

HALLIBURTON

DUAL SPACED NEUTRON SPECTRAL DENSITY

| | | | |
|--------------------------|--|---------------------------|--|
| COMPANY | | CHAMA OIL & MINERALS LLC | |
| WELL | | SORS 1P | |
| FIELD/BLOCK | | WILDACT | |
| COUNTY | | WASHINGTON CO | |
| STATE | | CO | |
| Permanent Datum | | GL | |
| Log measured from | | KB | |
| Drilling measured from | | KB | |
| Date | | 20-Jan-13 | |
| Run No. | | TWO | |
| Depth - Driller | | 8280.00 ft | |
| Depth - Logger | | 8276.0 ft | |
| Bottom - Logged Interval | | 8254 ft | |
| Top - Logged Interval | | CASING | |
| Casing - Driller | | 9.625 in @ 6369.0 ft | |
| Casing - Logger | | 6380.0 ft | |
| Bit Size | | 8.500 in @ | |
| Type Fluid in Hole | | WATER BASED MUD | |
| Density | | 9.0 ppq 43.00 s/qt | |
| PH | | 9.30 pH 6.4 cphm | |
| Source of Sample | | FLOW LINE | |
| Rm @ Meas. Temperature | | 0.800 ohmm @ 85.60 degF @ | |
| Rmf @ Meas. Temperature | | 0.20 ohmm @ 51.30 degF @ | |
| Rmc @ Meas. Temperature | | 0.100 ohmm @ 61.00 degF @ | |
| Source Rmf | | Rmc MEASURED MEASURED | |
| Rm @ BHT | | 0.41 ohmm @ 174.0 degF @ | |
| Time Since Circulation | | 8.0 hr | |
| Time on Bottom | | 20-Jan-13 18:38 | |
| Max. Rec. Temperature | | 174.0 degF @ 8276.0 ft @ | |
| Equipment | | 11454566 BRIGHTON | |
| Recorded By | | J. PINKETT | |
| Witnessed By | | R. WILSON | |

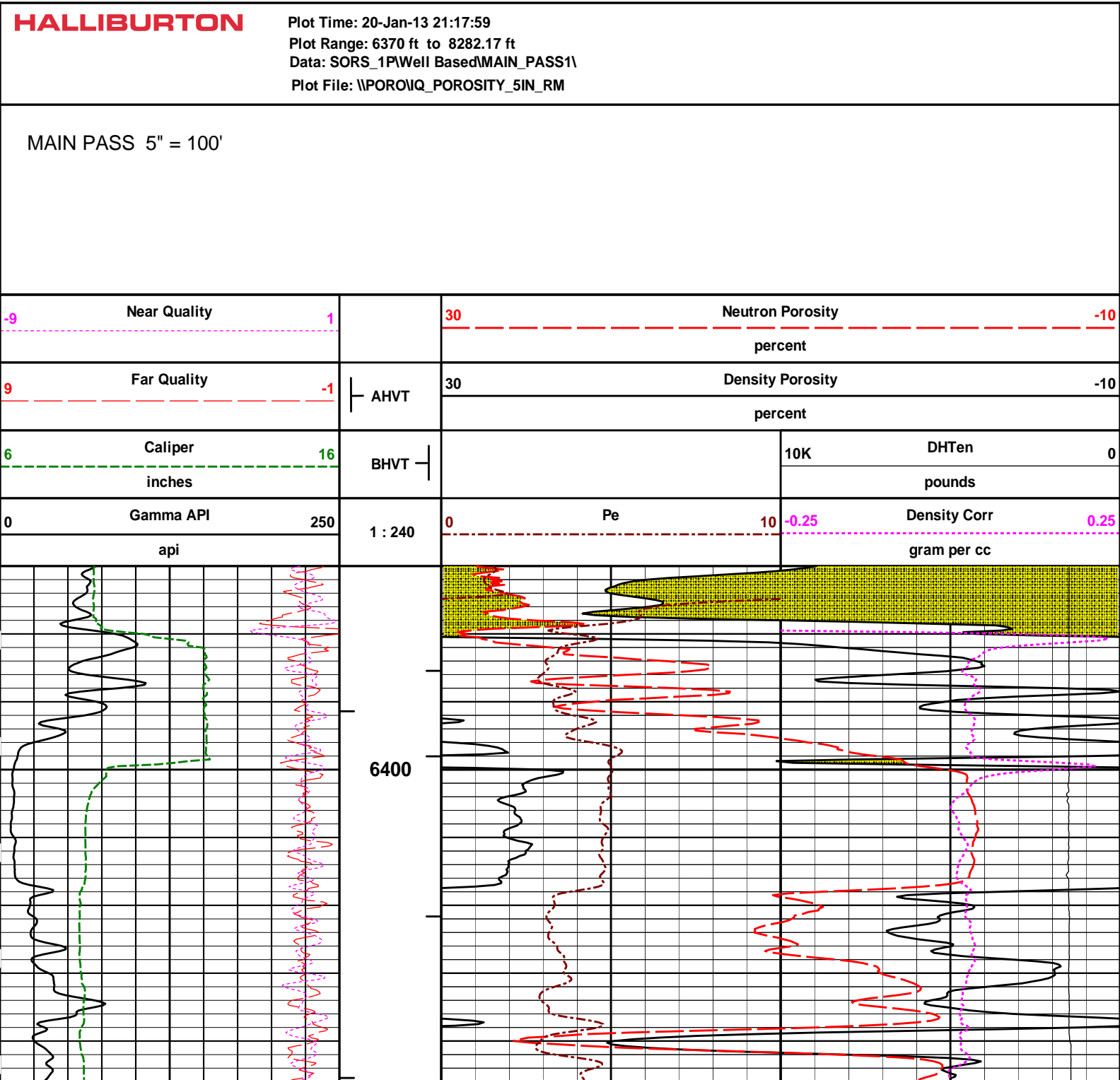
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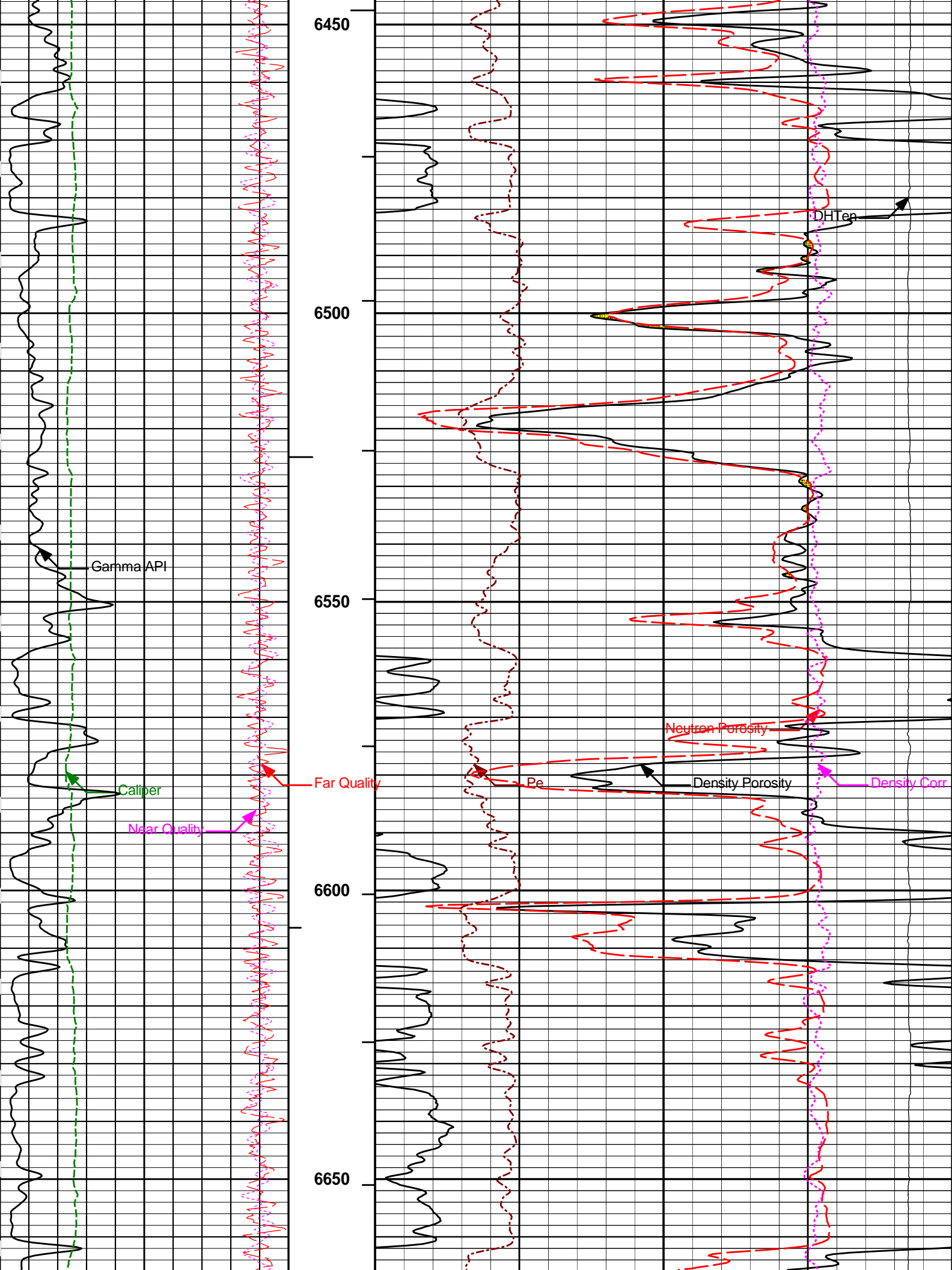
| | | | | | | | | | | | | | | | |
|---|------------|----------|--|--------------------------------|--|----------------------------|-----------------|---|-----------------|----------|--|-------------|--|----------|--|
| Service Ticket No.: | | | | API Serial No.: 05121110180000 | | | | PGM Version: WL INSITE R3.8.0 (Build 2) | | | | | | | |
| CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE | | | | | | RESISTIVITY SCALE CHANGES | | | | | | | | | |
| Date | Sample No. | | | | | Type Log | Depth | Scale Up Hole | Scale Down Hole | | | | | | |
| Depth-Driller | | | | | | | | | | | | | | | |
| Type Fluid in Hole | | | | | | | | | | | | | | | |
| Density | Viscosity | | | | | | | | | | | | | | |
| Ph | Fluid Loss | | | | | | | | | | | | | | |
| Source of Sample | | | | | | RESISTIVITY EQUIPMENT DATA | | | | | | | | | |
| Rm @ Meas. Temp | | @ | | @ | | Run No. | Tool Type & No. | Pad Type | Tool Pos. | Other | | | | | |
| Rmf @ Meas. Temp. | | @ | | @ | | TWO | ACRT | N/A | 1.25" S.O. | N/A | | | | | |
| Rmc @ Meas. Temp. | | @ | | @ | | | 11294353 | | | | | | | | |
| Source Rmf | Rmc | | | | | | | | | | | | | | |
| Rm @ BHT | | @ | | @ | | | | | | | | | | | |
| Rmf @ BHT | | @ | | @ | | | | | | | | | | | |
| Rmc @ BHT | | @ | | @ | | | | | | | | | | | |
| EQUIPMENT DATA | | | | | | | | | | | | | | | |
| GAMMA | | | | ACOUSTIC | | | | DENSITY | | | | NEUTRON | | | |
| Run No. | | TWO | | Run No. | | | | Run No. | | TWO | | Run No. | | TWO | |
| Serial No. | | 11812883 | | Serial No. | | | | Serial No. | | 11795867 | | Serial No. | | 11812167 | |
| Model No. | | GTET | | Model No. | | | | Model No. | | SDLT | | Model No. | | DSNT | |
| Diameter | | 3.625" | | No. of Cent. | | | | Diameter | | 4.5" | | Diameter | | 3.625" | |
| Detector Model No. | | GTET | | Spacing | | | | Log Type | | GAM/GAM | | Log Type | | NEU/NEU | |
| Type | | SCINT | | | | | | Source Type | | Cs137 | | Source Type | | Am241Be | |
| Length | | 8" | | LSA [Y/N] | | | | Serial No. | | 5471GW | | Serial No. | | DSN434 | |
| Distance to Source | | 18' | | FWDA [Y/N] | | | | Strength | | 1.5 Ci | | Strength | | 15 Ci | |
| LOGGING DATA | | | | | | | | | | | | | | | |

