Schlumberger

Company: **Esso Australia Pty Ltd.**

Well: **A−24**

Field: **Halibut**

Rig: **Crane** Country: **Australia**

RST−C Sigma Survey

Rig: Crane
Field: Halibut
Location: Gippsland
Well: A−24
Company: Esso Australia Pty Ltd.

LOCATION

Gippsland Basin
Bass Strait

Elev.: K.B. 29.45 m
G.L. −73 m
D.F. 29.45 m

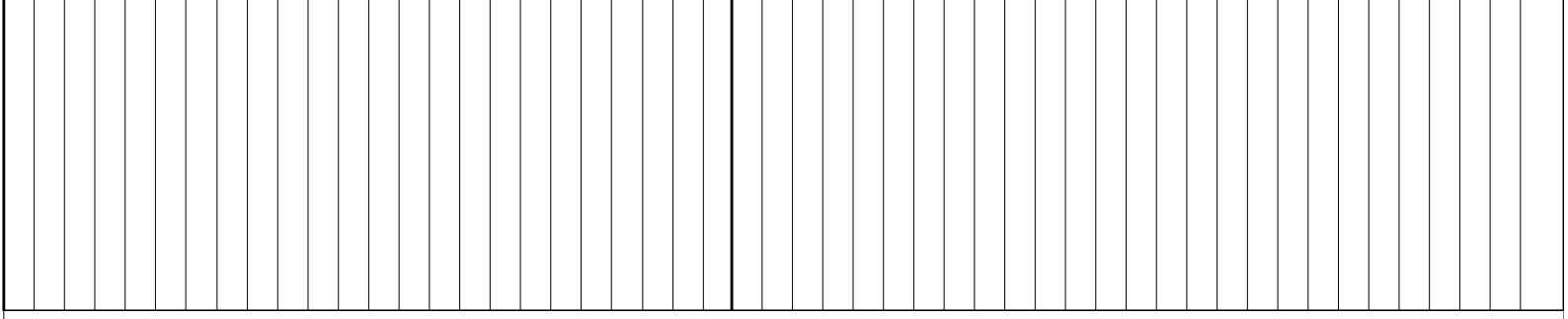
Permanent Datum: M.S.L — Elev.: 0 m
Log Measured From: K.B — 29.5 m above Perm. Datum
Drilling Measured From: K.B

State:	Max. Well Deviation	Longitude	Latitude
Victoria	40 deg	148*19' 07.62"E	38* 24' 20.36"S

Logging Date		21−Jan−2008		
Run Number		1		
Depth Driller		2984.5 m		
Schlumberger Depth		2915 m		
Bottom Log Interval		2915 m		
Top Log Interval		2745 m		
Casing Fluid Type		Production Fluids		
Salinity				
Density				
Fluid Level		752 m		
BIT/CASING/TUBING STRING				
Bit Size		8.500 in		
From		641 m		
To		2991 m		
Casing/Tubing Size		7.000 in		
Weight		26 lbm/ft		
Grade		L−80		
From		11.29 m		
To		2971.41 m		
Maximum Recorded Temperatures		227 degF		
Logger On Bottom	Time	21−Jan−2008	12:05	
Unit Number	Location	889	Prod 4 / AUSL	
Recorded By		S Gilbert, R Sani		
Witnessed By		G Rimmer		

		Run 1
PVT DATA	Oil Density	
	Water Salinity	
	Gas Gravity	
	Bo	
	Bw	
	1/Bg	
	Bubble Point Pressure	
	Bubble Point Temperature	
	Solution GOR	
	Maximum Deviation	40 deg
	CEMENTING DATA	
	Primary/Squeeze	Primary
	Casing String No	
	Lead Cement Type	
	Volume	
	Density	
	Water Loss	
	Additives	
	Tail Cement Type	
	Volume	
	Density	
	Water Loss	
	Additives	
	Expected Cement Top	

Logging Date		
Run Number		
Depth Driller		
Schlumberger Depth		
Bottom Log Interval		
Top Log Interval		
Casing Fluid Type		
Salinity		
Density		
Fluid Level		
BIT/CASING/TUBING STRING		
Bit Size		
From		
To		
Casing/Tubing Size		
Weight		
Grade		
From		
To		
Maximum Recorded Temperatures		
Logger On Bottom	Time	
Unit Number	Location	
Recorded By		
Witnessed By		



DEPTH SUMMARY LISTING

Date Created: 15−JAN−2008 13:25:00

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW−EB	Type:	PSDS/OSDS	Type:	2−32ZT
Serial Number:	6373	Serial Number:	325357	Serial Number:	24425
Calibration Date:	04−Jan−2007	Calibration Date:	15−Jan−2008	Length:	5299.86 M
Calibrator Serial Number:	9	Calibrator Serial Number:	1174		
Calibration Cable Type:	2−32ZT	Calibration Gain:	0.91	Conveyance Method:	Wireline
Wheel Correction 1:	−2	Calibration Offset:	220.00	Rig Type:	Rigless
Wheel Correction 2:	−4				

Depth Control Parameters

Log Sequence:	Subsequent Trip To the Well
Reference Log Name:	ExxonMobil Petrophysical Analysis

Depth Control Remarks

1. IDW used as primary depth control.
2. Z−chart used as back up.

OTHER SERVICES1
OS1: None
OS2:
OS3:
OS4:
OS5:

REMARKS: RUN NUMBER 1

Log correlated to Solar Composite log supplied with logging program.

