

# Schlumberger

**Company:** Lamont Doherty Earth Observatory

**Well:** Expedition 341, Site U1417E

**Field:** Southern Alaska Margin Tectonics

**Rig:** JOIDES Resolution Ocean: Pacific

High Resolution Laterolog Array (HRLA)  
Log Quality Control

Rig: JOIDES Resolution  
Field: Southern Alaska Margin Tectonics  
Location: Latitude: N 56° 57.5888'  
Well: Expedition 341, Site U1417E  
Company: Lamont Doherty Earth Observatory

LOCATION	Latitude: N 56° 57.5888'		Elev.: K.B. -4200.00 m	
	Longitude: W 147° 6.5983'		G.L. 0.00 m	
			D.F. -4200.00 m	
Permanent Datum: Mean Sea Level		Elev.: 0.00 m		
Log Measured From: Drill Floor		-4200.00 m above Perm. Datum		
Drilling Measured From: Drill Floor				
API Serial No.		Max. Hole Devi. 0 deg	Longitude W 147.1099	Latitude N 56.9598

Logging Date		21-Jun-2013		
Run Number		1		
Depth Driller		709.5 m		
Schlumberger Depth		624 m		
Bottom Log Interval		624 m		
Top Log Interval		0 m		
Casing Driller Size @ Depth		5.500 in @ 81 m @		
Casing Schlumberger		84 m		
Bit Size		9.875 in		
Type Fluid In Hole		Seawater		
MUD	Density	Viscosity	1.03 g/cm3	
	Fluid Loss	PH		
	Source Of Sample		N/A	
RM @ Measured Temperature		@ @		
RMF @ Measured Temperature		@ @		
RMC @ Measured Temperature		@ @		
Source RMF	RMC	N/A	N/A	
RM @ MRT	RMF @ MRT	@ 14	@ 14	@ @
Maximum Recorded Temperatures		14 degC		
Circulation Stopped	Time	20-Jun-2013	19:30	
Logger On Bottom	Time	21-Jun-2013	2:30	
Unit Number	Location	625003	Houston	
Recorded By		K. Swain		
Witnessed By		A. Slagle, L. Drab		

	Run 1	Run 2	Run 3
Logging Date			
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			
Viscosity			
Fluid Loss			
PH			
Source Of Sample			
RM @ Measured Temperature		@	
RMF @ Measured Temperature		@	
RMC @ Measured Temperature		@	
Source RMF			
RMC			
RM @ MRT		@	@
RMF @ MRT			
Maximum Recorded Temperatures			
Circulation Stopped			
Time			
Logger On Bottom			
Time			
Unit Number			
Location			
Recorded By			
Witnessed By			

**DISCLAIMER**  
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**OTHER SERVICES1**  
 OS1: FMS  
 OS2: DSI  
 OS3: HRLA  
 OS4: VSI  
 OS5:

**OTHER SERVICES2**  
 OS1:  
 OS2:  
 OS3:  
 OS4:  
 OS5:

**REMARKS: RUN NUMBER 1**  
 Hole drilled with RCB coring bit and bottom hole assembly (BHA). 9 7/8" BS  
 Lamont Magnetic Susceptibility (MSS) tool run in combination with HRLA/HLDS/HNGS  
 2 knuckle joints decouple the eccentered HLDS and HNGS from the centered HRLA  
 and MSS. A thru wired ECH-MRA separates the 2 knuckles for added capability.  
  
 2 MCD (mechanical Caliper Device) centralizers run with HRLA.  
 LDEO-MSS tool run below HRLA consisting of a deep reading sensor only with the  
 electronics cartridge and ELIC.  
 RCB coring bit released on bottom of hole prior to logging to allow  
 wireline tools to pass out of drill collars/pipe into open hole.  
  
 APS activation of pipe at drill pipe up to 70 m causes GR to be high due  
 to previous 1st run with APS as drill pipe requires more time to equilibrate  
 once activated.

**REMARKS: RUN NUMBER 2**

RUN 1		
SERVICE ORDER #:		
PROGRAM VERSION:	19C0-187	
FLUID LEVEL:		
LOGGED INTERVAL	START	STOP

RUN 2		
SERVICE ORDER #:		
PROGRAM VERSION:		
FLUID LEVEL:		
LOGGED INTERVAL	START	STOP





## EQUIPMENT DESCRIPTION

**RUN 1**

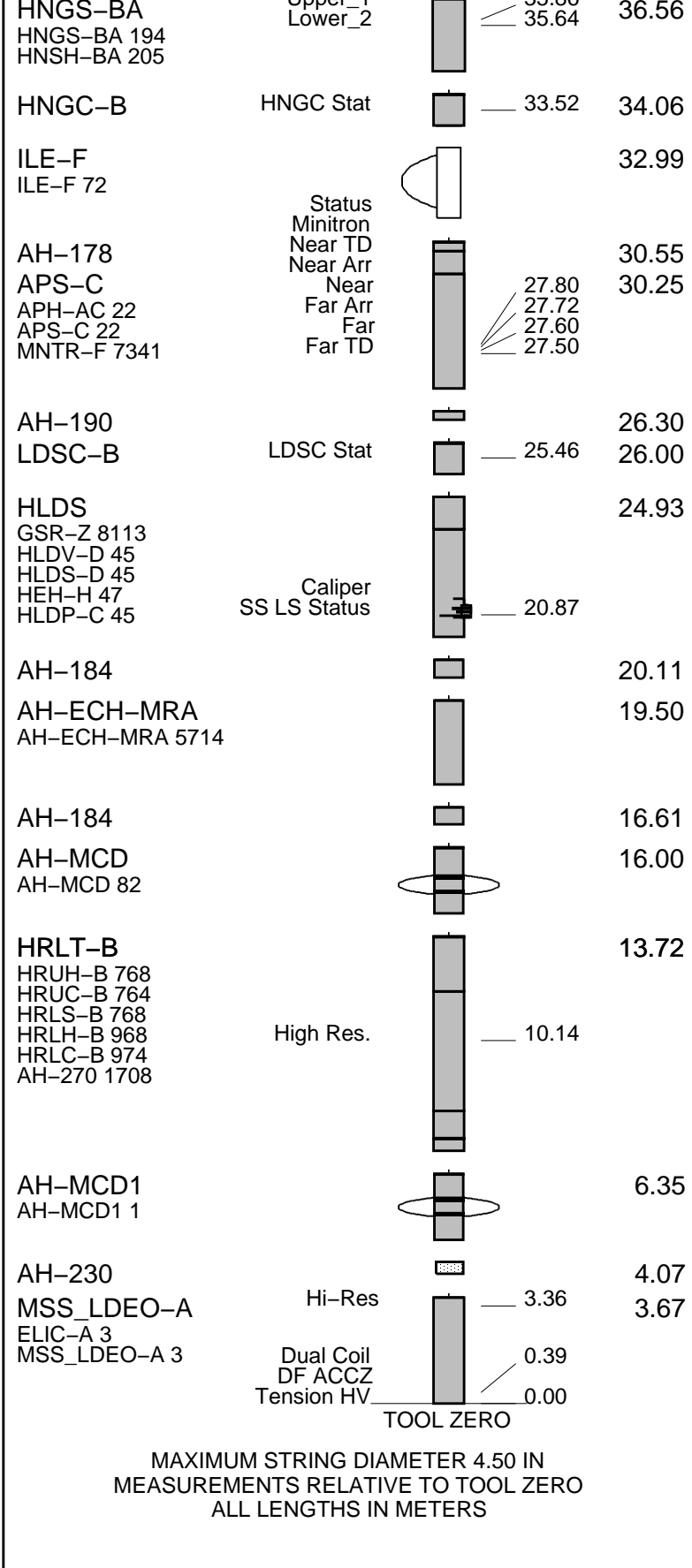
**SURFACE EQUIPMENT**

SFT-281 1  
 SFT-178 1  
 GSR-U 616008  
 WITM (EDTS)-A 1

**DOWNHOLE EQUIPMENT**

LEH-MT 101	MDSB_EDTC		38.54	39.93
	Mud Tempe		37.47	
AH-369	CTEM		36.90	38.97
EDTC-B	Gamma Ray		38.54	
EDTH-B 8303	EFTB DIAG		36.56	
EDTC-B 8317	TelStatus		35.86	
	EDTCB Ele			
	Inner 1			

**RUN 2**



Production String	(in)	(M)	Well Schematic	(M)	(in)	Casing String
	OD	ID		MD	MD	

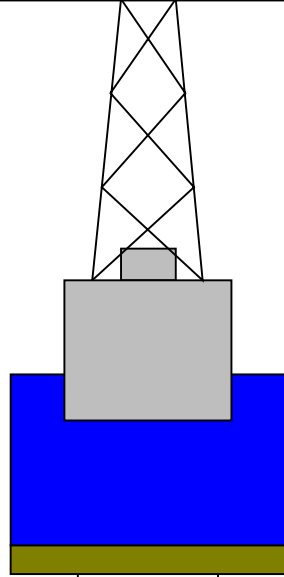
Kelly Bushing Elevation  
Derrick Floor Elevation

Mean Sea Level

-4200

-4200

-4189



4.1



0

4.1

Sea Floor

84

9.875

Open Hole

624

Total Depth

### Input DLIS Files

MSS\_LDEO\_HRLA\_LDL\_076PUP FN:100 23-Jun-2013 13:21 4423.4 M 4265.1 M

### Output DLIS Files

DEFAULT MSS\_LDEO\_HRLA\_LDL\_078PUP FN:102 PRODUCER 23-Jun-2013 14:30 224.0 M 65.1 M

### OP System Version: 19C0-187

MSS_LDEO-A	19C0-187	HRLT-B	19C0-187
HLDS	19C0-187	LDSC-B	19C0-187
APS-C	19C0-187	HNGC-B	19C0-187
HNGS-BA	19C0-187	EDTC-B	SKK-5169-EDTCB

### Changed Parameter Summary

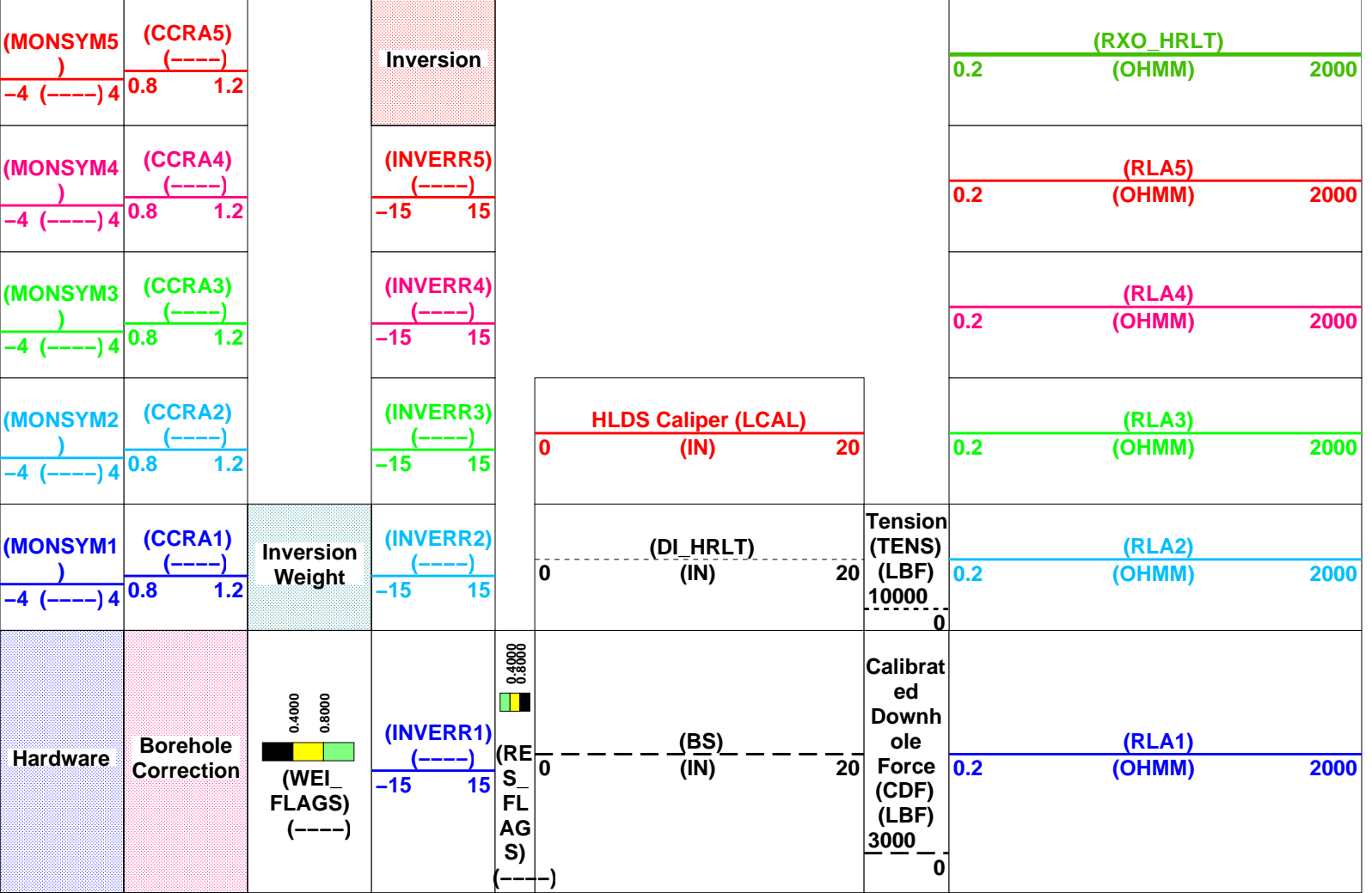
DLIS Name	New Value	Previous Value	Depth & Time
GCSE	BS	BS	224.0 14:30:40

#### PIP SUMMARY

Time Mark Every 60 S

2nd Pass, Sea Floor Depth Reference

<hr/>		
	(RT_HRLT)	
0.2	(OHMM)	2000
<hr/>		
	(RM_HRLT)	
0.02	(OHMM)	200
<hr/>		



\*\*\* HRLT FLAG TRACKS \*\*\*

BLACK areas show that the corresponding error flag is set.

TRACK R3\_LQC

INVERSION WEIGHT

Contribution from each hrlt channel in Inversion algorithm, and from left to right :

| Wei1 | Wei2 | Wei3 | Wei4 | Wei5 |

GREEN = OK

YELLOW = Contribution QUESTIONABLE

BLACK = Contribution UNRELIABLE

TRACK R5\_LQC

RESISTIVITY QUALITY INDICATOR

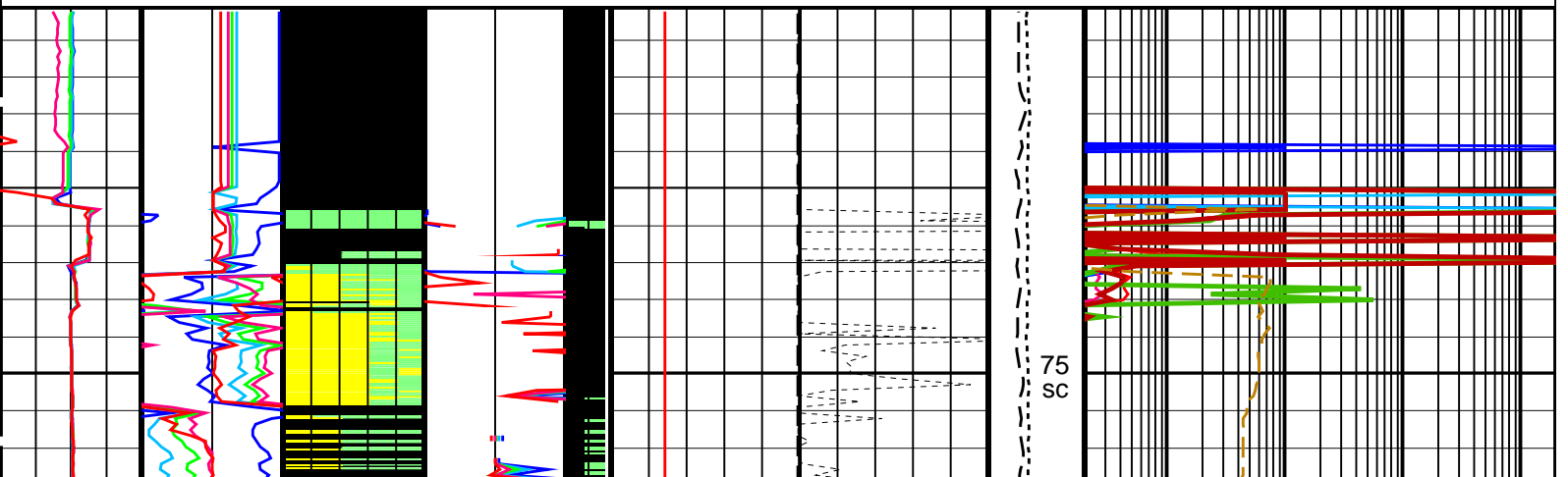
LQC flags on RXO\_HRLT & RT\_HRLT, and from left to right :