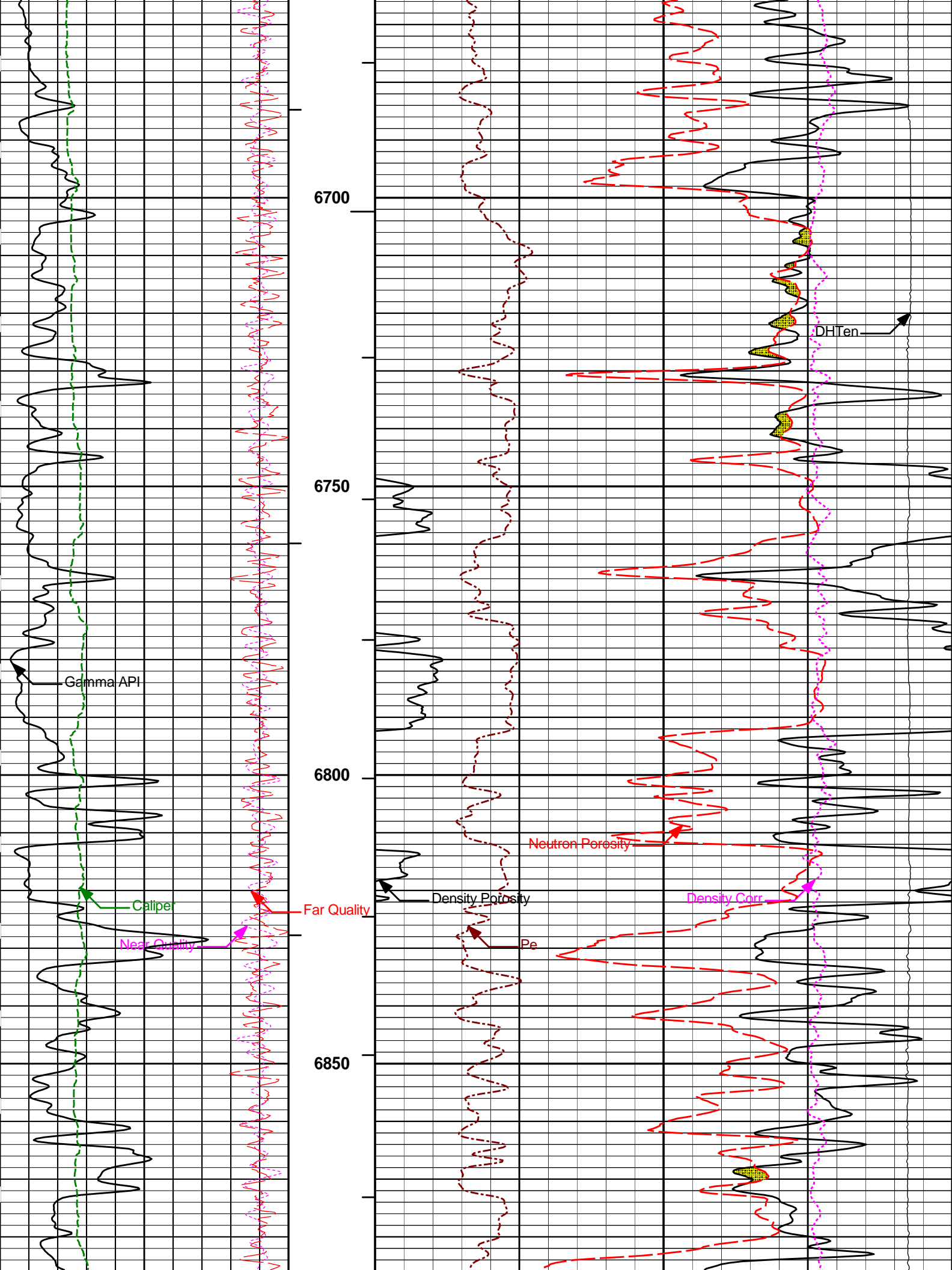
| GENERAL | | | | GAMMA | | ACOUSTIC | | | DENSITY | | | NEUTRON | | |
|---|-------|------|--------|-------|-----|----------|---|--------|---------|-----|--------|---------|----|--------|
| Run | Depth | | Speed | Scale | | Scale | | Matrix | Scale | | Matrix | Scale | | Matrix |
| No. | From | To | ft/min | L | R | L | R | | L | R | | L | R | |
| TWO | TD | SRFC | REC | 0 | 250 | | | | 30 | -10 | | 2.71 | 30 | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| DIRECTIONAL INFORMATION | | | | | | | | | | | | | | |
| Maximum Deviation @ | | | | | | | | KOP @ | | | | | | |
| Remarks: RWCH/GTET/CSNG/GEM/DSNT/SDLT/ACRT RAN IN COMBINATION | | | | | | | | | | | | | | |
| TENSION PULLS, WASHOUTS, AND BOREHOLE RUGOSITY CAN AFFECT TOOL RESPONSE | | | | | | | | | | | | | | |
| ANNULAR HOLE VOLUME CALCULATED FOR 7.0-INCH CASING | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |
| YOUR CREW: M. BURNETT, A. AXE, K. PRIEST | | | | | | | | | | | | | | |
| RIG: PRECISION 706 | | | | | | | | | | | | | | |
| THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES - BRIGHTON, CO - (303) 825-4346 | | | | | | | | | | | | | | |
| 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 WHICH 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. | | | | | | | | | | | | | | |
| HALLIBURTON | | | | | | | | | | | | | | |

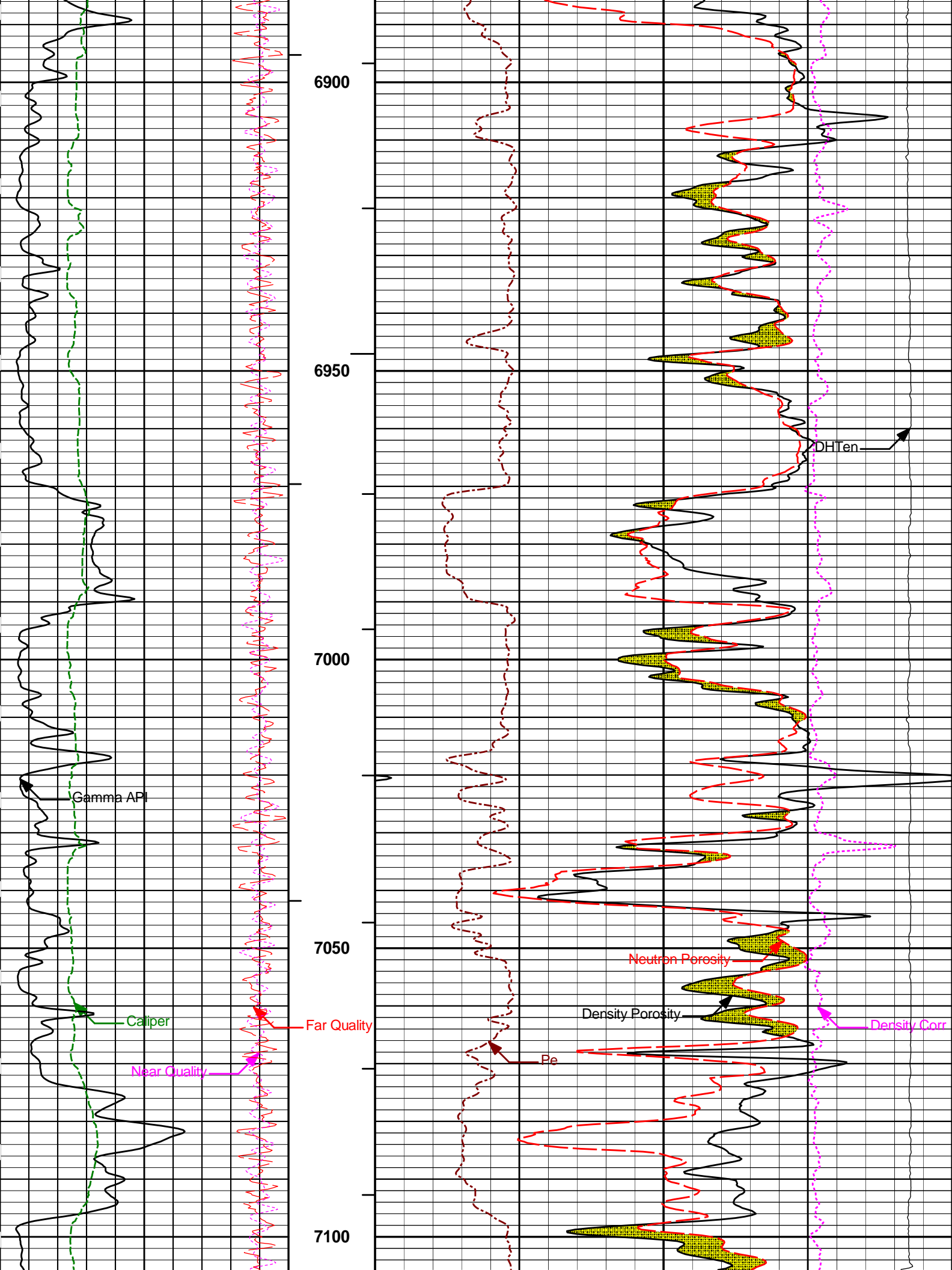
| | | | | | |
|--|-----------------|------|--|------------|------|
| | CrossPlot | AFAC | Archie A factor | 0.0200 | |
| | Rwa / CrossPlot | MFAC | Archie M factor | 2.1500 | |
| | Rwa / CrossPlot | RMFR | Rmf Reference | 0.10 | ohmm |
| | Rwa / CrossPlot | TMFR | Rmf Ref Temp | 75.00 | degF |
| | Rwa / CrossPlot | RWA | Resistivity of Formation Water | 0.05 | ohmm |
| | Rwa / CrossPlot | ADP | Use Air Porosity to calculate CrossplotPhi | No | |
| | SimpleLithology | RMF | Mud Filtrate Resistivity | 0.10 | ohmm |
| | SimpleLithology | RMFT | Temperature of Mud Filtrate | 175.00 | degF |
| | GTET | GROK | Process Gamma Ray? | Yes | |
| | GTET | GRSO | Gamma Tool Standoff | 0.000 | in |
| | GTET | GEOK | Process Gamma Ray EVR? | No | |
| | GTET | TPOS | Tool Position for Gamma Ray Tools. | Eccentered | |
| | CSNG | CGOK | Process CSNG Data? | Yes | |
| | CSNG | CENT | Is Tool Centralized? | No | |
| | CSNG | GBOK | Gamma Enviromental Corrections? | Yes | |
| | CSNG | BARF | Barite Correction Factor | 1.00 | |
| | CSNG | ORDG | Use Fixed Gain | No | |
| | CSNG | ORDO | Use Fixed Offset | No | |
| | CSNG | ORDR | Use Fixed Resolution Degradation Factor | No | |
| | GEMT | GMOK | Compute GEMT Results? | Yes | |
| | GEMT | FTAL | Fit Chemical Element Al | Yes | |
| | GEMT | FTBA | Fit Chemical Element Ba | No | |
| | GEMT | FITC | Fit Chemical Element C | Yes | |
| | GEMT | FTCA | Fit Chemical Element Ca | Yes | |
| | GEMT | FTCL | Fit Chemical Element Cl | Yes | |
| | GEMT | FTFE | Fit Chemical Element Fe | Yes | |
| | GEMT | FTGD | Fit Chemical Element Gd | Yes | |
| | GEMT | FITH | Fit Chemical Element H | Yes | |
| | GEMT | FTK | Fit Chemical Element K | Yes | |
| | GEMT | FTMG | Fit Chemical Element Mg | Yes | |
| | GEMT | FTMN | Fit Chemical Element Mn | Yes | |
| | GEMT | FTNA | Fit Chemical Element Na | No | |
| | GEMT | FITO | Fit Chemical Element O | Yes | |
| | GEMT | FTS | Fit Chemical Element S | Yes | |
| | GEMT | FTSI | Fit Chemical Element Si | Yes | |
| | GEMT | FTTI | Fit Chemical Element Ti | Yes | |
| | GEMT | KFIT | Potassium constraint flag (No = don't fit,Yes = fit) | Yes | |
| | GEMT | UFDF | Use Fix Resolution Degradation Factor | No | |
| | DSNT | DNOK | Process DSN? | Yes | |
| | DSNT | DEOK | Process DSN EVR? | No | |
| | DSNT | NLIT | Neutron Lithology | Limestone | |
| | DSNT | DNSO | DSN Standoff - 0.25 in (6.35 mm) Recommended | 0.250 | in |
| | DSNT | DNTP | Temperature Correction Type | None | |
| | DSNT | DPRS | DSN Pressure Correction Type | None | |
| | DSNT | SHCO | View More Correction Options | No | |
| | DSNT | UTVD | Use TVD for Gradient Corrections? | No | |
| | DSNT | LHWT | Logging Horizontal Water Tank? | No | |
| | SDLT | CLOK | Process Caliper Outputs? | Yes | |
| | SDLT Pad | DNOK | Process Density? | Yes | |
| | SDLT Pad | DNOK | Process Density EVR? | No | |
| | SDLT Pad | CB | Logging Calibration Blocks? | No | |
| | SDLT Pad | SPVT | SDLT Pad Temperature Valid? | Yes | |
| | SDLT Pad | DTWN | Disable temperature warning | No | |

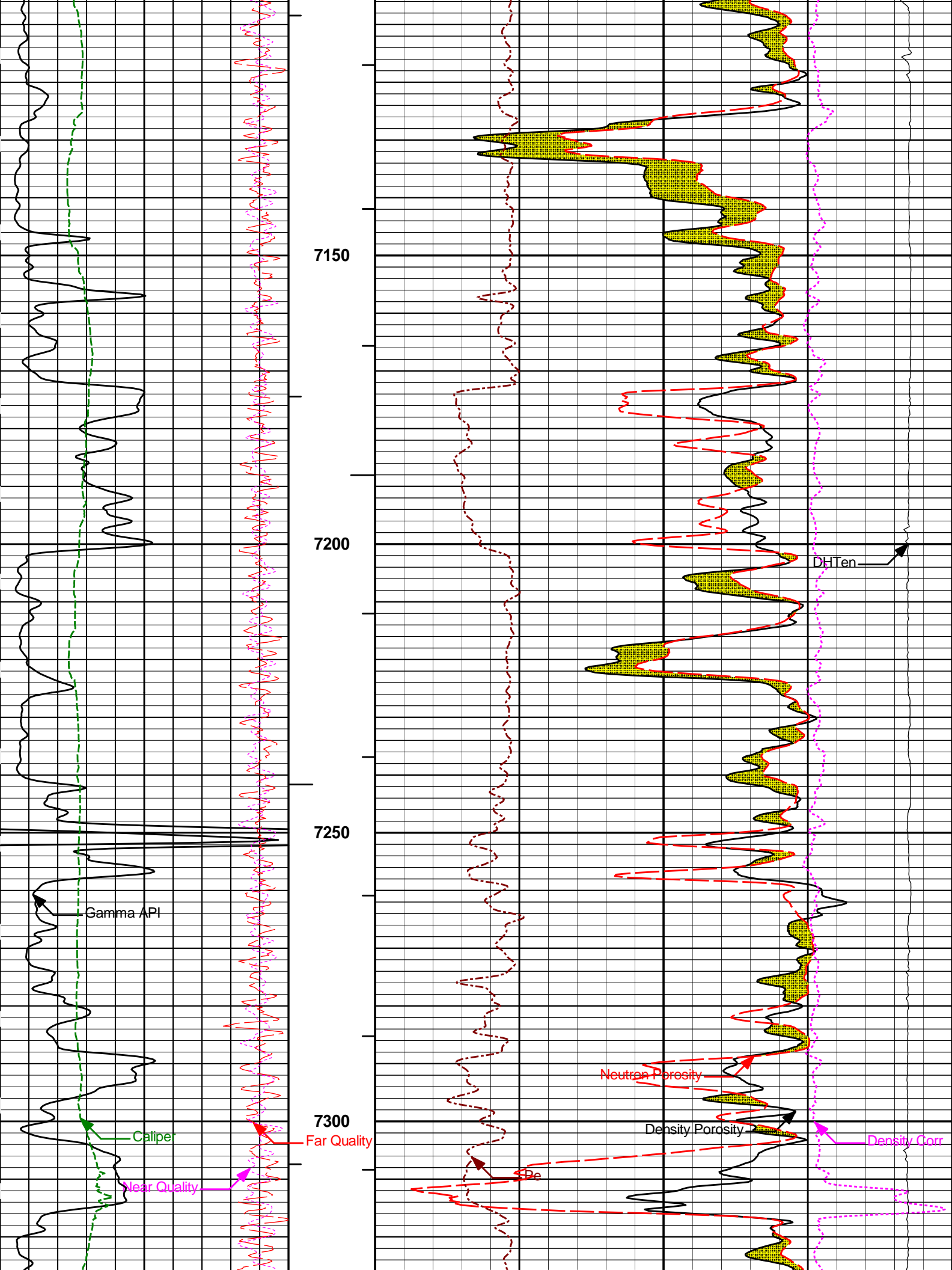
| | | | | |
|--|------|-------------------------------|-----------------|--------------------------|
| SDLT Pad | DMA | Formation Density Matrix | 2.710 | g/cc |
| SDLT Pad | DFL | Formation Density Fluid | 1.000 | g/cc |
| ACRt Sonde | RTOK | Process ACRt? | Yes | |
| ACRt Sonde | MNSO | Minimum Tool Standoff | 1.25 | in |
| ACRt Sonde | TCS1 | Temperature Correction Source | FP Lwr & FP Upr | |
| ACRt Sonde | TPOS | Tool Position | Eccentered | |
| ACRt Sonde | RMOP | Rmud Source | Mud Cell | |
| ACRt Sonde | RMIN | Minimum Resistivity for MAP | 0.20 | ohmm |
| ACRt Sonde | RMIN | Maximum Resistivity for MAP | 200.00 | ohmm |
| ACRt Sonde | THQY | Threshold Quality | 0.50 | |
| ACRt Sonde | MRFX | Fixed mud resistivity | 2000 | ohmm |
| BOTTOM | | | | |
| Data: SORS_1P\0001 TRIPLE_GEM_CSNG\003.01 20-Jan-13 20:55 Up | | | | Date: 20-Jan-13 20:57:07 |