Objectives: Conduct an RST−C Sigma mode log making one shut−in pass and one flowing pass at 900ft/hr.

Static Log interval:HUD to 2745m MDKB . Flowing Log interval: HUD to 2795m MDKB.

Maximum well deviation = 40 deg at 890m MDKB.

RST−C Sigma Survey with the well shut−in at 900ft/hr.

SBHT = 226.6 degF

SBHP = 3223.9 psia

RST−C Sigma survey with the well flowing at 900 ft/hr.
FBHT = 226.8 degF
FBHP = 3054.1 psia

Schlumberger Crew: Z Casey, J Light, P Lawrence

RUN 1

SERVICE ORDER #:	AUSL08589244
PROGRAM VERSION:	15C0−309
FLUID LEVEL:	752 m

LOGGED INTERVAL	START	STOP

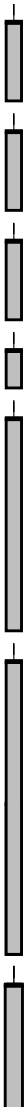
EQUIPMENT DESCRIPTION

RUN 1

SURFACE EQUIPMENT

WITM−A
PSC_16MHZ

DOWNHOLE EQUIPMENT



AH−SWBS 785 — 13.75
AH−SWBS 785

AH−SWBS 786 — 13.07
AH−SWBS 786

AH−SWBS 787 — 12.38
AH−SWBS 787

AH−SWHS−A 759 — 11.70
AH−SWHS−A 759

EQF−43 — 11.37
EQF−43

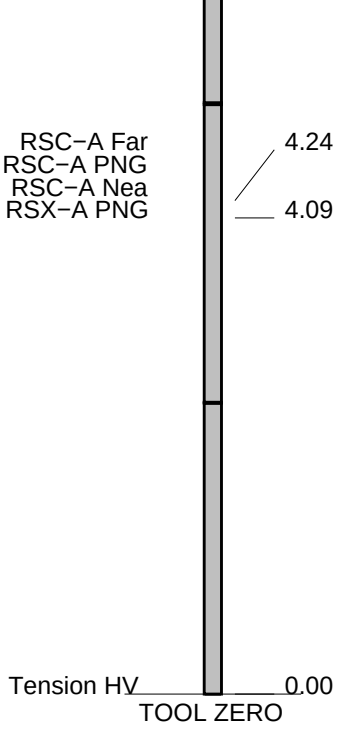
Detail MT — 9.54
TelStatus
CTEM

PSPT−B — 9.54
PSC−A
PSPT−B 827
PSTC 806
PBMS−B 827
CQG_F_Mano 827
RTD_Thermometer 827
GR 35143
CCL
PBMS 827