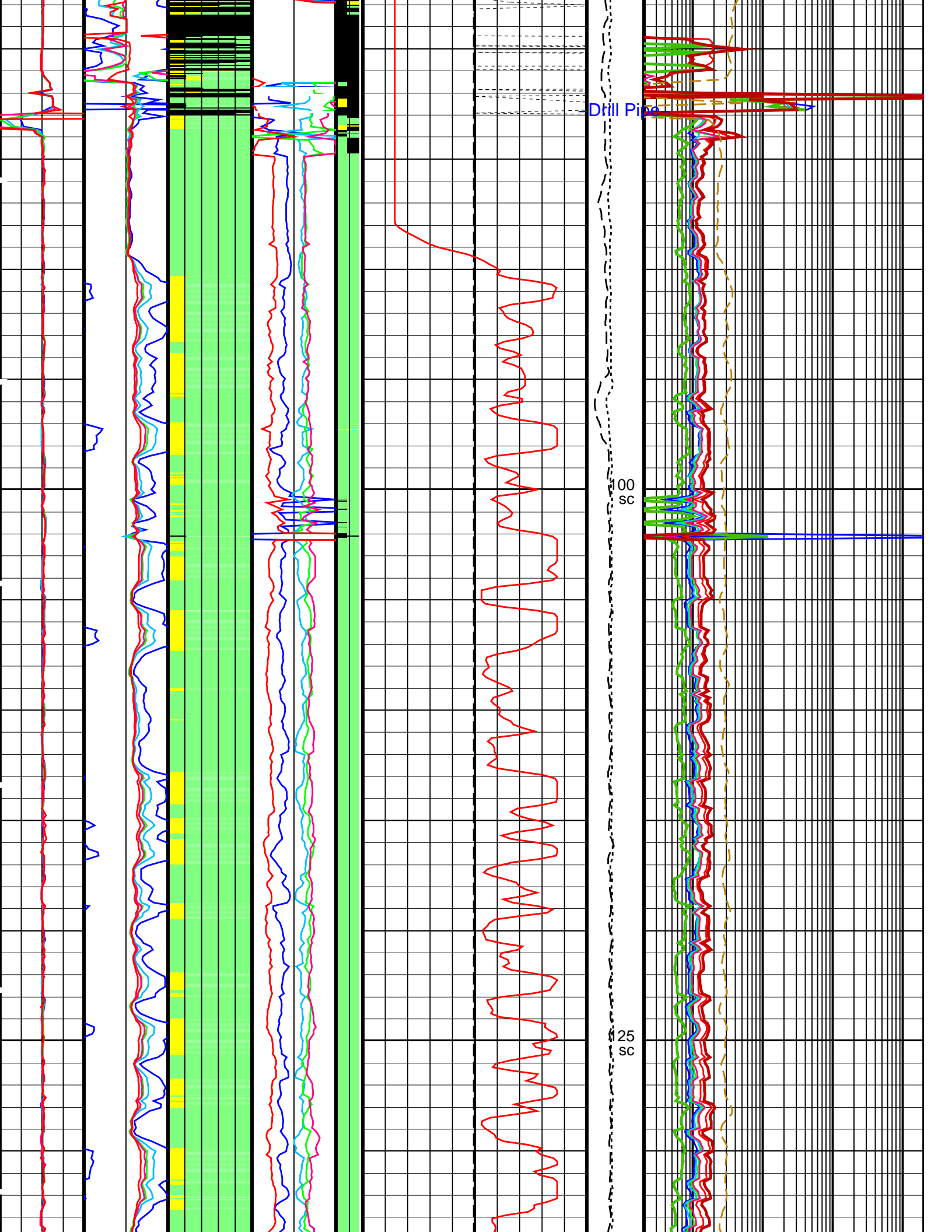
| RxoFlag | RTFlag |

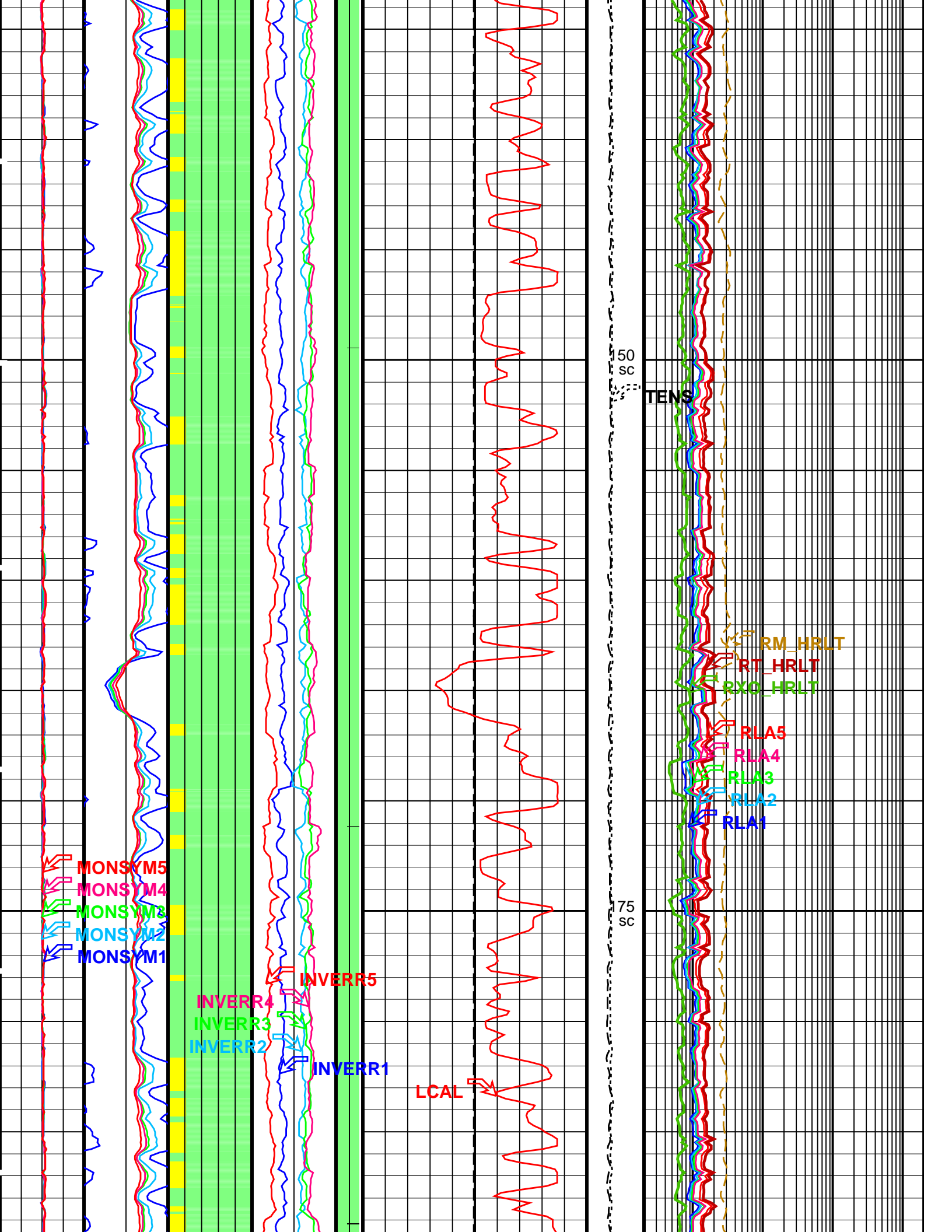
GREEN = OK

YELLOW = SHOULDER BED EFFECT

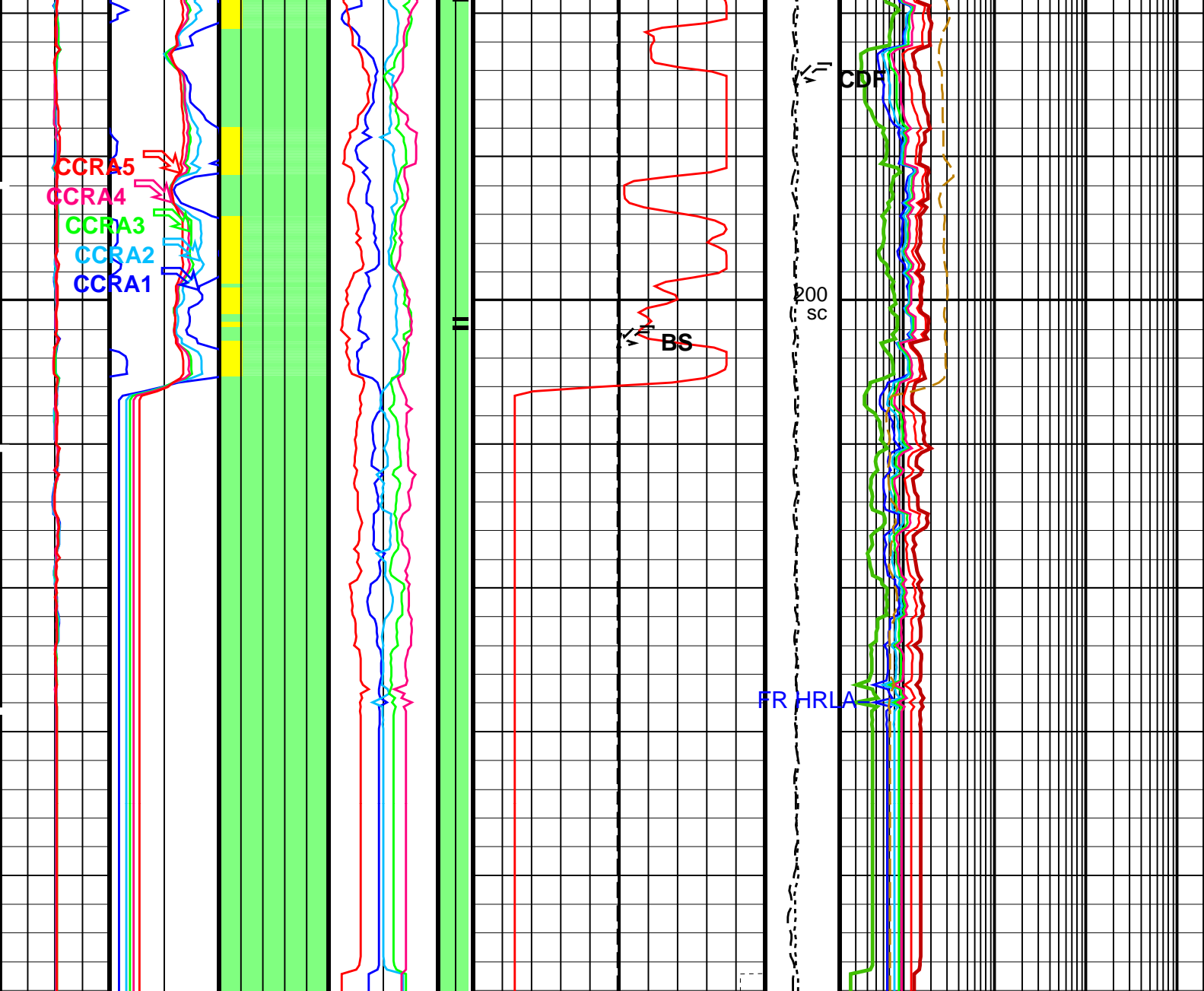
BLACK = NOK











\*\*\* HRLT FLAG TRACKS \*\*\*

BLACK areas show that the corresponding error flag is set.

2nd Pass, Sea Floor Depth Reference

TRACK R3\_LQC

INVERSION WEIGHT

Contribution from each hrlt channel in Inversion algorithm, and from left to right :

| Wei1 | Wei2 | Wei3 | Wei4 | Wei5 |

GREEN = OK

YELLOW = Contribution QUESTIONABLE

BLACK = Contribution UNRELIABLE

TRACK R5\_LQC

RESISTIVITY QUALITY INDICATOR

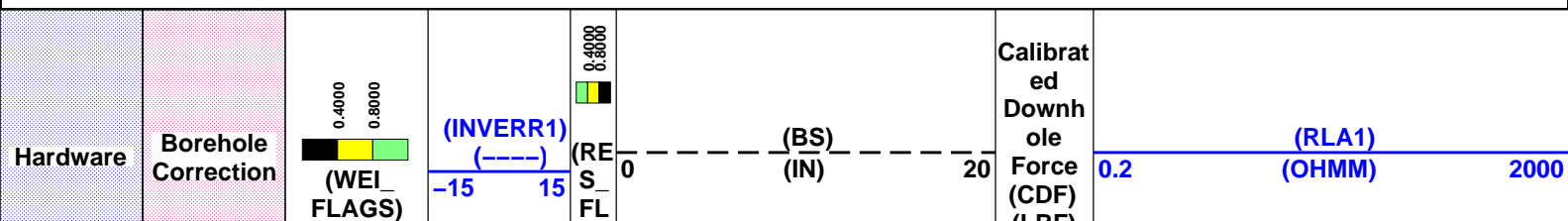
LQC flags on RXO\_HRLT & RT\_HRLT, and from left to right :

| RxoFlag | RTFlag |

GREEN = OK

YELLOW = SHOULDER BED EFFECT

BLACK = NOK



(MONSYM1)	(CCRA1)	Inversion Weight	(INVERR2)	(DI_HRLT)	Tension (TENS)	(RLA2)
(-----)	(-----)		(-----)	(IN)	(LBF)	(OHMM)
-4 (-----) 4	0.8 1.2		-15 15	0 20	10000 0	2000
(MONSYM2)	(CCRA2)		(INVERR3)	HLDS Caliper (LCAL)		(RLA3)
(-----)	(-----)		(-----)	(IN)		(OHMM)
-4 (-----) 4	0.8 1.2		-15 15	0 20		2000
(MONSYM3)	(CCRA3)		(INVERR4)			(RLA4)
(-----)	(-----)		(-----)			(OHMM)
-4 (-----) 4	0.8 1.2		-15 15			2000
(MONSYM4)	(CCRA4)		(INVERR5)			(RLA5)
(-----)	(-----)		(-----)			(OHMM)
-4 (-----) 4	0.8 1.2		-15 15			2000
(MONSYM5)	(CCRA5)	Inversion				(RXO_HRLT)
(-----)	(-----)					(OHMM)
-4 (-----) 4	0.8 1.2					2000
						(RM_HRLT)
						(OHMM)
						200
						(RT_HRLT)
						(OHMM)
						2000

PIP SUMMARY

Time Mark Every 60 S

### Parameters

DLIS Name	Description	Value
<b>HRLT-B: High Resolution Laterolog Array - B</b>		
BHS	Borehole Status	OPEN
BHT	Bottom Hole Temperature (used in calculations)	21 DEGC
CALSTAT	HRLTB Calibration Status	SHALLOW_DONE
CALTEMP	HRLTB Calibration Temperature	13.133 DEGC
FREQ0	HRLT Frequency Index for Mode 0	32
FREQ1	HRLT Frequency Index for Mode 1	128
FREQ2	HRLT Frequency Index for Mode 2	104
FREQ3	HRLT Frequency Index for Mode 3	86
FREQ4	HRLT Frequency Index for Mode 4	56
FREQ5	HRLT Frequency Index for Mode 5	44
FREQ6	HRLT Frequency Index for Mode 6	116
GCSE	Generalized Caliper Selection	BS
GDEV	Average Angular Deviation of Borehole from Normal	0 DEG
GGRD	Geothermal Gradient	0.018227 DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN_9
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE
ISSBAR	Barite Mud Switch	NOBARITE
KFAC_HRLT	HRLT K Factor Option	SONDE
LOOPCOEF_S	HRLT Loop Coefficient for Shallow Modes	LOW
LOOPMOD0	HRLT Mode 0 Loop Mode	AUTO
LOOPMOD1	HRLT Mode 1 Loop Mode	AUTO
LOOPMOD2	HRLT Mode 2 Loop Mode	AUTO
LOOPMOD3	HRLT Mode 3 Loop Mode	AUTO
LOOPMOD4	HRLT Mode 4 Loop Mode	AUTO
LOOPMOD5	HRLT Mode 5 Loop Mode	AUTO
LOOPMOD6	HRLT Mode 6 Loop Mode	AUTO
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
PROCINV	Inversion Selection	ON
PROCMFL	Inversion Micro-Resistivity Selection	NO_EXTERNAL_RXO
PROCMFO	Mechanical Standoff Fin Size	0 IN
PROCRM	Processing Mud Resistivity Select	HRLT_Compute
PROCSPO	Sonde Position	Centered
SHT	Surface Hole Temperature	9 DEGC
<b>HLDS: Hostile Litho-Density Sonde</b>		
CLCL	HLDS LS Control Loop Controller Mode	AUTO_DEFAULT