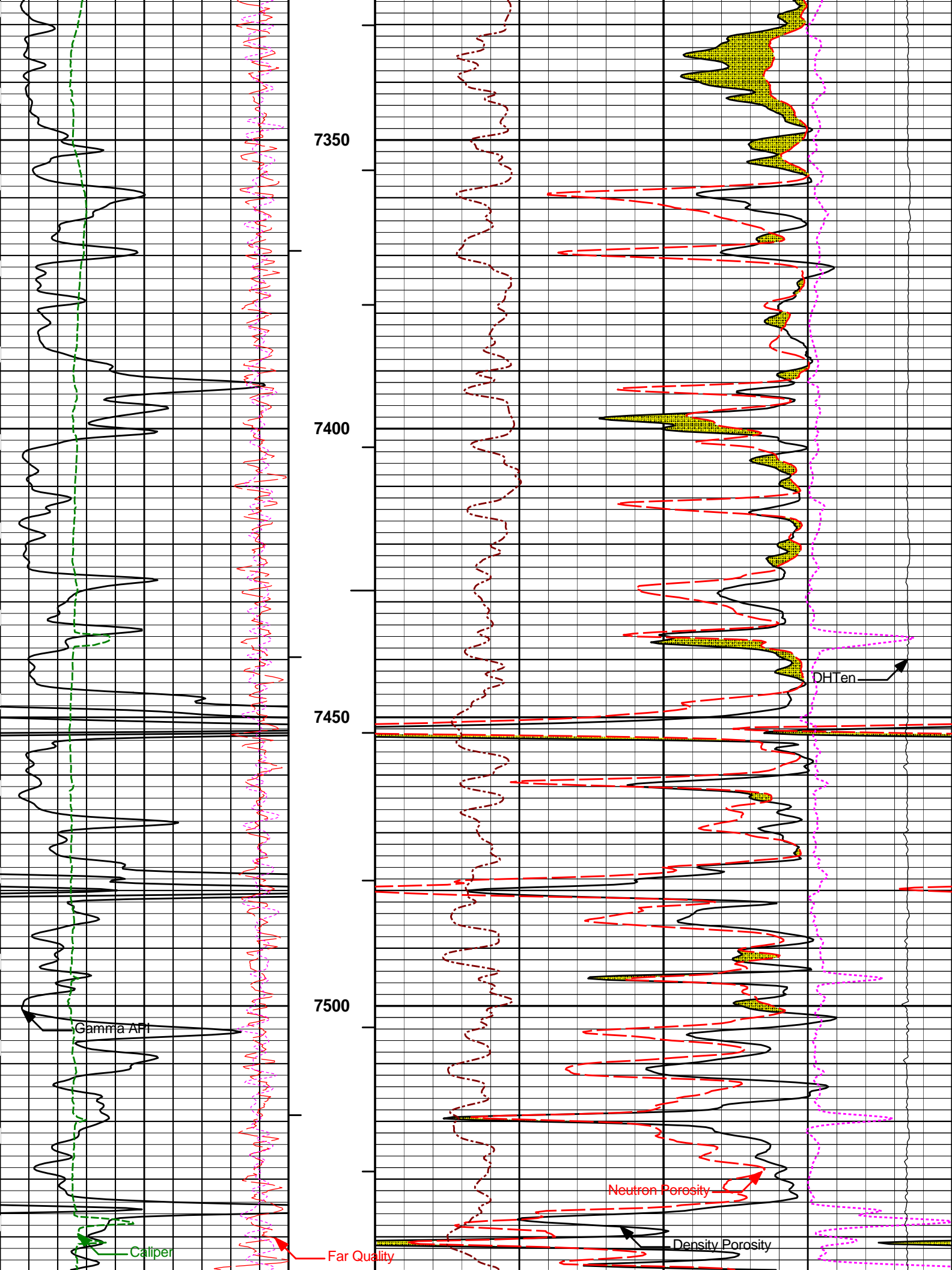


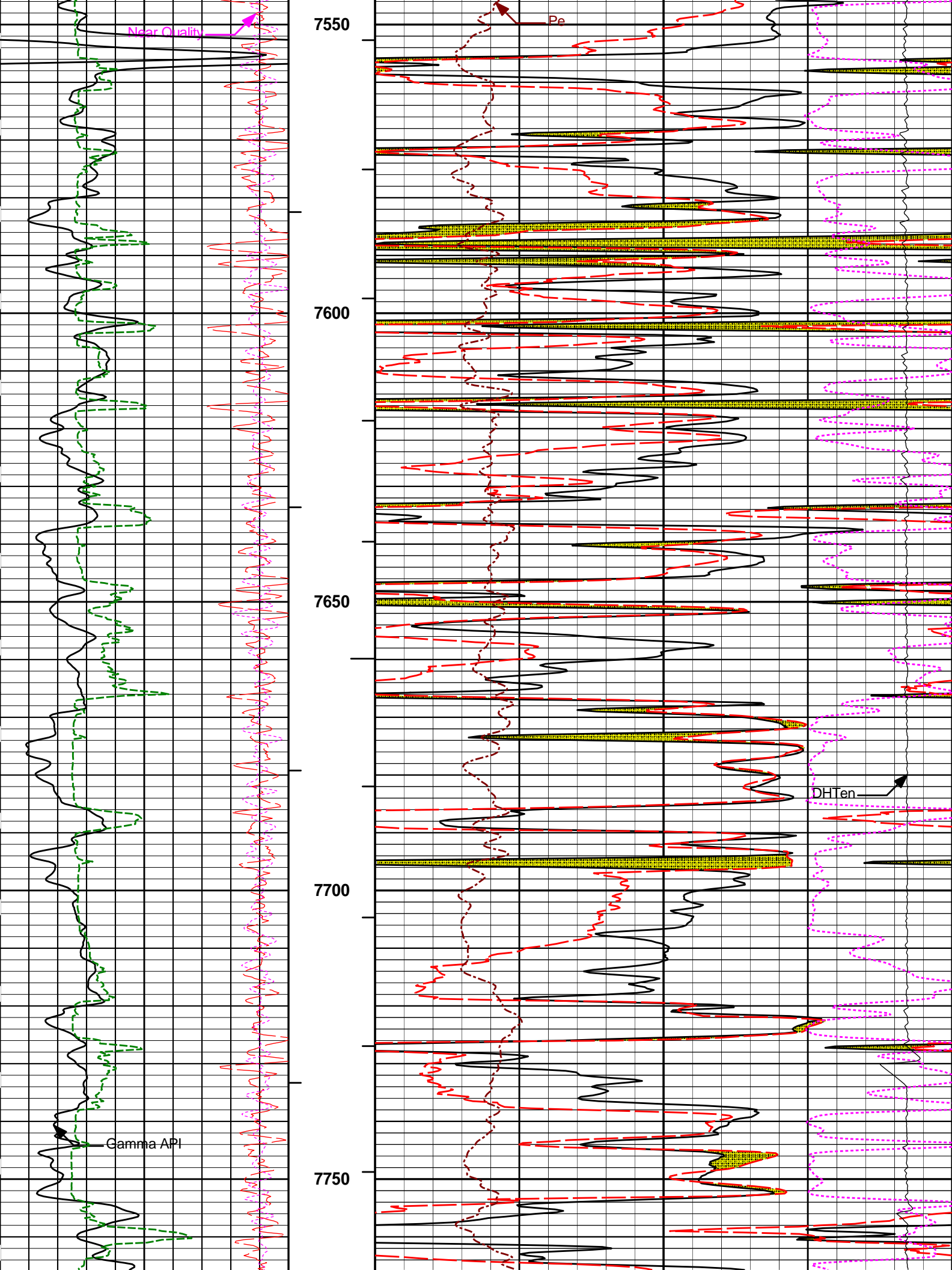


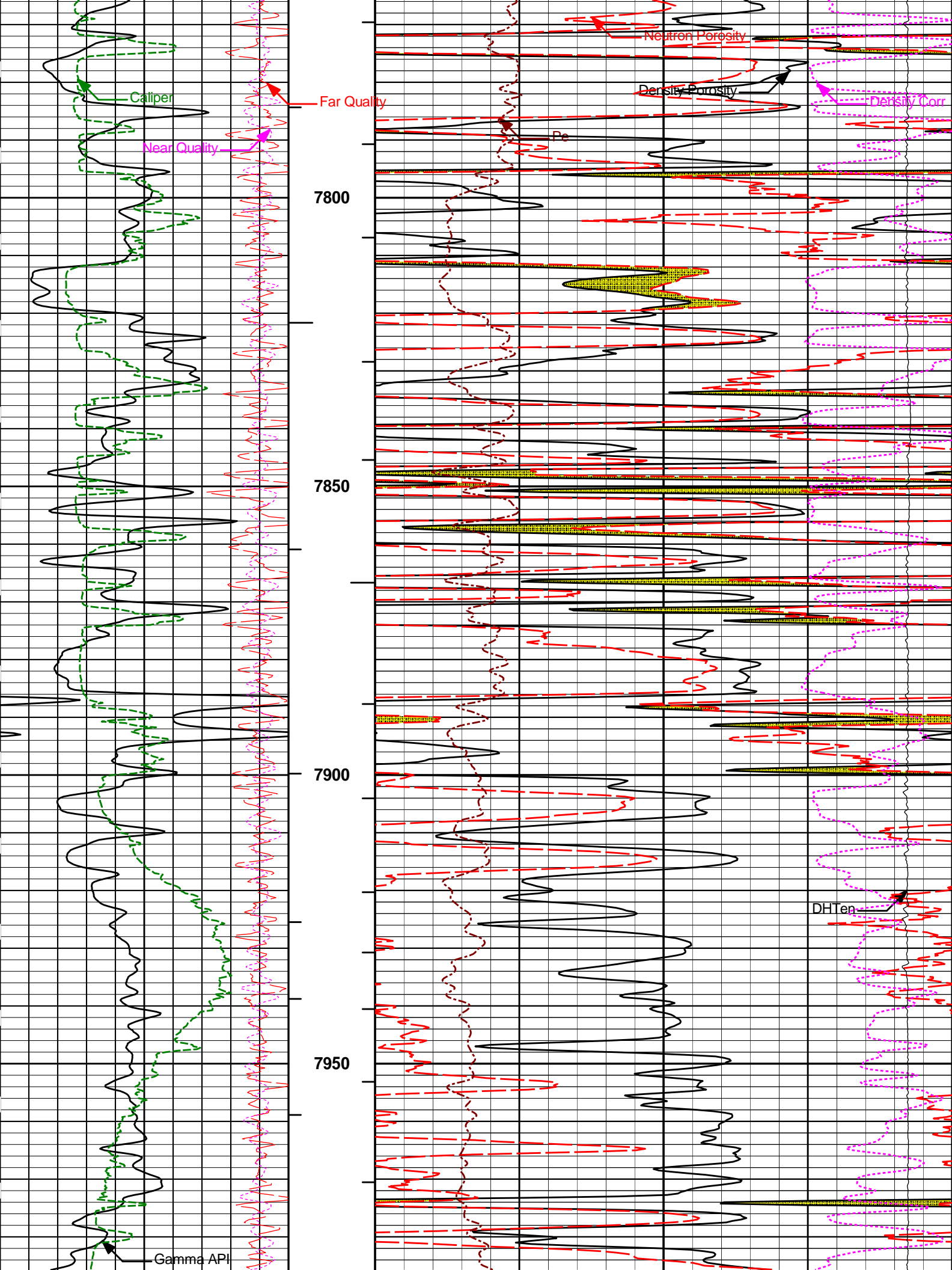


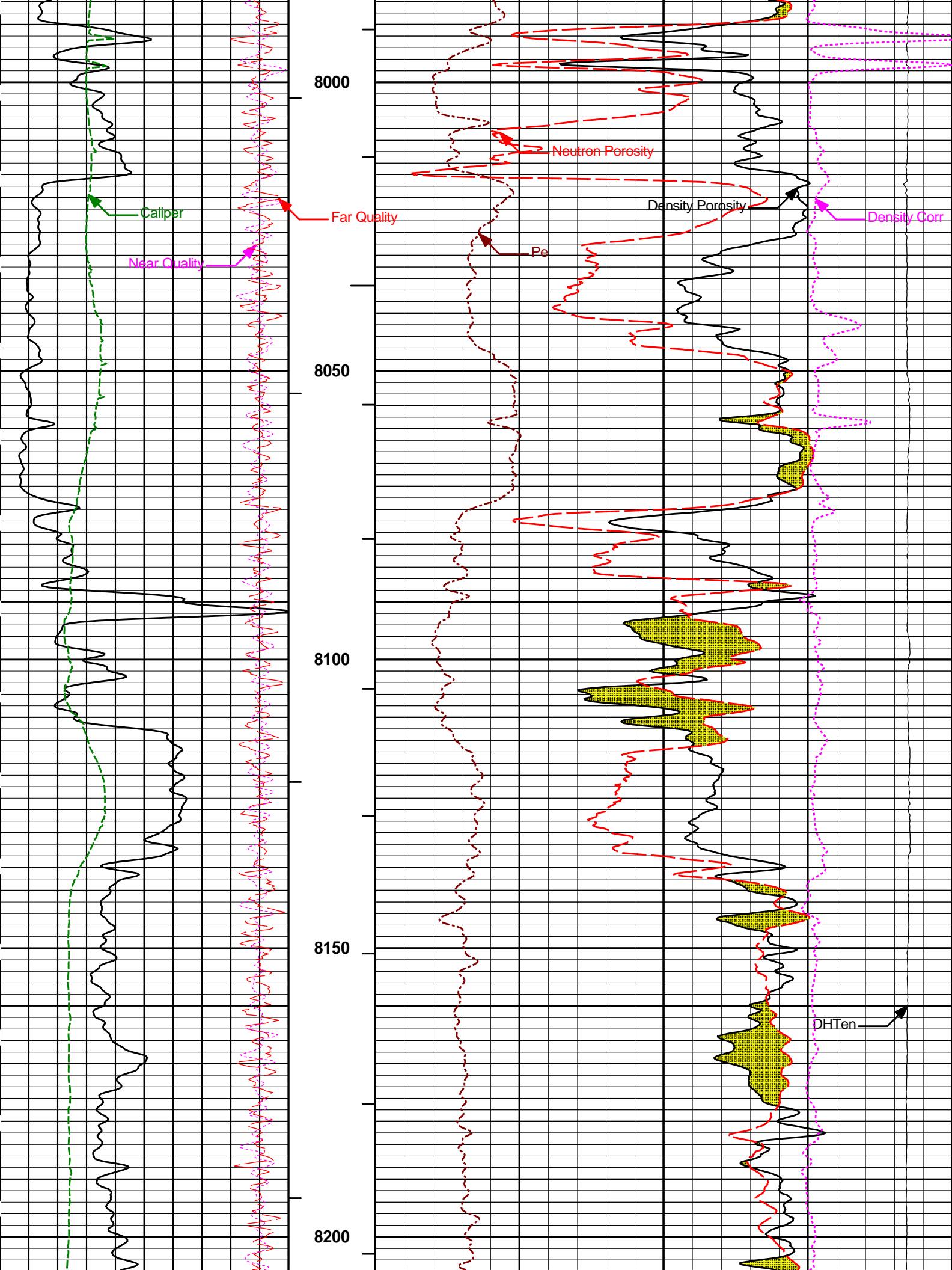


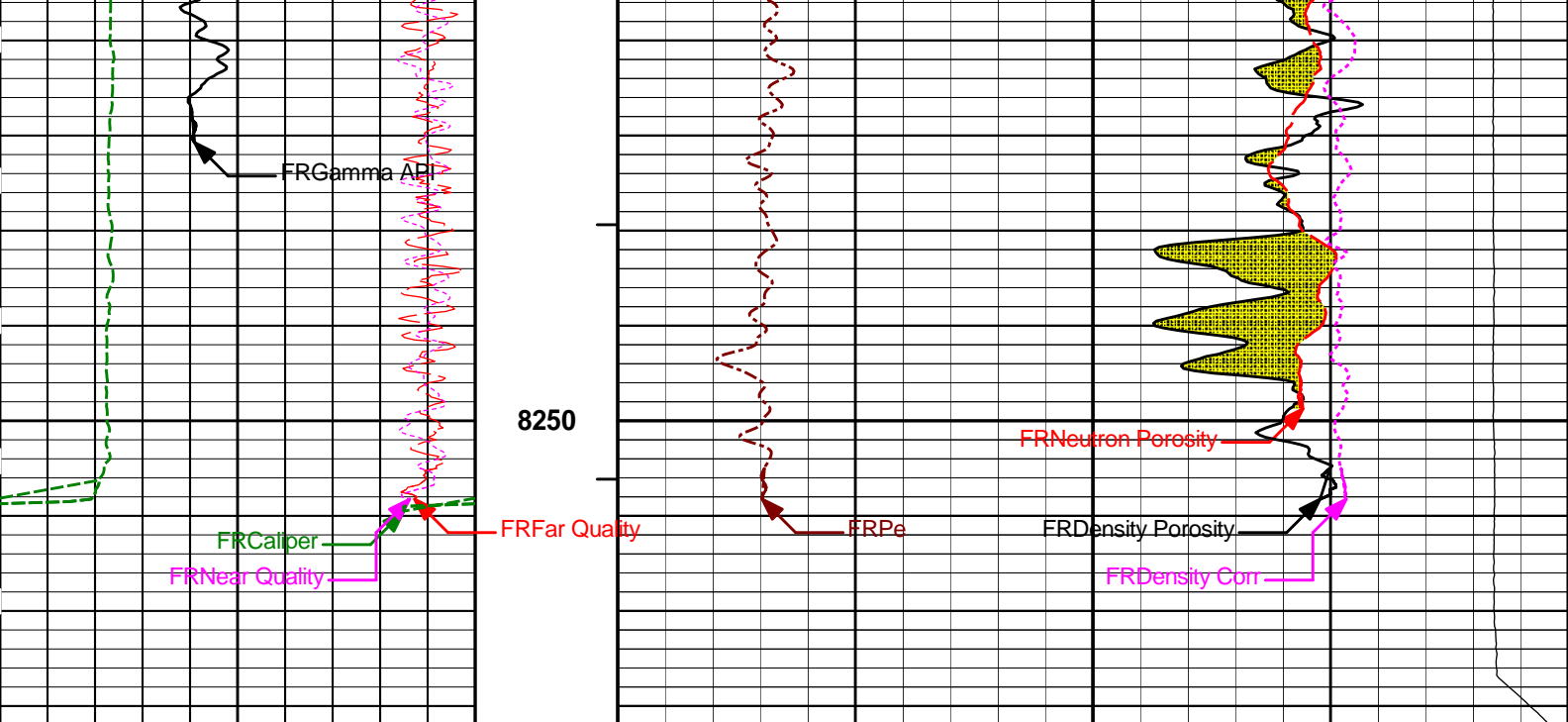












| | | | | | | | | | | |
|----|--------------|-----|---------|----|------------------|----|-------|--------------|-------------|-----|
| 0 | Gamma API | 250 | 1 : 240 | 0 | Pe | 10 | -0.25 | Density Corr | 0.25 | |
| | api | | | | | | | | gram per cc | |