GR — 8.41
Well_Temp — 7.48
CQG Manom — 7.37
CCL — 7.25
PBMS PSTC — 7.02

RST−C — 7.02
RSCH−A 98
RSC−CA 116
RSS−A 93
RSXH−A 179

RSX−CA 101

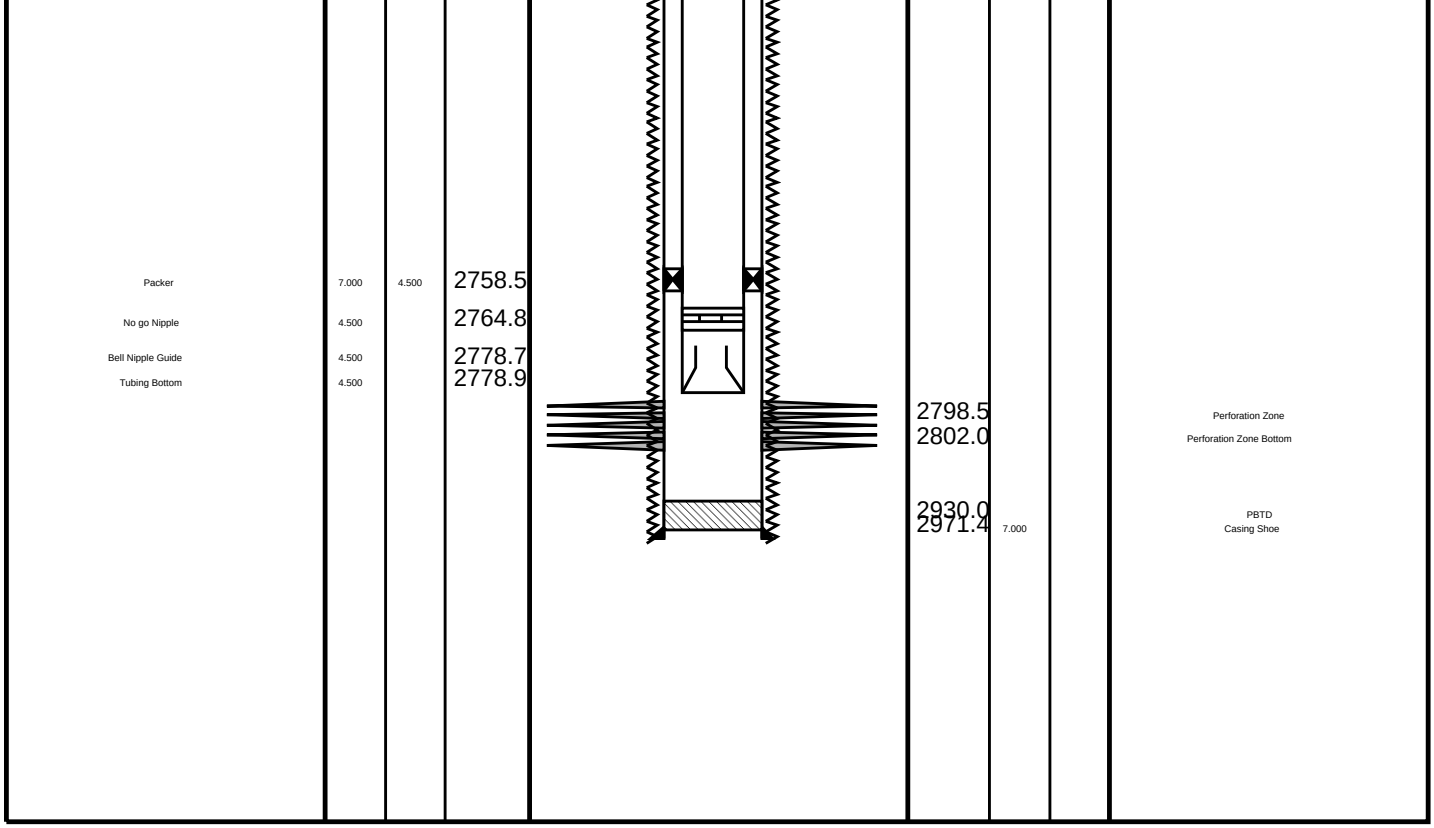


MAXIMUM STRING DIAMETER 1.72 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Production String	OD (in)	ID (in)	MD (m)
Tubing	4.500		11.3
Tubing Hanger	7.000	0.000	11.3
Shutin Valve	4.500		140.4
Side Pocket Mandrel	4.500		738.5
Side Pocket Mandrel	4.500		1114.1
Landing Nipple	4.500		1129.9

Well Schematic

Casing String	MD (m)	OD (in)	ID (in)
Casing String	−1.2	7.000	
Casing Shoe	180.4	16.000	
Casing Shoe	175.0	20.000	
Casing String	0.0	16.000	
Casing String	0.0	9.625	
Casing String	13.4	20.000	
Casing Shoe	639.4	9.625	
Borehole Segment	641.0	8.500	



Schlumberger

Job Event Summary

MAXIS Field Log

Schlumberger Job Event Summary

	Time	Elapsed Time	Depth (M)		File
Log Pass (up)	21−Jan−2008 12:00	000:20	2921.7 −	2728.1	RST_PSP_014LUP
Log Pass (up)	21−Jan−2008 12:46	000:44	2923.3 −	2727.0	RST_PSP_020LUP
Station Log	21−Jan−2008 13:38	002:34	2910.0 −	23.4	RST_PSP_022LTP
Log Pass (up)	21−Jan−2008 16:18	000:29	2923.5 −	2789.2	RST_PSP_023LUP

