

**Company:** Lamont Doherty

**Well:** ODP Leg 204, Site 1245 E

**Field:** Hydrate Ridge

**Ocean:** Pacific **State:** Oregon

## Natural Gamma Ray Spectroscopy

|                                |  |                          |  |
|--------------------------------|--|--------------------------|--|
| Ocean: Pacific                 |  | Elev.: K.B. 11.3 m       |  |
| Field: Hydrate Ridge           |  | G.L. -882 m              |  |
| Location: N 44* 35.1708'       |  | D.F. 11 m                |  |
| Well: ODP Leg 204, Site 1245 E |  | Elev.: 0 m               |  |
| Company: Lamont Doherty        |  | 11.3 m above Perm. Datum |  |
| <b>LOCATION</b>                |  |                          |  |
| N 44* 35.1708'                 |  | Elev.: K.B. 11.3 m       |  |
| W 125* 8.9627'                 |  | G.L. -882 m              |  |
| Permanent Datum: _____         |  | D.F. 11 m                |  |
| Log Measured From: _____       |  | Elev.: 0 m               |  |
| Drilling Measured From: _____  |  | 11.3 m above Perm. Datum |  |
| API Serial No. _____           |  | Max. Hole Devi. _____    |  |
| Longitude _____                |  | Latitude _____           |  |

|                               |                                |  |  |
|-------------------------------|--------------------------------|--|--|
| Logging Date                  | 14-Aug-2002                    |  |  |
| Run Number                    | 1                              |  |  |
| Depth Driller                 | 1421 m                         |  |  |
| Schlumberger Depth            | 1201 m                         |  |  |
| Bottom Log Interval           | 1169 m                         |  |  |
| Top Log Interval              | 883 m                          |  |  |
| Casing Driller Size @ Depth   | 0.000 in @ 956 m               |  |  |
| Casing Schlumberger           | 956 m                          |  |  |
| Bit Size                      | 9.875 in                       |  |  |
| Type Fluid In Hole            | Salt water/ Sepiolite          |  |  |
| Density                       | 1.1 g/cm3                      |  |  |
| Fluid Loss                    | PH _____                       |  |  |
| Source Of Sample              | Mudpit                         |  |  |
| RM @ Measured Temperature     | 0.322 ohm.m @ 27 degC          |  |  |
| RMF @ Measured Temperature    | @ @                            |  |  |
| RMC @ Measured Temperature    | @ @                            |  |  |
| Source RMF                    | RMC                            |  |  |
| RM @ MRT                      | 0.402 @ 17 @ 17                |  |  |
| Maximum Recorded Temperatures | 17 degC                        |  |  |
| Circulation Stopped           | 14-Aug-2002 18:00              |  |  |
| Logger On Bottom              | 14-Aug-2002 21:53              |  |  |
| Unit Number                   | 99 Houston                     |  |  |
| Recorded By                   | K. Swain                       |  |  |
| Witnessed By                  | G. Guerin, S. Barr, T. Collett |  |  |

| Logging Date                  | Run 1 | Run 2 | Run |
|-------------------------------|-------|-------|-----|
| Run Number                    |       |       |     |
| Depth Driller                 |       |       |     |
| Schlumberger Depth            |       |       |     |
| Bottom Log Interval           |       |       |     |
| Top Log Interval              |       |       |     |
| Casing Driller Size @ Depth   |       |       |     |
| Casing Schlumberger           |       |       |     |
| Bit Size                      |       |       |     |
| Type Fluid In Hole            |       |       |     |
| Density                       |       |       |     |
| Fluid Loss                    |       |       |     |
| Source Of Sample              |       |       |     |
| RM @ Measured Temperature     |       |       |     |
| RMF @ Measured Temperature    |       |       |     |
| RMC @ Measured Temperature    |       |       |     |
| Source RMF                    |       |       |     |
| RM @ MRT                      |       |       |     |
| Maximum Recorded Temperatures |       |       |     |
| Circulation Stopped           |       |       |     |
| Logger On Bottom              |       |       |     |
| Unit Number                   |       |       |     |
| Recorded By                   |       |       |     |
| Witnessed By                  |       |       |     |

**DISCLAIMER**

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|  |   |
|--|---|
| OTHER SERVICES1<br>OS1: IPL<br>OS2: FMS/DSST<br>OS3: VSI<br>OS4:<br>OS5: | OTHER SERVICES2<br>OS1:<br>OS2:<br>OS3:<br>OS4:<br>OS5: |
|--|---|

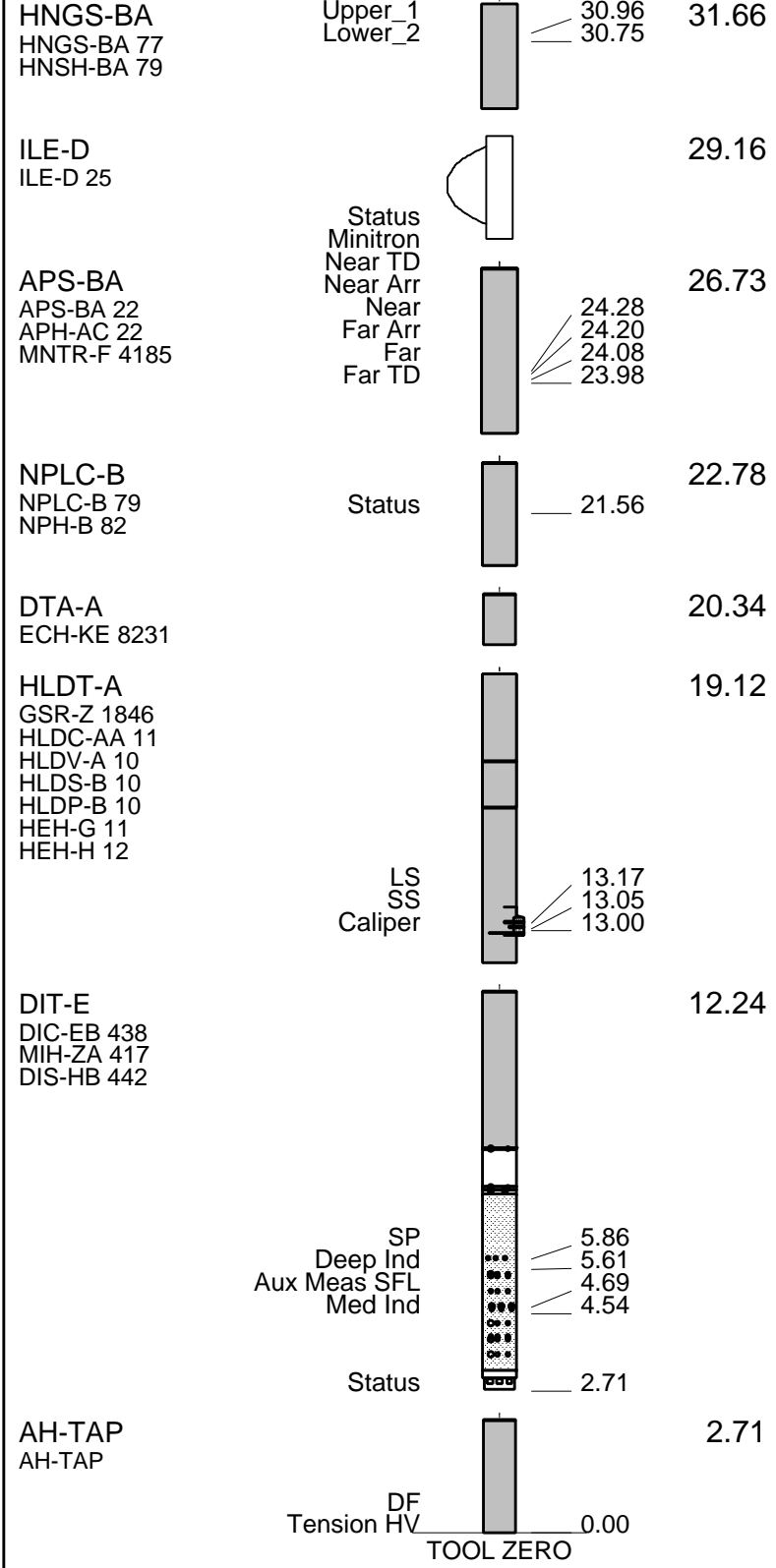
|   |                       |
|---|-----------------------|
| REMARKS: RUN NUMBER 1<br>Depths in meters below rig floor, mbrf.<br>Rig stuck at 1232 mbrf but became free, logging TD at 1201 mbrf.<br>Drill pipe SLB at 956 mbrf.<br>Sea floor SLB at 883 mbrf. | REMARKS: RUN NUMBER 2 |
|---|-----------------------|

|                  |          |      |                  |       |      |
|------------------|----------|------|------------------|-------|------|
| RUN 1            |          |      | RUN 2            |       |      |
| SERVICE ORDER #: | 10C0-306 |      | SERVICE ORDER #: |       |      |
| PROGRAM VERSION: |          |      | PROGRAM VERSION: |       |      |
| FLUID LEVEL:     |          |      | FLUID LEVEL:     |       |      |
| LOGGED INTERVAL  | START    | STOP | LOGGED INTERVAL  | START | STOP |
|                  |          |      |                  |       |      |
|                  |          |      |                  |       |      |

**EQUIPMENT DESCRIPTION**

|   |  |       |  |
|---|--|-------|--|
| RUN 1   |  | RUN 2 |  |
| <b>SURFACE EQUIPMENT</b>                                |  |       |  |
| SFT-281 24<br>SFT-178 4722<br>GSR-U 135<br>WITM (DTS)-A |  |       |  |

|                           |   |       |       |
|---------------------------|---|-------|-------|
| <b>DOWNHOLE EQUIPMENT</b> |   |       |       |
| LEH-QT                    |  | 34.84 |       |
| LEH-QT 1497               |   |       |       |
| AH-QSST                   |  | 33.95 |       |
| AH-QSST 12                |   |       |       |
| DTC-H                     | CTEM  | 32.30 |       |
| ECH-KC 9841               | TelStatus   |       |       |
|                           | ToolStatu   | 31.66 | 32.58 |



TOOL ZERO

MAXIMUM STRING DIAMETER 3.88 IN  
 MEASUREMENTS RELATIVE TO TOOL ZERO  
 ALL LENGTHS IN METERS

## Output DLIS Files

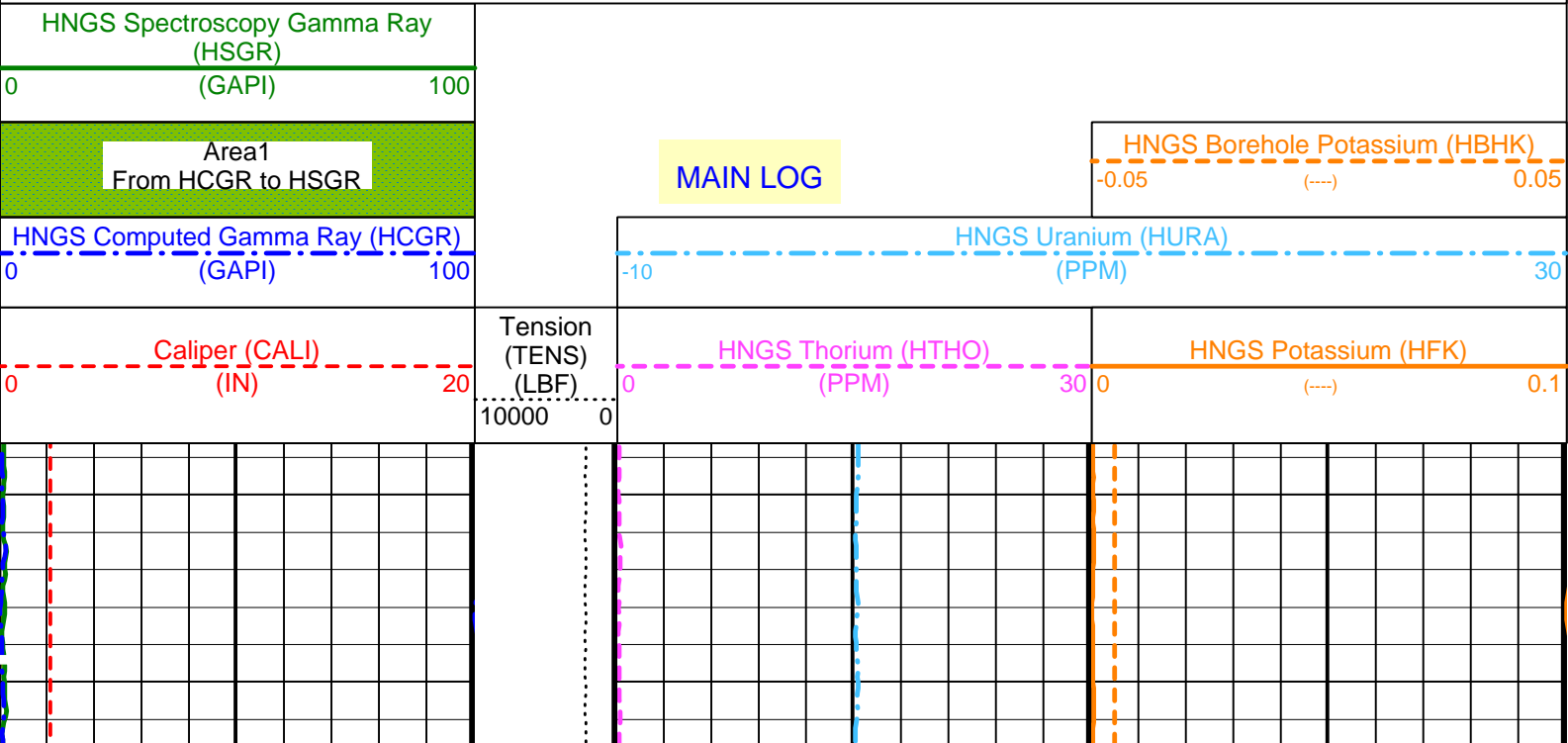
|         |                       |       |          |                   |          |         |
|---------|-----------------------|-------|----------|-------------------|----------|---------|
| DEFAULT | PI_LDL_APS_NGS_008LUP | FN:9  | PRODUCER | 14-Aug-2002 21:49 | 1202.4 M | 858.8 M |
| REDUCE  | PI_LDL_APS_NGS_008LUP | FN:10 | PRODUCER | 14-Aug-2002 21:49 | 1202.4 M | 858.8 M |