CLCE	HLDS LS Control Loop Controller Mode	AUTO_DEFAULT	
CLCS	HLDS SS Control Loop Controller Mode	AUTO	
CLLS	HLDS Mode Loop Long Spacing	AUTO	
CLSS	HLDS Mode Loop Short Spacing	AUTO	
DHC	Density Hole Correction	BS	
DPPM	Density Porosity Processing Mode	HIRS	
FD	Fluid Density	1	G/C3
LATC	HLDS Activation Correction	ON	
LLDL	HLDS LS Low Level Discriminator DAC	14000	
LLDS	HLDS SS Low Level Discriminator DAC	14000	
LLML	HLDS LS Low Level Discriminator Mode	AUTO	
LLMS	HLDS SS Low Level Discriminator Mode	AUTO	
MDEN	Matrix Density	2.71	G/C3
PHVL	HLDS Long Spacing High Voltage Setting	1000	V
PHVS	HLDS Short Spacing High Voltage Setting	1000	V
PSDL	HLDS LS Pulse Shape Compensation DAC	30000	
PSDS	HLDS SS Pulse Shape Compensation DAC	30000	
PSML	HLDS LS Pulse Shape Compensation Mode	AUTO	
PSMS	HLDS SS Pulse Shape Compensation Mode	AUTO	
APS-C: Accelerator-Porosity Tool			
	APS Software Version	5	
AASD	APS Thermal and Array Detectors High Voltage Setting	1964.91	V
ADSO	APS Array Detectors Data Source Switch	Both	
AFSD	APS Far Detector High Voltage Setting	2085.02	V
AHCS	APS Holesize Correction Source	GCSE	
AHSS	APS Holesize Correction Switch	ON	
AMTY	APS Environmental Corrections Mud Type	WaterBaseBarite	
ANSD	APS Near Detector High Voltage Setting	1731.78	V
ASOS	APS Standoff Correction Switch	ON	
ATSS	APS Temperature-Pressure-Salinity Correction Switch	OFF	
BHFL_APS	APS TNPH Borehole Fluid Type	WATER	
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	21	DEGC
BSCO_APS	APS TNPH Borehole Salinity Correction Option	NO	
DPPM	Density Porosity Processing Mode	HIRS	
DSCO_APS	APS TNPH Density Source Correction Option	MEASURED	
FSAL	Formation Salinity	-50000	PPM
FSCO_APS	APS TNPH Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN_9	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HSCO_APS	APS TNPH Hole Size Correction Option	YES	
ISSBAR	Barite Mud Switch	NOBARITE	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
MCCO_APS	APS TNPH Mud Cake Correction Option	NO	
MCO_APS	APS TNPH Mud Correction	NATU	
MWCO_APS	APS TNPH Mud Weight Correction Option	YES	
NARC	APS Near/Array Calibration Ratio	1.06345	
NFRC	APS Near/Far Calibration Ratio	0.889129	
PTCO_APS	APS TNPH Pressure/Temperature Correction Option	NO	
SHT	Surface Hole Temperature	9	DEGC
TNCO_APS	APS TNPH Computation Option	YES	
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	
BHT	Bottom Hole Temperature (used in calculations)	21	DEGC
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	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN_9	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
H1P	HNGS Detector 1 Allow/Disallow In Processing	ALLOW	
H2P	HNGS Detector 2 Allow/Disallow In Processing	ALLOW	
HABK	HNGS Borehole Potassium Running Average	-0.00219827	
HALF	HNGS Alpha Filter Length	60	IN
HCRB	HNGS Apply Borehole Potassium Correction	NONE	
HMWM	Mud Weighting Material	NATU	
HNPE	HNGS Processing Enable	YES	
ISSBAR	Barite Mud Switch	NOBARITE	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
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	
SHT	Surface Hole Temperature	9	DEGC
TPOS	Tool Position	ECCE	
VBA1	HNGS Detector 1 Variable Barite Factor Running Average	1.00701	

Parameter	Description	Value	Unit
VBA2	HNGS Detector 2 Variable Barite Factor Running Average	0.994333	
EDTC-B	Enhanced DTS Cartridge		
BHFL	Borehole Fluid Type	WATER	
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	21	DEGC
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
DPPM	Density Porosity Processing Mode	HIRS	
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN_9	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HSCO	Hole Size Correction Option	YES	
ISSBAR	Barite Mud Switch	NOBARITE	
ISSBAR_EDTC	Nuclear Mud Type	NOBARITE	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MWCO	Mud Weight Correction Option	YES	
PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	9	DEGC
SOCN	Standoff Distance	0	IN
SOCO	Standoff Correction Option	NO	
TPOS_EDTC	EDTC Tool Centered/Eccentered	Eccentered	
U-ETELM_EDTS	Telemetry Mode for eWAFE	Standard_EDTS	
U-TELM_EDTS	Telemetry Mode for WAFE	Standard_EDTS	
System and Miscellaneous			
ALTDPCCHAN	Name of alternate depth channel	SpeedCorrectedDepth	
BS	Bit Size	9.875	IN
BSAL	Borehole Salinity	-50000.00	PPM
CSIZ	Current Casing Size	13.375	IN
CWEI	Casing Weight	168.00	LB/F
DFD	Drilling Fluid Density	1.03	G/C3
DO	Depth Offset for Playback	-4200.0	M
FLEV	Fluid Level	-50000.00	M
MST	Mud Sample Temperature	-50000.00	DEGC
PBVSADP	Use alternate depth channel for playback	NO	
PP	Playback Processing	OFF	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
TD	Total Depth	4910	M
TDD	Total Depth - Driller	4910.00	M
TDL	Total Depth - Logger	4910.00	M
TWS	Temperature of Connate Water Sample	37.78	DEGC

Format: HRLT\_LQC Vertical Scale: 1:200 Graphics File Created: 23-Jun-2013 14:30

### OP System Version: 19C0-187

MSS_LDEO-A	19C0-187	HRLT-B	19C0-187
HLDS	19C0-187	LDSC-B	19C0-187
APS-C	19C0-187	HNGC-B	19C0-187
HNGS-BA	19C0-187	EDTC-B	SKK-5169-EDTCB

### Speed Corrected Depth Log

#### Input DLIS Files

MSS\_LDEO\_HRLA\_LDL\_076PUP FN:100 23-Jun-2013 13:21 4423.4 M 4265.1 M

#### Output DLIS Files

DEFAULT MSS\_LDEO\_HRLA\_LDL\_078PUP FN:102 PRODUCER 23-Jun-2013 14:30

#### Input DLIS Files

23-Jun-2013 13:19

#### Output DLIS Files

DEFAULT MSS\_LDEO\_HRLA\_LDL\_077PUP FN:101 PRODUCER 23-Jun-2013 14:28 628.6 M -11.6 M

# OP System Version: 19C0-187

MSS\_LDEO-A 19C0-187  
 HLDS 19C0-187  
 APS-C 19C0-187  
 HNGS-BA 19C0-187

HRLT-B 19C0-187  
 LDSC-B 19C0-187  
 HNGC-B 19C0-187  
 EDTC-B SKK-5169-EDTCB

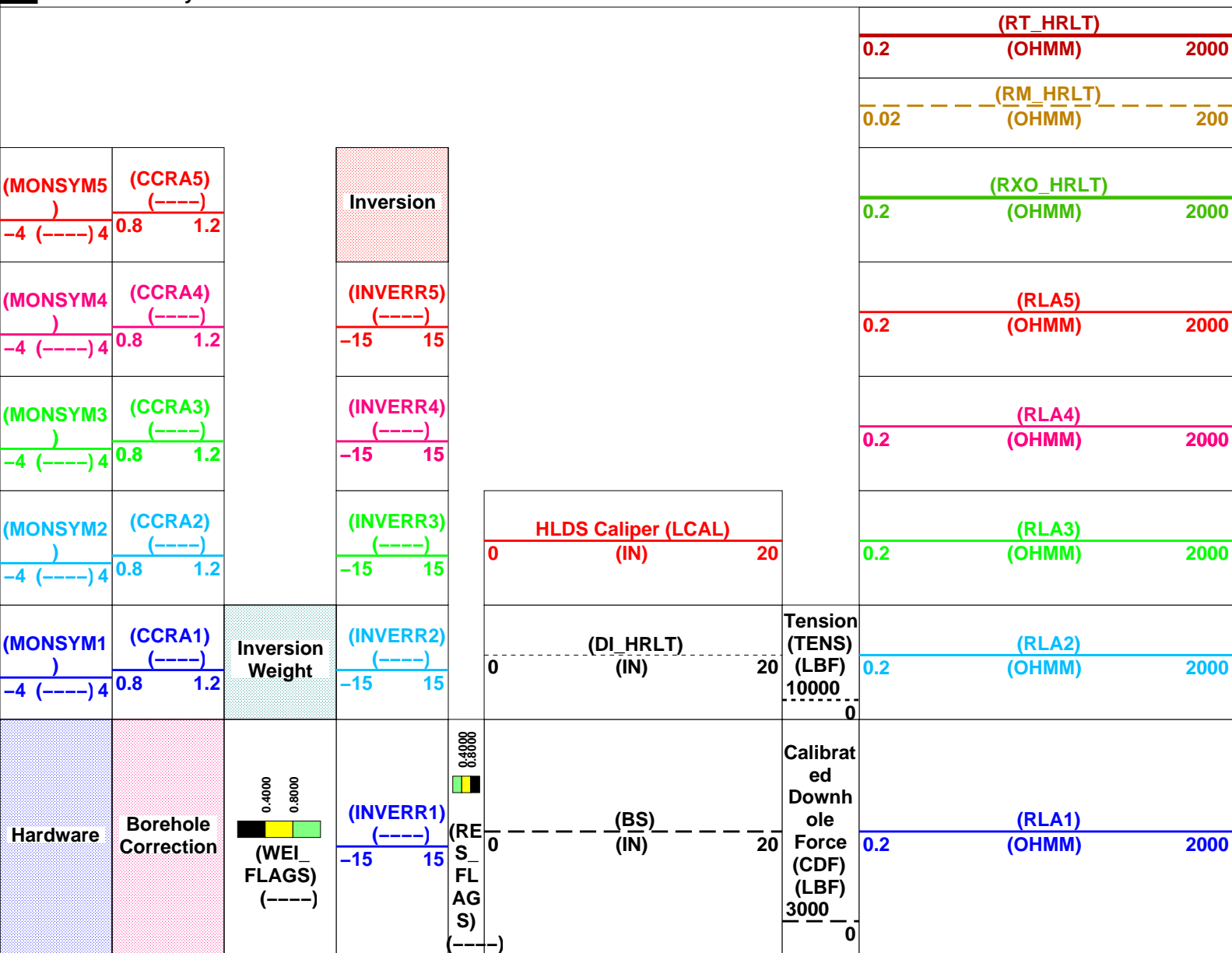
## Changed Parameter Summary

**DLIS Name**                      **New Value**                      **Previous Value**    **Depth & Time**

GCSE                                      BS                                      BS                                      628.6 14:28:29

### PIP SUMMARY

Time Mark Every 60 S



### \*\*\* HRLT FLAG TRACKS \*\*\*

BLACK areas show that the corresponding error flag is set.

TRACK R3\_LQC

INVERSION WEIGHT

Contribution from each hrlt channel in Inversion algorithm, and from left to right :