| 6 | Caliper | 16 | BHVT | | | | 10K | DHTen | 0 | |
| | inches | | | | | | | | pounds | |
| 9 | Far Quality | -1 | AHVT | 30 | Density Porosity | | | | | -10 |
| | | | | | percent | | | | | |
| -9 | Near Quality | 1 | | 30 | Neutron Porosity | | | | | -10 |
| | | | | | percent | | | | | |

HALLIBURTON

Plot Time: 20-Jan-13 21:18:04
Plot Range: 6370 ft to 8282.17 ft
Data: SORS_1PWell Based\MAIN_PASS1\
Plot File: \\PORO\IQ_POROSITY_5IN_RM

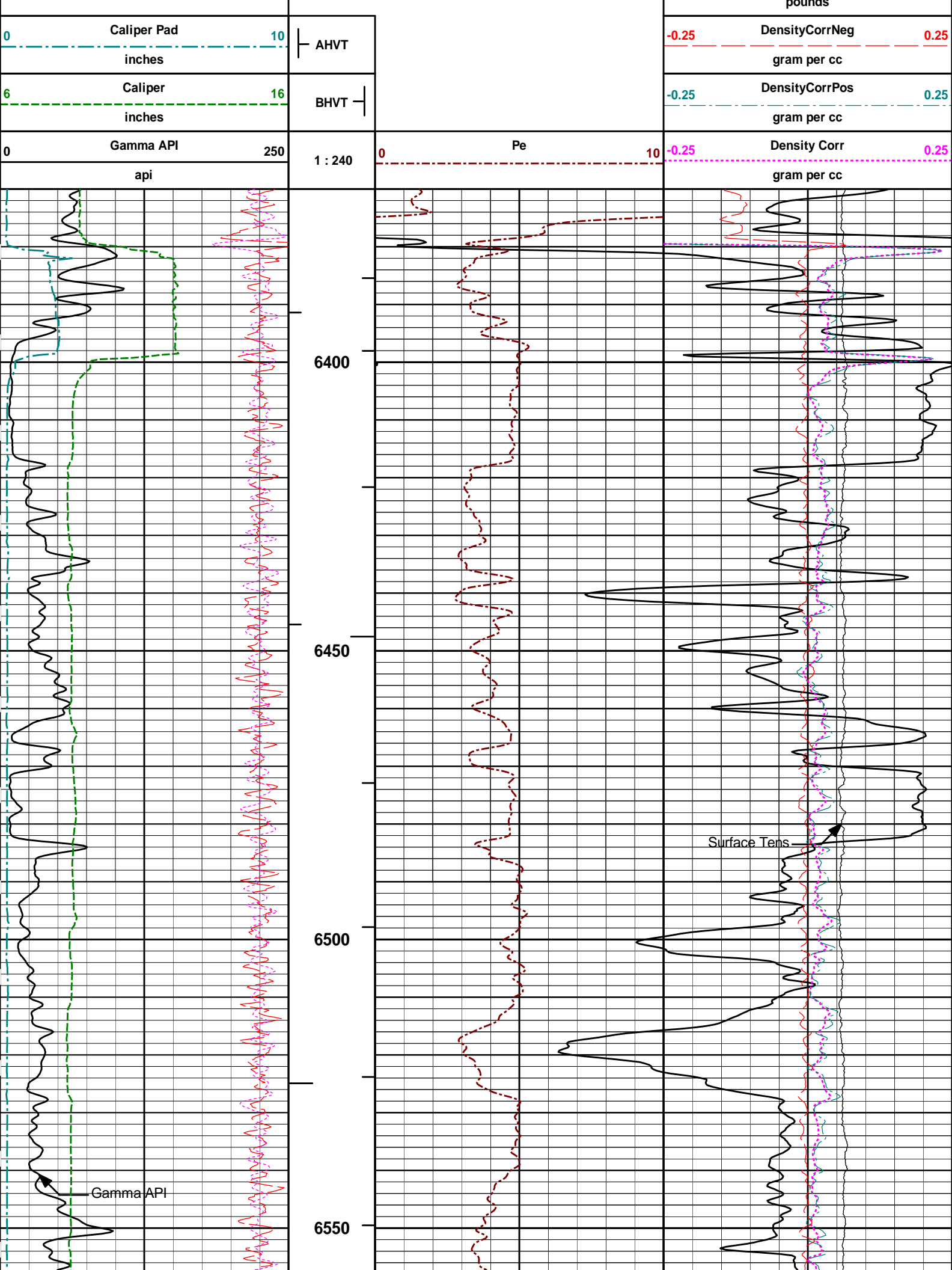
MAIN PASS 5" = 100'