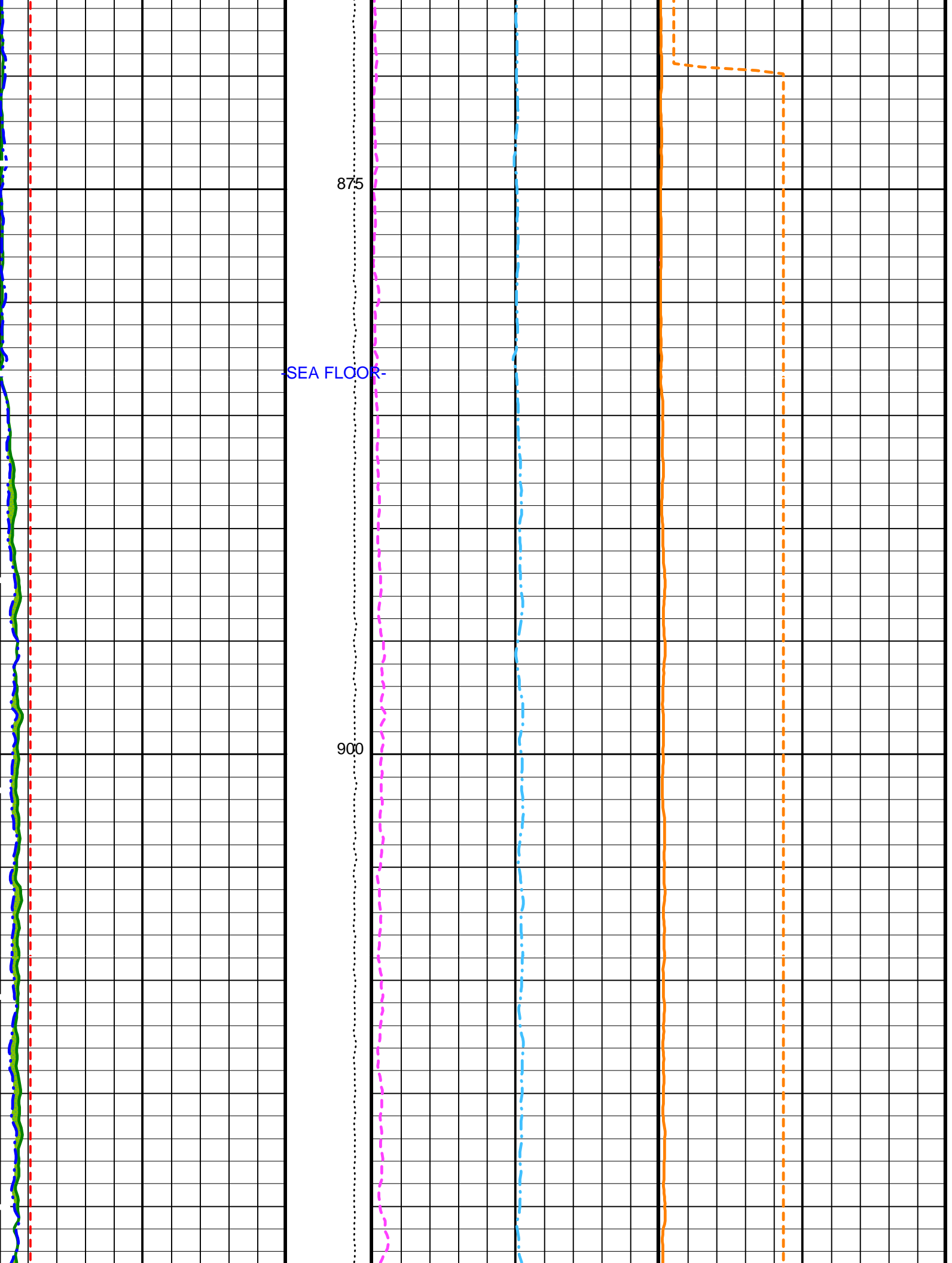
## OP System Version: 10C0-306 MCM

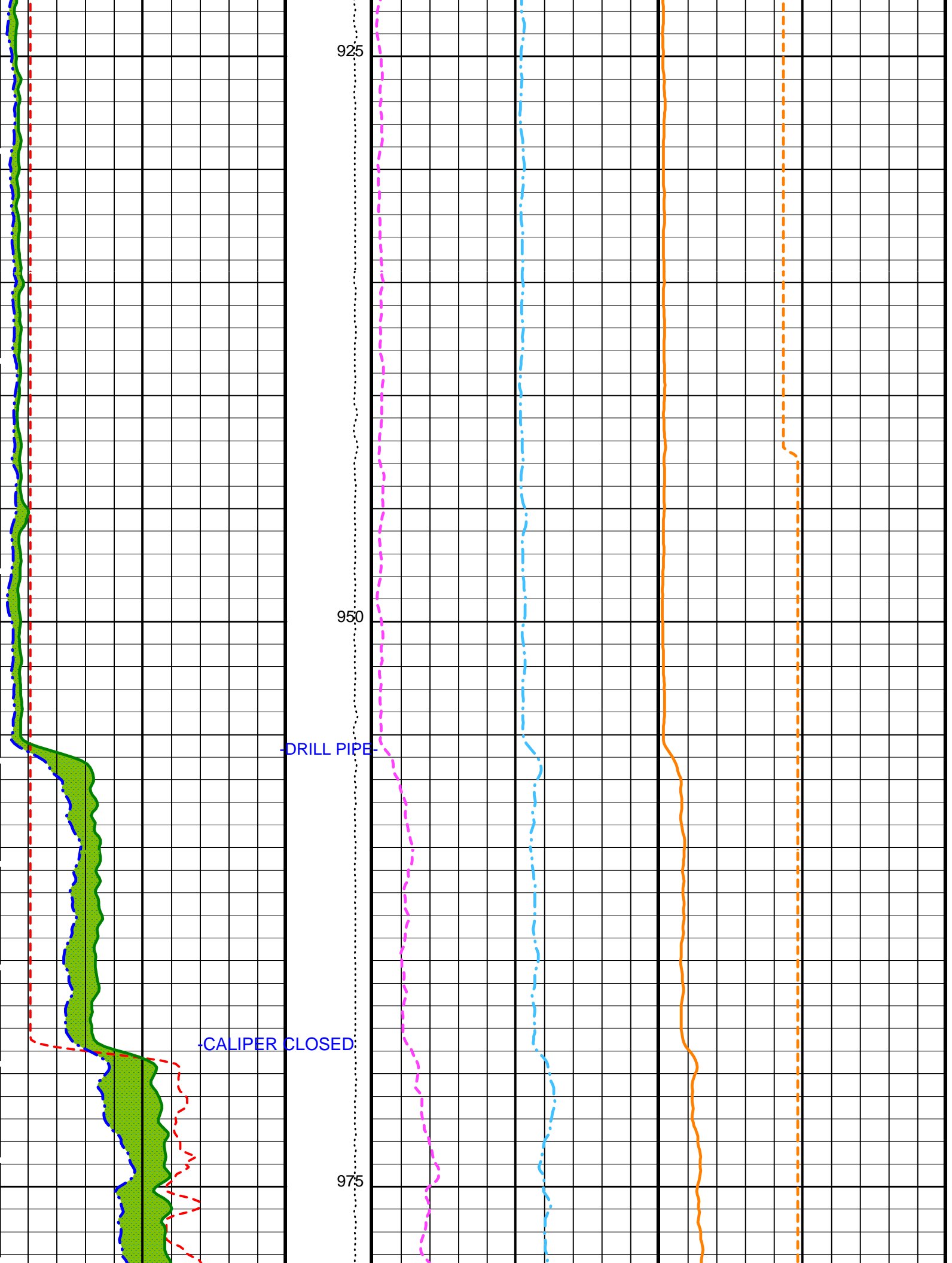
|        |          |         |          |
|--------|----------|---------|----------|
| DIT-E  | 10C0-306 | HLDT-A  | 10C0-306 |
| DTA-A  | 10C0-306 | NPLC-B  | OP10-KP1 |
| APS-BA | OP10-KP1 | HNGS-BA | OP10-KP1 |
| DTC-H  | 10C0-306 |         |          |