| Wei1 | Wei2 | Wei3 | Wei4 | Wei5 |

GREEN = OK

YELLOW = Contribution QUESTIONABLE

BLACK = Contribution UNRELIABLE

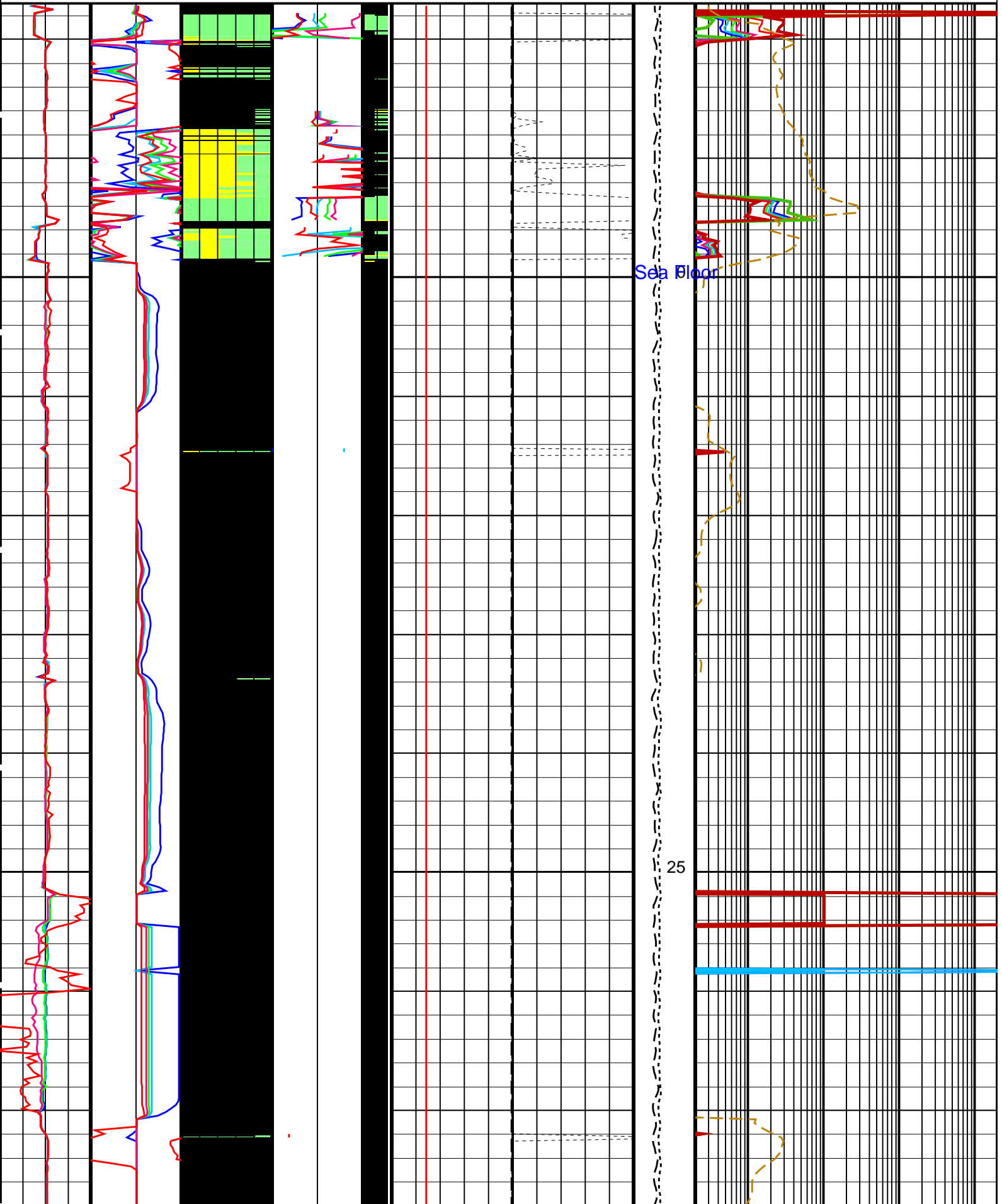
TRACK R5\_LQC

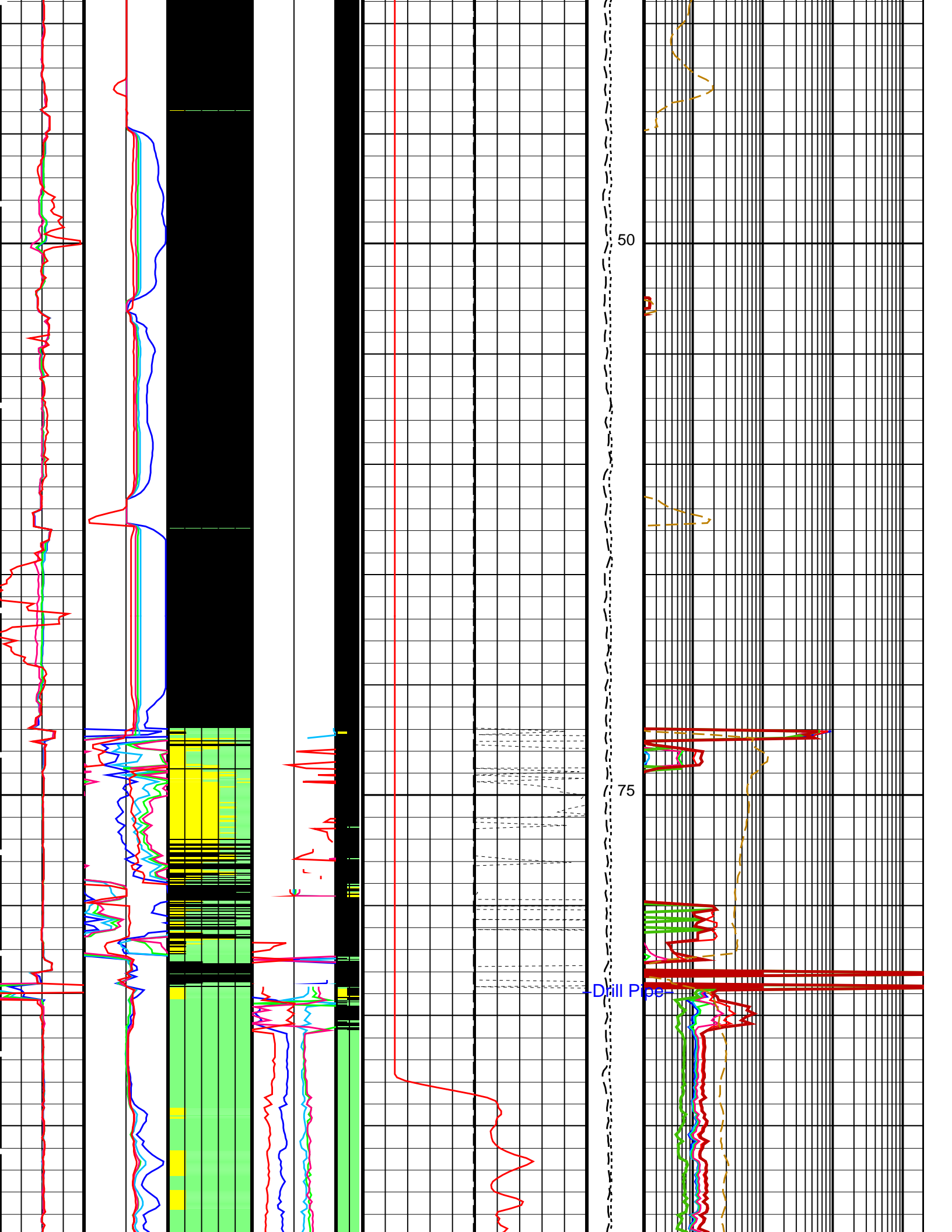
RESISTIVITY QUALITY INDICATOR

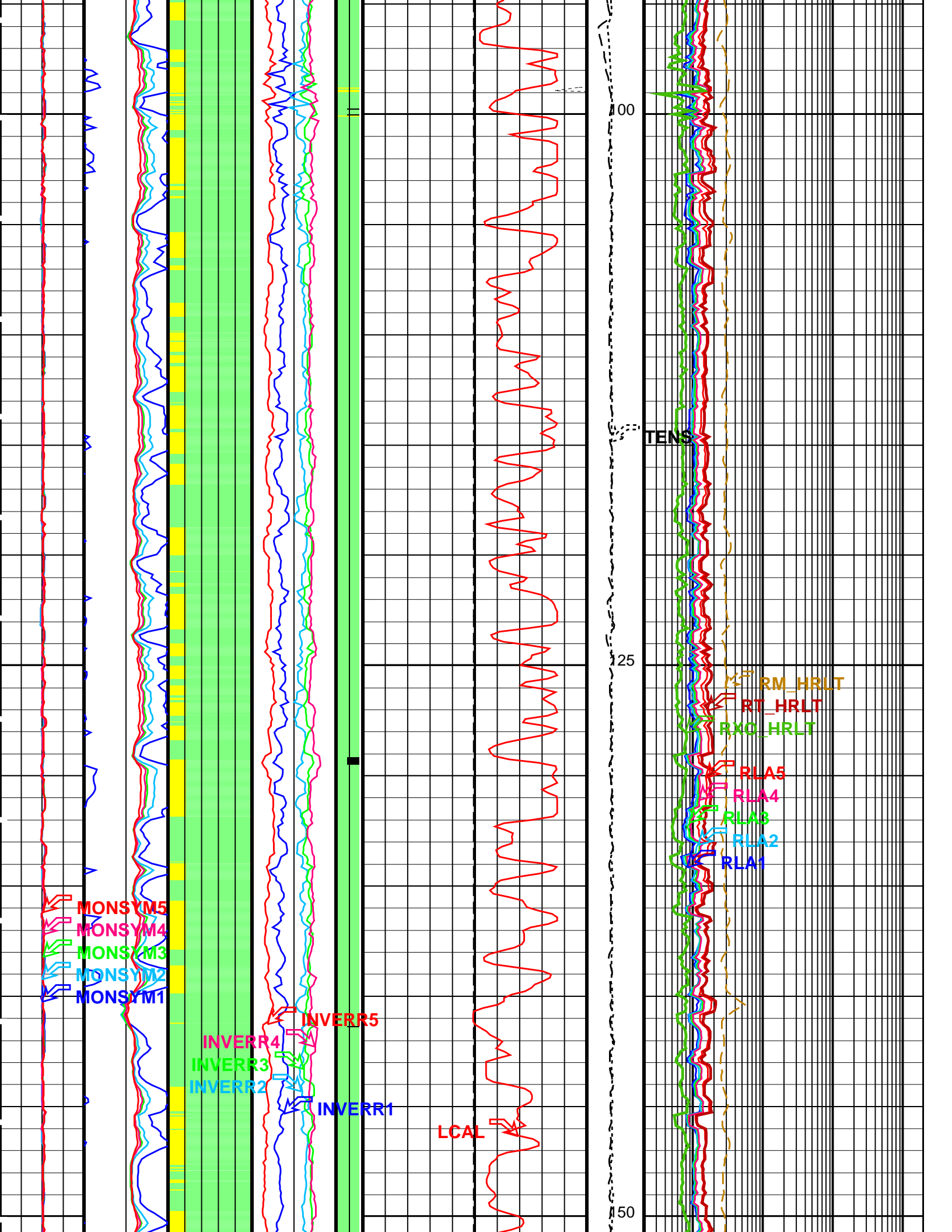
GREEN = OK

YELLOW = SHOULDER BED EFFECT

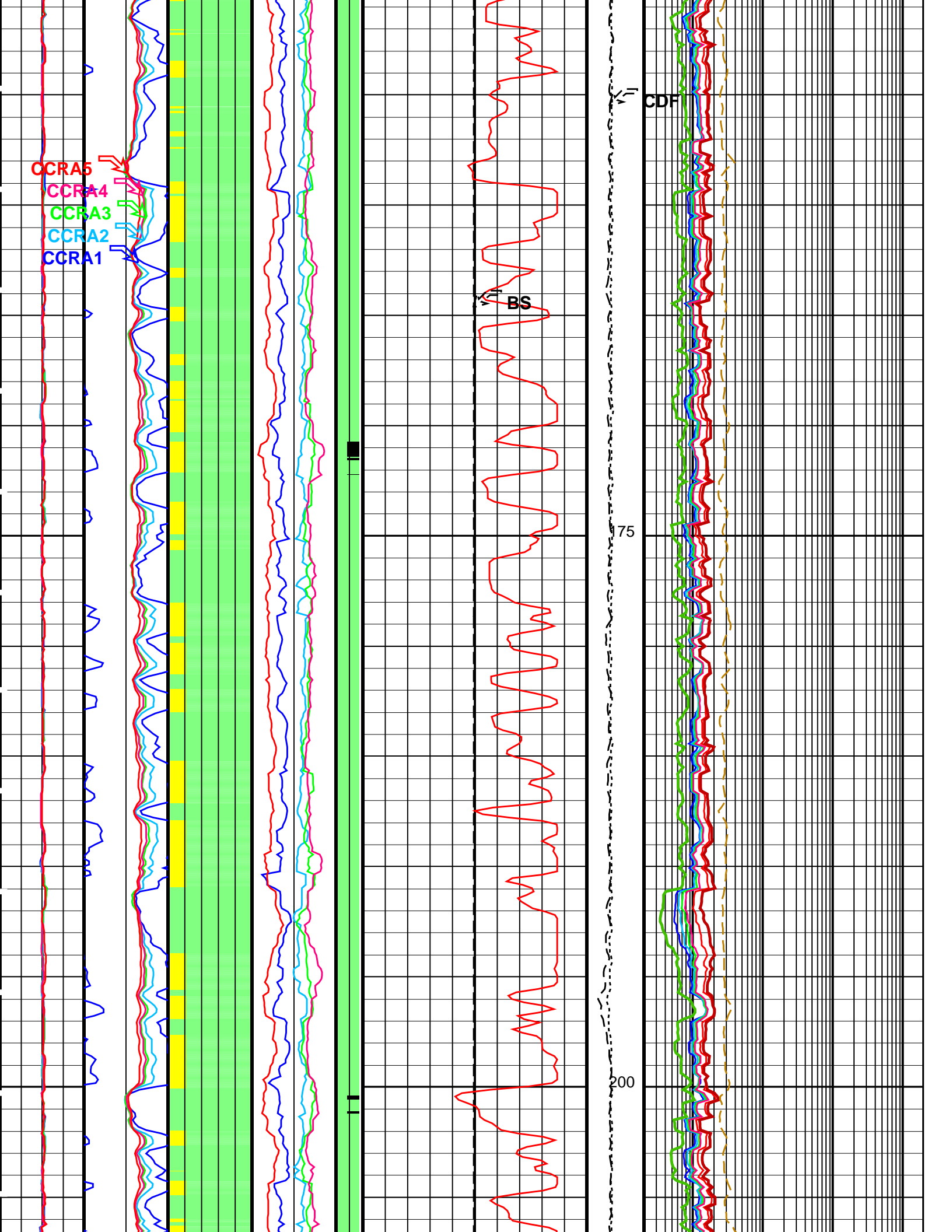
BLACK = NOK

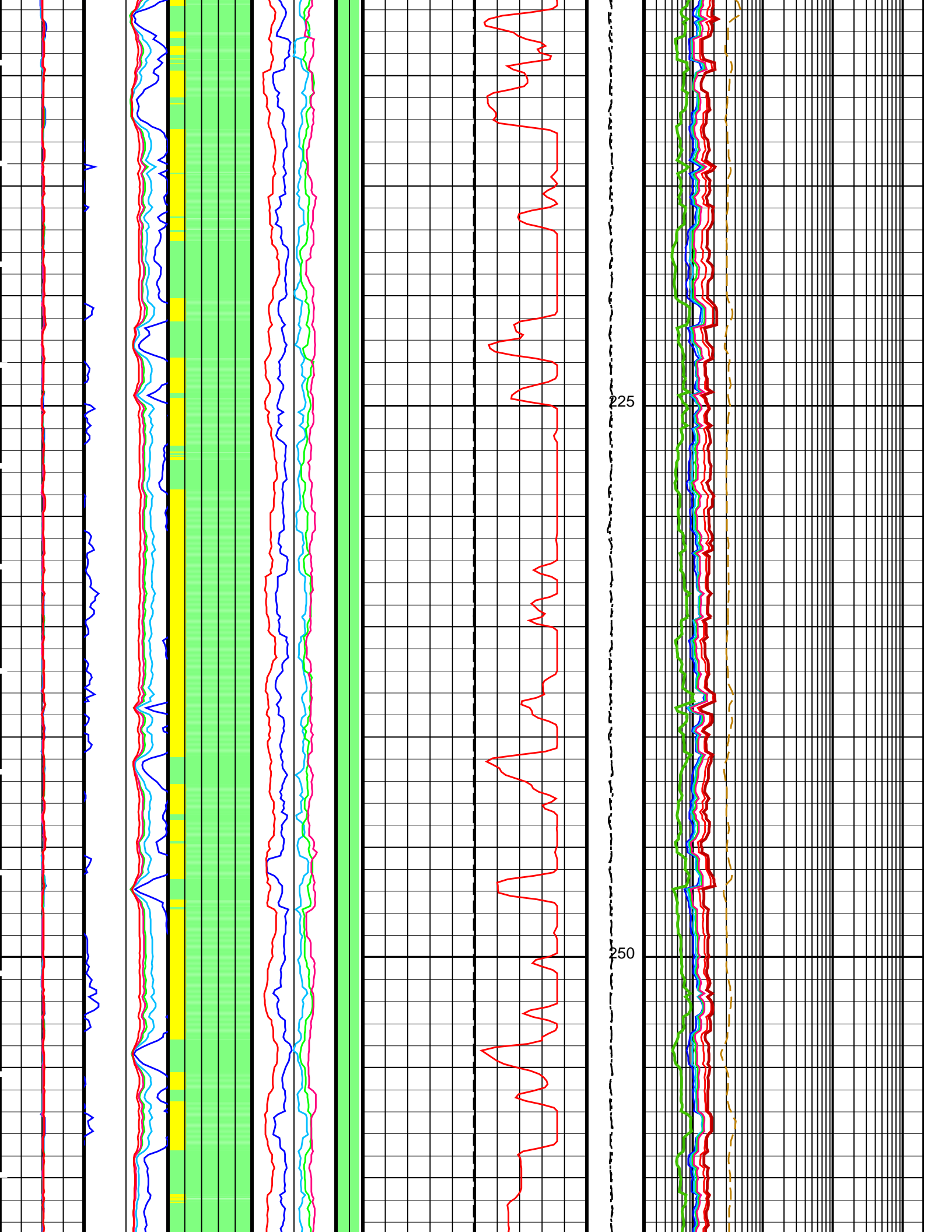


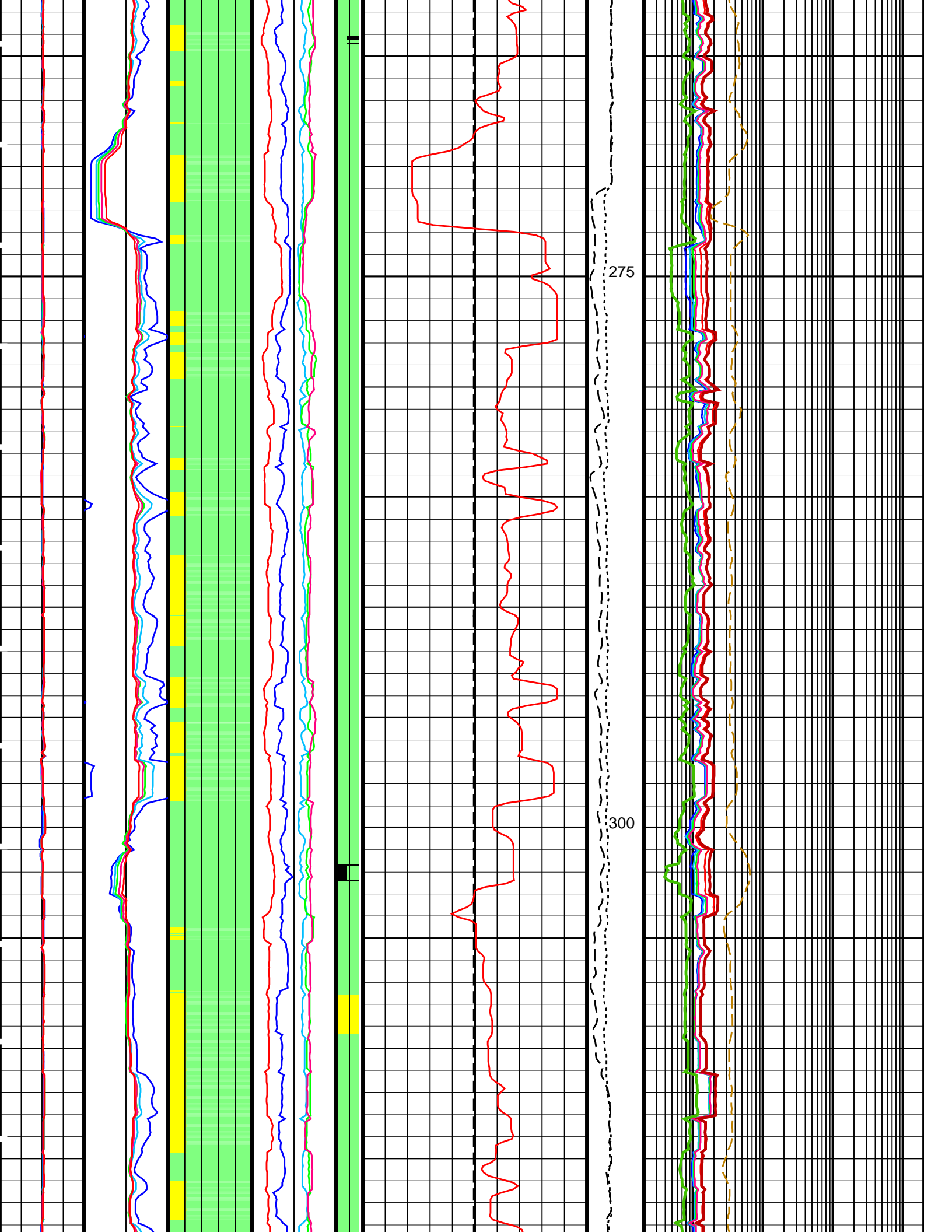


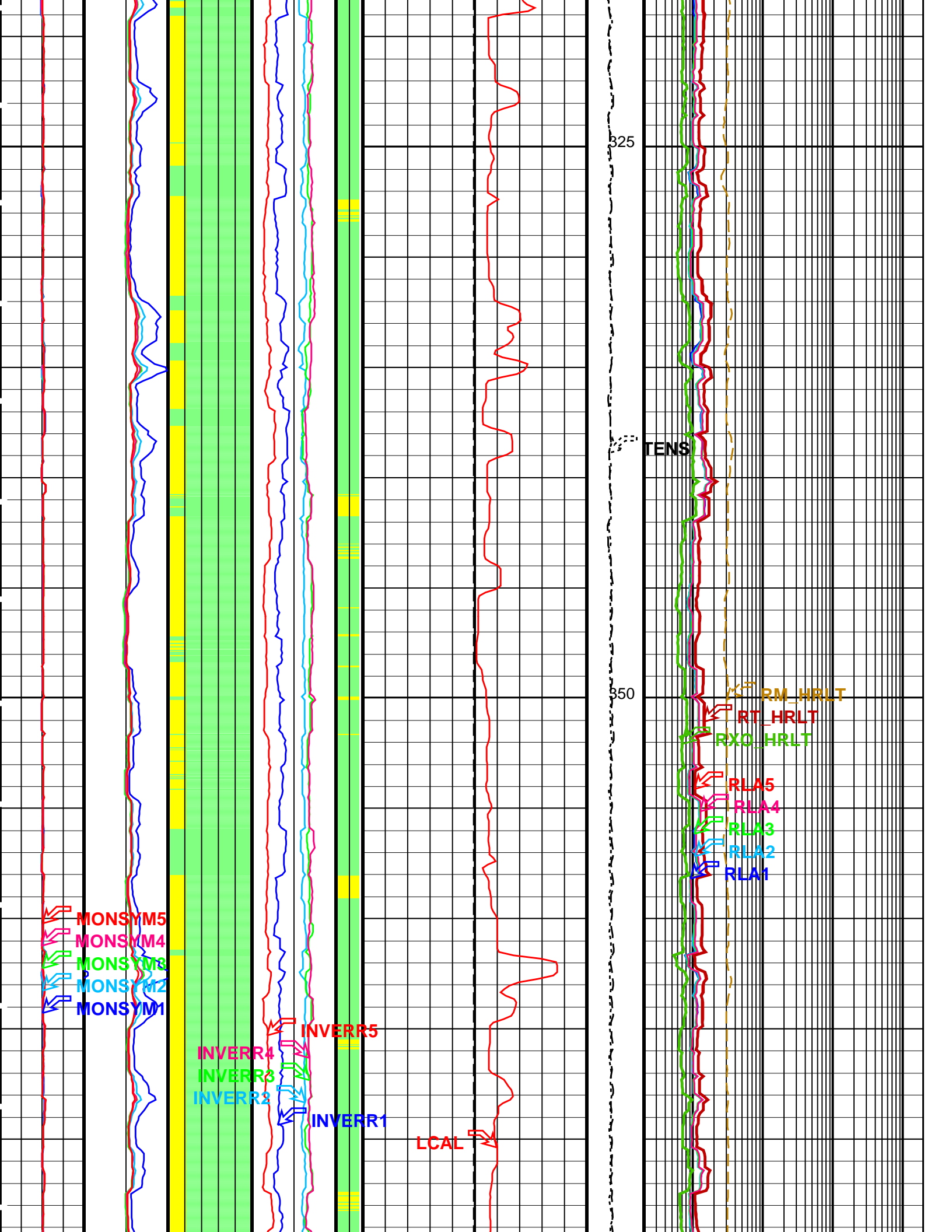


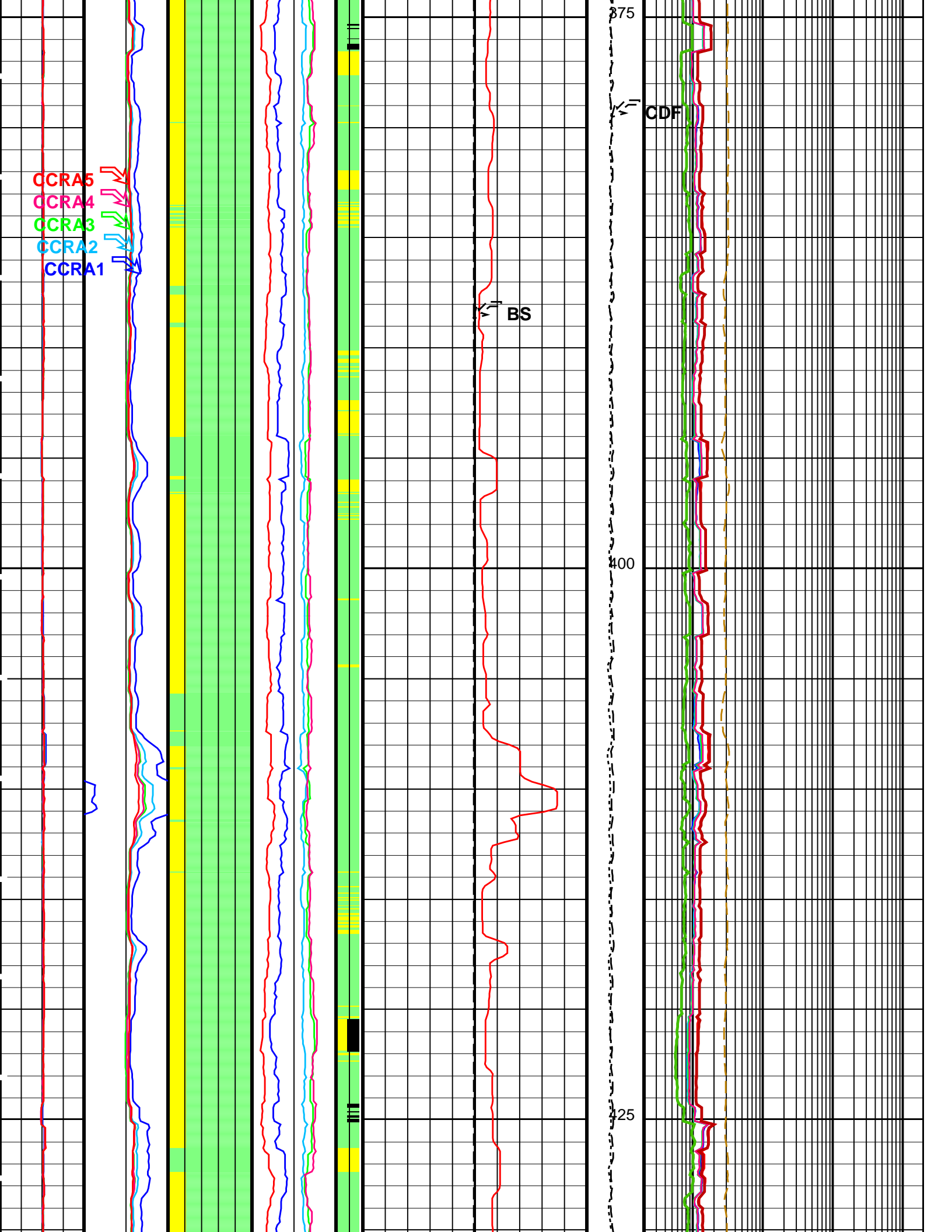


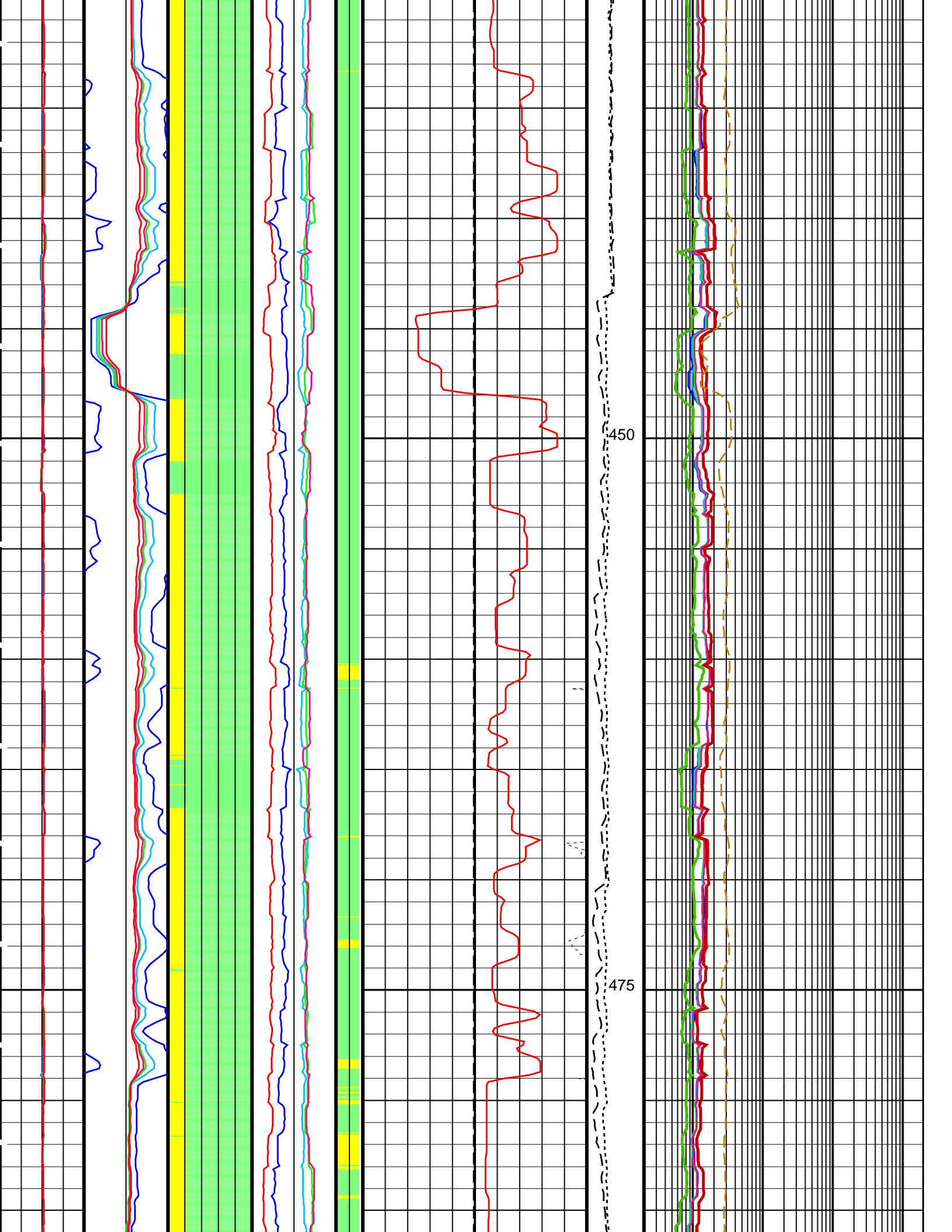


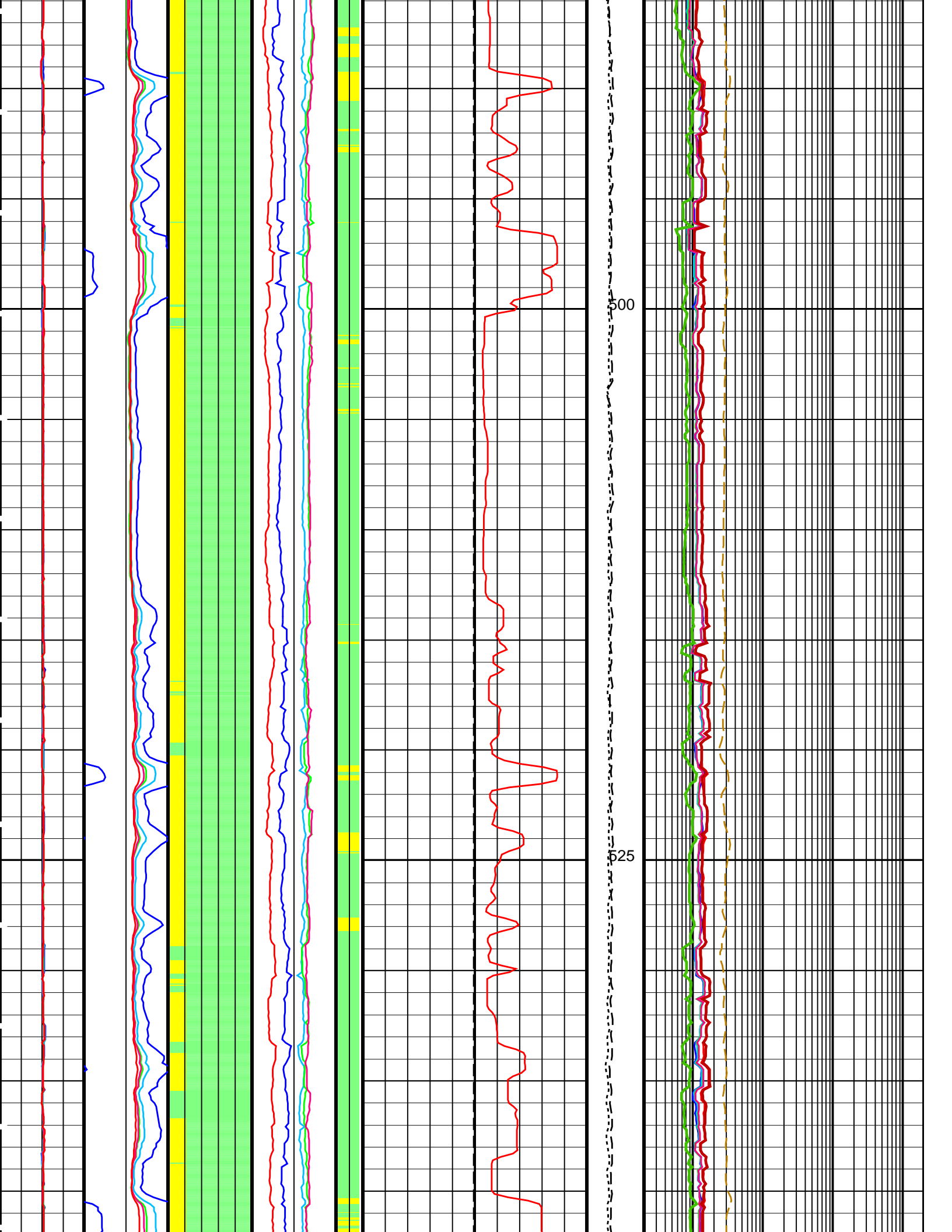


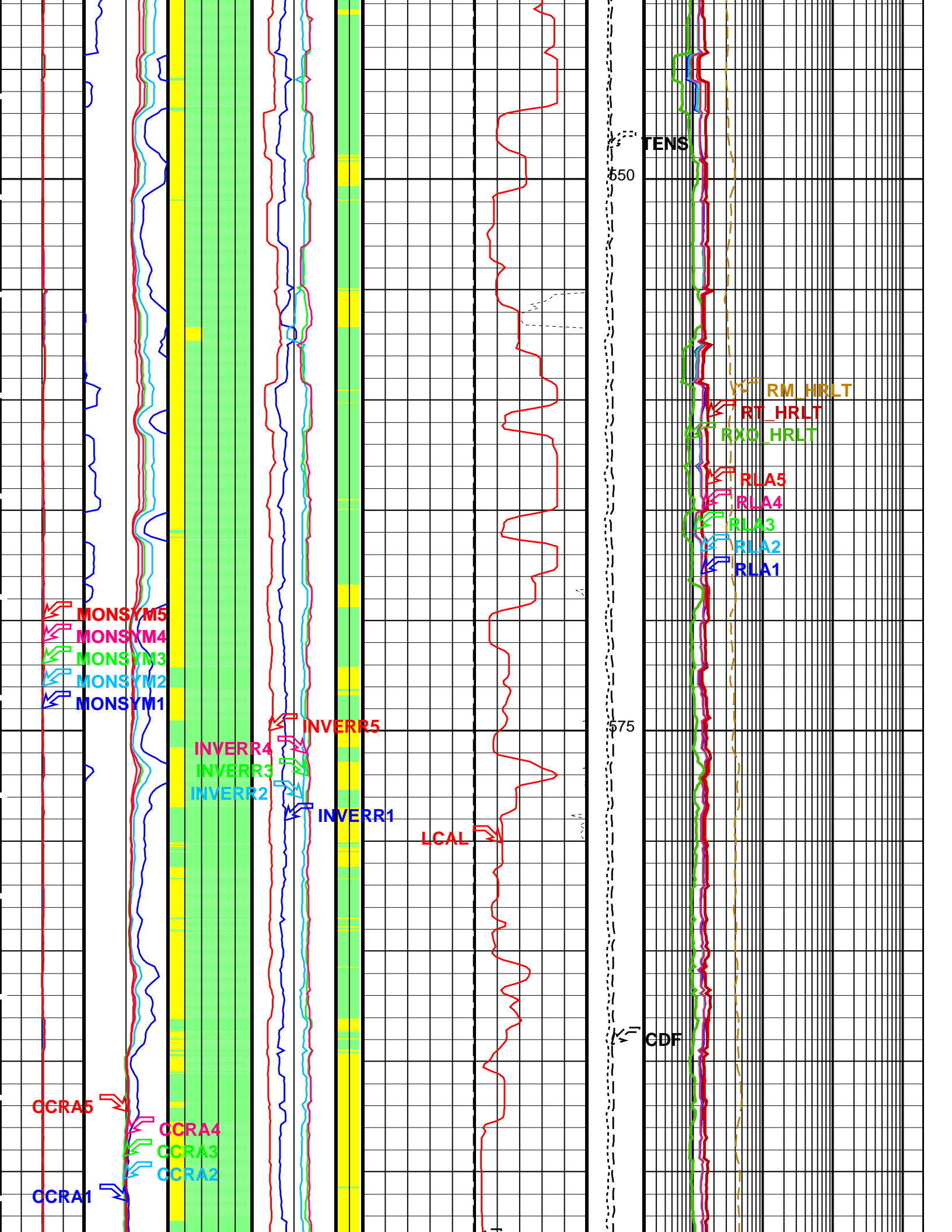




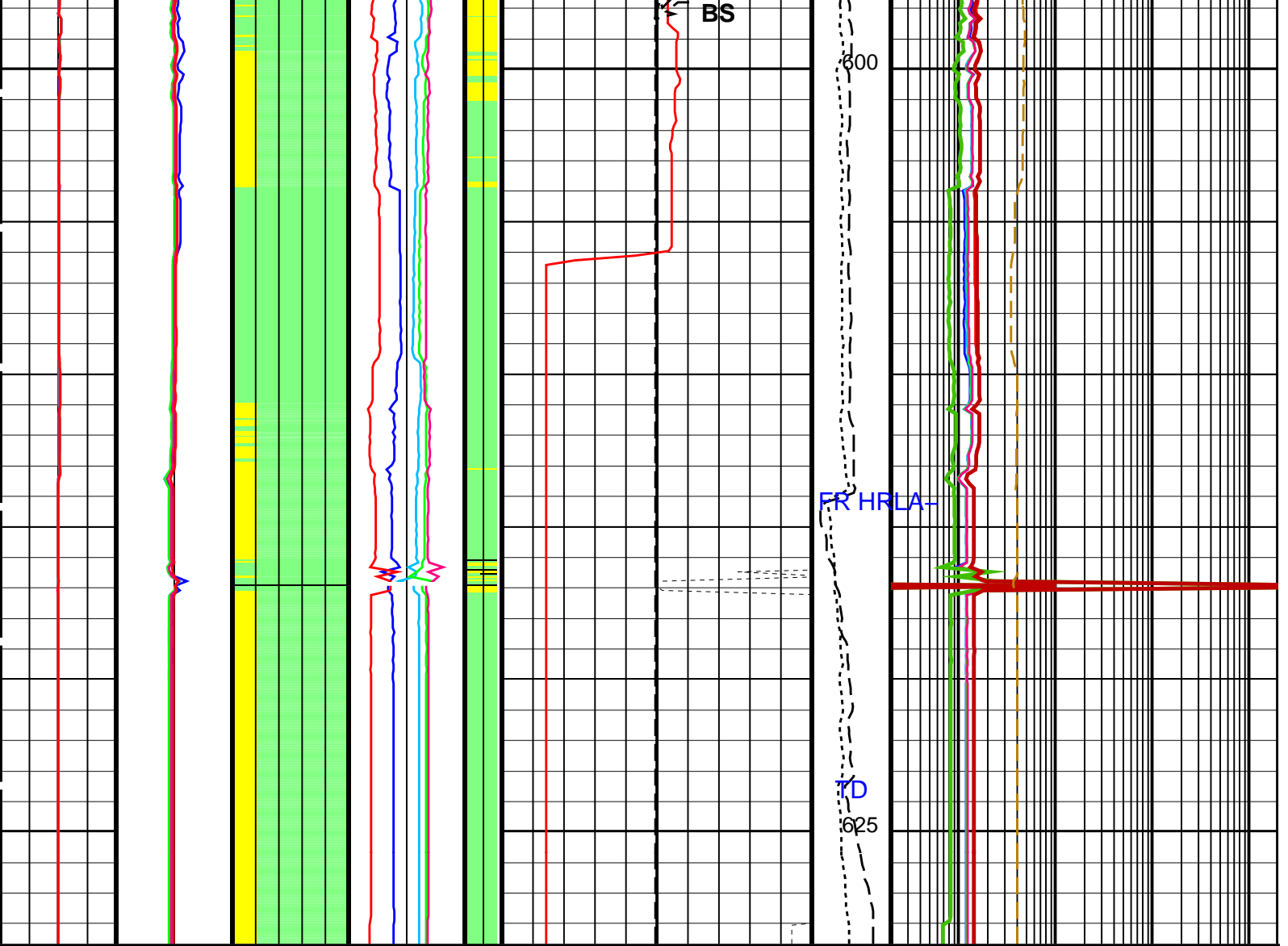












\*\*\* HRLT FLAG TRACKS \*\*\*

BLACK areas show that the corresponding error flag is set.

1st Pass, Sea Floor Depth Reference

TRACK R3\_LQC

INVERSION WEIGHT

Contribution from each hrlt channel in Inversion algorithm, and from left to right :

| Wei1 | Wei2 | Wei3 | Wei4 | Wei5 |

GREEN = OK

YELLOW = Contribution QUESTIONABLE

BLACK = Contribution UNRELIABLE

TRACK R5\_LQC

RESISTIVITY QUALITY INDICATOR

LQC flags on RXO\_HRLT & RT\_HRLT, and from left to right :

| RxoFlag | RTFlag |

GREEN = OK

YELLOW = SHOULDER BED EFFECT

BLACK = NOK

Hardware	Borehole Correction	<p>(WEI_FLAGS) (----)</p>	<p>(INVERR1) (----)</p> <p>-15 15</p>	<p>(RE S FL AG S) (----)</p> <p>0 (BS) (IN) 20</p>	<p>Calibrated Downhole Force (CDF) (LBF)</p> <p>3000 0</p>	<p>(RLA1) (OHMM)</p> <p>0.2 2000</p>
(MONV1)	(CCRA1)		(INVERR2)	(RE S FL AG S) (----)	Tension (TENS)	(FLAG)

(MONSYM1)	(CCRA1)	Inversion Weight	(INVERR2)	(DI_HRLT)	(TENS)	(RLA2)
-4 (-----) 4	0.8 1.2		-15 15	0 (IN) 20	10000	0.2 (OHMM) 2000
(MONSYM2)	(CCRA2)		(INVERR3)	HLDS Caliper (LCAL)		(RLA3)
-4 (-----) 4	0.8 1.2		-15 15	0 (IN) 20		0.2 (OHMM) 2000
(MONSYM3)	(CCRA3)		(INVERR4)			(RLA4)
-4 (-----) 4	0.8 1.2		-15 15			0.2 (OHMM) 2000
(MONSYM4)	(CCRA4)		(INVERR5)			(RLA5)
-4 (-----) 4	0.8 1.2		-15 15			0.2 (OHMM) 2000
(MONSYM5)	(CCRA5)	Inversion				(RXO_HRLT)
-4 (-----) 4	0.8 1.2					0.2 (OHMM) 2000
						(RM_HRLT)
						0.02 (OHMM) 200
						(RT_HRLT)
						0.2 (OHMM) 2000

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
HRLT-B: High Resolution Laterolog Array - B		
BHS	Borehole Status	OPEN
BHT	Bottom Hole Temperature (used in calculations)	SHALLOW_DONE DEGC
CALSTAT	HRLTB Calibration Status	SHALLOW_DONE
CALTEMP	HRLTB Calibration Temperature	13.133 DEGC
FREQ0	HRLT Frequency Index for Mode 0	32
FREQ1	HRLT Frequency Index for Mode 1	128
FREQ2	HRLT Frequency Index for Mode 2	104
FREQ3	HRLT Frequency Index for Mode 3	86
FREQ4	HRLT Frequency Index for Mode 4	56
FREQ5	HRLT Frequency Index for Mode 5	44
FREQ6	HRLT Frequency Index for Mode 6	116
GCSE	Generalized Caliper Selection	BS
GDEV	Average Angular Deviation of Borehole from Normal	0 DEG
GGRD	Geothermal Gradient	0.018227 DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN 9