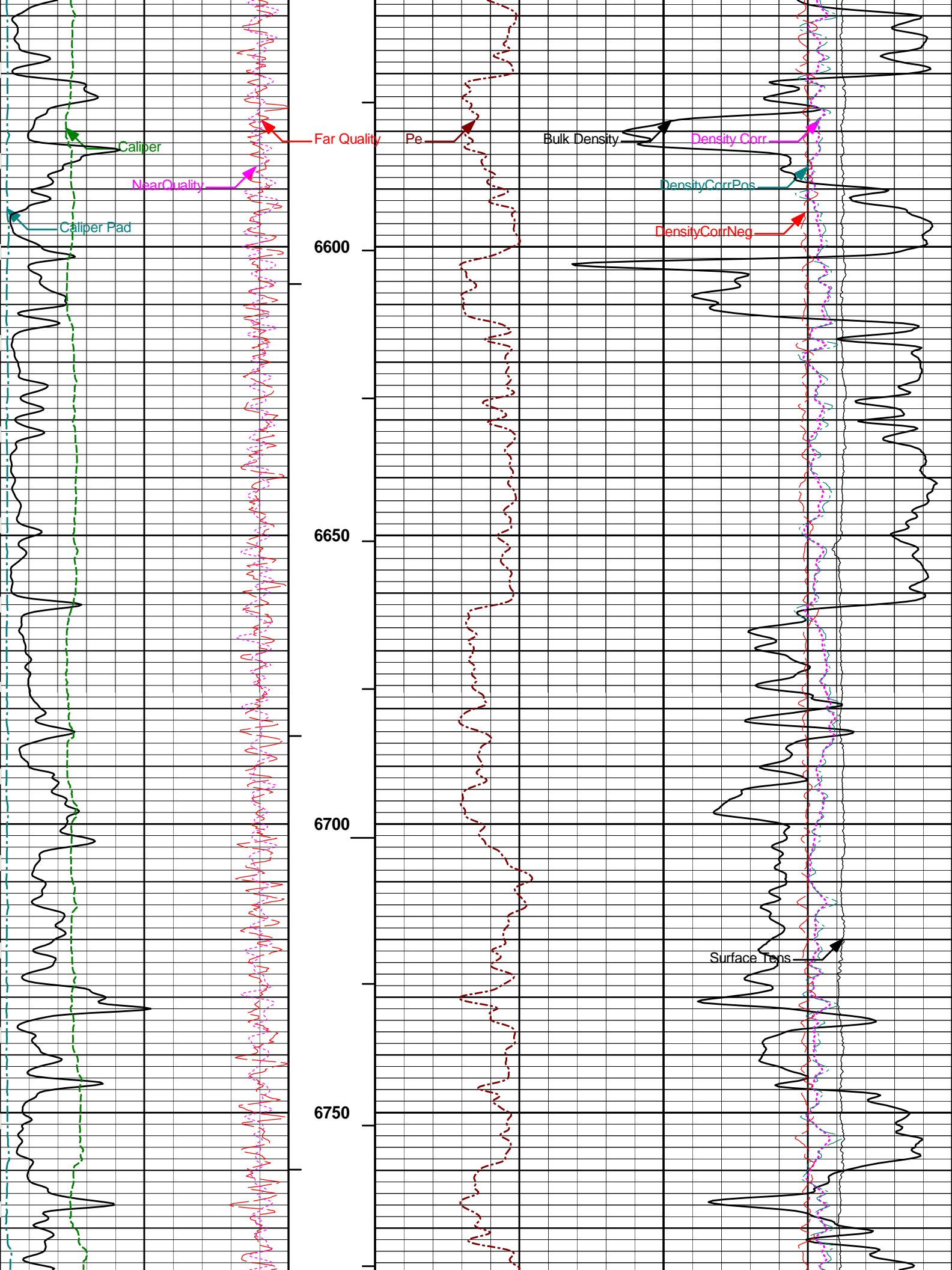
HALLIBURTON

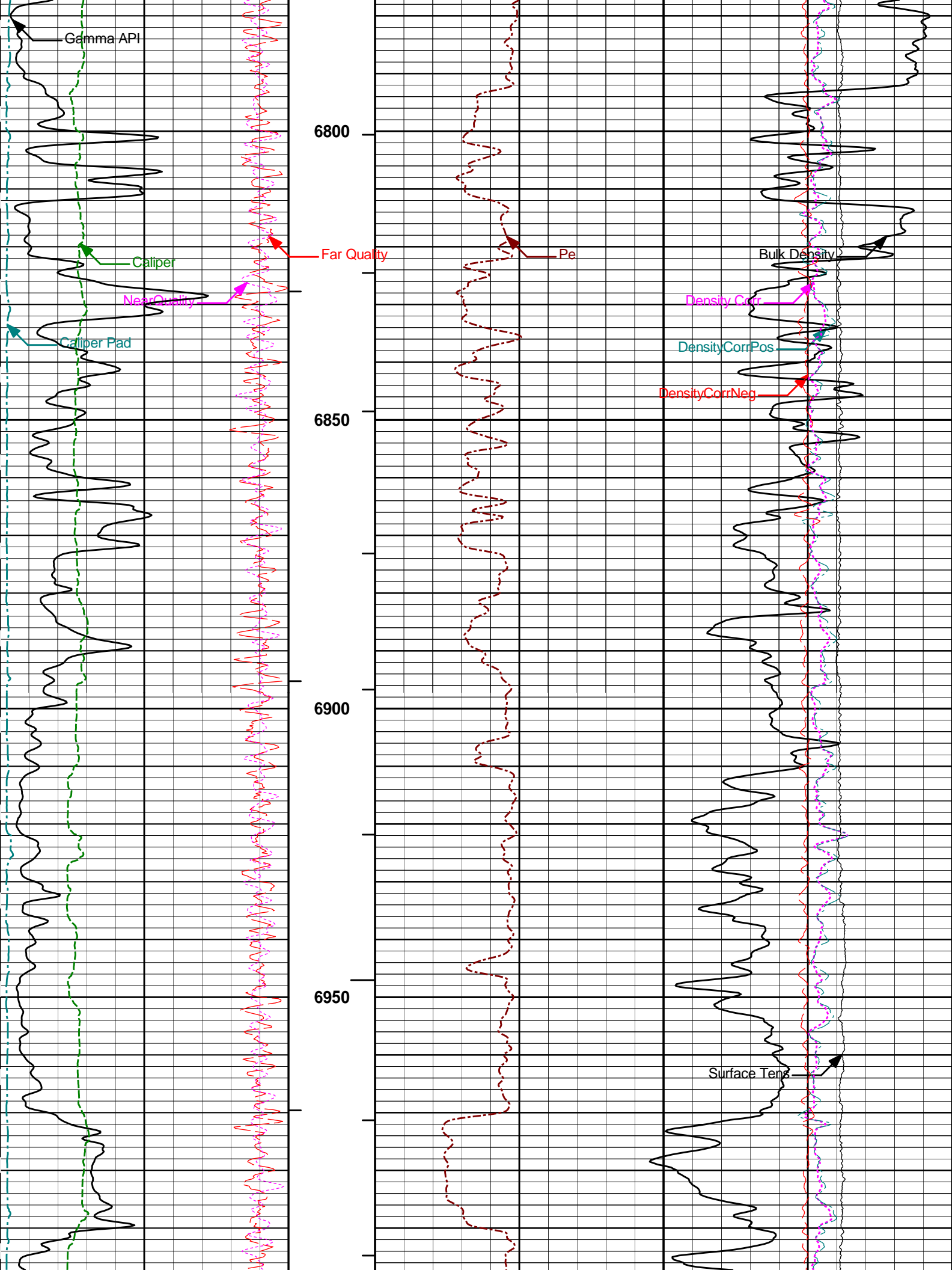
Plot Time: 20-Jan-13 21:18:04
Plot Range: 6370 ft to 8282.17 ft
Data: SORS_1PWell Based\MAIN_PASS1*
Plot File: \\PORO\IQ_RHOB_5IN_RM

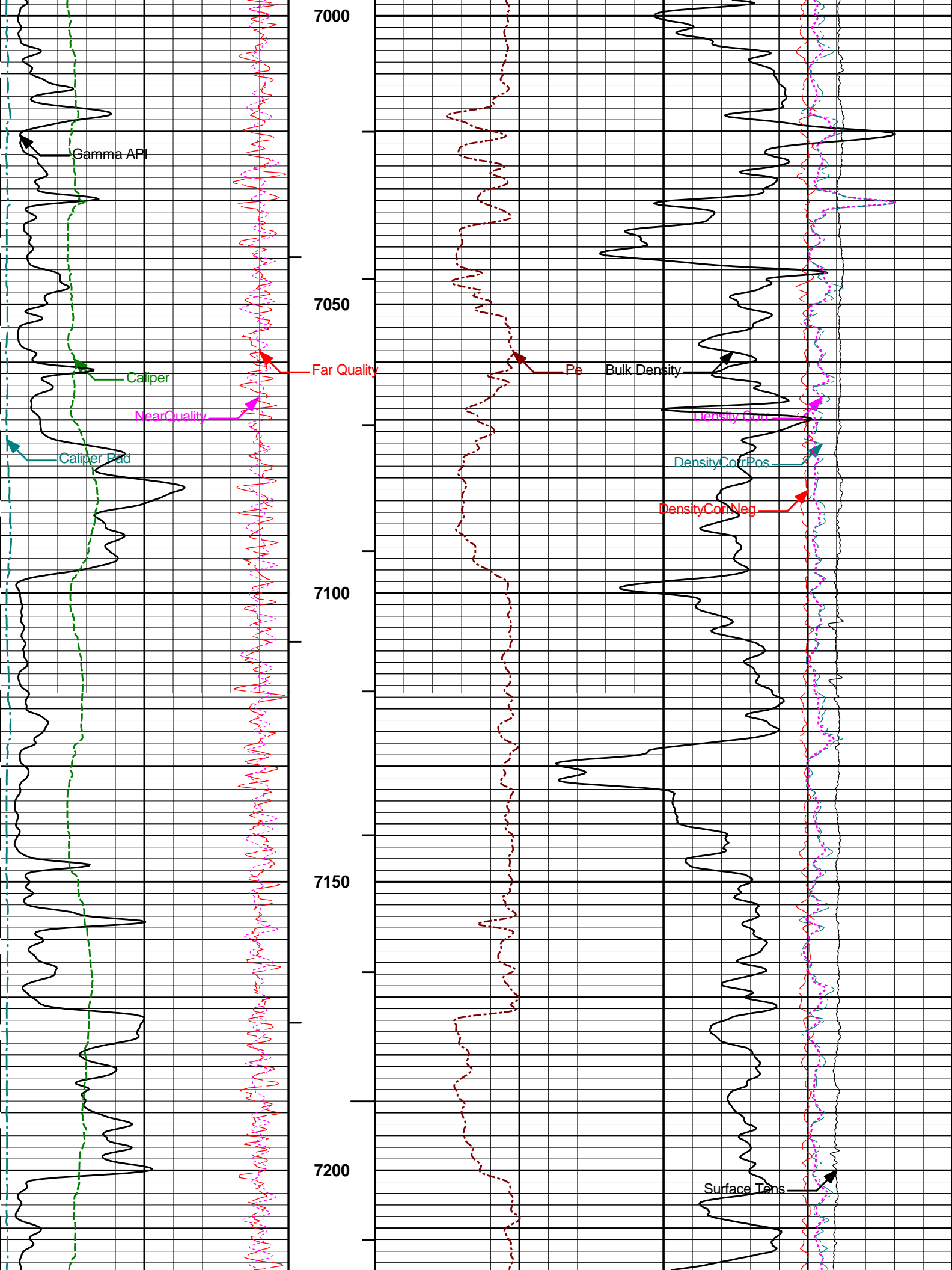
MAIN PASS 5" = 100'

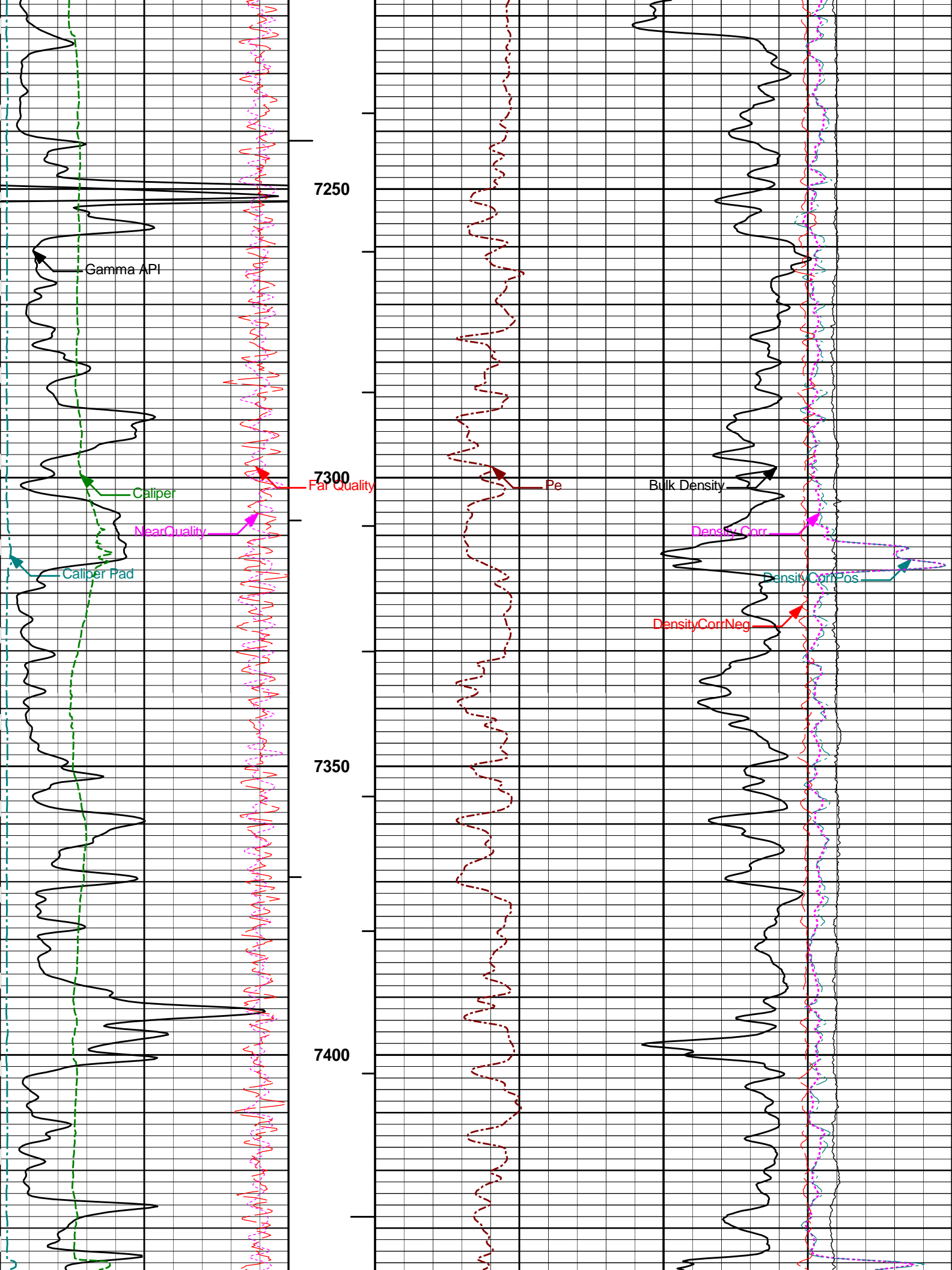
| | | | | | | | |
|-------------|--|---|--|--------------|--|--------------|--|
| NearQuality | | 2 | | Bulk Density | | 3 | |
| -9 | | | | gram per cc | | | |
| | | | | | | | |
| Far Quality | | | | 10K | | Surface Tens | |
| 9 | | | | | | 0 | |
| -1 | | | | | | pounds | |