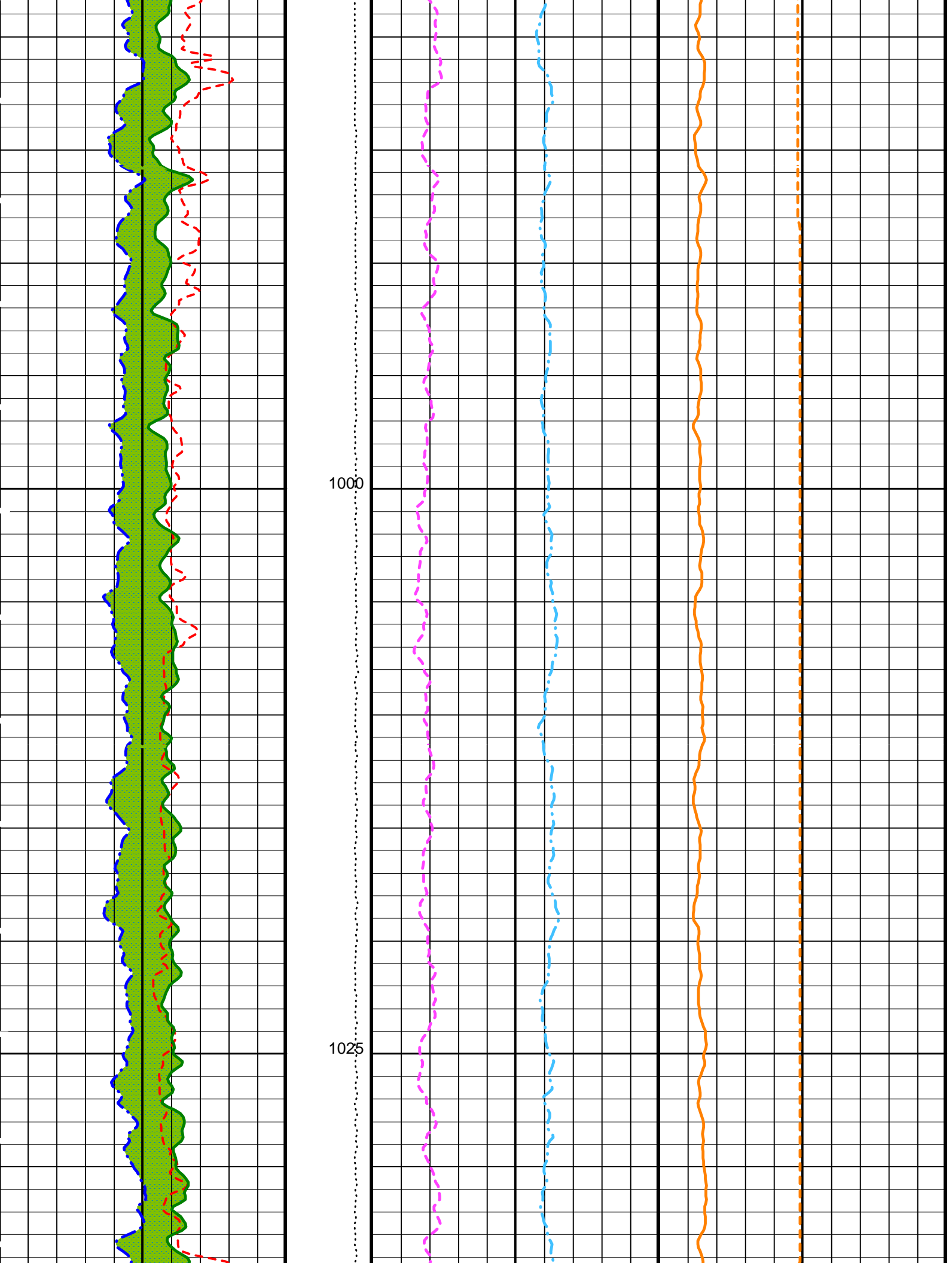
### PIP SUMMARY

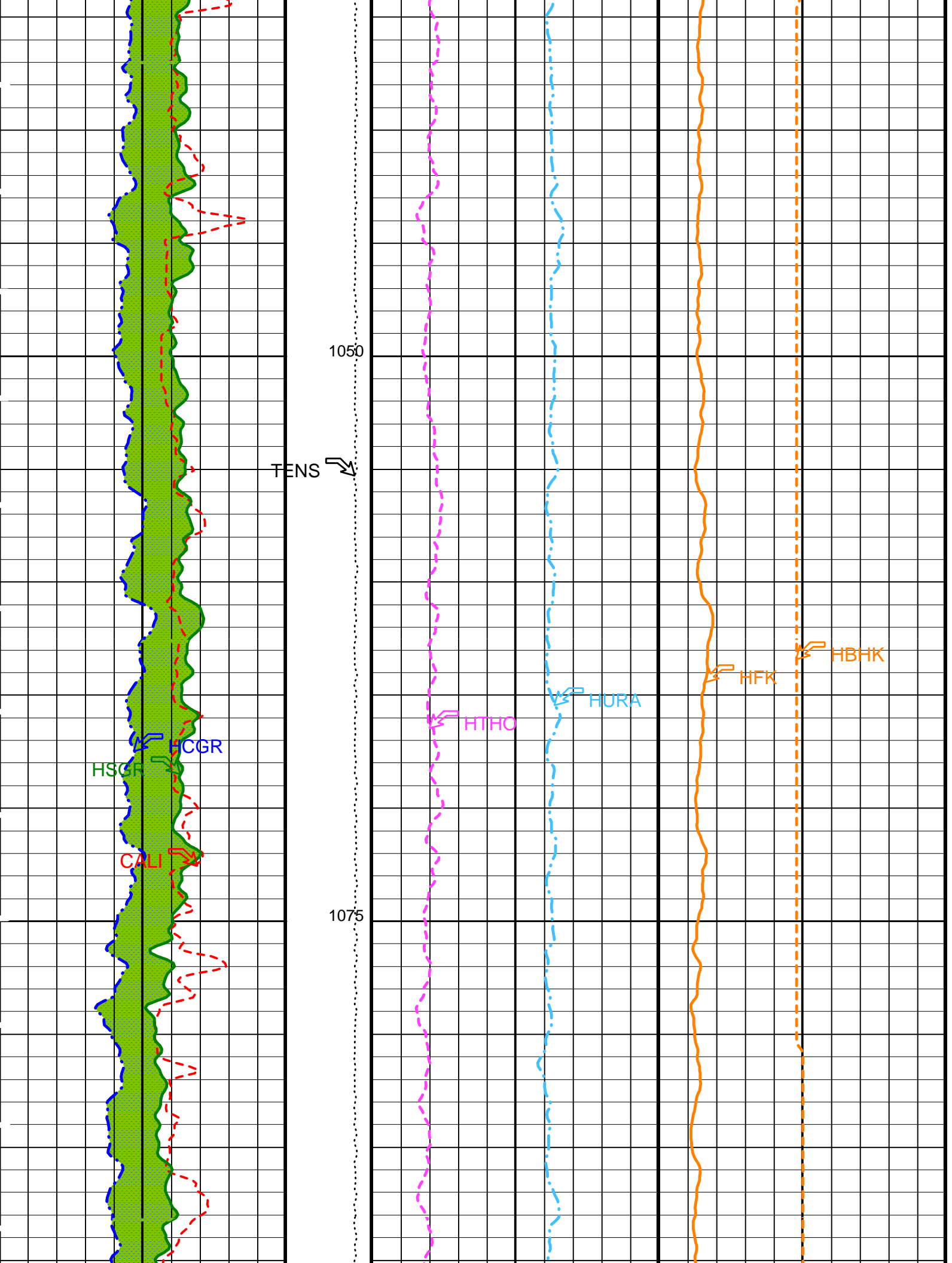
Time Mark Every 60 S











1050

TENS

HTFO

HURA

HFK

HBHK

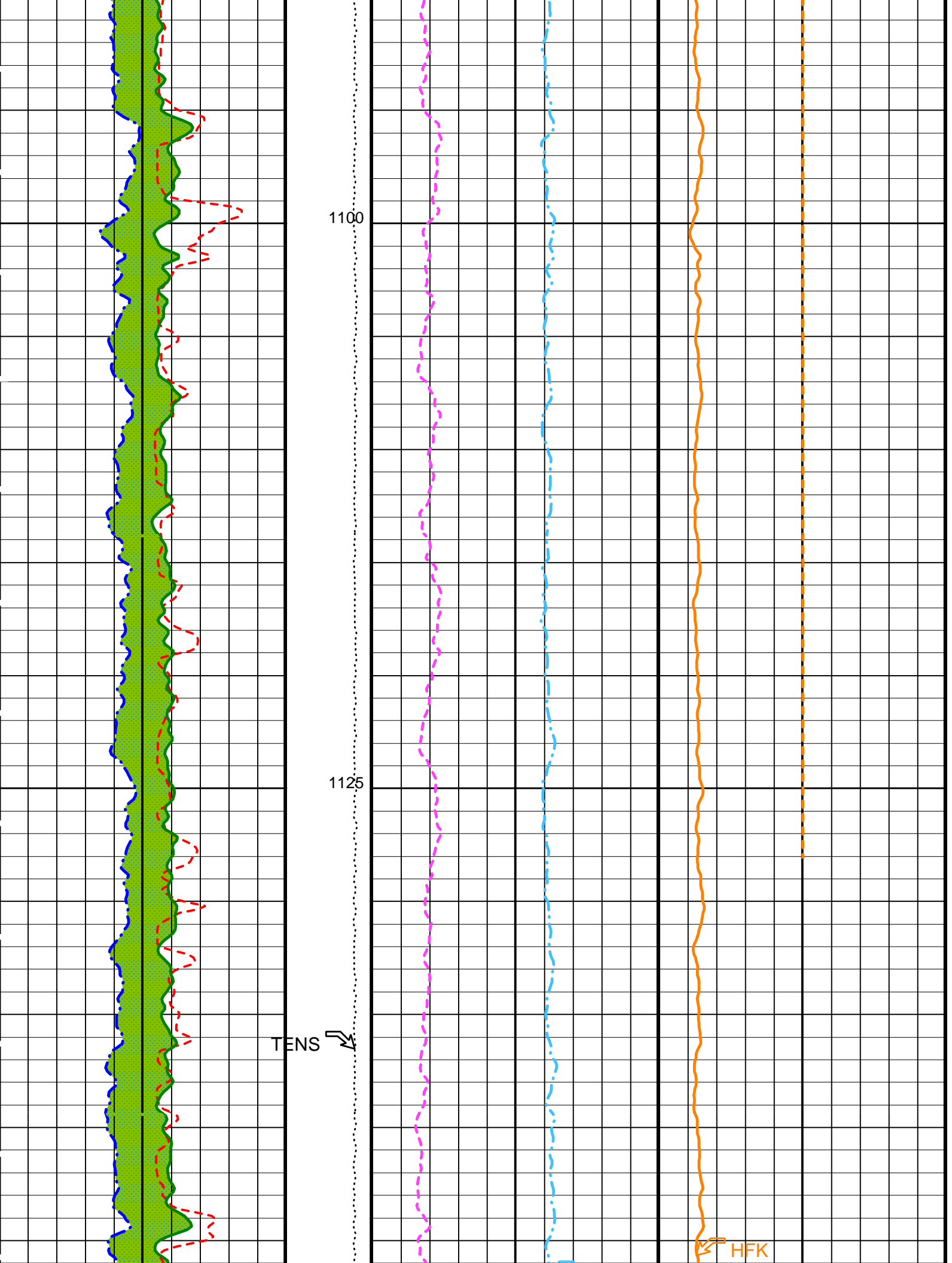
HSCR

CGR

CALI

1075



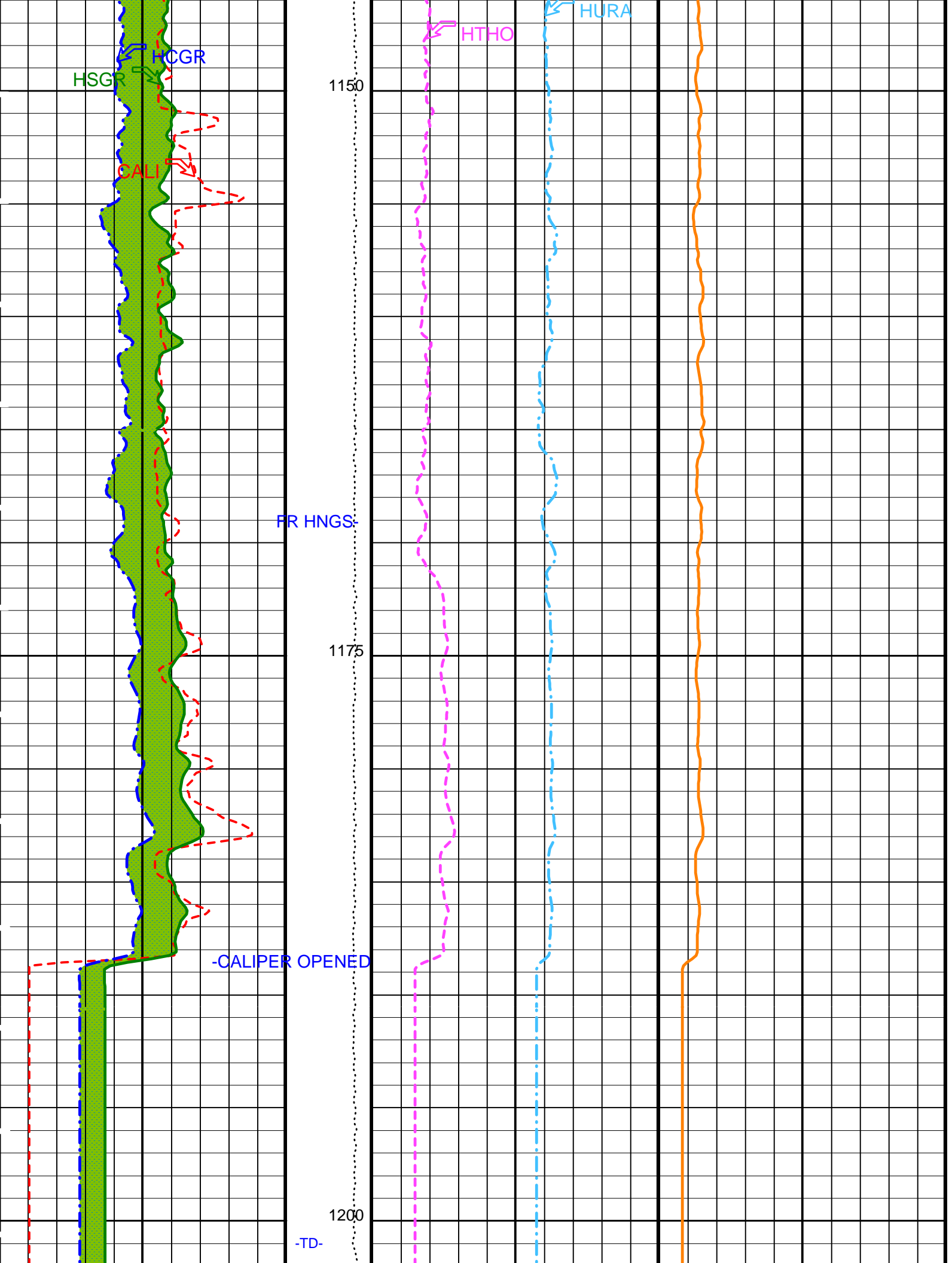


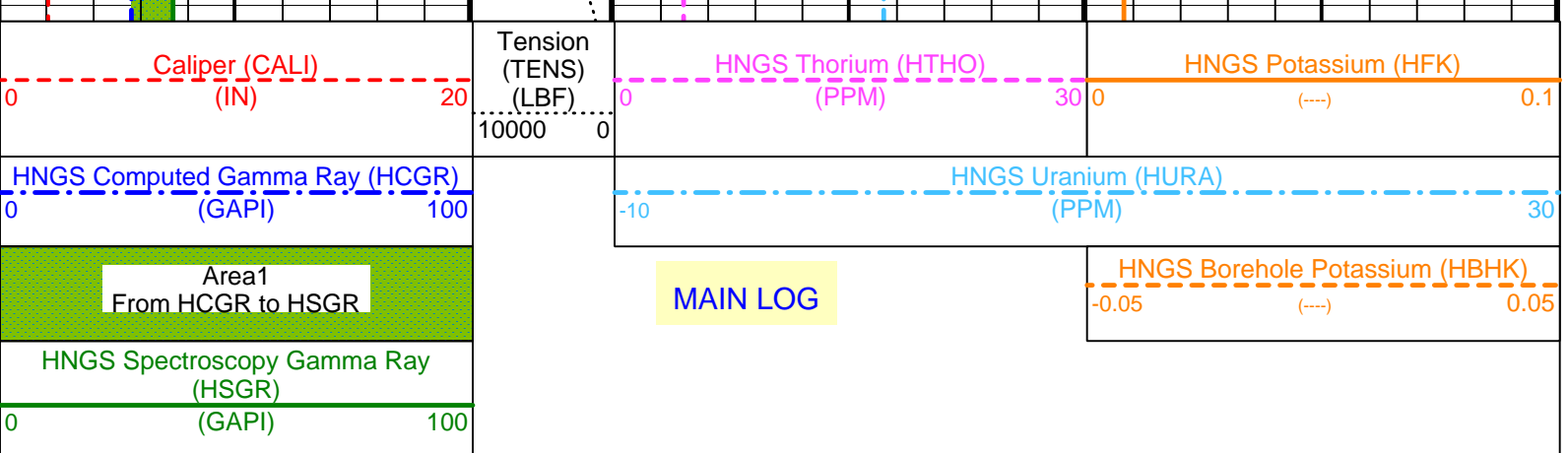
1100

1125

TENS ↗

HFK ↗





PIP SUMMARY

Time Mark Every 60 S

Parameters

| DLIS Name | Description  | Value       |      |
|-----------|--|-------------|------|
| BHS       | DIT-E: Dual Induction - E                              |             |      |
| GCSE      | Borehole Status  | OPEN        |      |
|           | Generalized Caliper Selection                          | CALI        |      |
| BHS       | APS-BA: Accelerator-Porosity Tool                      |             |      |
| GCSE      | Borehole Status  | OPEN        |      |
|           | Generalized Caliper Selection                          | CALI        |      |
| BAR1      | HNGS-BA: Hostile Natural Gamma Ray Sonde               |             |      |
| BAR2      | HNGS Detector 1 Barite Constant                        | 1           |      |
| BHK       | HNGS Detector 2 Barite Constant                        | 1           |      |
| BHS       | HNGS Borehole Potassium Correction Concentration       | 0           |      |
| CSD1      | Borehole Status  | OPEN        |      |
| CSD2      | Inner Casing Outer Diameter                            | 0           | IN   |
| CSW1      | Outer Casing Outer Diameter                            | 0           | IN   |
| CSW2      | Inner Casing Weight                                    | 0           | LB/F |
| DBCC      | Outer Casing Weight                                    | 0           | LB/F |
| GCSE      | HNGS Barite Constant Correction Flag                   | NONE        |      |
| H1P       | Generalized Caliper Selection                          | CALI        |      |
| H2P       | HNGS Detector 1 Allow/Disallow In Processing           | ALLOW       |      |
| HABK      | HNGS Detector 2 Allow/Disallow In Processing           | ALLOW       |      |
| HALF      | HNGS Borehole Potassium Running Average                | -0.00234174 |      |
| HCRB      | HNGS Alpha Filter Length                               | 60          | IN   |
| HMWM      | HNGS Apply Borehole Potassium Correction               | NONE        |      |