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE
ISSBAR	Barite Mud Switch	NOBARITE
KFAC_HRLT	HRLT K Factor Option	SONDE
LOOPCOEF_S	HRLT Loop Coefficient for Shallow Modes	LOW
LOOPMOD0	HRLT Mode 0 Loop Mode	AUTO
LOOPMOD1	HRLT Mode 1 Loop Mode	AUTO
LOOPMOD2	HRLT Mode 2 Loop Mode	AUTO
LOOPMOD3	HRLT Mode 3 Loop Mode	AUTO
LOOPMOD4	HRLT Mode 4 Loop Mode	AUTO
LOOPMOD5	HRLT Mode 5 Loop Mode	AUTO
LOOPMOD6	HRLT Mode 6 Loop Mode	AUTO
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
PROCINV	Inversion Selection	ON
PROCMFL	Inversion Micro-Resistivity Selection	NO_EXTERNAL_RXO
PROCMFS	Mechanical Stand-off Fin Size	0 IN
PROCRM	Processing Mud Resistivity Select	HRLT_Compute
PROCSPO	Sonde Position	Centered
SHT	Surface Hole Temperature	9 DEGC
HLDS: Hostile Litho-Density Sonde		
CLCL	HLDS LS Control Loop Controller Mode	AUTO_DEFAULT
CLCS	HLDS SS Control Loop Controller Mode	AUTO_DEFAULT
CLLS	HLDS Mode Loop Long Spacing	AUTO
CLSS	HLDS Mode Loop Short Spacing	AUTO
DHC	Density Hole Correction	BS
DPPM	Density Porosity Processing Mode	HIRS

FD	Fluid Density	1	G/C3
LATC	HLDS Activation Correction	ON	
LLDL	HLDS LS Low Level Discriminator DAC	14000	
LLDS	HLDS SS Low Level Discriminator DAC	14000	
LLML	HLDS LS Low Level Discriminator Mode	AUTO	
LLMS	HLDS SS Low Level Discriminator Mode	AUTO	
MDEN	Matrix Density	2.71	G/C3
PHVL	HLDS Long Spacing High Voltage Setting	1000	V
PHVS	HLDS Short Spacing High Voltage Setting	1000	V
PSDL	HLDS LS Pulse Shape Compensation DAC	30000	
PSDS	HLDS SS Pulse Shape Compensation DAC	30000	
PSML	HLDS LS Pulse Shape Compensation Mode	AUTO	
PSMS	HLDS SS Pulse Shape Compensation Mode	AUTO	

APS-C: Accelerator-Porosity Tool

	APS Software Version	5	
AASD	APS Thermal and Array Detectors High Voltage Setting	1964.91	V
ADSO	APS Array Detectors Data Source Switch	Both	
AFSD	APS Far Detector High Voltage Setting	2085.02	V
AHCS	APS Holesize Correction Source	GCSE	
AHSS	APS Holesize Correction Switch	ON	
AMTY	APS Environmental Corrections Mud Type	WaterBaseBarite	
ANSD	APS Near Detector High Voltage Setting	1731.78	V
ASOS	APS Standoff Correction Switch	ON	
ATSS	APS Temperature-Pressure-Salinity Correction Switch	OFF	
BHFL_APS	APS TNPH Borehole Fluid Type	WATER	
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	21	DEGC
BSCO_APS	APS TNPH Borehole Salinity Correction Option	NO	
DPPM	Density Porosity Processing Mode	HIRS	
DSCO_APS	APS TNPH Density Source Correction Option	MEASURED	
FSAL	Formation Salinity	-50000	PPM
FSCO_APS	APS TNPH Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN 9	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HSCO_APS	APS TNPH Hole Size Correction Option	YES	
ISSBAR	Barite Mud Switch	NOBARITE	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
MCCO_APS	APS TNPH Mud Cake Correction Option	NO	
MCOR_APS	APS TNPH Mud Correction	NATU	
MWCO_APS	APS TNPH Mud Weight Correction Option	YES	
NARC	APS Near/Array Calibration Ratio	1.06345	