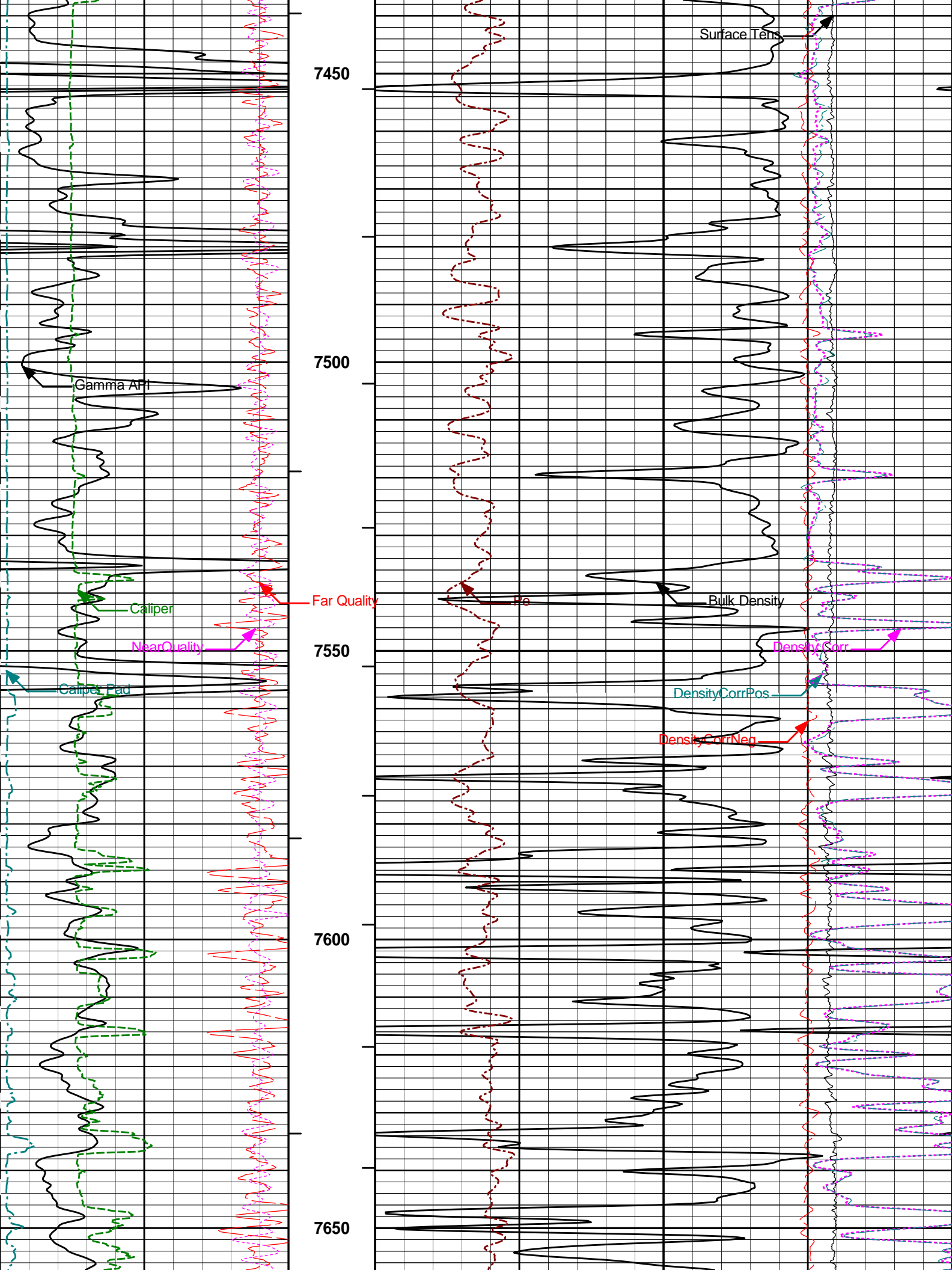


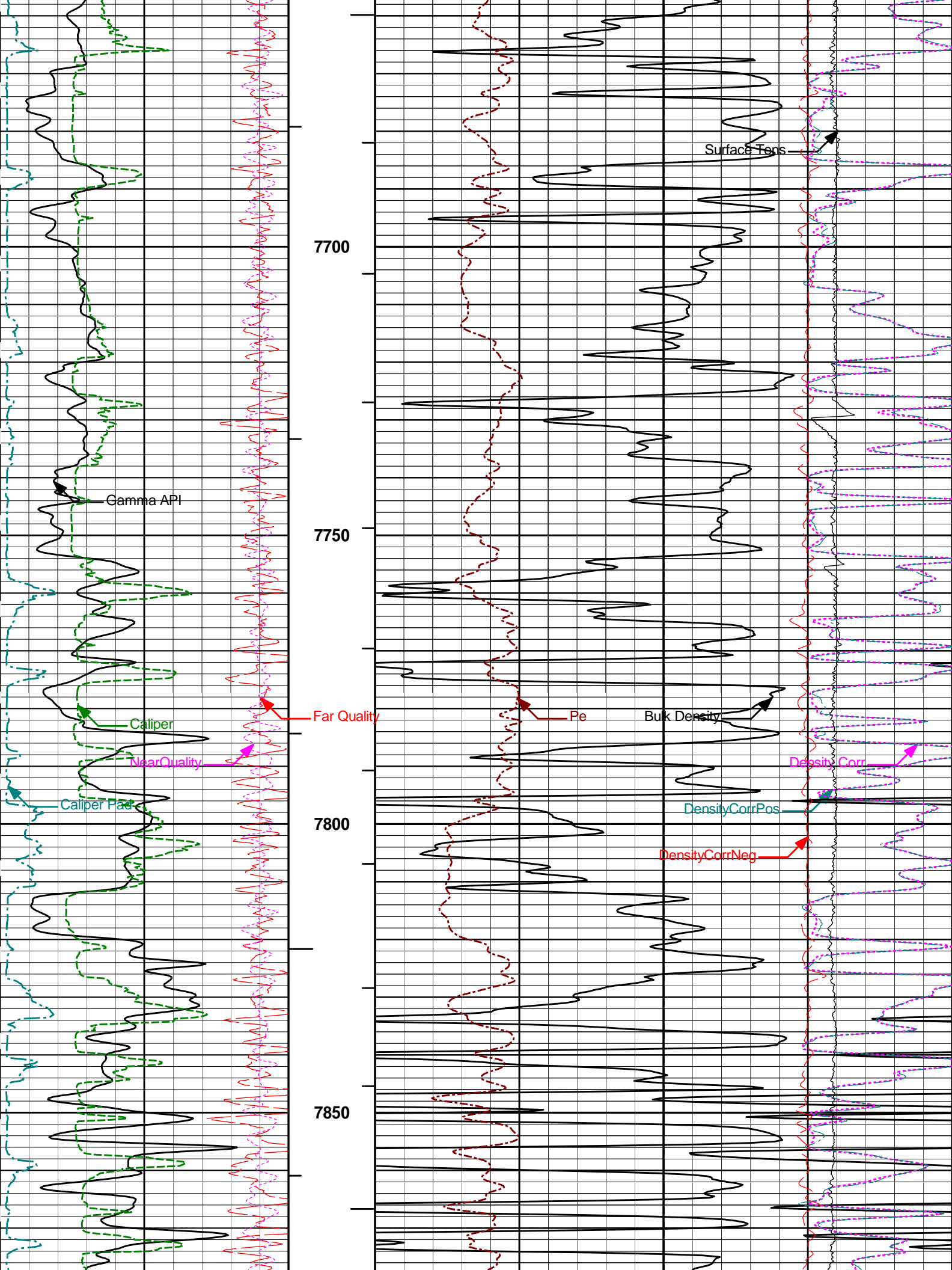


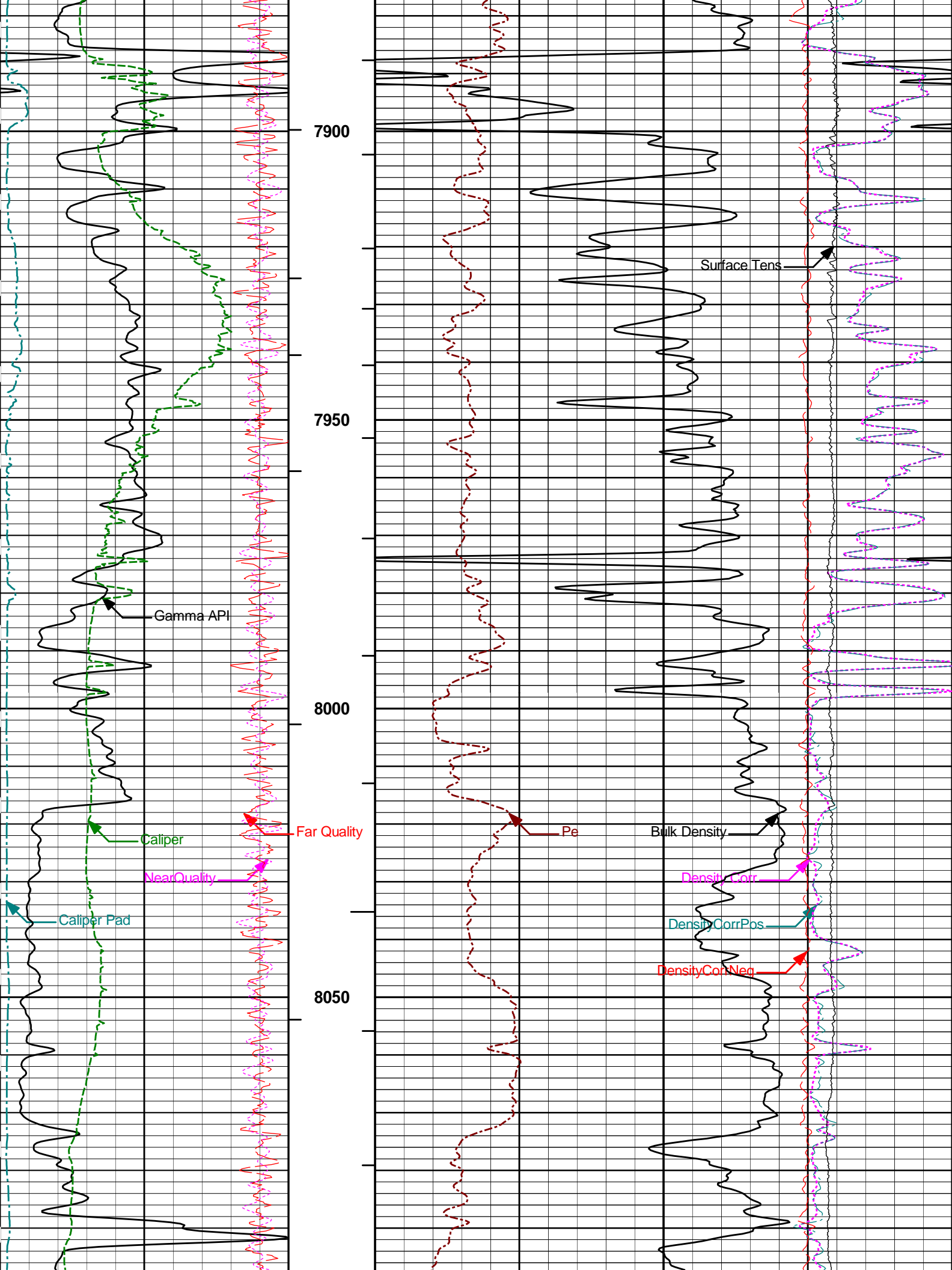


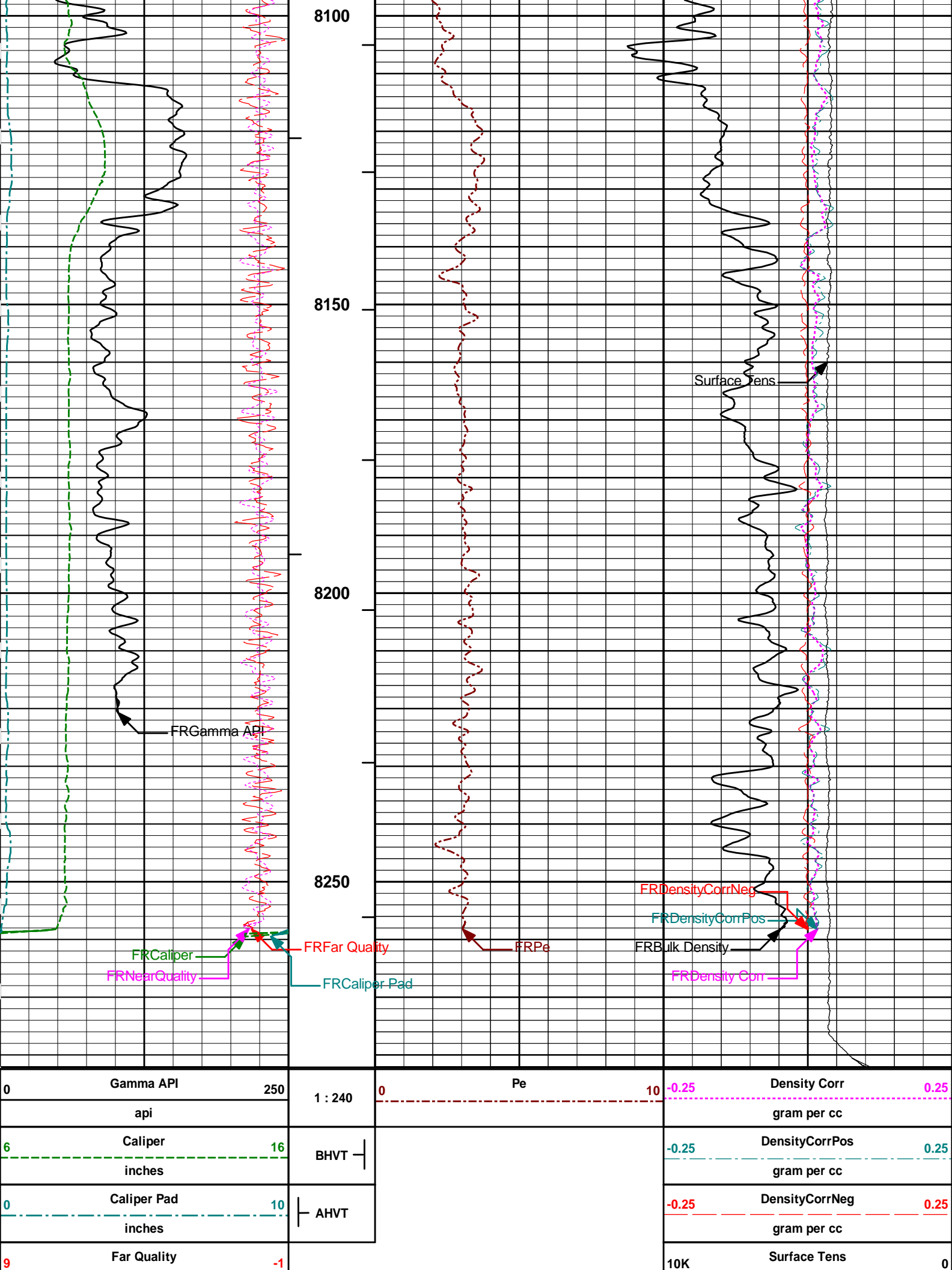












| | | | |
|-------------|---|---|--------------|
| | | | pounds |
| NearQuality | 1 | 2 | Bulk Density |
| | | | gram per cc |

| | |
|--------------------|---|
| HALLIBURTON | Plot Time: 20-Jan-13 21:18:07 Plot Range: 6370 ft to 8282.17 ft Data: SORS_1PWell Based\MAIN_PASS1\ Plot File: \\PORO\IQ_RHOB_5IN_RM |
|--------------------|---|

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|---------------------|
| MAIN PASS 5" = 100' |
|---------------------|

| |
|---------------------------|
| HALLIBURTON |
| CALIBRATION REPORT |

| | | | |
|--|----------------------------|-----------------------------|--------------------|
| NATURAL GAMMA RAY TOOL SHOP CALIBRATION | | | |
| Tool Name: | GTET - 11812883 | Reference Calibration Date: | 18-Dec-12 10:42:41 |
| Engineer: | J. PINKETT | Calibration Date: | 18-Jan-13 10:21:33 |
| Software Version: | WL INSITE R3.8.0 (Build 2) | Calibration Version: | 1 |

| | | | |
|---|----------|------------|-------|
| Calibrator Source S/N: TB-289 Calibrator API Reference:243.00 api Equivalent Calibrator API Reference:247.3 api | | | |
| Measurement | Measured | Calibrated | Units |
| Background | 68.4 | 67.4 | api |
| Background + Calibrator | 319.3 | 314.7 | api |
| Calibrator | 250.9 | 247.3 | api |

| | | | |
|---|----------------------------|-----------------------------|--------------------|
| NATURAL GAMMA RAY TOOL FIELD CALIBRATION | | | |
| Tool Name: | GTET - 11812883 | Reference Calibration Date: | 18-Jan-13 10:21:33 |
| Engineer: | J. PINKETT | Calibration Date: | 18-Jan-13 10:29:44 |
| Software Version: | WL INSITE R3.8.0 (Build 2) | Calibration Version: | 1 |

| | | | |
|---|-------|------------|-----------|
| Calibrator Source S/N: TB-289 Calibrator API Reference:243.00 api Equivalent Calibrator API Reference:247.3 api | | | |
| Field Verification | Shop | Field | Units |
| Background | 67.4 | 66.7 | api |
| Background + Calibrator | 314.7 | 310.4 | api |
| Calibrator | 247.3 | 243.7 | api |
| Shop | Field | Difference | Tolerance |
| 247.3 | 243.7 | 3.6 | +/- 9.00 |

| | | | |
|---------------------------------|----------------------------|-----------------------------|--------------------|
| CSNG-FS SHOP CALIBRATION | | | |
| Tool Name: | CSNG - 10846351 | Reference Calibration Date: | 17-Dec-12 14:29:22 |
| Engineer: | J. PINKETT | Calibration Date: | 18-Jan-13 11:03:24 |
| Software Version: | WL INSITE R3.8.0 (Build 2) | Calibration Version: | 1 |
| Source SN: | TB-290 | | |

| TITANIUM CASE | Measured | Calibrated | Units |
|-------------------------|----------|------------|-----------|
| 60 KEV Peak Channel # | 48.0 | 48.0 | Channel # |
| 239 KEV Peak Channel # | 23.8 | 23.8 | Channel # |
| 583 KEV Peak Channel # | 53.5 | 53.5 | Channel # |
| 2614 KEV Peak Channel # | 221.2 | 221.1 | Channel # |
| Calibrate Temperature | 56.1 | 45.6 | degF |

| Pass/Fail Summary | Centroid |
|-------------------|----------|
| 239 KEV Peak | Passed |
| 583 KEV Peak | Passed |
| 2614 KEV Peak | Passed |