| HNPE      | Mud Weighting Material                                 | NATU        |      |
| S1BI      | HNGS Processing Enable                                 | YES         |      |
| S2BI      | HNGS Detector 1 Calibration Bismuth Count Rate         | 1.3         | CPS  |
| SGRC      | HNGS Detector 2 Calibration Bismuth Count Rate         | 1.3         | CPS  |
| TPOS      | HNGS Standard Gamma-Ray Correction Flag                | YES         |      |
| VBA1      | Tool Position  | ECCE        |      |
| VBA2      | HNGS Detector 1 Variable Barite Factor Running Average | 0.96881     |      |
|           | HNGS Detector 2 Variable Barite Factor Running Average | 0.969517    |      |
| BS        | System and Miscellaneous                               |             |      |
| DFD       | Bit Size   | 9.875       | IN   |
|           | Drilling Fluid Density                                 | 1.10        | G/C3 |

Format: HNGSYields Vertical Scale: 1:200

Graphics File Created: 14-Aug-2002 21:49

OP System Version: 10C0-306

MCM

|        |          |         |          |
|--------|----------|---------|----------|
| DIT-E  | 10C0-306 | HLDT-A  | 10C0-306 |
| DTA-A  | 10C0-306 | NPLC-B  | OP10-KP1 |
| APS-BA | OP10-KP1 | HNGS-BA | OP10-KP1 |
| DTC-H  | 10C0-306 |         |          |

Output DLIS Files

|         |                       |       |          |                   |
|---------|-----------------------|-------|----------|-------------------|
| DEFAULT | PI_LDL_APS_NGS_008LUP | FN:9  | PRODUCER | 14-Aug-2002 21:49 |
| REDUCE  | PI_LDL_APS_NGS_008LUP | FN:10 | PRODUCER | 14-Aug-2002 21:49 |

Output DLIS Files

|         |                       |       |          |                   |
|---------|-----------------------|-------|----------|-------------------|
| DEFAULT | PI_LDL_APS_NGS_021LUP | FN:23 | PRODUCER | 15-Aug-2002 00:38 |
|---------|-----------------------|-------|----------|-------------------|

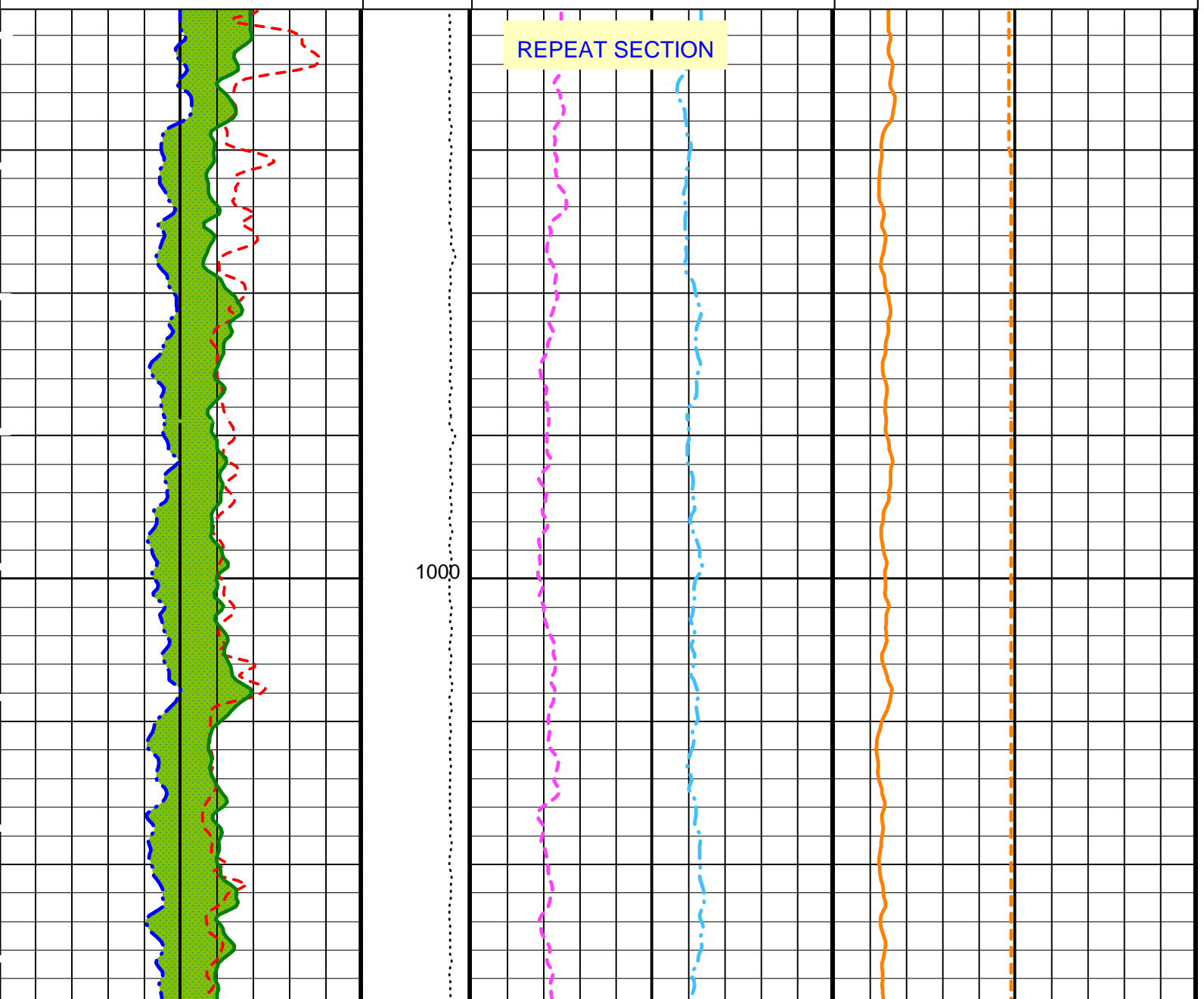
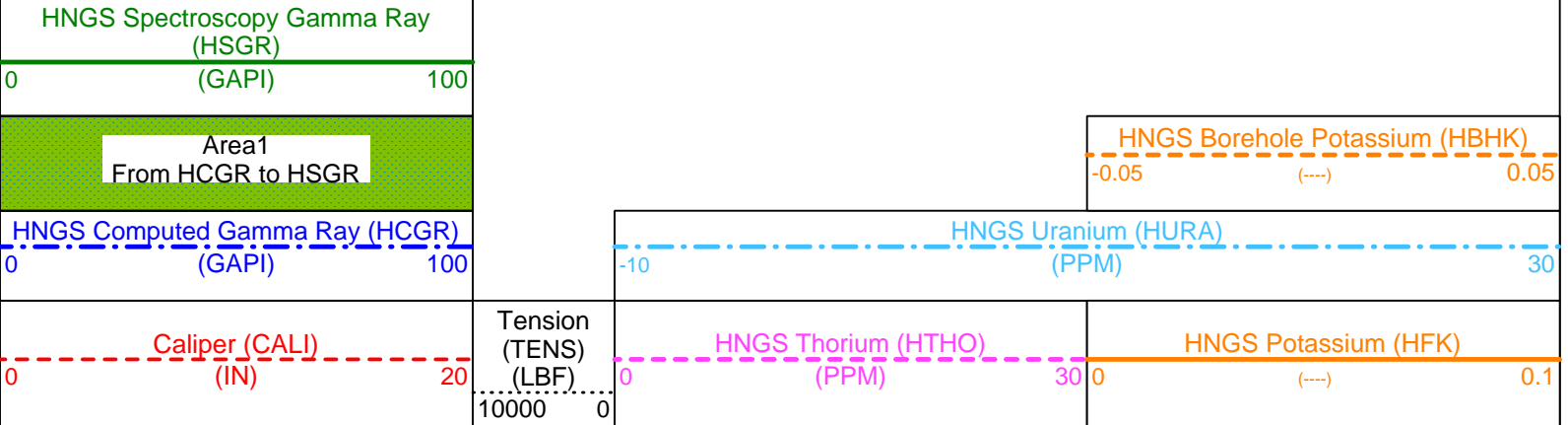
# OP System Version: 10C0-306

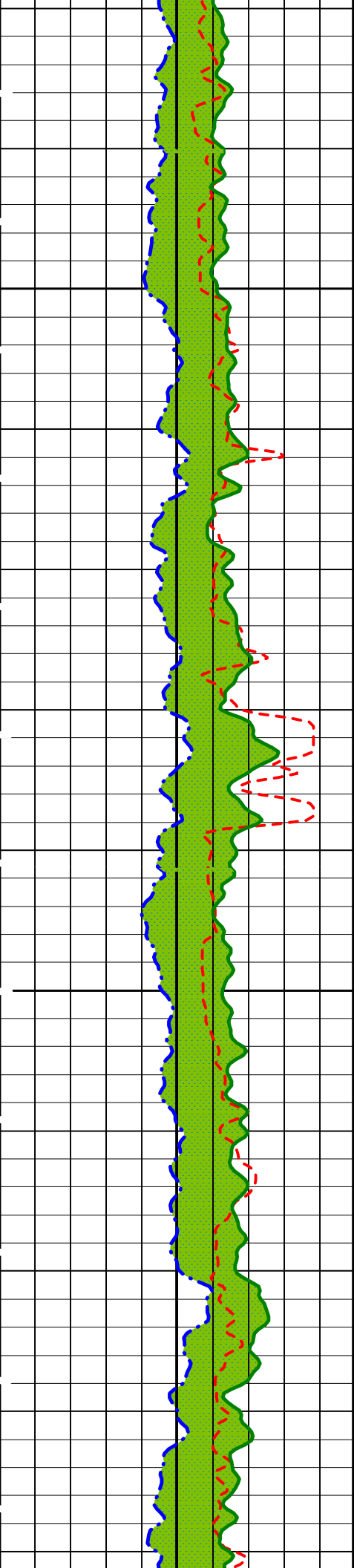
MCM

|        |          |         |          |
|--------|----------|---------|----------|
| DIT-E  | 10C0-306 | HLDT-A  | 10C0-306 |
| DTA-A  | 10C0-306 | NPLC-B  | OP10-KP1 |
| APS-BA | OP10-KP1 | HNGS-BA | OP10-KP1 |
| DTC-H  | 10C0-306 |         |          |