Schlumberger

RST−C Sigma Flowing
Pass #2 @ 900 ft/hr

MAXIS Field Log

Company: Esso Australia Pty Ltd. **Well: A−24**

Output DLIS Files

DEFAULT	RST_PSP_023LUP	FN:22	PRODUCER	21−Jan−2008 16:18	2923.5 M	2789.2 M

OP System Version: 15C0−309

MCM

RST−C	SRPC−3474−Q4_2007	PSPT−B	SRPC−3474−Q4_2007

PIP SUMMARY

Time Mark Every 60 S

RST Sigma (SIGM) 60 (CU) 0

RST Weighted Inelastic Ratio (WINR_RST) 0.4 (−−−− 0

RST Porosity (TPHI) 0.6 (V/V) 0

RST Far Effective Capture CR (RSCF_RST) 45 (−−−− 0

RST Sigma Borehole Fluid (SIBF) 100 (CU) 0

RST Near Effective Capture CR (RSCN_RST) 45 (−−−− 0

Sigma Borehole Far Apparent (SBFA_FIL) 150 (CU) 0

Tension (TENS) 0 (LBF) 3000

RST Capture to Inelastic Ratio Far (CIRF_FIL) 5 (−−−− 0

RST Capture Ratio (TRAT_FIL) 1.5 (−−−− 0.5

Sigma Formation Far Apparent (SFFA_FIL) 60 (CU) 0

RST Capture to Inelastic Ratio Near (CIRN_FIL) 2.5 (−−−− 0

Minitron Arc Detection (MARC) 0 (−−−− 5

RST Sigma Difference (DSIG) −30 (CU) 30

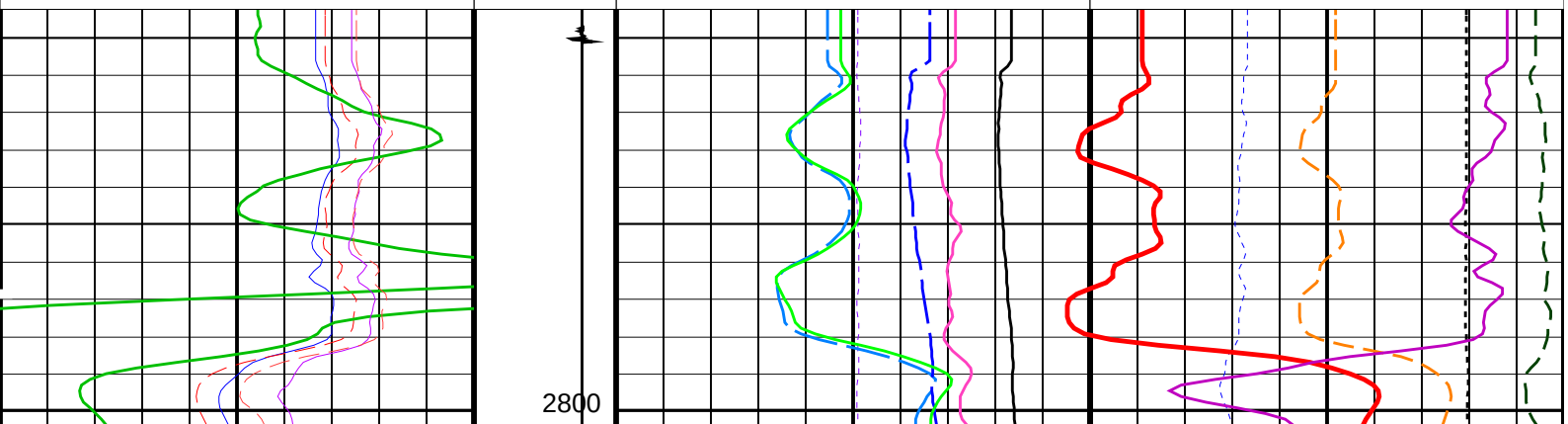
MCS Far Background (filtered) (FBAC) 0 (CPS) 5000