Blanket Reference Value: 230.00 API

Calibrator Value: 261.2 API

| | Counts | Units | Measured | Calibrated | Units |
|-----------------|--------|-------|----------|------------|-------|
| Thorium Blanket | 1797.9 | CPS | 320.7 | 316.7 | API |
| Background | 315.0 | CPS | 59.5 | 55.5 | API |

Gamma Ray Gain: 0.89

Expected Gain Range: 0.85 - 1.15

Gamma Gain Check: Passed

CSNG-FS FIELD CALIBRATION

| | | | |
|--------------------------|-----------------------------------|------------------------------------|---------------------------|
| Tool Name: | CSNG - 10846351 | Reference Calibration Date: | 18-Jan-13 11:03:24 |
| Engineer: | J. PINKETT | Calibration Date: | 18-Jan-13 12:14:11 |
| Software Version: | WL INSITE R3.8.0 (Build 2) | Calibration Version: | 1 |
| Source SN: | | | |

| TITANIUM CASE | Shop | Field | Units |
|-------------------------|-------|-------|-----------|
| 60 KEV Peak Channel # | 48.0 | 48.0 | Channel # |
| 239 KEV Peak Channel # | 23.8 | 23.9 | Channel # |
| 583 KEV Peak Channel # | 53.5 | 53.9 | Channel # |
| 2614 KEV Peak Channel # | 221.1 | 222.2 | Channel # |
| Calibrate Temperature | 45.6 | 57.9 | degF |

| Pass/Fail Summary | Centroid |
|-------------------|----------|
| 239 KEV Peak | Passed |
| 583 KEV Peak | Passed |
| 2614 KEV Peak | Passed |

Blanket Reference Value: 230.00 API

Calibrator Value: 261.2 API

| | Counts | Units | Measured | Calibrated | Units |
|-----------------|--------|-------|----------|------------|-------|
| Thorium Blanket | 1776.7 | CPS | 316.7 | 317.1 | API |
| Background | 313.1 | CPS | 55.5 | 55.9 | API |

Gamma Ray Gain: 0.90

Expected Gain Range: 0.85 - 1.15

Gamma Gain Check: Passed

GEMT SHOP CALIBRATION

| | | | |
|-------------------|----------------------------|-----------------------------|--------------------|
| Tool Name: | GEMT - 90268460 | Reference Calibration Date: | 31-Jul-12 02:55:27 |
| Engineer: | B. PEDERSEN | Calibration Date: | 28-Aug-12 16:15:59 |
| Software Version: | WL INSITE R3.6.0 (Build 3) | Calibration Version: | 1 |
| Source SN: | --- | | |

GEM Verification Summary

| Location | Measured | Units |
|------------------------|----------|-----------|
| Hydrogen Peak Location | 58.598 | Channel # |
| Carbon Peak Location | 118.950 | Channel # |
| Oxygen Peak Location | 163.173 | Channel # |
| Iron Peak Location | 204.918 | Channel # |

| Centroids | Expected | Measured | Pass/Fail |
|------------------------|-----------|----------|-----------|
| Hydrogen Peak Location | 56 - 65 | 58.598 | Passed |
| Carbon Peak Location | 116 - 125 | 118.950 | Passed |
| Oxygen Peak Location | 160 - 171 | 163.173 | Passed |
| Iron Peak Location | 202 - 211 | 204.918 | Passed |

| Energy Resolution | Expected | Measured | Pass/Fail |
|-------------------|------------|----------|-----------|
| Hydrogen Peak | 0.0 - 8.55 | 7.060 | Passed |
| Carbon Peak | 4.0 - 5.8 | 4.256 | Passed |
| Oxygen Peak | 4.0 - 5.9 | 4.502 | Passed |
| Iron Peak | 2.8 - 5.4 | 3.928 | Passed |

Spectrum Energy Calibration

| | Measured | Units | Pass/Fail |
|-------------|----------|-----------|-----------|
| Gain Factor | 0.9968 | | Passed |
| Offset | -2.181 | Channel # | Passed |
| Linearity | 99.6209 | % | Passed |

| DUAL SPACED NEUTRON SHOP CALIBRATION | | | |
|--------------------------------------|----------------------------|-----------------------------|--------------------|
| Tool Name: | DSNT - 11812167 | Reference Calibration Date: | 18-Dec-12 11:37:16 |
| Engineer: | J. PINKETT | Calibration Date: | 18-Jan-13 10:41:49 |
| Software Version: | WL INSITE R3.8.0 (Build 2) | Calibration Version: | 1 |

Logging Source S/N: DSN434
Tank Serial Number: 11068236
Reference value assigned to Tank: 53.720
Snow Block S/N: BRIGHTON
Calibration Tank Water Temperature: 45 degF
Min. Tool Housing Outside Diameter: 3.625 in

| CALIBRATION CONSTANTS | | | |
|-----------------------|-------------|-----------|----------------------------|
| Measurement | Prev. Value | New Value | Control Limit On New Value |
| Gain: | 1.000 | 1.003 | 0.900 - 1.100 |

| WATER TANK SUMMARY (Horizontal Water Tank) | | | | |
|--|----------------------------------|------------------------|--------|-------------------------|
| Measurement | Current Reading (Previous Coef.) | Calibrated (New Coef.) | Change | Control Limit On Change |
| Porosity (decp): | 0.2215 | 0.2223 | 0.0009 | +/- 0.0020 |
| Calibrated Ratio: | 10.08 | 10.11 | 0.029 | +/- 0.050 |

| VERIFIER | | | | |
|-----------------------------|--------|-------------------|--|--|
| Measurement | Value | Control Limit | | |
| Snow-Block Porosity (decp): | 0.0765 | 0.02000 - 0.09000 | | |
| PASS/FAIL SUMMARY | | | | |
| Background Check: | | Passed | | |
| Gain-Range Check: | | Passed | | |
| Snow-Block Check: | | Passed | | |

| DUAL SPACED NEUTRON FIELD CALIBRATION | | | | |
|---------------------------------------|----------------------------|-----------------------------|--------------------|--|
| Tool Name: | DSNT - 11812167 | Reference Calibration Date: | 18-Jan-13 10:41:49 | |
| Engineer: | J. PINKETT | Calibration Date: | 18-Jan-13 10:43:11 | |
| Software Version: | WL INSITE R3.8.0 (Build 2) | Calibration Version: | 1 | |

Logging Source S/N: DSN434
Snow Block S/N: BRIGHTON

| NEUTRON FIELD-CHECK SUMMARY | | | | |
|-----------------------------|--------|--------|------------|-------------------------|
| | Shop | Field | Difference | Control Limit On Change |
| Snow-Block Porosity (decp): | 0.0765 | 0.0761 | -0.0004 | +/- 0.0150 |
| PASS/FAIL SUMMARY | | | | |
| Block Change Check: | | Passed | | |
| Snow Block Stat Check: | | Passed | | |
| Temperature Check: | | Passed | | |

| DENSITY CALIPER SHOP CALIBRATION | | | | |
|----------------------------------|----------------------------|-----------------------------|--------------------|--|
| Tool Name: | SDLT - 11812177 | Reference Calibration Date: | 18-Jan-13 11:45:13 | |
| Engineer: | J. PINKETT | Calibration Date: | 18-Jan-13 11:52:21 | |
| Software Version: | WL INSITE R3.8.0 (Build 2) | Calibration Version: | 1 | |
| Host Tool Name: | DSNT - 11812167 | | | |

| CALIBRATION COEFFICIENTS | | | |
|--------------------------|----------------|--------------|----------------------------|
| Measurement | Previous Value | New Value | Control Limit On New Value |
| Pad Offset | -4097.27 | -3484.97 | -7000.00 - -1000.00 |
| Pad Gain | 0.0004149 | 0.0003838 | 0.000200 - 0.000600 |
| Arm Offset | -4358.75 | -4517.64 | -5000.00 - 3000.00 |
| Arm Gain | 0.0006161 | 0.0005692 | 0.000300 - 0.000700 |
| Arm Power | -0.000008136 | -0.000005493 | -0.000010000 - 0.000010000 |

The ring diameter is computed from: DIAMETER = PAD EXTENSION + ARM EXTENSION + TOOL DIAMETER
Tool Diameter: 4.50 in

| CALIBRATION RINGS | | | | |
|-------------------|-----------------------------------|-------------------------|--------|----------------------------|
| Measurement | Current Reading (Previous Coeff.) | Calibrated (New Coeff.) | Change | Control Limit On New Value |
| PAD EXTENSION: | | | | |
| Small Ring (in) | 1.91 | 2.00 | 0.09 | +/- 0.20 |
| Medium Ring (in) | 3.80 | 3.75 | -0.05 | +/- 0.20 |
| RING DIAMETER: | | | | |
| Small Ring (in) | 6.49 | 6.50 | 0.01 | +/- 0.20 |
| Medium Ring (in) | 8.32 | 8.25 | -0.07 | +/- 0.20 |
| Large Ring (in) | 15.00 | 15.00 | 0.00 | +/- 0.20 |
| PASS/FAIL SUMMARY | | | | |

Calibration-Coefficients Range Check:Passed

Ring-Measurement Check:Passed

PASS/FAIL SUMMARY

Calibration-Coefficients Range Check:Passed

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:SDLT Pad - 11795867

Reference Calibration Date:18-Dec-12 12:13:29

Engineer:J. PINKETT

Calibration Date:18-Jan-13 11:22:54

Software Version:WL INSITE R3.8.0 (Build 2)

Calibration Version:1

Logging Source S/N: 5471GW

Aluminum Block S/N: 63066

Magnesium Block S/N: 12345

Density: 2.602g/cc

Density: 1.690g/cc

Pe: 3.100

Pe: 2.650

DENSITY CALIBRATION SUMMARY

| Measurement | Previous Value | New Value | Control Limit |
|----------------------|----------------|-----------|---------------|
| Near Bar Gain | 1.0620 | 1.0586 | 0.90 - 1.10 |
| Near Dens Gain | 1.0305 | 1.0267 | 0.90 - 1.10 |
| Near Peak Gain | 1.0180 | 1.0316 | 0.90 - 1.10 |
| Near Lith Gain | 0.9795 | 0.9892 | 0.90 - 1.10 |
| Far Bar Gain | 1.0107 | 1.0064 | 0.90 - 1.10 |
| Far Dens Gain | 0.9979 | 0.9997 | 0.90 - 1.10 |
| Far Peak Gain | 0.9947 | 0.9957 | 0.90 - 1.10 |
| Far Lith Gain | 0.9805 | 0.9894 | 0.90 - 1.10 |
| Near Bar Offset | -0.6417 | -0.5982 | NONE |
| Near Dens Offset | -0.3278 | -0.2795 | NONE |
| Near Peak Offset | -0.2016 | -0.3002 | NONE |
| Near Lith Offset | 0.1179 | 0.0613 | NONE |
| Far Bar Offset | -0.1866 | -0.1445 | NONE |
| Far Dens Offset | -0.0588 | -0.0687 | NONE |
| Far Peak Offset | -0.0397 | -0.0348 | NONE |
| Far Lith Offset | 0.0875 | 0.0369 | NONE |
| Near Bar Background | 843.26 | 839.48 | 700 - 1450 |
| Near Dens Background | 279.28 | 278.87 | 230 - 480 |
| Near Peak Background | 121.77 | 122.22 | 100 - 210 |
| Near Lith Background | 148.82 | 147.43 | 125 - 260 |
| Far Bar Background | 658.87 | 656.72 | 450 - 900 |
| Far Dens Background | 258.52 | 257.67 | 175 - 345 |
| Far Peak Background | 101.95 | 101.18 | 70 - 140 |
| Far Lith Background | 104.91 | 105.28 | 75 - 145 |

CALIBRATION BLOCK SUMMARY

| Measurement | Current Reading (Previous Coef) | Calibrated (New Coef) | Change | Control Limit On Change |
|----------------|------------------------------------|--------------------------|--------|----------------------------|
| MAGNESIUM | | | | |
| Density (g/cc) | 1.682 | 1.690 | 0.008 | +/- 0.015 |
| Pe | 2.705 | 2.592 | -0.113 | +/- 0.150 |
| ALUMINUM | | | | |
| Density (g/cc) | 2.592 | 2.602 | 0.010 | +/- 0.01500 |
| Pe | 3.130 | 3.050 | -0.080 | +/- 0.150 |

TOOL SUMMARY

| Measurement | Near Detector | | Far Detector | |
|----------------------------|---------------|----------------|--------------|----------------|
| | Value | Control Limits | Value | Control Limits |
| QUALITY | | | | |
| Background | -0.0017 | +/- 0.0110 | -0.0006 | +/- 0.0140 |
| Magnesium Block | -0.0008 | +/- 0.0110 | -0.0004 | +/- 0.0140 |
| Aluminum Block | -0.0011 | +/- 0.0110 | -0.0000 | +/- 0.0140 |
| Resolution | 8.82 | 6.00 - 11.50 | 9.07 | 6.00 - 11.50 |
| Internal Verifier(B+D+P+L) | 1388 | 1200 - 2700 | 1121 | 800 - 1700 |

| PASS/FAIL SUMMARY | |
|--------------------------------|--------|
| Background Quality Check: | Passed |
| Background Range Check: | Passed |
| Background Resolution Check: | Passed |
| Background Verification Check: | Passed |
| Magnesium Quality Check: | Passed |
| Aluminum Quality Check: | Passed |
| Gains Check: | Passed |
| Changes in Calibration Blocks: | Passed |

SPECTRAL DENSITY FIELD CHECK

Tool Name: SDLT Pad - 11795867

Reference Calibration Date: 18-Jan-13 11:22:54

Engineer: J. PINKETT

Calibration Date: 18-Jan-13 12:23:02

Software Version: WL INSITE R3.8.0 (Build 2)

Calibration Version: 1

Pad Temperature: 54.1 degF

| DENSITY FIELD CALIBRATION SUMMARY | | | | |
|-----------------------------------|----------|----------|--------|-------------------|
| Measurement | Shop | Field | Change | Control Limit +/- |
| Near (B+D+P+L) cps | 1387.990 | 1392.403 | 4.413 | 15.050 |
| Far (B+D+P+L) cps | 1120.850 | 1123.188 | 2.338 | 17.626 |
| Near Resolution | 8.82 | 8.74 | -0.080 | 0.50 |
| Far Resolution | 9.07 | 8.96 | -0.110 | 1.00 |

| PASS/FAIL SUMMARY | |
|-------------------------|--------|
| Bkg Quality Check: | Passed |
| Bkg Resolution Check: | Passed |
| Bkg Verification Check: | Passed |