## PIP SUMMARY

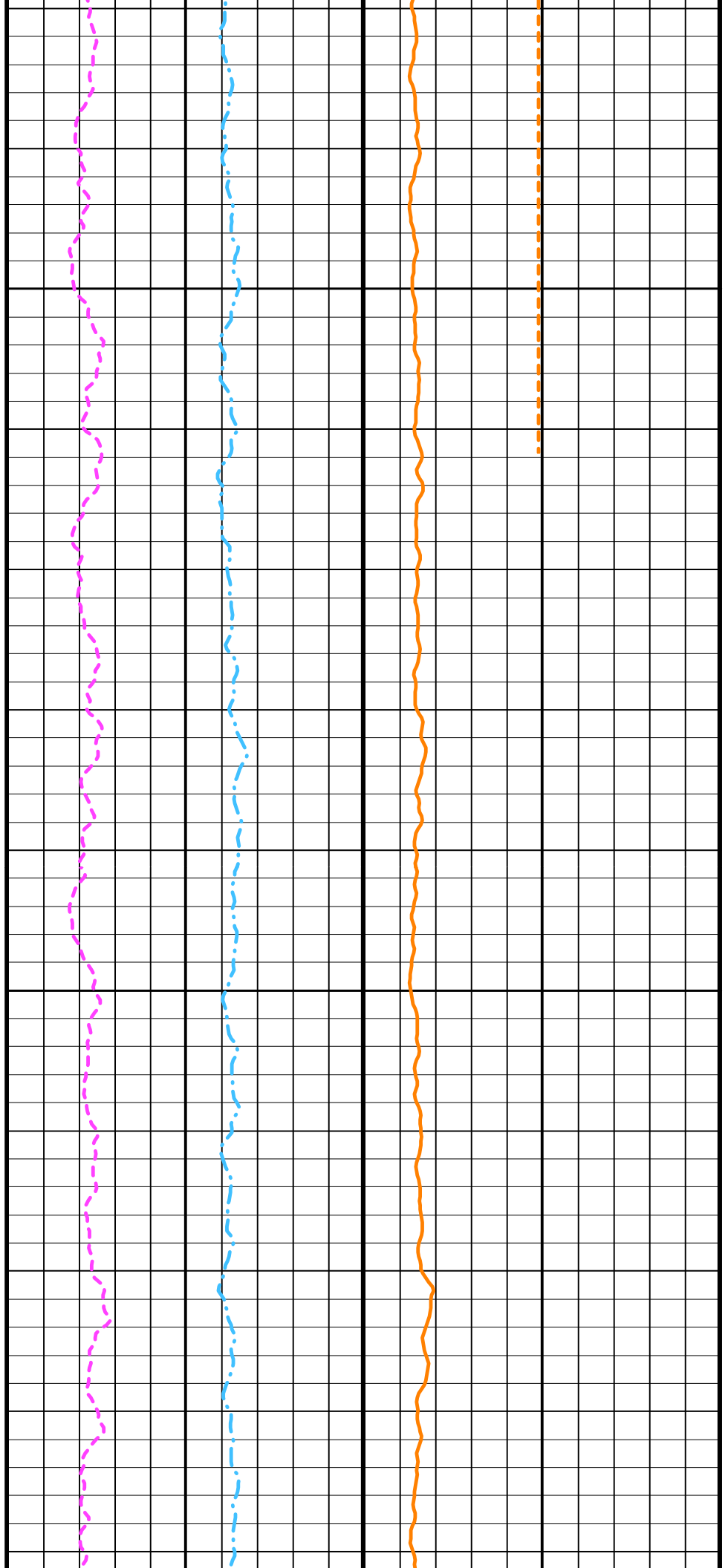
Time Mark Every 60 S

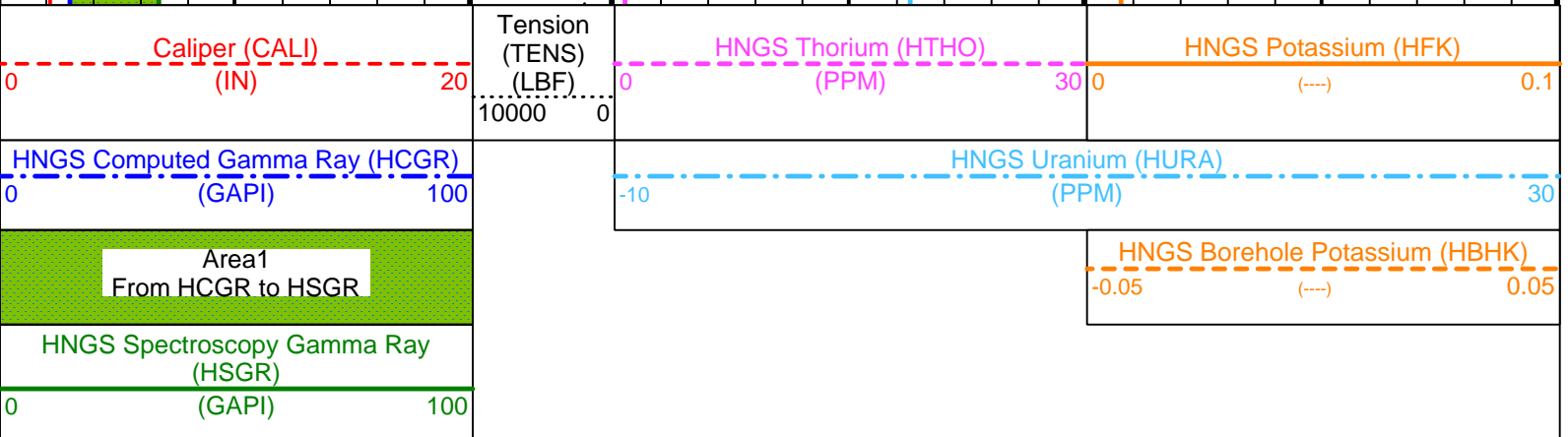
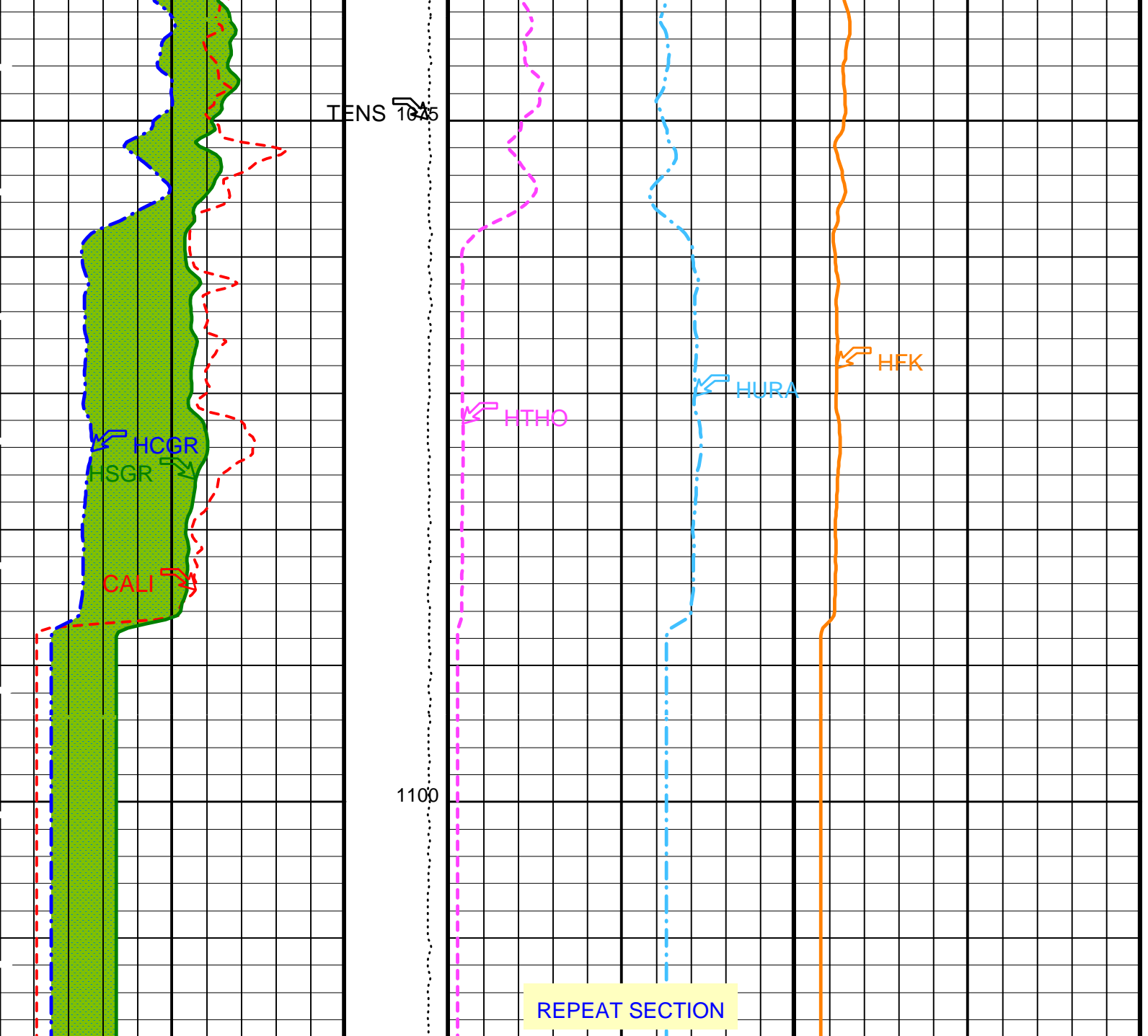




1025

1050





PIP SUMMARY

Time Mark Every 60 S

### Parameters

| DLIS Name | Description | Value |
|-----------|-------------|-------|
|-----------|-------------|-------|

|  |  |             |      |
|--|--|-------------|------|
| DIT-E: Dual Induction - E                | Borehole Status  | OPEN        |      |
| BHS                                      | Generalized Caliper Selection                          | CALI        |      |
| GCSE                                     | APB-BA: Accelerator-Porosity Tool                      |             |      |
| BHS                                      | Borehole Status  | OPEN        |      |
| GCSE                                     | Generalized Caliper Selection                          | CALI        |      |
| HNGS-BA: Hostile Natural Gamma Ray Sonde |  |             |      |
| BAR1                                     | HNGS Detector 1 Barite Constant                        | 1           |      |
| BAR2                                     | HNGS Detector 2 Barite Constant                        | 1           |      |
| BHK                                      | HNGS Borehole Potassium Correction Concentration       | 0           |      |
| BHS                                      | Borehole Status  | OPEN        |      |
| CSD1                                     | Inner Casing Outer Diameter                            | 0           | IN   |
| CSD2                                     | Outer Casing Outer Diameter                            | 0           | IN   |
| CSW1                                     | Inner Casing Weight                                    | 0           | LB/F |
| CSW2                                     | Outer Casing Weight                                    | 0           | LB/F |
| DBCC                                     | HNGS Barite Constant Correction Flag                   | NONE        |      |
| GCSE                                     | Generalized Caliper Selection                          | CALI        |      |
| H1P                                      | HNGS Detector 1 Allow/Disallow In Processing           | ALLOW       |      |
| H2P                                      | HNGS Detector 2 Allow/Disallow In Processing           | ALLOW       |      |
| HABK                                     | HNGS Borehole Potassium Running Average                | -0.00989776 |      |
| HALF                                     | HNGS Alpha Filter Length                               | 60          | IN   |
| HCRB                                     | HNGS Apply Borehole Potassium Correction               | NONE        |      |
| HMWM                                     | Mud Weighting Material                                 | NATU        |      |
| HNPE                                     | HNGS Processing Enable                                 | YES         |      |
| S1BI                                     | HNGS Detector 1 Calibration Bismuth Count Rate         | 1.3         | CPS  |
| S2BI                                     | HNGS Detector 2 Calibration Bismuth Count Rate         | 1.3         | CPS  |
| SGRC                                     | HNGS Standard Gamma-Ray Correction Flag                | YES         |      |
| TPOS                                     | Tool Position  | ECCE        |      |
| VBA1                                     | HNGS Detector 1 Variable Barite Factor Running Average | 0.949044    |      |
| VBA2                                     | HNGS Detector 2 Variable Barite Factor Running Average | 0.95209     |      |
| System and Miscellaneous                 |  |             |      |
| BS                                       | Bit Size   | 9.875       | IN   |
| DFD                                      | Drilling Fluid Density                                 | 1.10        | G/C3 |

Format: HNGSYields Vertical Scale: 1:200 Graphics File Created: 15-Aug-2002 00:38

### OP System Version: 10C0-306 MCM

|        |          |         |          |
|--------|----------|---------|----------|
| DIT-E  | 10C0-306 | HLDT-A  | 10C0-306 |
| DTA-A  | 10C0-306 | NPLC-B  | OP10-KP1 |
| APS-BA | OP10-KP1 | HNGS-BA | OP10-KP1 |
| DTC-H  | 10C0-306 |         |          |