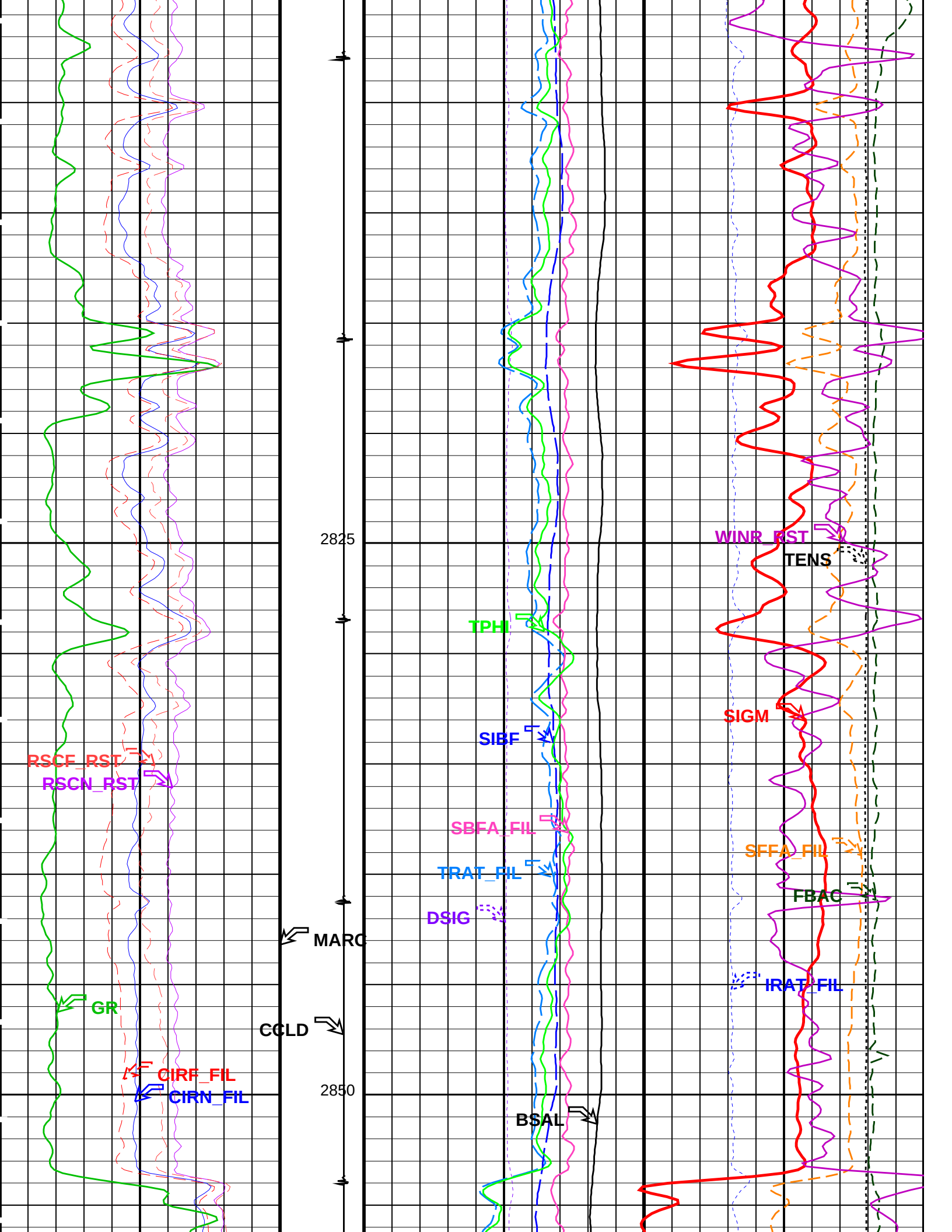
Gamma Ray (GR) 0 (GAPI) 150

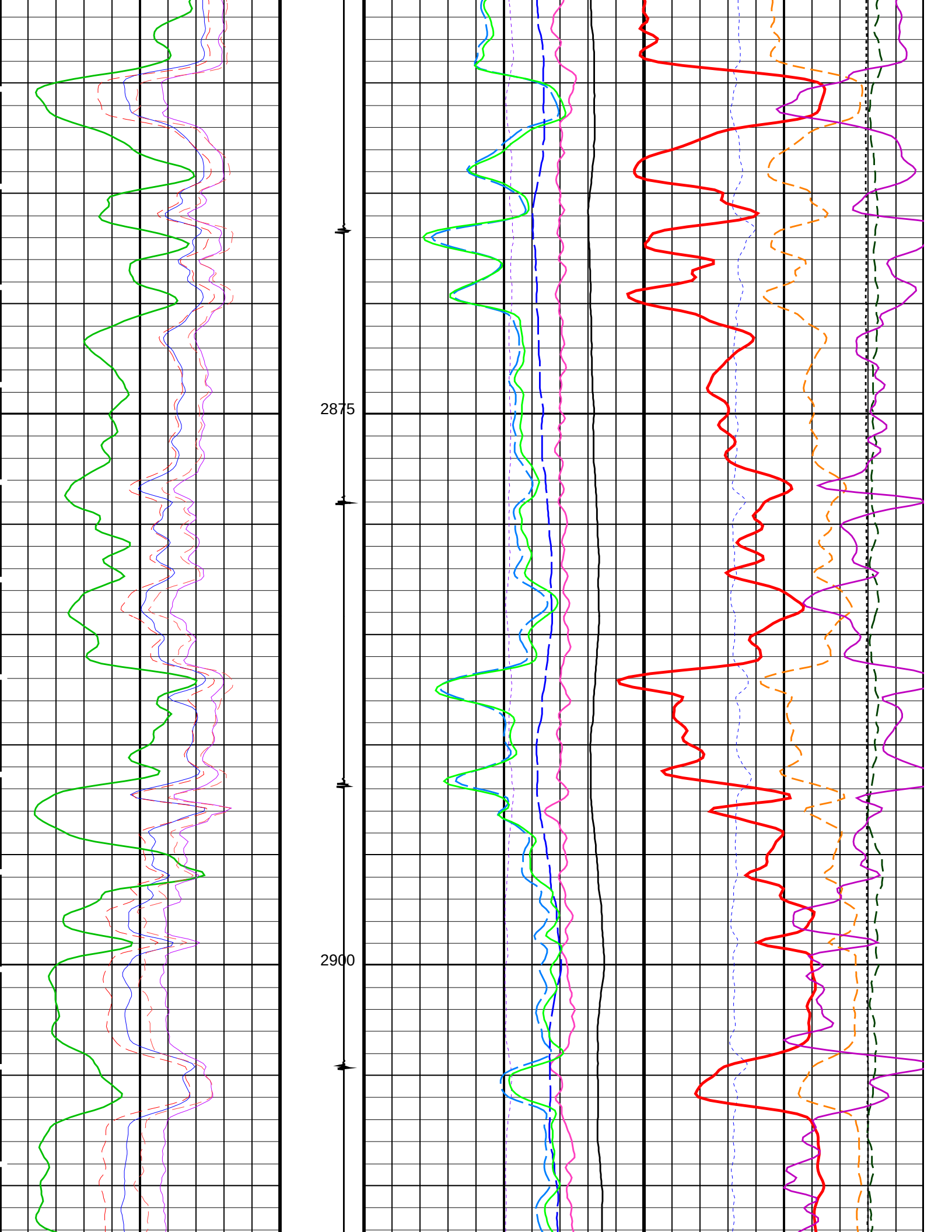
Discriminated CCL (CCLD) 3 (V) −1

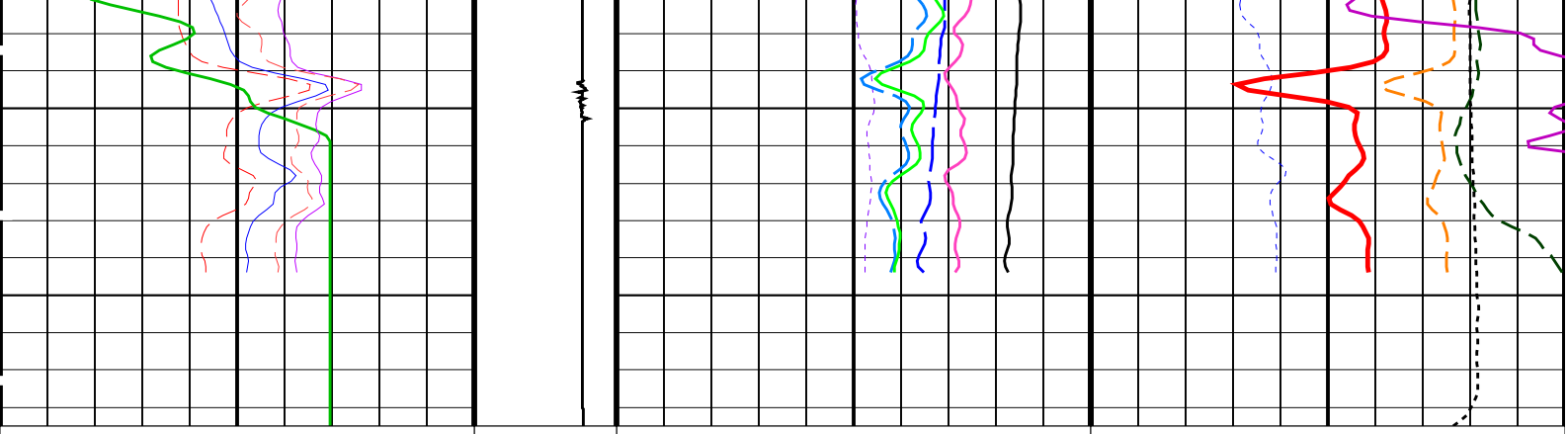
RST Borehole Salinity (BSAL) 450 (PPK) −50

RST Inelastic Ratio (IRAT_FIL) 0.75 (−−−− 0




2825
2850
RSCF_RST
RSCN_RST
GR
CIRF_FIL
CIRN_FIL
MARC
CCLD
TPHI
SIBF
SBFA_FIL
TRAT_FIL
DSIG
BSAL
WINR_RST
TENS
SIGM
SFFA_FIL
FBAC
IRAT_FIL


2875
2900



Gamma Ray (GR)	Discriminated CCL (CCLD)	RST Borehole Salinity (BSAL)	RST Inelastic Ratio (IRAT_FIL)
0 (GAPI) 150	3 (V) −1	450 (PPK) −50	0.75 (---- 0

RST Capture to Inelastic Ratio Near (CIRN_FIL)	Minitron Arc Detection (MARC)	RST Sigma Difference (DSIG)	MCS Far Background (filtered) (FBAC)
2.5 (---- 0	0 (---- 5	−30 (CU) 30	0 (CPS) 5000

RST Capture to Inelastic Ratio Far (CIRF_FIL)	RST Capture Ratio (TRAT_FIL)	Sigma Formation Far Apparent (SFFA_FIL)
5 (---- 0	1.5 (---- 0.5	60 (CU) 0