SDLT CALIPER FIELD CALIBRATION

Tool Name: SDLT - 11812177

Reference Calibration Date: 18-Jan-13 11:52:21

Engineer: J. PINKETT

Calibration Date: 18-Jan-13 11:56:36

Software Version: WL INSITE R3.8.0 (Build 2)

Calibration Version: 1

| MEASURED CALIPER VALUES | | | | |
|-------------------------|------|-------|--------|----------------------------|
| Measurement | Shop | Field | Change | Control Limit On New Value |
| Pad Extension | 3.75 | 3.74 | -0.01 | +/- 0.10 |
| Ring Diameter | 8.25 | 8.25 | 0.00 | +/- 0.15 |

| PASS/FAIL SUMMARY | |
|----------------------|--------|
| Pad Extension Check: | Passed |
| Diameter Check: | Passed |

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ASD-2 - 11821855

Reference Calibration Date: 02-Feb-13 10:10:07:00


| | | | | | | | | | |
|--|--------|----------|-------|--|----------|--------------------|---------------|------------------|---------------|
| Tool Name: ACRt Sonde - 11294353 | | | | Reference Calibration Date: 23-Oct-12 16:37:36 | | | | | |
| Engineer: J SCHMIDT | | | | Calibration Date: 29-Nov-12 15:10:41 | | | | | |
| Software Version: WL INSITE R3.4.4 (Build 2) | | | | Calibration Version: 1 | | | | | |
| Host Tool Name: ACRt Instrument - 11302817 | | | | | | | | | |
| TYPICAL GAIN RANGE | | | | | | | | | |
| Subarray | R12KHz | | | R36KHz | | | R72KHz | | |
| | Lower | (mmho/m) | Upper | Lower | (mmho/m) | Upper | Lower | (mmho/m) | Upper |
| A1 (80") | 0.95 | 1.01 | 1.05 | 0.95 | 1.01 | 1.05 | 0.95 | 1.01 | 1.05 |
| A2 (50") | 0.95 | 1.06 | 1.05 | 0.95 | 1.06 | 1.05 | 0.95 | 1.06 | 1.05 |
| A3 (29") | 0.95 | 1.01 | 1.05 | 0.95 | 1.01 | 1.05 | 0.95 | 1.01 | 1.05 |
| A4 (17") | 0.95 | 1.03 | 1.05 | 0.95 | 1.03 | 1.05 | 0.95 | 1.03 | 1.05 |
| A5 (10") | N/A | N/A | N/A | 0.95 | 1.01 | 1.05 | 0.95 | 1.01 | 1.05 |
| A6 (6") | N/A | N/A | N/A | 0.95 | 0.99 | 1.05 | 0.95 | 0.99 | 1.05 |
| | | | | | | | | | |
| TYPICAL SONDE OFFSET RANGE | | | | | | | | | |
| Subarray | R12KHz | | | R36KHz | | | R72KHz | | |
| | Lower | (mmho/m) | Upper | Lower | (mmho/m) | Upper | Lower | (mmho/m) | Upper |
| A1 (80") | -5 | -0.56 | 2 | -6 | -4.45 | -2 | -8 | -5.07 | -2 |
| A2 (50") | -7 | -1.23 | 0 | -7 | -2.91 | 0 | -7 | -4.99 | 0 |
| A3 (29") | -27 | -12.69 | -9 | -9 | -3.43 | -3 | -7 | -3.70 | -1 |
| A4 (17") | -180 | -91.43 | -60 | -45 | -29.14 | -15 | -39 | -25.11 | -13 |
| A5 (10") | N/A | N/A | N/A | -150 | -99.10 | -50 | -80 | -47.75 | -10 |
| A6 (6") | N/A | N/A | N/A | 175 | 346.17 | 525 | 90 | 174.99 | 270 |
| | | | | | | | | | |
| TRANSMITTER CURRENT GAIN | | | | | | R-MUD VERIFICATION | | | |
| Signal | Lower | | R | Upper | | Signal | Lower (ohm-m) | Measured (ohm-m) | Upper (ohm-m) |
| 12K | | 0.6 | 0.89 | 1.3 | | Mud Cell | 0.95 | 1.00 | 1.05 |
| 36K | | 1.0 | 1.84 | 2.0 | | | | | |
| 72K | | 1.0 | 1.14 | 2.0 | | | | | |
| | | | | | | | | | |
| PASS/FAIL SUMMARY | | | | | | | | | |
| GAIN RANGE CHK | | | | | | FAIL | | | |
| SONDE OFFSET RANGE CHK | | | | | | PASS | | | |
| Tx CURRENT GAIN | | | | | | PASS | | | |
| Rmud VERIFICATION | | | | | | PASS | | | |
| | | | | | | | | | |
| TOOL OUT OF TOLERANCE | | | | | | | | | |

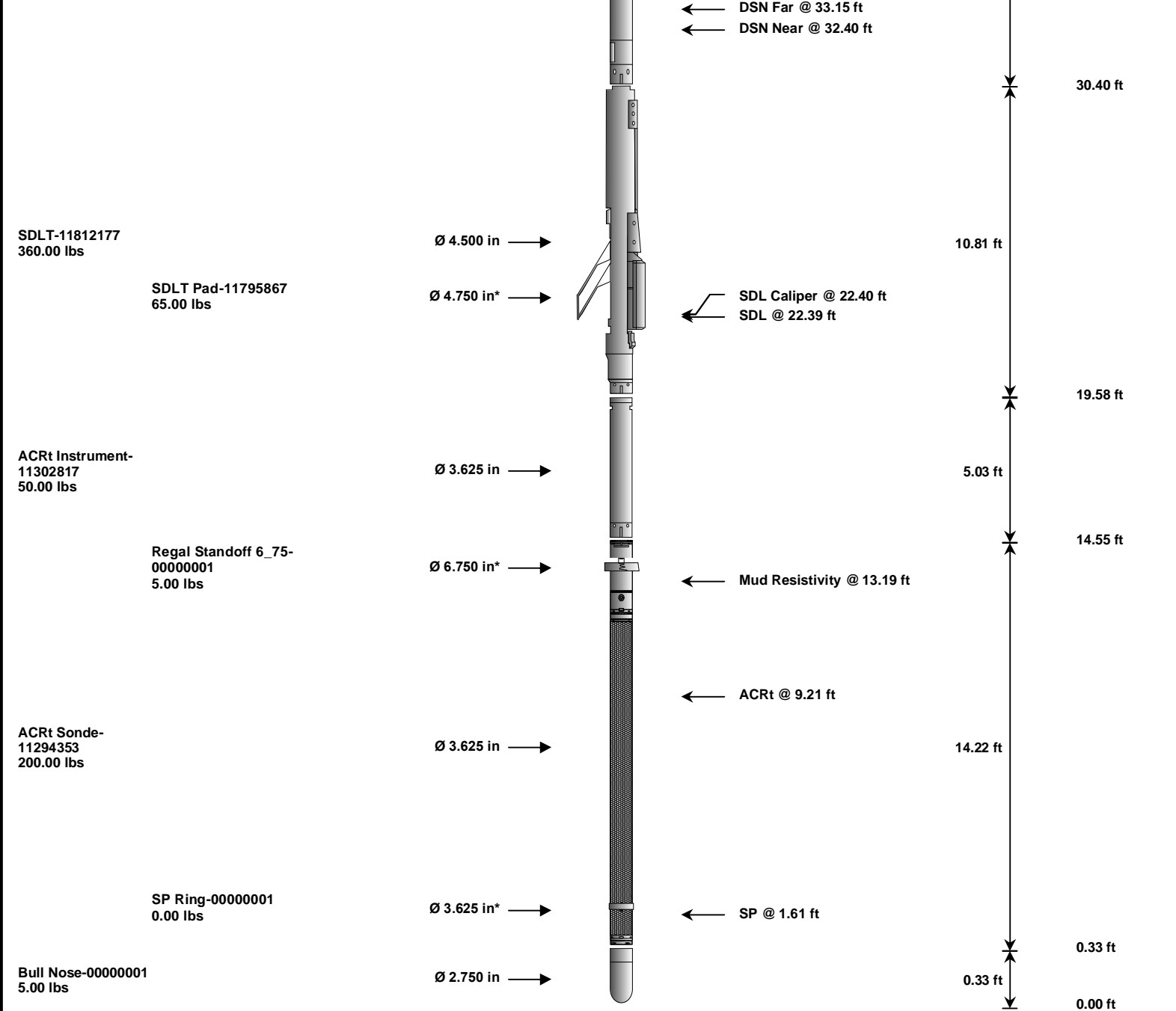
| | | | | | | |
|-------------------------|--------|--------|-------|------------|------------|-----------|
| CALIBRATION SUMMARY | | | | | | |
| Sensor | Shop | Field | Post | Difference | Tolerance | Units |
| GTET-11812883 | | | | | | |
| Gamma Ray Calibrator | 247.3 | 243.7 | ----- | 3.6 | +/- 9.00 | api |
| CSNG-10846351 | | | | | | |
| 60 KEV Peak Channel # | 48.0 | 48.0 | ----- | 0.0 | ----- | Channel # |
| 239 KEV Peak Channel # | 23.8 | 23.9 | ----- | -0.1 | ----- | Channel # |
| 583 KEV Peak Channel # | 53.5 | 53.9 | ----- | -0.4 | ----- | Channel # |
| 2614 KEV Peak Channel # | 221.1 | 222.2 | ----- | -1.1 | ----- | Channel # |
| DSNT-11812167 | | | | | | |
| Snow-Block Porosity | 0.0765 | 0.0761 | ----- | 0.0004 | +/- 0.0150 | decp |
| SDLT-11812177 | | | | | | |
| Pad Extension | 3.75 | 3.74 | ----- | 0.01 | +/-0.10 | in |

| | | | | | | |
|---|----------|----------|-------|--------|-----------|-------|
| ad Extension | 8.75 | 8.75 | ----- | 0.00 | +/-0.15 | in |
| Ring Diameter | 8.25 | 8.25 | ----- | 0.00 | +/-0.15 | in |
| SDLT Pad-11795867 | | | | | | |
| Near(B+D+P+L) | 1387.990 | 1392.403 | ----- | -4.413 | +/-15.050 | cps |
| Far(B+D+P+L) | 1120.850 | 1123.188 | ----- | -2.338 | +/-17.626 | cps |
| ACRt Sonde-11294353 | | | | | | |
| Mud Cell | 1.00 | ----- | ----- | 0.00 | ----- | ohm-m |
| Data: SORS_1P\0001 TRIPLE_GEM_CSNG\IDLE | | | | | | |
| Date: 20-Jan-13 17:25:58 | | | | | | |

HALLIBURTON

TOOL STRING DIAGRAM REPORT

| Description | Overbody Description | O.D. | Diagram | Sensors @ Delays | Length | Accumulated Length |
|--|----------------------|-------------------------------|--|---|---------|--------------------|
| RWCH-10409638 135.00 lbs | | Ø 3.625 in → |  | ← Load Cell @ 68.98 ft ← BH Temperature @ 68.41 ft | 6.25 ft | 72.66 ft |
| GTET-11812883 165.00 lbs | | Ø 3.625 in → | | ← GammaRay @ 60.35 ft | 8.52 ft | 66.41 ft |
| CSNG-10846351 114.00 lbs | | Ø 3.625 in → | | ← CSNG @ 52.26 ft | 8.17 ft | 57.89 ft |
| UnivWearRing3.6- 00000001 5.00 lbs | | Ø 4.200 in* → Ø 3.625 in → | | | | 49.72 ft |
| GEMT-90268460 300.00 lbs | | Ø 5.000 in → | | ← BGO Crystal @ 42.24 ft | 9.64 ft | 40.08 ft |
| DSN Decentralizer- 11812167 6.60 lbs | | Ø 5.000 in* → Ø 3.625 in → | | | 9.69 ft | |
| DSNT-11812167 174.00 lbs | | Ø 3.625 in → | | | | |



| Mnemonic | | Tool Name | Serial Number | Weight (lbs) | Length (ft) | Accumulated Length (ft) | Max.Log. Speed (fpm) |
|---|---|-----------|---------------|-----------------|--------------|-------------------------|--------------------------|
| RWCH | Releasable Wireline Cable Head | | 10409638 | 135.00 | 6.25 | 66.41 | 300.00 |
| GTET | Gamma Telemetry Tool | | 11812883 | 165.00 | 8.52 | 57.89 | 60.00 |
| CSNG | Compensated Spectral Natural Gamma | | 10846351 | 114.00 | 8.17 | 49.72 | 15.00 |
| UWR3P6 | Universal Wear Ring 3 5-8 inch | | 00000001 | 5.00 | 0.35 | * 50.22 | 300.00 |
| GEMT | Gamma, Elements and Minerals Tool | | 90268460 | 300.00 | 9.64 | 40.08 | 15.00 |
| DSNT | Dual Spaced Neutron | | 11812167 | 174.00 | 9.69 | 30.40 | 60.00 |
| DCNT | DSN Decentralizer | | 11812167 | 6.60 | 5.13 | * 33.73 | 300.00 |
| SDLT | Spectral Density Tool | | 11812177 | 360.00 | 10.81 | 19.58 | 60.00 |
| SDLP | Density Insite Pad | | 11795867 | 65.00 | 2.55 | * 21.79 | 60.00 |
| ACRt | Array Compensated True Resistivity Instrument Section | | 11302817 | 50.00 | 5.03 | 14.55 | 300.00 |
| ACRt | Array Compensated True Resistivity Sonde Section | | 11294353 | 200.00 | 14.22 | 0.33 | 300.00 |
| SP | SP Ring | | 00000001 | 0.00 | 0.25 | * 1.61 | 300.00 |
| RSOF | Regal Standoff 6.75in | | 00000001 | 5.00 | 0.52 | * 13.40 | 300.00 |
| BLNS | Bull Nose | | 00000001 | 5.00 | 0.33 | 0.00 | 300.00 |
| Total | | | | 1,584.60 | 72.66 | | |
| * Not included in Total Length and Length Accumulation. | | | | | | | |
| Data: SORS_1P\0001 TRIPLE_GEM_CSNG\IDLE | | | | | | | Date: 20-Jan-13 17:05:34 |

| | | | |
|---------|--------------------------|-------|----|
| COMPANY | CHAMA OIL & MINERALS LLC | | |
| WELL | SORS 1P | | |
| FIELD | WILDACT | | |
| COUNTY | WASHINGTON | STATE | CO |

HALLIBURTON

DUAL SPACED NEUTRON
SPECTRAL DENSITY