### Output DLIS Files

|         |                       |       |          |                   |
|---------|-----------------------|-------|----------|-------------------|
| DEFAULT | PI_LDL_APS_NGS_021LUP | FN:23 | PRODUCER | 15-Aug-2002 00:38 |
| REDUCE  | PI_LDL_APS_NGS_021LUP | FN:24 | PRODUCER | 15-Aug-2002 00:38 |

### Calibration and Check Summary

| Measurement  | Nominal | Master | Before | After  | Change    | Limit   | Units |
|--|---------|--------|--------|--------|-----------|---------|-------|
| Hostile Environment Litho Density - A Wellsite Calibration - Background Measurement                        |         |        |        |        |           |         |       |
| Master: 10-Aug-2002 14:41 Before: 10-Aug-2002 18:55 After: 15-Aug-2002 2:56                                |         |        |        |        |           |         |       |
| LSW1 Background  | 100.0   | 87.71  | 86.31  | 87.71  | 1.398     | 0.03000 | CPS   |
| LSW2 Background  | 105.0   | 92.23  | 90.58  | 91.79  | 1.215     | 0.03000 | CPS   |
| LSW3 Background  | 210.0   | 178.9  | 175.1  | 178.6  | 3.453     | 0.03000 | CPS   |
| LSW4 Background  | 290.0   | 237.2  | 235.2  | 234.3  | -0.9699   | 0.03000 | CPS   |
| LSW5 Background  | 610.0   | 515.8  | 517.0  | 519.4  | 2.378     | 0.03000 | CPS   |
| SSW1 Background  | 100.0   | 85.59  | 83.89  | 84.14  | 0.2507    | 0.03000 | CPS   |
| SSW2 Background  | 200.0   | 165.7  | 167.5  | 166.4  | -1.033    | 0.03000 | CPS   |
| SSW3 Background  | 530.0   | 437.0  | 438.4  | 438.7  | 0.2879    | 0.03000 | CPS   |
| SSW4 Background  | 280.0   | 232.7  | 231.4  | 232.2  | 0.7736    | 0.03000 | CPS   |
| SSW5 Background  | 205.0   | 174.6  | 172.9  | 175.0  | 2.156     | 0.03000 | CPS   |
| Hostile Environment Litho Density - A Wellsite Calibration - Tool Quality Control Information High Voltage |         |        |        |        |           |         |       |
| Master: 10-Aug-2002 14:41 Before: 10-Aug-2002 18:55 After: 15-Aug-2002 2:56                                |         |        |        |        |           |         |       |
| LS Bkg. High Voltage   | 1131    | 1131   | 1134   | 1131   | -3.002    | N/A     | V     |
| SS Bkg. High Voltage   | 1175    | 1175   | 1176   | 1172   | -4.523    | N/A     | V     |
| Hostile Environment Litho Density - A Wellsite Calibration - Detectors Resolution From BKG Measurements    |         |        |        |        |           |         |       |
| Master: 10-Aug-2002 14:41 Before: 10-Aug-2002 18:55 After: 15-Aug-2002 2:56                                |         |        |        |        |           |         |       |
| LS Background Resolution   | 1.000   | 1.033  | 1.043  | 1.028  | -0.01519  | N/A     |       |
| SS Background Resolution   | 1.000   | 0.9460 | 0.9414 | 0.9424 | 0.0009627 | N/A     |       |

Hostile Environment Litho Density - A Wellsite Calibration - Caliper Calibration

Before: 10-Aug-2002 19:49

|                    |       |     |       |     |     |     |    |
|--------------------|-------|-----|-------|-----|-----|-----|----|
| Caliper Small Ring | 12.00 | N/A | 17.12 | N/A | N/A | N/A | IN |
| Caliper Large Ring | 15.30 | N/A | 21.12 | N/A | N/A | N/A | IN |

Accelerator-Porosity Tool Wellsite Calibration - Detector Background

Master: 24-Jul-2002 3:08 Before: 14-Aug-2002 22:54 After: 15-Aug-2002 2:20

|                             |       |       |       |       |         |     |     |
|-----------------------------|-------|-------|-------|-------|---------|-----|-----|
| Near Det Bkg Cntrate        | 30.00 | 32.30 | 33.22 | 32.70 | -0.5201 | N/A | CPS |
| Far Det Bkg Cntrate         | 30.00 | 33.62 | 33.08 | 33.29 | 0.2117  | N/A | CPS |
| Array-1 Det Bkg Cntrate     | 30.00 | 28.88 | 29.55 | 29.79 | 0.2428  | N/A | CPS |
| Array-2 Det Bkg Cntrate     | 30.00 | 29.64 | 31.18 | 29.71 | -1.475  | N/A | CPS |
| Array Therm Det Bkg Cntrate | 30.00 | 32.75 | 35.03 | 33.48 | -1.550  | N/A | CPS |

Accelerator-Porosity Tool Wellsite Calibration - Calibration Ratios

Master: 24-Jul-2002 3:08

|                              |        |        |     |     |     |     |
|------------------------------|--------|--------|-----|-----|-----|-----|
| Near/Far Calibration Ratio   | 0.9250 | 0.9076 | N/A | N/A | N/A | N/A |
| Near/Array Calibration Ratio | 1.030  | 1.066  | N/A | N/A | N/A | N/A |
| Near/Array Cal Ratio Up/Down | 1.000  | 1.006  | N/A | N/A | N/A | N/A |

Accelerator-Porosity Tool Wellsite Calibration - Tank Check

Master: 24-Jul-2002 3:09

|                           |       |        |     |     |     |     |    |
|---------------------------|-------|--------|-----|-----|-----|-----|----|
| Array-1 Standoff Porosity | 11.75 | 11.51  | N/A | N/A | N/A | N/A | PU |
| Array-2 Standoff Porosity | 11.75 | 11.19  | N/A | N/A | N/A | N/A | PU |
| Average Slowing Down Time | 6.000 | 5.884  | N/A | N/A | N/A | N/A | US |
| Array-1 SDT Ratio Up/Down | 1.000 | 0.9901 | N/A | N/A | N/A | N/A |    |
| Array-2 SDT Ratio Up/Down | 1.000 | 0.9732 | N/A | N/A | N/A | N/A |    |
| Sigma Formation           | 27.50 | 27.88  | N/A | N/A | N/A | N/A | CU |

Hostile Natural Gamma Ray Sonde Wellsite Calibration - Detector 1 Check

Master: 12-Jul-2002 21:08 Before: 24-Jul-2002 6:59 After: 15-Aug-2002 3:01

|                  |       |       |       |       |          |       |      |
|------------------|-------|-------|-------|-------|----------|-------|------|
| Na 511 Peak Loc  | 40.00 | 40.59 | 40.60 | 40.56 | -0.03789 | 1.000 |      |
| Na 511 Peak Res  | 15.50 | 16.79 | 16.89 | 16.56 | -0.3257  | 2.000 | %    |
| High Voltage     | 1150  | 1224  | 1220  | 1219  | -1.032   | 30.00 | V    |
| Na 1785 Peak Loc | 142.6 | 145.1 | 146.3 | 145.7 | -0.5972  | 7.000 |      |
| Na 1785 Peak Res | 8.500 | 10.40 | 8.694 | 8.617 | -0.07694 | 2.000 | %    |
| Temperature      | 15.50 | 24.98 | 22.43 | 22.28 | -0.1454  | N/A   | DEGC |
| Na Count Rate    | 45.00 | 50.31 | 49.89 | 49.07 | -0.8164  | 8.000 | CPS  |

Hostile Natural Gamma Ray Sonde Wellsite Calibration - Detector 2 Check

Master: 12-Jul-2002 21:08 Before: 24-Jul-2002 6:59 After: 15-Aug-2002 3:01

|                  |       |       |       |       |          |       |      |
|------------------|-------|-------|-------|-------|----------|-------|------|
| Na 511 Peak Loc  | 40.00 | 40.58 | 40.59 | 40.53 | -0.06694 | 1.000 |      |
| Na 511 Peak Res  | 15.50 | 16.72 | 16.53 | 16.72 | 0.1935   | 2.000 | %    |
| High Voltage     | 1150  | 1253  | 1250  | 1245  | -4.557   | 30.00 | V    |
| Na 1785 Peak Loc | 142.6 | 144.7 | 144.3 | 144.5 | 0.1626   | 7.000 |      |
| Na 1785 Peak Res | 8.500 | 9.766 | 9.897 | 8.738 | -1.159   | 2.000 | %    |
| Temperature      | 15.50 | 24.15 | 21.87 | 22.37 | 0.5064   | N/A   | DEGC |
| Na Count Rate    | 45.00 | 50.19 | 49.39 | 48.82 | -0.5724  | 8.000 | CPS  |

Hostile Natural Gamma Ray Sonde Wellsite Calibration - Ratio Of Detector 1 To Detector 2

Master: 12-Jul-2002 21:08 Before: 24-Jul-2002 6:59 After: 15-Aug-2002 3:01

|                              |       |       |       |       |           |         |
|------------------------------|-------|-------|-------|-------|-----------|---------|
| Coincidence Count Rate Ratio | 1.000 | 1.004 | 1.010 | 1.006 | -0.003504 | 0.05000 |
|------------------------------|-------|-------|-------|-------|-----------|---------|

Hostile Natural Gamma Ray Sonde Master Calibration - Detector 1 Calibration

Master: 12-Jul-2002 21:01

|                       |       |        |    |    |    |     |
|-----------------------|-------|--------|----|----|----|-----|
| Na 511 Peak Set Point | 40.00 | 41.00  | -- | -- | -- | --  |
| Th Peak Loc           | 209.6 | 208.9  | -- | -- | -- | --  |
| Th Peak Res           | 7.000 | 8.227  | -- | -- | -- | %   |
| Background Count Rate | 142.5 | 24.67  | -- | -- | -- | CPS |
| Gain Ratio            | 1.000 | 0.9793 | -- | -- | -- | --  |

Hostile Natural Gamma Ray Sonde Master Calibration - Detector 2 Calibration

Master: 12-Jul-2002 21:01

|                       |       |        |    |    |    |     |
|-----------------------|-------|--------|----|----|----|-----|
| Na 511 Peak Set Point | 40.00 | 41.00  | -- | -- | -- | --  |
| Th Peak Loc           | 209.6 | 208.8  | -- | -- | -- | --  |
| Th Peak Res           | 7.000 | 8.191  | -- | -- | -- | %   |
| Background Count Rate | 142.5 | 22.68  | -- | -- | -- | CPS |
| Gain Ratio            | 1.000 | 0.9792 | -- | -- | -- | --  |

Accelerator-Porosity Tool - Detector Plateau Settings :

|                                |        |
|--------------------------------|--------|
| Near Detector Plateau Setting  | 1748 V |
| Far Detector Plateau Setting   | 2052 V |
| Array Detector Plateau Setting | 1969 V |



Primary Equipment:  
 Dual Induction Sonde  
 Dual Induction Cartridge

DIS - HB 442  
 DIC - EB 438

Auxiliary Equipment:  
 Mass Isolated Housing

MIH - ZA 417

| Dual Induction - E Wellsite Calibration |                             |                    |                    |        |                           |                     |                    |                       |                     |                    |                    |  |
|---|-----------------------------|--------------------|--------------------|--------|---------------------------|---------------------|--------------------|-----------------------|---------------------|--------------------|--------------------|--|
| Induction Electronics (10 kHz)          |                             |                    |                    |        |                           |                     |                    |                       |                     |                    |                    |  |
| Phase                                   | ID Elect Real Offset 10 kHz | MM/M               | Value              | Phase  | ID Elect Real Gain 10 kHz | Value               | Phase              | ID Elect Phase 10 kHz | DEG                 | Value              |                    |  |
| Before                                  |                             |                    | 37.53              | Before |                           | 0.9770              | Before             |                       |                     | 10.63              |                    |  |
|   | -262.8<br>(Minimum)         | 37.15<br>(Nominal) | 337.2<br>(Maximum) |        | 0.8294<br>(Minimum)       | 0.9794<br>(Nominal) | 1.171<br>(Maximum) |                       | 0.6325<br>(Minimum) | 10.63<br>(Nominal) | 20.63<br>(Maximum) |  |
| Phase                                   | ID Elect Quad Offset 10 kHz | MM/M               | Value              | Phase  | ID Elect Quad Gain 10 kHz | Value               | Phase              | IM Elect Phase 10 kHz | DEG                 | Value              |                    |  |
| Before                                  |                             |                    | 22.25              | Before |                           | 0.9660              | Before             |                       |                     | 13.27              |                    |  |
|   | -277.5<br>(Minimum)         | 22.53<br>(Nominal) | 322.5<br>(Maximum) |        | 0.8193<br>(Minimum)       | 0.9693<br>(Nominal) | 1.157<br>(Maximum) |                       | 3.310<br>(Minimum)  | 13.31<br>(Nominal) | 23.31<br>(Maximum) |  |
| Phase                                   | IM Elect Real Offset 10 kHz | MM/M               | Value              | Phase  | IM Elect Real Gain 10 kHz | Value               |                    |                       |                     |                    |                    |  |
| Before                                  |                             |                    | 96.05              | Before |                           | 0.9527              |                    |                       |                     |                    |                    |  |
|   | -453.5<br>(Minimum)         | 96.54<br>(Nominal) | 646.5<br>(Maximum) |        | 0.8074<br>(Minimum)       | 0.9574<br>(Nominal) | 1.140<br>(Maximum) |                       |                     |                    |                    |  |
| Phase                                   | IM Elect Quad Offset 10 kHz | MM/M               | Value              | Phase  | IM Elect Quad Gain 10 kHz | Value               |                    |                       |                     |                    |                    |  |
| Before                                  |                             |                    | 94.74              | Before |                           | 0.9503              |                    |                       |                     |                    |                    |  |
|   | -454.8<br>(Minimum)         | 95.18<br>(Nominal) | 645.2<br>(Maximum) |        | 0.8055<br>(Minimum)       | 0.9555<br>(Nominal) | 1.137<br>(Maximum) |                       |                     |                    |                    |  |