NFRC	APS Near/Far Calibration Ratio	0.889129	
PTCO_APS	APS TNPH Pressure/Temperature Correction Option	NO	
SHT	Surface Hole Temperature	9	DEGC
TNCO_APS	APS TNPH Computation Option	YES	

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	
BHT	Bottom Hole Temperature (used in calculations)	21	DEGC
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	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN 9	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
H1P	HNGS Detector 1 Allow/Disallow In Processing	ALLOW	
H2P	HNGS Detector 2 Allow/Disallow In Processing	ALLOW	
HABK	HNGS Borehole Potassium Running Average	-0.00219827	
HALF	HNGS Alpha Filter Length	60	IN
HCRB	HNGS Apply Borehole Potassium Correction	NONE	
HMWM	Mud Weighting Material	NATU	
HNPE	HNGS Processing Enable	YES	
ISSBAR	Barite Mud Switch	NOBARITE	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
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	
SHT	Surface Hole Temperature	9	DEGC
TPOS	Tool Position	ECCE	
VBA1	HNGS Detector 1 Variable Barite Factor Running Average	1.00701	
VBA2	HNGS Detector 2 Variable Barite Factor Running Average	0.994333	

EDTC-B: Enhanced DTS Cartridge

BHFL	Borehole Fluid Type	WATER	
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	21	DEGC
BSCO	Borehole Salinity Correction Option	NO	

BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
DPPM	Density Porosity Processing Mode	HIRS	
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN 9	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HSCO	Hole Size Correction Option	YES	
ISSBAR	Barite Mud Switch	NOBARITE	
ISSBAR_EDTC	Nuclear Mud Type	NOBARITE	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MWCO	Mud Weight Correction Option	YES	
PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	9	DEGC
SOCN	Standoff Distance	0	IN
SOCO	Standoff Correction Option	NO	
TPOS_EDTC	EDTC Tool Centered/Eccentered	Eccentered	
U-ETELM_EDTS	Telemetry Mode for eWAFE	Standard_EDTS	
U-TELM_EDTS	Telemetry Mode for WAFE	Standard_EDTS	
<b>System and Miscellaneous</b>			
ALTDPCHAN	Name of alternate depth channel	SpeedCorrectedDepth	
BS	Bit Size	9.875	IN
BSAL	Borehole Salinity	-50000.00	PPM
CSIZ	Current Casing Size	13.375	IN
CWEI	Casing Weight	168.00	LB/F
DFD	Drilling Fluid Density	1.03	G/C3
DO	Depth Offset for Playback	-4200.0	M
FLEV	Fluid Level	-50000.00	M
MST	Mud Sample Temperature	-50000.00	DEGC
PBVSDAP	Use alternate depth channel for playback	NO	
PP	Playback Processing	OFF	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
TD	Total Depth	4910	M
TDD	Total Depth - Driller	4910.00	M
TDL	Total Depth - Logger	4910.00	M
TWS	Temperature of Connate Water Sample	37.78	DEGC

Format: HRLT\_LQC Vertical Scale: 1:200 Graphics File Created: 23-Jun-2013 14:28

### OP System Version: 19C0-187

MSS_LDEO-A	19C0-187	HRLT-B	19C0-187
HLDS	19C0-187	LDSC-B	19C0-187
APS-C	19C0-187	HNGC-B	19C0-187
HNGS-BA	19C0-187	EDTC-B	SKK-5169-EDTCB