RST Near Effective Capture CR (RSCN_RST)	Sigma Borehole Far Apparent (SBFA_FIL)	Tension (TENS)
45 (---- 0	150 (CU) 0	0 (LBF) 3000

RST Far Effective Capture CR (RSCF_RST)	RST Sigma Borehole Fluid (SIBF)
45 (---- 0	100 (CU) 0

RST Porosity (TPHI)
0.6 (V/V) 0

RST Weighted Inelastic Ratio (WINR_RST)
0.4 (---- 0

RST Sigma (SIGM)
60 (CU) 0

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
	RST−C: Reservoir Saturation Pro Tool C		
AIRB	RST Air Borehole	No	
BHS	Borehole Status	CASED	
BSALOPT	RST Borehole Salinity Option	Unknown	
BSFL	RST Borehole Salinity Filter Length	51	
DFPC	RST Depth Filter Processing Constant	One	
DFPC_TDTL	RST Depth Filter Processing Constant (TDT−like)	Two	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
NORM_IRAT_RST	RST Normalized Inelastic Ratio	0.48	
NORM_SIGM_RST	RST Normalized Sigma	30	CU
RGAI	Near/Far Gain Calibration Ratio	1	
TIER_SIGM	RST Sigma Acquisition Mode	0_RST_Sigma	
	PSPT−B: Production Services Logging Platform		
BHS	Borehole Status	CASED	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
	System and Miscellaneous		
BS	Bit Size	8.500	IN
BSAL	Borehole Salinity	−50000.00	PPM
CSIZ	Current Casing Size	7.000	IN
CWEI	Casing Weight	26.00	LB/F

Format: RST_SIG_ANSW Vertical Scale: 1:200 Graphics File Created: 21-Jan-2008 16:18