Before: 24-Jul-2002 7:24

| Dual Induction - E Wellsite Calibration |                             |                    |                    |        |                           |                     |                    |                       |                     |                    |                    |  |
|---|-----------------------------|--------------------|--------------------|--------|---------------------------|---------------------|--------------------|-----------------------|---------------------|--------------------|--------------------|--|
| Induction Electronics (20 kHz)          |                             |                    |                    |        |                           |                     |                    |                       |                     |                    |                    |  |
| Phase                                   | ID Elect Real Offset 20 kHz | MM/M               | Value              | Phase  | ID Elect Real Gain 20 kHz | Value               | Phase              | ID Elect Phase 20 kHz | DEG                 | Value              |                    |  |
| Before                                  |                             |                    | 14.85              | Before |                           | 1.004               | Before             |                       |                     | 9.036              |                    |  |
|   | -110.3<br>(Minimum)         | 14.68<br>(Nominal) | 139.7<br>(Maximum) |        | 0.8551<br>(Minimum)       | 1.005<br>(Nominal)  | 1.207<br>(Maximum) |                       | -5.718<br>(Minimum) | 9.282<br>(Nominal) | 24.28<br>(Maximum) |  |
| Phase                                   | ID Elect Quad Offset 20 kHz | MM/M               | Value              | Phase  | ID Elect Quad Gain 20 kHz | Value               | Phase              | IM Elect Phase 20 kHz | DEG                 | Value              |                    |  |
| Before                                  |                             |                    | 8.842              | Before |                           | 0.9923              | Before             |                       |                     | 12.07              |                    |  |
|   | -115.9<br>(Minimum)         | 9.089<br>(Nominal) | 134.1<br>(Maximum) |        | 0.8445<br>(Minimum)       | 0.9945<br>(Nominal) | 1.192<br>(Maximum) |                       | -2.653<br>(Minimum) | 12.35<br>(Nominal) | 27.35<br>(Maximum) |  |
| Phase                                   | IM Elect Real Offset 20 kHz | MM/M               | Value              | Phase  | IM Elect Real Gain 20 kHz | Value               |                    |                       |                     |                    |                    |  |
| Before                                  |                             |                    | 39.82              | Before |                           | 1.010               |                    |                       |                     |                    |                    |  |
|   | -184.7<br>(Minimum)         | 40.31<br>(Nominal) | 265.3<br>(Maximum) |        | 0.8587<br>(Minimum)       | 1.009<br>(Nominal)  | 1.212<br>(Maximum) |                       |                     |                    |                    |  |
| Phase                                   | IM Elect Quad Offset 20 kHz | MM/M               | Value              | Phase  | IM Elect Quad Gain 20 kHz | Value               |                    |                       |                     |                    |                    |  |
| Before                                  |                             |                    | 39.36              | Before |                           | 1.007               |                    |                       |                     |                    |                    |  |
|   | -185.2<br>(Minimum)         | 39.80<br>(Nominal) | 264.8<br>(Maximum) |        | 0.8566<br>(Minimum)       | 1.007<br>(Nominal)  | 1.209<br>(Maximum) |                       |                     |                    |                    |  |

Before: 24-Jul-2002 6:54

| Dual Induction - E Wellsite Calibration |                             |                    |                    |        |                           |                     |                    |                       |                    |                    |                    |  |
|---|-----------------------------|--------------------|--------------------|--------|---------------------------|---------------------|--------------------|-----------------------|--------------------|--------------------|--------------------|--|
| Induction Electronics (40 kHz)          |                             |                    |                    |        |                           |                     |                    |                       |                    |                    |                    |  |
| Phase                                   | ID Elect Real Offset 40 kHz | MM/M               | Value              | Phase  | ID Elect Real Gain 40 kHz | Value               | Phase              | ID Elect Phase 40 kHz | DEG                | Value              |                    |  |
| Before                                  |                             |                    | 9.741              | Before |                           | 0.9887              | Before             |                       |                    | 27.54              |                    |  |
|   | -75.43<br>(Minimum)         | 9.570<br>(Nominal) | 94.57<br>(Maximum) |        | 0.8395<br>(Minimum)       | 0.9895<br>(Nominal) | 1.185<br>(Maximum) |                       | 9.068<br>(Minimum) | 29.07<br>(Nominal) | 49.07<br>(Maximum) |  |
| Phase                                   | ID Elect Quad Offset 40 kHz | MM/M               | Value              | Phase  | ID Elect Quad Gain 40 kHz | Value               | Phase              | IM Elect Phase 40 kHz | DEG                | Value              |                    |  |
| Before                                  |                             |                    | 5.856              | Before |                           | 0.9765              | Before             |                       |                    | 31.11              |                    |  |
|   | -79.10<br>(Minimum)         | 5.897<br>(Nominal) | 90.90<br>(Maximum) |        | 0.8281<br>(Minimum)       | 0.9781<br>(Nominal) | 1.169<br>(Maximum) |                       | 12.68<br>(Minimum) | 32.68<br>(Nominal) | 52.68<br>(Maximum) |  |
| Phase                                   | IM Elect Real Offset 40 kHz | MM/M               | Value              | Phase  | IM Elect Real Gain 40 kHz | Value               |                    |                       |                    |                    |                    |  |
| Before                                  |                             |                    | 26.08              | Before |                           | 1.025               |                    |                       |                    |                    |                    |  |
|   | -103.8<br>(Minimum)         | 26.19<br>(Nominal) | 156.2<br>(Maximum) |        | 0.8673<br>(Minimum)       | 1.017<br>(Nominal)  | 1.224<br>(Maximum) |                       |                    |                    |                    |  |
| Phase                                   | IM Elect Quad Offset 40 kHz | MM/M               | Value              | Phase  | IM Elect Quad Gain 40 kHz | Value               |                    |                       |                    |                    |                    |  |
| Before                                  |                             |                    | 25.86              | Before |                           | 1.022               |                    |                       |                    |                    |                    |  |
|   | -104.1<br>(Minimum)         | 25.92<br>(Nominal) | 155.9<br>(Maximum) |        | 0.8649<br>(Minimum)       | 1.015<br>(Nominal)  | 1.221<br>(Maximum) |                       |                    |                    |                    |  |

| Dual Induction - E Wellsite Calibration |  |          |        |  |        |
|---|--|----------|--------|--|--------|
| SFL Electronics                         |  |          |        |  |        |
| Phase                                   | SFL Voltage Offset MV                          | Value    | Phase  | SFL Voltage Gain                                 | Value  |
| Before                                  |  | 1.196    | Before |  | 1.016  |
|   | -15.00 (Minimum) 0 (Nominal) 15.00 (Maximum)   |          |        | 0.8500 (Minimum) 1.000 (Nominal) 1.200 (Maximum) |        |
| Phase                                   | SFL Current Offset MA                          | Value    | Phase  | SFL Current Gain                                 | Value  |
| Before                                  |  | 0.005420 | Before |  | 0.9940 |
|   | -0.6000 (Minimum) 0 (Nominal) 0.6000 (Maximum) |          |        | 0.8500 (Minimum) 1.000 (Nominal) 1.200 (Maximum) |        |

Before: 24-Jul-2002 6:55

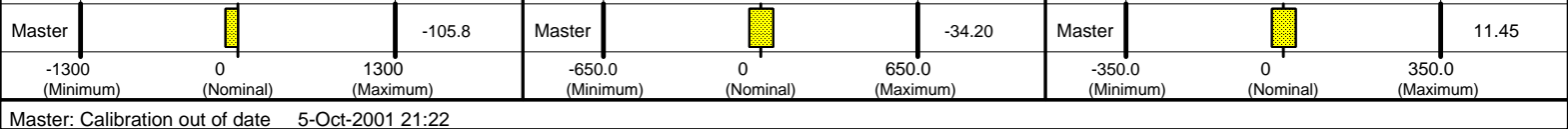
| Dual Induction - E Wellsite Calibration                |  |       |       |   |           |       |   |           |  |
|--|--|-------|-------|---|-----------|-------|---|-----------|--|
| Electronics Calibration Changes Files/Depth Intervals: |  |       |       |   |           |       |   |           |  |
| Phase  | ID (R > 27 OHM-M) MM/M                   | Value | Phase | ID (R < 27 OHM-M) %                     | Value     | Phase | SFL (R < 1 OHM-M) OHMM                    | Value     |  |
| After  |  | 0     | After |   | 0.0001640 | After |   | 0.0005177 |  |
|  | 0 (Minimum) 0 (Nominal) 0.7500 (Maximum) |       |       | 0 (Minimum) 0 (Nominal) 2.000 (Maximum) |           |       | 0 (Minimum) 0 (Nominal) 0.02000 (Maximum) |           |  |
| Phase  | IM (R > 27 OHM-M) MM/M                   | Value | Phase | IM (R < 27 OHM-M) %                     | Value     |       |   |           |  |
| After  |  | 0     | After |   | 0.0001433 |       |   |           |  |
|  | 0 (Minimum) 0 (Nominal) 0.7500 (Maximum) |       |       | 0 (Minimum) 0 (Nominal) 2.000 (Maximum) |           |       |   |           |  |
| Phase  | SFL (R > 27 OHM-M) MM/M                  | Value | Phase | SFL (R < 27 OHM-M) %                    | Value     |       |   |           |  |
| After  |  | 0     | After |   | 0.0003939 |       |   |           |  |
|  | 0 (Minimum) 0 (Nominal) 0.7500 (Maximum) |       |       | 0 (Minimum) 0 (Nominal) 2.000 (Maximum) |           |       |   |           |  |

After: 15-Aug-2002 2:07

| Dual Induction - E Master Calibration  |  |         |        |   |         |        |   |        |  |
|--|--|---------|--------|---|---------|--------|---|--------|--|
| Test Loop Calibration: Calibration of Internal Reference to Test Loop Standard |  |         |        |   |         |        |   |        |  |
| Phase  | Deep 10 kHz Gain Factor                          | Value   | Phase  | Deep 20 kHz Gain Factor                           | Value   | Phase  | Deep 40 kHz Gain Factor                           | Value  |  |
| Master   |  | 0.9956  | Master |   | 1.008   | Master |   | 1.026  |  |
|  | 0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum) |         |        | 0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)  |         |        | 0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)  |        |  |
| Phase  | Medium 10 kHz Gain Factor                        | Value   | Phase  | Medium 20 kHz Gain Factor                         | Value   | Phase  | Medium 40 kHz Gain Factor                         | Value  |  |
| Master   |  | 1.022   | Master |   | 1.030   | Master |   | 1.061  |  |
|  | 0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum) |         |        | 0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)  |         |        | 0.9000 (Minimum) 1.000 (Nominal) 1.100 (Maximum)  |        |  |
| Phase  | Deep 10 kHz Phase Shift                          | Value   | Phase  | Deep 20 kHz Phase Shift                           | Value   | Phase  | Deep 40 kHz Phase Shift                           | Value  |  |
| Master   |  | 0.1143  | Master |   | -0.1524 | Master |   | -1.426 |  |
|  | -1.500 (Minimum) 0 (Nominal) 1.500 (Maximum)     |         |        | -2.000 (Minimum) 0 (Nominal) 2.000 (Maximum)      |         |        | -4.000 (Minimum) -1.000 (Nominal) 2.000 (Maximum) |        |  |
| Phase  | Medium 10 kHz Phase Shift                        | Value   | Phase  | Medium 20 kHz Phase Shift                         | Value   | Phase  | Medium 40 kHz Phase Shift                         | Value  |  |
| Master   |  | -0.2558 | Master |   | -0.9331 | Master |   | -2.461 |  |
|  | -1.500 (Minimum) 0 (Nominal) 1.500 (Maximum)     |         |        | -3.000 (Minimum) -1.000 (Nominal) 1.000 (Maximum) |         |        | -5.000 (Minimum) -2.000 (Nominal) 1.000 (Maximum) |        |  |