### Input DLIS Files

DEFAULT	MSS_LDEO_HRLA_LDL_075PUP	FN:99	PRODUCER	23-Jun-2013 13:19	4828.0 M	4188.4 M
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### Output DLIS Files

DEFAULT	MSS_LDEO_HRLA_LDL_077PUP	FN:101	PRODUCER	23-Jun-2013 14:28
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### Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
High Resolution Laterolog Array - B Wellsite Calibration - HRLT M01							
Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19							
HRLT M0-M1 Voltage Plus - 0	0	N/A	-319.5	-319.6	-0.06070	9.681	UV
HRLT M0-M1 Voltage Plus - 1	0	N/A	-336.4	-338.8	-2.425	9.681	UV
HRLT M0-M1 Voltage Plus - 2	0	N/A	-336.7	-338.4	-1.714	9.681	UV
HRLT M0-M1 Voltage Plus - 3	0	N/A	-339.9	-341.0	-1.113	9.681	UV
HRLT M0-M1 Voltage Plus - 4	0	N/A	-327.2	-327.7	-0.4758	9.681	UV
HRLT M0-M1 Voltage Plus - 5	0	N/A	-323.2	-323.5	-0.2760	9.681	UV
HRLT M0-M1 Voltage Plus - 6	0	N/A	328.0	329.5	1.473	9.681	UV
HRLT M0-M1 Voltage Plus - 7	0	N/A	-322.7	-322.7	0	9.681	UV

High Resolution Laterolog Array – B Wellsite Calibration – HRLT M12

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT M1-M2 Voltage Plus – 0	0	N/A	1757	1757	-0.3696	53.42	UV
HRLT M1-M2 Voltage Plus – 1	0	N/A	1854	1865	11.04	53.42	UV
HRLT M1-M2 Voltage Plus – 2	0	N/A	1848	1856	7.536	53.42	UV
HRLT M1-M2 Voltage Plus – 3	0	N/A	1864	1868	4.795	53.42	UV
HRLT M1-M2 Voltage Plus – 4	0	N/A	1794	1795	1.535	53.42	UV
HRLT M1-M2 Voltage Plus – 5	0	N/A	1773	1773	0.4408	53.42	UV
HRLT M1-M2 Voltage Plus – 6	0	N/A	-1817	-1823	-6.657	53.42	UV
HRLT M1-M2 Voltage Plus – 7	0	N/A	1781	1781	0	53.42	UV

High Resolution Laterolog Array – B Wellsite Calibration – HRLT M23

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT M2-M3 Voltage Plus – 0	0	N/A	1744	1742	-1.570	53.42	UV
HRLT M2-M3 Voltage Plus – 1	0	N/A	1852	1862	9.860	53.42	UV
HRLT M2-M3 Voltage Plus – 2	0	N/A	1848	1855	6.829	53.42	UV
HRLT M2-M3 Voltage Plus – 3	0	N/A	1867	1871	3.787	53.42	UV
HRLT M2-M3 Voltage Plus – 4	0	N/A	1791	1791	-0.02759	53.42	UV
HRLT M2-M3 Voltage Plus – 5	0	N/A	1770	1770	-0.4113	53.42	UV
HRLT M2-M3 Voltage Plus – 6	0	N/A	-1804	-1809	-4.846	53.42	UV
HRLT M2-M3 Voltage Plus – 7	0	N/A	1781	1781	0	53.42	UV

High Resolution Laterolog Array – B Wellsite Calibration – HRLT V34

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT A3-A4 Voltage Plus – 0	0	N/A	68520	68530	6.273	2100	UV
HRLT A3-A4 Voltage Plus – 1	0	N/A	72600	73030	438.0	2100	UV
HRLT A3-A4 Voltage Plus – 2	0	N/A	72720	73020	299.0	2100	UV
HRLT A3-A4 Voltage Plus – 3	0	N/A	73760	73950	192.8	2100	UV
HRLT A3-A4 Voltage Plus – 4	0	N/A	70690	70750	58.16	2100	UV
HRLT A3-A4 Voltage Plus – 5	0	N/A	69900	69940	39.48	2100	UV
HRLT A3-A4 Voltage Plus – 6	0	N/A	-69680	-69950	-265.2	2100	UV
HRLT A3-A4 Voltage Plus – 7	0	N/A	70000	70000	0	2100	UV

High Resolution Laterolog Array – B Wellsite Calibration – HRLT V45

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT A4-A5 Voltage Plus – 0	0	N/A	68810	68810	7.523	2100	UV
HRLT A4-A5 Voltage Plus – 1	0	N/A	72970	73440	472.7	2100	UV
HRLT A4-A5 Voltage Plus – 2	0	N/A	73090	73390	301.5	2100	UV
HRLT A4-A5 Voltage Plus – 3	0	N/A	74100	74290	194.3	2100	UV
HRLT A4-A5 Voltage Plus – 4	0	N/A	70990	71050	59.49	2100	UV
HRLT A4-A5 Voltage Plus – 5	0	N/A	70190	70210	25.24	2100	UV
HRLT A4-A5 Voltage Plus – 6	0	N/A	-70060	-70330	-273.9	2100	UV
HRLT A4-A5 Voltage Plus – 7	0	N/A	70000	70000	0	2100	UV

High Resolution Laterolog Array – B Wellsite Calibration – HRLT V56

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT A5-A6 Voltage Plus – 0	0	N/A	68710	68710	5.008	2100	UV
HRLT A5-A6 Voltage Plus – 1	0	N/A	72700	73170	472.7	2100	UV
HRLT A5-A6 Voltage Plus – 2	0	N/A	72850	73150	304.0	2100	UV
HRLT A5-A6 Voltage Plus – 3	0	N/A	73900	74090	192.0	2100	UV
HRLT A5-A6 Voltage Plus – 4	0	N/A	70840	70910	68.19	2100	UV
HRLT A5-A6 Voltage Plus – 5	0	N/A	70060	70090	34.30	2100	UV
HRLT A5-A6 Voltage Plus – 6	0	N/A	-69770	-70030	-267.8	2100	UV
HRLT A5-A6 Voltage Plus – 7	0	N/A	70000	70000	0	2100	UV

High Resolution Laterolog Array – B Wellsite Calibration – HRLT VTP

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT Torpedo-M0 Voltage – 0	0	N/A	-68390	-68390	5.992	2100	UV
HRLT Torpedo-M0 Voltage – 1	0	N/A	-73050	-73490	-439.0	2100	UV
HRLT Torpedo-M0 Voltage – 2	0	N/A	-73160	-73470	-310.5	2100	UV
HRLT Torpedo-M0 Voltage – 3	0	N/A	-74210	-74390	-177.9	2100	UV
HRLT Torpedo-M0 Voltage – 4	0	N/A	-71060	-71110	-51.70	2100	UV
HRLT Torpedo-M0 Voltage – 5	0	N/A	-70230	-70250	-22.26	2100	UV
HRLT Torpedo-M0 Voltage – 6	0	N/A	70070	70320	250.7	2100	UV
HRLT Torpedo-M0 Voltage – 7	0	N/A	-70000	-70000	0	2100	UV

High Resolution Laterolog Array – B Wellsite Calibration – HRLT VBD

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT Bridle#9-M0 Voltage – 0	0	N/A	-68370	-68380	-8.383	2100	UV
HRLT Bridle#9-M0 Voltage – 1	0	N/A	-73020	-73480	-457.3	2100	UV
HRLT Bridle#9-M0 Voltage – 2	0	N/A	-73130	-73450	-316.7	2100	UV
HRLT Bridle#9-M0 Voltage – 3	0	N/A	-74170	-74370	-204.0	2100	UV
HRLT Bridle#9-M0 Voltage – 4	0	N/A	-71040	-71110	-63.20	2100	UV
HRLT Bridle#9-M0 Voltage – 5	0	N/A	-70210	-70250	-34.00	2100	UV
HRLT Bridle#9-M0 Voltage – 6	0	N/A	70020	70300	273.8	2100	UV
HRLT Bridle#9-M0 Voltage – 7	0	N/A	-70000	-70000	0	2100	UV

High Resolution Laterolog Array – B Wellsite Calibration – HRLT ISO

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT Source Current Plus – 0	0	N/A	285.1	285.2	0.03937	8.520	UA
HRLT Source Current Plus – 1	0	N/A	281.1	281.1	0	8.520	UA

HRLT Source Current Plus - 1	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus - 2	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus - 3	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus - 4	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus - 5	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus - 6	0	N/A	281.1	281.1	0	8.520	UA
HRLT Source Current Plus - 7	0	N/A	281.1	281.1	0	8.520	UA

High Resolution Laterolog Array - B Wellsite Calibration - HRLT MV

Before: 21-Jun-2013 5:02 After: 21-Jun-2013 14:19

HRLT Vertical Voltage PI - 0	0	N/A	-321.9	-321.9	0.03369	9.681	UV
HRLT Vertical Voltage PI - 1	0	N/A	-331.5	-333.6	-2.111	9.681	UV
HRLT Vertical Voltage PI - 2	0	N/A	-330.4	-332.0	-1.516	9.681	UV
HRLT Vertical Voltage PI - 3	0	N/A	-331.7	-332.6	-0.8864	9.681	UV
HRLT Vertical Voltage PI - 4	0	N/A	-316.3	-316.6	-0.2819	9.681	UV
HRLT Vertical Voltage PI - 5	0	N/A	-327.4	-327.6	-0.1616	9.681	UV
HRLT Vertical Voltage PI - 6	0	N/A	336.5	337.6	1.141	9.681	UV
HRLT Vertical Voltage PI - 7	0	N/A	-322.7	-322.7	0	9.681	UV

Hostile Litho-Density Sonde Wellsite Calibration - Background Measurement

Master: 23-May-2013 18:26 Before: 5-Jun-2013 5:19 After: 21-Jun-2013 15:43

SS Cs Resolution Bkg	9.000	7.935	8.049	7.894	-0.1558	1.800	%
LS Cs Resolution Bkg	9.000	8.162	8.063	8.099	0.03602	1.800	%
LSW1 Background	100.0	71.72	70.78	70.77	-0.009674	0.03000	CPS
LSW2 Background	100.0	65.95	64.89	65.91	1.019	0.03000	CPS
LSW3 Background	200.0	146.1	143.2	142.4	-0.8057	0.03000	CPS
LSW4 Background	250.0	176.3	175.6	173.4	-2.196	0.03000	CPS
LSW5 Background	600.0	404.2	405.6	401.3	-4.256	0.03000	CPS
SSW1 Background	100.0	80.22	79.61	80.05	0.4435	0.03000	CPS
SSW2 Background	200.0	141.1	142.8	140.8	-2.062	0.03000	CPS
SSW3 Background	500.0	380.9	379.7	382.0	2.379	0.03000	CPS
SSW4 Background	270.0	201.0	199.2	199.1	-0.1189	0.03000	CPS
SSW5 Background	200.0	143.8	144.9	143.3	-1.597	0.03000	CPS

Hostile Litho-Density Sonde Wellsite Calibration - Aluminum Measurement

Master: 23-May-2013 19:07

LSW1 Aluminum	600.0	513.7	N/A	N/A	N/A	N/A	CPS
LSW2 Aluminum	900.0	737.9	N/A	N/A	N/A	N/A	CPS
LSW3 Aluminum	1100	887.0	N/A	N/A	N/A	N/A	CPS
LSW4 Aluminum	580.0	448.1	N/A	N/A	N/A	N/A	CPS
LSW5 Aluminum	570.0	411.4	N/A	N/A	N/A	N/A	CPS
SSW1 Aluminum	2800	2391	N/A	N/A	N/A	N/A	CPS
SSW2 Aluminum	8000	6513	N/A	N/A	N/A	N/A	CPS
SSW3 Aluminum	11600	9048	N/A	N/A	N/A	N/A	CPS
SSW4 Aluminum	5000	3653	N/A	N/A	N/A	N/A	CPS
SSW5 Aluminum	660.0	442.2	N/A	N/A	N/A	N/A	CPS

Hostile Litho-Density Sonde Wellsite Calibration - Lithology Measurement

Master: 23-May-2013 18:57

LSW1 Iron	400.0	354.2	N/A	N/A	N/A	N/A	CPS
LSW2 Iron	730.0	602.9	N/A	N/A	N/A	N/A	CPS
LSW3 Iron	1000	794.0	N/A	N/A	N/A	N/A	CPS
LSW4 Iron	520.0	408.1	N/A	N/A	N/A	N/A	CPS
LSW5 Iron	470.0	376.8	N/A	N/A	N/A	N/A	CPS
SSW1 Iron	2100	1748	N/A	N/A	N/A	N/A	CPS
SSW2 Iron	6800	5423	N/A	N/A	N/A	N/A	CPS
SSW3 Iron	10800	8249	N/A	N/A	N/A	N/A	CPS
SSW4 Iron	4600	3342	N/A	N/A	N/A	N/A	CPS
SSW5 Iron	580.0	391.9	N/A	N/A	N/A	N/A	CPS

Hostile Litho-Density Sonde Wellsite Calibration - Caliper Calibration

Before: 5-Jun-2013 5:19

HLDS Caliper Small Ring	12.00	N/A	16.02	N/A	N/A	N/A	IN
HLDS Caliper Large Ring	15.19	N/A	19.90	N/A	N/A	N/A	IN

Accelerator-Porosity Tool Wellsite Calibration - Detector Background

Master: 24-May-2013 10:47 Before: 24-May-2013 10:54 After: 21-Jun-2013 14:24

Near Det Bkg Cntrate	30.00	33.52	32.19	32.47	0.2844	N/A	CPS
Far Det Bkg Cntrate	30.00	33.43	32.67	32.86	0.1863	N/A	CPS
Array-1 Det Bkg Cntrate	30.00	29.51	28.88	30.28	1.405	N/A	CPS
Array-2 Det Bkg Cntrate	30.00	29.86	29.59	29.53	-0.06015	N/A	CPS
Array Therm Det Bkg Cntrate	30.00	31.39	34.16	31.82	-2.336	N/A	CPS

Accelerator-Porosity Tool Wellsite Calibration - Calibration Ratios

Master: 24-May-2013 10:47

Near/Far Calibration Ratio	0.9250	0.8891	N/A	N/A	N/A	N/A	
Near/Array Calibration Ratio	1.030	1.063	N/A	N/A	N/A	N/A	
Near/Array Cal Ratio Up/Down	1.000	1.017	N/A	N/A	N/A	N/A	

Accelerator-Porosity Tool Wellsite Calibration - Tank Check

Master: 24-May-2013 10:47

Array-1 Standoff Porosity	11.75	10.38	N/A	N/A	N/A	N/A	PU
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Array-2 Standoff Porosity	11.75	10.04	N/A	N/A	N/A	N/A	PU
Average Slowing Down Time	6.000	6.114	N/A	N/A	N/A	N/A	US
Array-1 SDT Ratio Up/Down	1.000	0.9764	N/A	N/A	N/A	N/A	
Array-2 SDT Ratio Up/Down	1.000	0.9755	N/A	N/A	N/A	N/A	
Sigma Formation	27.50	34.51	N/A	N/A	N/A	N/A	CU

Accelerator-Porosity Tool Wellsite Calibration – CCR7 signal boxes

Master: 24-May-2013 10:47

Near Detector Plateau Setting	1650	1732	N/A	N/A	N/A	N/A	V
Far Detector Plateau Setting	2000	2085	N/A	N/A	N/A	N/A	V
Array Detector Plateau Setting	2000	1965	N/A	N/A	N/A	N/A	V

Hostile Natural Gamma Ray Sonde Wellsite Calibration – Detector 1 Check

Master: 22-May-2013 20:18 Before: 5-Jun-2013 5:31 After: 21-Jun-2013 15:44

Na 511 Peak Loc	40.00	39.77	39.78	39.85	0.06499	1.000	
Na 511 Peak Res	15.50	15.23	15.40	12.72	-2.674	2.000	%
High Voltage	1150	1161	1143	1151	7.681	N/A	V
Na 1785 Peak Loc	142.6	143.9	143.2	141.3	-1.901	7.000	
Na 1785 Peak Res	8.500	7.558	8.088	7.759	-0.3289	2.000	%
Temperature	15.50	16.49	14.24	16.34	2.107	N/A	DEGC
Na Count Rate	45.00	14.90	15.37	14.04	-1.332	8.000	CPS

Hostile Natural Gamma Ray Sonde Wellsite Calibration – Detector 2 Check

Master: 22-May-2013 20:18 Before: 5-Jun-2013 5:31 After: 21-Jun-2013 15:44

Na 511 Peak Loc	40.00	39.67	39.68	39.51	-0.1639	1.000	
Na 511 Peak Res	15.50	15.00	15.05	15.43	0.3853	2.000	%
High Voltage	1150	1082	1074	1085	11.62	N/A	V
Na 1785 Peak Loc	142.6	141.4	140.3	143.0	2.653	7.000	
Na 1785 Peak Res	8.500	9.134	8.027	9.053	1.026	2.000	%
Temperature	15.50	16.94	14.41	18.12	3.704	N/A	DEGC
Na Count Rate	45.00	14.58	15.20	14.08	-1.128	8.000	CPS

