 | 0.0000 |
| DRM2 | 0.0000 | DRC2 | 0.0000 |
| MRM1 | 0.0000 | MRC1 | 0.0000 |
| MRM2 | 0.0000 | MRC2 | 0.0000 |
| SRM1 | 0.0000 | SRC1 | 0.0000 |
| SRM2 | 0.0000 | SRC2 | 0.0000 |

#### Calibration Site Corrections

|           |      |             |
|-----------|------|-------------|
| Channel 1 | 0.00 | mmhos/metre |
| Channel 2 | 0.00 | mmhos/metre |
| Channel 3 | 0.00 | mmhos/metre |
| Channel 4 | 0.00 | mmhos/metre |

#### Apparent Porosity and Water Saturation Constants

|                                      |        |         |
|--------------------------------------|--------|---------|
| Archie Constant (A)                  | 1.00   |         |
| Cementation Exponent (M)             | 2.00   |         |
| Saturation Exponent (N)              | 2.00   |         |
| Saturation of Water for Apor         | 100.00 | percent |
| Resistivity of Water for Apor and Sw | 0.05   | ohm-m   |
| Resistivity of Mud Filtrate for Sw   | 0.00   | ohm-m   |

## DOWNHOLE EQUIPMENT

C:\DOCUME~1\patelj\LOCALS~1\Temp\Weatherford PreView\0\Chevron Fee 159X.dta

#### SHA-H Compact Swivel Head Adaptor

SHA 143 Length: 2.30 ft Weight: 22.0 lb

#### Compact Gamma

MCG 221 Length: 8.70 ft Weight: 63.9 lb

#### Compact Neutron

MDN 78 Length: 5.04 ft Weight: 50.7 lb

#### Compact Density/Caliper

MPD 230 Length: 9.59 ft Weight: 90.4 lb

#### SKJ-E.A Compact Knuckle Joint

SKJ 143 Length: 2.17 ft Weight: 24.3 lb

#### Compact Focussed Electric

MFE 102 Length: 6.03 ft Weight: 48.5 lb

#### Compact Induction

MAI 210 Length: 10.81 ft Weight: 48.5 lb

Total Length: 44.64 ft Weight: 348.3 lb



|   |                                 |
|---|---------------------------------|
| 37.05 ft                                | GRGC - Gamma Ray                |
| 34.14 ft                                | CGXT - MCG External Temperature |
| 30.59 ft                                | NPRS - Sandstone Neutron Por.   |
| 22.12 ft                                | AVOL - Annular Volume           |
| 22.12 ft                                | HVOL - Hole Volume              |
| 22.12 ft                                | CLDC - Density Caliper          |
| 21.42 ft                                | DEN - Compensated Density       |
| 21.42 ft                                | DCOR - Density Correction       |
| 21.42 ft                                | DPOR - Base Density Porosity    |
| 21.36 ft                                | PDPE - PE                       |
| 13.70 ft                                | FEFE - Shallow FE               |
| 2.58 ft                                 | RILM - Medium Induction         |
| 2.58 ft                                 | RILD - Deep Induction           |
| Tool Zero                               | (0.13ft from bottom)            |
| All measurements relative to tool zero. |                                 |

COMPANY  
WELL

CHEVRON U.S.A.  
FEE 159X

FIELD RANGELY WEBER SAND UNIT

PROVINCE/COUNTY RIO BLANCO

COUNTRY/STATE U.S.A / COLORADO

|                         |         |      |               |         |      |
|-------------------------|---------|------|---------------|---------|------|
| Elevation Kelly Bushing | 5355.00 | feet | First Reading | 6489.00 | feet |
| Elevation Drill Floor   | 5354.00 | feet | Depth Driller | 6515.00 | feet |
| Elevation Ground Level  | 5333.00 | feet | Depth Logger  | 6510.00 | feet |



**Weatherford®**

COMPENSATED PHOTO DENSITY  
COMPENSATED DUAL NEUTRON  
LOG