Master: Calibration out of date 5-Oct-2001 20:50

| Dual Induction - E Master Calibration   |  |       |        |  |        |        |  |        |  |
|---|--|-------|--------|--|--------|--------|--|--------|--|
| Sonde Error Corrections: Correction for sonde response in zero conductivity environment. (Normalized to 25C). |  |       |        |  |        |        |  |        |  |
| Phase   | Real Deep 10 kHz S.E. Corr.                  | Value | Phase  | Real Deep 20 kHz S.E. Corr.                  | Value  | Phase  | Real Deep 40 kHz S.E. Corr.                  | Value  |  |
| Master  |  | 44.95 | Master |  | 16.36  | Master |  | 4.690  |  |
|   | -50.00 (Minimum) 0 (Nominal) 125.0 (Maximum) |       |        | -30.00 (Minimum) 0 (Nominal) 30.00 (Maximum) |        |        | -15.00 (Minimum) 0 (Nominal) 15.00 (Maximum) |        |  |
| Phase   | Quad Deep 10 kHz S.E. Corr.                  | Value | Phase  | Quad Deep 20 kHz S.E. Corr.                  | Value  | Phase  | Quad Deep 40 kHz S.E. Corr.                  | Value  |  |
| Master  |  | 108.9 | Master |  | 64.63  | Master |  | 46.10  |  |
|   | -250.0 (Minimum) 0 (Nominal) 350.0 (Maximum) |       |        | -125.0 (Minimum) 0 (Nominal) 200.0 (Maximum) |        |        | -75.00 (Minimum) 0 (Nominal) 125.0 (Maximum) |        |  |
| Phase   | Real Medium 10 kHz S.E. Corr.                | Value | Phase  | Real Medium 20 kHz S.E. Corr.                | Value  | Phase  | Real Medium 40 kHz S.E. Corr.                | Value  |  |
| Master  |  | 20.73 | Master |  | -1.786 | Master |  | -10.46 |  |
|   | -50.00 (Minimum) 0 (Nominal) 140.0 (Maximum) |       |        | -50.00 (Minimum) 0 (Nominal) 50.00 (Maximum) |        |        | -30.00 (Minimum) 0 (Nominal) 30.00 (Maximum) |        |  |
| Phase   | Quad Medium 10 kHz S.E. Corr.                | Value | Phase  | Quad Medium 20 kHz S.E. Corr.                | Value  | Phase  | Quad Medium 40 kHz S.E. Corr.                | Value  |  |



### Hostile Environment Litho Density - A / Equipment Identification

**Primary Equipment:**

|  |           |      |
|--|-----------|------|
| HOSTILE ENVIRONMENT LITHO DENSITY HIGH V | HLDV - A  | 10   |
| HOSTILE ENVIRONMENT LITHO DENSITY CARTRI | HLDC - AA | 11   |
| Gamma Source Radioactive                 | GSR - Z   | 1846 |

**Auxiliary Equipment:**

|  |          |    |
|--|----------|----|
| HOSTILE ENVIRONMENT LITHO DENSITY SONDE  | HLDS - B | 10 |
| HOSTILE ENVIRONMENT ELECTRONICS CARTRIDG | HEH - H  | 12 |
| HOSTILE ENVIRONMENT ELECTRONICS CARTRIDG | HEH - G  | 11 |
| HOSTILE ENVIRONMENT LITHO DENSITY PAD    | HLDP - B | 10 |

### Nuclear Porosity Lithology Cartridge - B / Equipment Identification

**Primary Equipment:**

|                |          |    |
|----------------|----------|----|
| NPLC Cartridge | NPLC - B | 79 |
|----------------|----------|----|

**Auxiliary Equipment:**

|              |         |    |
|--------------|---------|----|
| NPLC Housing | NPH - B | 82 |
|--------------|---------|----|

### Accelerator-Porosity Tool / Equipment Identification

**Primary Equipment:**

|                            |          |      |
|----------------------------|----------|------|
| Accelerator-Porosity Sonde | APS - BA | 22   |
| APS Minitron               | MNTR - F | 4185 |

**Auxiliary Equipment:**

|                                 |           |      |
|---------------------------------|-----------|------|
| Accelerator-Porosity Housing    | APH - AC  | 22   |
| APS Calibration Water Tank      | SFT - 178 | 4722 |
| APS Aluminium Calibrator Sleeve | SFT - 281 | 24   |

### Hostile Natural Gamma Ray Sonde / Equipment Identification

**Primary Equipment:**

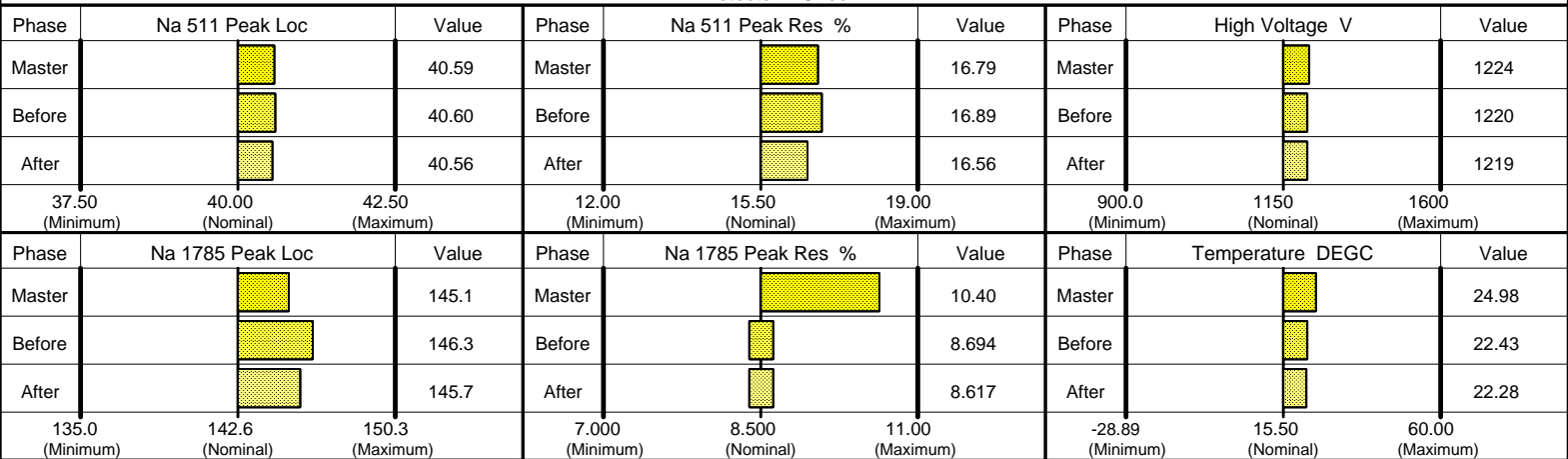
|            |           |    |
|------------|-----------|----|
| HNGS Sonde | HNGS - BA | 77 |
|------------|-----------|----|

**Auxiliary Equipment:**

|                          |           |     |
|--------------------------|-----------|-----|
| HNGS Sonde Housing       | HNSH - BA | 79  |
| Gamma Source Radioactive | GSR - U   | 135 |

### Hostile Natural Gamma Ray Sonde Wellsite Calibration

#### Detector 1 Check



| Phase  | Na Count Rate CPS | Value |
|--------|-------------------|-------|
| Master |                   | 145.1 |

|        |   |       |
|--------|---|-------|
| Master |   | 50.31 |
| Before |   | 49.89 |
| After  |   | 49.07 |
|        | 10.00 (Minimum)    45.00 (Nominal)    100.0 (Maximum) |       |

Master: 12-Jul-2002 21:08      Before: 24-Jul-2002 6:59      After: 15-Aug-2002 3:01

| Hostile Natural Gamma Ray Sonde Wellsite Calibration |   |       |        |   |       |        |  |       |
|--|---|-------|--------|---|-------|--------|--|-------|
| Detector 2 Check                                     |   |       |        |   |       |        |  |       |
| Phase  | Na 511 Peak Loc                                       | Value | Phase  | Na 511 Peak Res %                                     | Value | Phase  | High Voltage V   | Value |
| Master   |   | 40.58 | Master |   | 16.72 | Master |  | 1253  |
| Before   |   | 40.59 | Before |   | 16.53 | Before |  | 1250  |
| After  |   | 40.53 | After  |   | 16.72 | After  |  | 1245  |
|  | 37.50 (Minimum)    40.00 (Nominal)    42.50 (Maximum) |       |        | 12.00 (Minimum)    15.50 (Nominal)    19.00 (Maximum) |       |        | 900.0 (Minimum)    1150 (Nominal)    1600 (Maximum)    |       |
| Phase  | Na 1785 Peak Loc                                      | Value | Phase  | Na 1785 Peak Res %                                    | Value | Phase  | Temperature DEGC                                       | Value |
| Master   |   | 144.7 | Master |   | 9.766 | Master |  | 24.15 |
| Before   |   | 144.3 | Before |   | 9.897 | Before |  | 21.87 |
| After  |   | 144.5 | After  |   | 8.738 | After  |  | 22.37 |
|  | 135.0 (Minimum)    142.6 (Nominal)    150.3 (Maximum) |       |        | 7.000 (Minimum)    8.500 (Nominal)    11.00 (Maximum) |       |        | -28.89 (Minimum)    15.50 (Nominal)    60.00 (Maximum) |       |
| Phase  | Na Count Rate CPS                                     | Value |        |   |       |        |  |       |
| Master   |   | 50.19 |        |   |       |        |  |       |
| Before   |   | 49.39 |        |   |       |        |  |       |
| After  |   | 48.82 |        |   |       |        |  |       |
|  | 10.00 (Minimum)    45.00 (Nominal)    100.0 (Maximum) |       |        |   |       |        |  |       |

Master: 12-Jul-2002 21:08      Before: 24-Jul-2002 6:59      After: 15-Aug-2002 3:01

| Hostile Natural Gamma Ray Sonde Wellsite Calibration |  |       |
|--|--|-------|
| Ratio Of Detector 1 To Detector 2                    |  |       |
| Phase  | Coincidence Count Rate Ratio                           | Value |
| Master   |  | 1.004 |
| Before   |  | 1.010 |
| After  |  | 1.006 |
|  | 0.9500 (Minimum)    1.000 (Nominal)    1.050 (Maximum) |       |

Master: 12-Jul-2002 21:08  
Before: 24-Jul-2002 6:59  
After: 15-Aug-2002 3:01

| Hostile Natural Gamma Ray Sonde Master Calibration |   |       |        |  |        |        |   |       |
|--|---|-------|--------|--|--------|--------|---|-------|
| Detector 1 Calibration                             |   |       |        |  |        |        |   |       |
| Phase  | Na 511 Peak Set Point                                 | Value | Phase  | Th Peak Loc  | Value  | Phase  | Th Peak Res %   | Value |
| Master   |   | 41.00 | Master |  | 208.9  | Master |   | 8.227 |
|  | 38.00 (Minimum)    40.00 (Nominal)    42.00 (Maximum) |       |        | 201.0 (Minimum)    209.6 (Nominal)    218.3 (Maximum)  |        |        | 5.000 (Minimum)    7.000 (Nominal)    9.000 (Maximum) |       |
| Phase  | Background Count Rate CPS                             | Value | Phase  | Gain Ratio   | Value  |        |   |       |
| Master   |   | 24.67 | Master |  | 0.9793 |        |   |       |
|  | 20.00 (Minimum)    142.5 (Nominal)    265.0 (Maximum) |       |        | 0.9400 (Minimum)    1.000 (Nominal)    1.060 (Maximum) |        |        |   |       |

Master: 12-Jul-2002 21:01

| Hostile Natural Gamma Ray Sonde Master Calibration |   |       |        |  |        |        |   |       |
|--|---|-------|--------|--|--------|--------|---|-------|
| Detector 2 Calibration                             |   |       |        |  |        |        |   |       |
| Phase  | Na 511 Peak Set Point                                 | Value | Phase  | Th Peak Loc  | Value  | Phase  | Th Peak Res %   | Value |
| Master   |   | 41.00 | Master |  | 208.8  | Master |   | 8.191 |
|  | 38.00 (Minimum)    40.00 (Nominal)    42.00 (Maximum) |       |        | 201.0 (Minimum)    209.6 (Nominal)    218.3 (Maximum)  |        |        | 5.000 (Minimum)    7.000 (Nominal)    9.000 (Maximum) |       |
| Phase  | Background Count Rate CPS                             | Value | Phase  | Gain Ratio   | Value  |        |   |       |
| Master   |   | 23.68 | Master |  | 0.9793 |        |   |       |
|  | 20.00 (Minimum)    142.5 (Nominal)    265.0 (Maximum) |       |        | 0.9400 (Minimum)    1.000 (Nominal)    1.060 (Maximum) |        |        |   |       |

|                           |                    |                    |                    |       |        |                     |                    |                    |        |
|---------------------------|--------------------|--------------------|--------------------|-------|--------|---------------------|--------------------|--------------------|--------|
| master                    | 20.00<br>(Minimum) | 142.5<br>(Nominal) | 265.0<br>(Maximum) | 22.68 | master | 0.9400<br>(Minimum) | 1.000<br>(Nominal) | 1.060<br>(Maximum) | 0.9792 |
| Master: 12-Jul-2002 21:01 |                    |                    |                    |       |        |                     |                    |                    |        |

Company: Lamont Doherty

**Schlumberger**

Well: ODP Leg 204, Site 1245 E

Field: Hydrate Ridge

Ocean: Pacific

State: Oregon

Natural Gamma Ray  
Spectroscopy