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

Master: 22-May-2013 20:18 Before: 5-Jun-2013 5:31 After: 21-Jun-2013 15:44

Coincidence Count Rate Ratio	1.000	1.024	1.014	0.9996	-0.01401	0.05000	
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Hostile Natural Gamma Ray Sonde Master Calibration – Detector 1 Calibration

Master: 22-May-2013 20:18

Na 511 Peak Set Point	40.00	41.00	--	--	--	--	
Th Peak Loc	209.6	211.4	--	--	--	--	
Th Peak Res	7.000	6.972	--	--	--	--	%
Background Count Rate	142.5	18.97	--	--	--	--	CPS
Gain Ratio	1.000	1.011	--	--	--	--	

Hostile Natural Gamma Ray Sonde Master Calibration – Detector 2 Calibration

Master: 22-May-2013 20:18

Na 511 Peak Set Point	40.00	41.00	--	--	--	--	
Th Peak Loc	209.6	208.8	--	--	--	--	
Th Peak Res	7.000	6.474	--	--	--	--	%
Background Count Rate	142.5	18.20	--	--	--	--	CPS
Gain Ratio	1.000	1.001	--	--	--	--	

Enhanced DTS Cartridge Wellsite Calibration – EDTC Accelerometer Calibration

Before: 21-Jun-2013 5:02

EDTC Z-Axis Acceleration	9.810	N/A	9.801	N/A	N/A	N/A	M/S2
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Enhanced DTS Cartridge Wellsite Calibration – Detector Calibration

Before: 5-Jun-2013 5:18

Gamma Ray (Jig – Bkg)	156.4	N/A	156.4	N/A	N/A	14.22	GAPI
Gamma Ray (Calibrated)	164.0	N/A	164.0	N/A	N/A	15.00	GAPI

Accelerator-Porosity Tool – Detector Plateau Settings :

Near Detector Plateau Setting	1732 V
Far Detector Plateau Setting	2085 V
Array Detector Plateau Setting	1965 V

High Resolution Laterolog Array – B / Equipment Identification

Primary Equipment:		
HRLT Sonde	HRLS – B	768
Auxiliary Equipment:		
HRLT lower Housing	HRLH – B	968
HRLT Lower Cartridge	HRLC – B	974
HRLT upper Housing	HRUH – B	768

High Resolution Laterolog Array - B Wellsite Calibration						
HRLT M01						
Idx	Phase	HRLT M0-M1 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		-319.5	-322.7	-280.7	-379.7
	After		-319.6			
1	Before		-336.4	-322.7	-280.7	-379.7
	After		-338.8			
2	Before		-336.7	-322.7	-280.7	-379.7
	After		-338.4			
3	Before		-339.9	-322.7	-280.7	-379.7
	After		-341.0			
4	Before		-327.2	-322.7	-280.7	-379.7
	After		-327.7			
5	Before		-323.2	-322.7	-280.7	-379.7
	After		-323.5			
6	Before		328.0	322.7	379.7	280.7
	After		329.5			
7	Before		-322.7	-322.7	-280.7	-379.7
	After		-322.7			
		(Minimum) (Nominal) (Maximum)				
Before: 21-Jun-2013 5:02						
After: 21-Jun-2013 14:19						

High Resolution Laterolog Array - B Wellsite Calibration						
HRLT M12						
Idx	Phase	HRLT M1-M2 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		1757	1781	2095	1549
	After		1757			
1	Before		1854	1781	2095	1549
	After		1865			
2	Before		1848	1781	2095	1549
	After		1856			
3	Before		1864	1781	2095	1549
	After		1868			
4	Before		1794	1781	2095	1549
	After		1795			
5	Before		1773	1781	2095	1549
	After		1773			
6	Before		-1817	-1781	-1549	-2095
	After		-1823			
7	Before		1781	1781	2095	1549
	After		1781			
		(Minimum) (Nominal) (Maximum)				
Before: 21-Jun-2013 5:02						
After: 21-Jun-2013 14:19						



High Resolution Laterolog Array – B Wellsite Calibration

HRLT M23

Idx	Phase	HRLT M2–M3 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		1744	1781	2095	1549
	After		1742			
1	Before		1852	1781	2095	1549
	After		1862			
2	Before		1848	1781	2095	1549
	After		1855			
3	Before		1867	1781	2095	1549
	After		1871			
4	Before		1791	1781	2095	1549
	After		1791			
5	Before		1770	1781	2095	1549
	After		1770			
6	Before		-1804	-1781	-1549	-2095
	After		-1809			
7	Before		1781	1781	2095	1549
	After		1781			
		(Minimum) (Nominal) (Maximum)				

Before: 21-Jun-2013 5:02

After: 21-Jun-2013 14:19

High Resolution Laterolog Array – B Wellsite Calibration

HRLT V34

Idx	Phase	HRLT A3–A4 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		68520	70000	82360	60900
	After		68530			
1	Before		72600	70000	82360	60900
	After		73030			
2	Before		72720	70000	82360	60900
	After		73020			
3	Before		73760	70000	82360	60900
	After		73950			
4	Before		70690	70000	82360	60900
	After		70750			
5	Before		69900	70000	82360	60900
	After		69940			
6	Before		-69680	-70000	-60900	-82360
	After		-69950			
7	Before		70000	70000	82360	60900
	After		70000			
		(Minimum) (Nominal) (Maximum)				

Before: 21-Jun-2013 5:02

After: 21-Jun-2013 14:19

High Resolution Laterolog Array – B Wellsite Calibration

HRLT V45

Idx	Phase	HRLT A4–A5 Voltage Plus UV	Value	Nominal	Maximum	Minimum
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0	Before		68810	70000	82360	60900
	After		68810			
1	Before		72970	70000	82360	60900
	After		73440			
2	Before		73090	70000	82360	60900
	After		73390			
3	Before		74100	70000	82360	60900
	After		74290			
4	Before		70990	70000	82360	60900
	After		71050			
5	Before		70190	70000	82360	60900
	After		70210			
6	Before		-70060	-70000	-60900	-82360
	After		-70330			
7	Before		70000	70000	82360	60900
	After		70000			
			(Minimum)	(Nominal)	(Maximum)	

Before: 21-Jun-2013 5:02  
 After: 21-Jun-2013 14:19

High Resolution Laterolog Array – B Wellsite Calibration						
HRLT V56						
Idx	Phase	HRLT A5–A6 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		68710	70000	82360	60900
	After		68710			
1	Before		72700	70000	82360	60900
	After		73170			
2	Before		72850	70000	82360	60900
	After		73150			
3	Before		73900	70000	82360	60900
	After		74090			
4	Before		70840	70000	82360	60900
	After		70910			
5	Before		70060	70000	82360	60900
	After		70090			
6	Before		-69770	-70000	-60900	-82360
	After		-70030			
7	Before		70000	70000	82360	60900
	After		70000			
			(Minimum)	(Nominal)	(Maximum)	

Before: 21-Jun-2013 5:02  
 After: 21-Jun-2013 14:19

High Resolution Laterolog Array – B Wellsite Calibration						
HRLT VTP						
Idx	Phase	HRLT Torpedo–M0 Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		-68390	-70000	-60900	-82360
	After		-68390			

1	Before		-73050	-70000	-60900	-82360
	After		-73490			
2	Before		-73160	-70000	-60900	-82360
	After		-73470			
3	Before		-74210	-70000	-60900	-82360
	After		-74390			
4	Before		-71060	-70000	-60900	-82360
	After		-71110			
5	Before		-70230	-70000	-60900	-82360
	After		-70250			
6	Before		70070	70000	82360	60900
	After		70320			
7	Before		-70000	-70000	-60900	-82360
	After		-70000			
			(Minimum)	(Nominal)	(Maximum)	

Before: 21-Jun-2013 5:02

After: 21-Jun-2013 14:19

High Resolution Laterolog Array – B Wellsite Calibration							
HRLT VBD							
Idx	Phase	HRLT Bridle#9-M0 Voltage Plus UV	Value	Nominal	Maximum	Minimum	
0	Before		-68370	-70000	-60900	-82360	
	After		-68380				
1	Before		-73020	-70000	-60900	-82360	
	After		-73480				
2	Before		-73130	-70000	-60900	-82360	
	After		-73450				
3	Before		-74170	-70000	-60900	-82360	
	After		-74370				
4	Before		-71040	-70000	-60900	-82360	
	After		-71110				
5	Before		-70210	-70000	-60900	-82360	
	After		-70250				
6	Before		70020	70000	82360	60900	
	After		70300				
7	Before		-70000	-70000	-60900	-82360	
	After		-70000				
			(Minimum)	(Nominal)	(Maximum)		

Before: 21-Jun-2013 5:02

After: 21-Jun-2013 14:19

High Resolution Laterolog Array – B Wellsite Calibration							
HRLT ISO							
Idx	Phase	HRLT Source Current Plus UA	Value	Nominal	Maximum	Minimum	
0	Before		285.1	284.0	334.1	247.0	
	After		285.2				
1	Before		281.1	281.1	330.7	244.4	
	After		281.1				

2	Before		281.1	281.1	330.7	244.4
	After		281.1			
3	Before		281.1	281.1	330.7	244.4
	After		281.1			
4	Before		281.1	281.1	330.7	244.4
	After		281.1			
5	Before		281.1	281.1	330.7	244.4
	After		281.1			
6	Before		281.1	281.1	330.7	244.4
	After		281.1			
7	Before		281.1	281.1	330.7	244.4
	After		281.1			
			(Minimum)	(Nominal)	(Maximum)	

Before: 21-Jun-2013 5:02  
 After: 21-Jun-2013 14:19

High Resolution Laterolog Array – B Wellsite Calibration						
HRLT MV						
Idx	Phase	HRLT Vertical Voltage Plus UV	Value	Nominal	Maximum	Minimum
0	Before		-321.9	-322.7	-280.7	-379.7
	After		-321.9			
1	Before		-331.5	-322.7	-280.7	-379.7
	After		-333.6			
2	Before		-330.4	-322.7	-280.7	-379.7
	After		-332.0			
3	Before		-331.7	-322.7	-280.7	-379.7
	After		-332.6			
4	Before		-316.3	-322.7	-280.7	-379.7
	After		-316.6			
5	Before		-327.4	-322.7	-280.7	-379.7
	After		-327.6			
6	Before		336.5	322.7	379.7	280.7
	After		337.6			
7	Before		-322.7	-322.7	-280.7	-379.7
	After		-322.7			
			(Minimum)	(Nominal)	(Maximum)	

Before: 21-Jun-2013 5:02  
 After: 21-Jun-2013 14:19

### Hostile Litho-Density Sonde / Equipment Identification

**Primary Equipment:**

Hostile Litho Density Sonde	HLDS – D	45
Hostile Litho Density High Voltage	HLDV – D	45
Gamma Source Radioactive	GSR – Z	8113

**Auxiliary Equipment:**

Hostile Litho Density Pad	HLDP – C	45
Hostile Litho Density High Voltage Housi	HEH – H	47

Litho-Density Spectroscopy Cartridge - B / Equipment Identification

Primary Equipment:		
LDSC Cartridge	LDSC - B	521
Auxiliary Equipment:		
LDSC Housing	LDSH - A	319

Accelerator-Porosity Tool / Equipment Identification

Primary Equipment:		
Accelerator-Porosity Sonde	APS - C	22
APS Minitron	MNTR - F	7341
Auxiliary Equipment:		
Accelerator-Porosity Housing	APH - AC	22
APS Calibration Water Tank	SFT - 178	1
APS Aluminum Calibrator Sleeve	SFT - 281	1

Hostile Natural Gamma Ray Cartridge - B / Equipment Identification

Primary Equipment:		
HNGC Cartridge	HNGC - B	300
Auxiliary Equipment:		
HNGC Housing	HNGH - A	115

Hostile Natural Gamma Ray Sonde / Equipment Identification

Primary Equipment:		
HNGS Sonde	HNGS - BA	194
Auxiliary Equipment:		
HNGS Sonde Housing	HNSH - BA	205
Gamma Source Radioactive	GSR - U	616008

Hostile Natural Gamma Ray Sonde Wellsite Calibration

Detector 1 Check

Phase	Na 511 Peak Loc	Value	Phase	Na 511 Peak Res %	Value	Phase	High Voltage V	Value
Master		39.77	Master		15.23	Master		1161
Before		39.78	Before		15.40	Before		1143
After		39.85	After		12.72	After		1151
	37.50 (Minimum) 40.00 (Nominal) 43.50 (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		143.9	Master		7.558	Master		16.49
Before		143.2	Before		8.088	Before		14.24
After		141.3	After		7.759	After		16.34
	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		14.90						
Before		15.37						
After		14.04						
	10.00 (Minimum) 45.00 (Nominal) 100.0 (Maximum)							
Master: 22-May-2013 20:18			Before: 5-Jun-2013 5:31			After: 21-Jun-2013 15:44		

Hostile Natural Gamma Ray Sonde Wellsite Calibration

Detector 2 Check

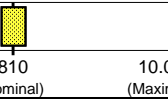
Phase	Na 511 Peak Loc	Value	Phase	Na 511 Peak Res %	Value	Phase	High Voltage V	Value	
Master		39.67	Master		15.00	Master		1082	
Before		39.68	Before		15.05	Before		1074	
After		39.51	After		15.43	After		1085	
	37.50 (Minimum)	40.00 (Nominal)	43.50 (Maximum)	12.00 (Minimum)	15.50 (Nominal)	19.00 (Maximum)	900.0 (Minimum)	1150 (Nominal)	1600 (Maximum)
Phase	Na 1785 Peak Loc	Value	Phase	Na 1785 Peak Res %	Value	Phase	Temperature DEGC	Value	
Master		141.4	Master		9.134	Master		16.94	
Before		140.3	Before		8.027	Before		14.41	
After		143.0	After		9.053	After		18.12	
	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		14.58							
Before		15.20							
After		14.08							
	10.00 (Minimum)	45.00 (Nominal)	100.0 (Maximum)						
Master: 22-May-2013 20:18			Before: 5-Jun-2013 5:31			After: 21-Jun-2013 15:44			

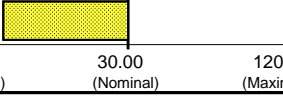
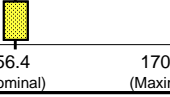
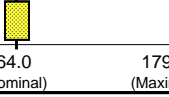
Hostile Natural Gamma Ray Sonde Wellsite Calibration			
Ratio Of Detector 1 To Detector 2			
Phase	Coincidence Count Rate Ratio	Value	
Master		1.024	
Before		1.014	
After		0.9996	
	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)
Master: 22-May-2013 20:18			
Before: 5-Jun-2013 5:31			
After: 21-Jun-2013 15:44			

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		211.4	Master		6.972	
	38.00 (Minimum)	40.00 (Nominal)	43.00 (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		18.97	Master		1.011				
	10.00 (Minimum)	142.5 (Nominal)	265.0 (Maximum)	0.9400 (Minimum)	1.000 (Nominal)	1.060 (Maximum)			
Master: 22-May-2013 20:18									

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		6.474	
	38.00 (Minimum)	40.00 (Nominal)	43.00 (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		18.20	Master		1.001				
	10.00 (Minimum)	142.5 (Nominal)	265.0 (Maximum)	0.9400 (Minimum)	1.000 (Nominal)	1.060 (Maximum)			
Master: 22-May-2013 20:18									

Enhanced DTS Cartridge / Equipment Identification		
Primary Equipment:		
EDTC Gamma Ray Detector	EDTG - A/B	8305
Enhanced DTS Cartridge	EDTC - B	8317

Enhanced DTS Cartridge Wellsite Calibration		
EDTC Accelerometer Calibration		
Phase	EDTC Z-Axis Acceleration M/S2	Value
Before		9.801
	9.610 (Minimum)	9.810 (Nominal)
		10.01 (Maximum)
Before: 21-Jun-2013 5:02		

Enhanced DTS Cartridge Wellsite Calibration										
Detector Calibration										
Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value		
Before		6.203	Before		156.4	Before		164.0		
	0 (Minimum)			142.2 (Minimum)			149.0 (Minimum)			
Before: 5-Jun-2013 5:18										

Company: **Lamont Doherty Earth Observatory**



Well: **Expedition 341, Site U1417E**

Field: **Southern Alaska Margin Tectonics**

Rig: **JOIDES Resolution**

Ocean: **Pacific**

High Resolution Laterolog Array (HRLA)  
Log Quality Control