OP System Version: 15C0-309

MCM

RST-C	SRPC-3474-Q4_2007	PSPT-B	SRPC-3474-Q4_2007

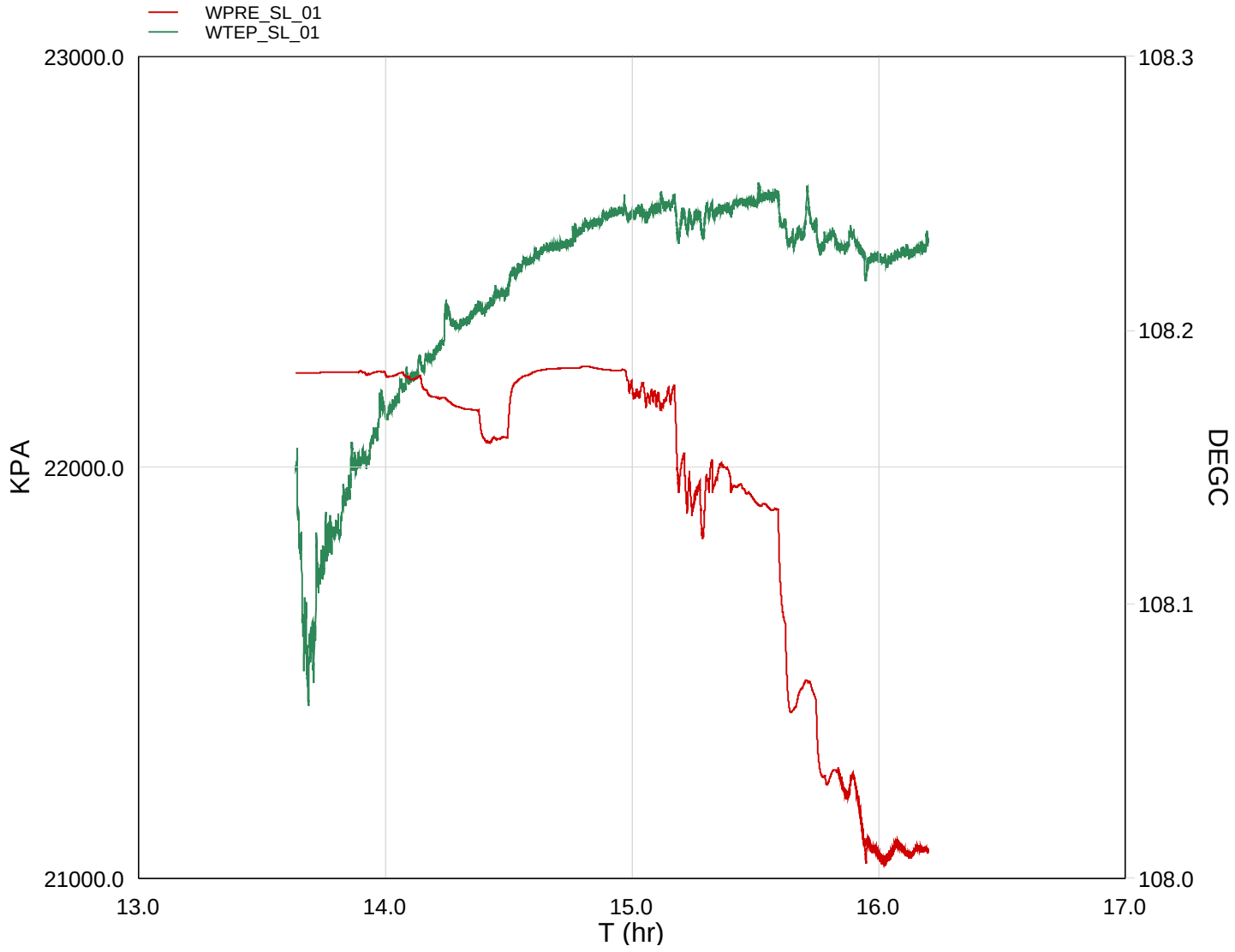
Output DLIS Files

DEFAULT	RST_PSP_023LUP	FN:22	PRODUCER	21-Jan-2008 16:18

Schlumberger

Bordyn Plot @ 2915m MDKB

MAXIS Field Log



TIME	TIME	DegF	PSIA
11000.0000	13.6367	226.6540	3223.9173

11250.0000	13.7070	226.5553	3224.2780
11500.0000	13.7764	226.6148	3224.4182
11750.0000	13.8459	226.6568	3224.5279
12000.0000	13.9153	226.6789	3224.5980
12250.0000	13.9848	226.7204	3224.5427
12500.0000	14.0542	226.7160	3224.0000
12750.0000	14.1237	226.7310	3222.3284
13000.0000	14.1931	226.7441	3215.8906
13250.0000	14.2625	226.7680	3213.8395
13500.0000	14.3320	226.7675	3211.4614
13750.0000	14.4014	226.7735	3200.8822
14000.0000	14.4709	226.7835	3201.1735
14250.0000	14.5403	226.7999	3221.6626
14500.0000	14.6098	226.8125	3224.7179
14750.0000	14.6792	226.8159	3225.6807
15000.0000	14.7487	226.8166	3225.9729
15250.0000	14.8181	226.8293	3226.5144
15500.0000	14.8875	226.8349	3225.3780
15750.0000	14.9570	226.8374	3225.1866
16000.0000	15.0264	226.8372	3217.3565
16250.0000	15.0959	226.8419	3215.5697
16500.0000	15.1653	226.8439	3218.4948
16750.0000	15.2348	226.8370	3186.2267
17000.0000	15.3039	226.8429	3186.0827
17250.0000	15.3734	226.8394	3190.9991
17500.0000	15.4428	226.8453	3185.0496
17750.0000	15.5123	226.8508	3177.6567
18000.0000	15.5817	226.8520	3176.1688
18250.0000	15.6512	226.8242	3105.1015
18500.0000	15.7206	226.8371	3115.2519
18750.0000	15.7900	226.8199	3078.8235
19000.0000	15.8595	226.8156	3076.1695
19250.0000	15.9289	226.8130	3067.4403
19500.0000	15.9984	226.8098	3053.9453
19750.0000	16.0678	226.8093	3057.9497
20000.0000	16.1373	226.8086	3054.0515

Schlumberger

RST−C Sigma Shut−in
Pass #1 @ 900 ft/hr

MAXIS Field Log

Company: Esso Australia Pty Ltd. **Well: A−24**

Input DLIS Files

DEFAULT	**RST_PSP_020LUP**	**FN:19**	**PRODUCER**	**21−Jan−2008 12:46**	**2923.3 M**	**2727.0 M**

Output DLIS Files

DEFAULT	**RST_PSP_025PUP**	**FN:24**	**PRODUCER**	**21−Jan−2008 16:52**	**2923.5 M**	**2722.2 M**

OP System Version: 15C0−309

MCM

RST−C SRPC−3474−Q4_2007 PSPT−B SRPC−3474−Q4_2007

PIP SUMMARY

Time Mark Every 60 S

RST Sigma (SIGM)
60 (CU) 0

RST Weighted Inelastic Ratio (WINR_RST)
0.4 (−−−− 0

RST Porosity (TPHI)
0.6 (V/V) 0

RST Far Effective Capture CR (RSCF_RST)
45 (−−−− 0

RST Sigma Borehole Fluid (SIBF)
100 (CU) 0

RST Near Effective Capture CR (RSCN_RST)
45 (−−−− 0

Sigma Borehole Far Apparent (SBFA_FIL)
150 (CU) 0

Tension (TENS)
0 (LBF) 3000

RST Capture to Inelastic Ratio Far (CIRF_FIL)
5 (−−−− 0

RST Capture Ratio (TRAT_FIL)
1.5 (−−−− 0.5

Sigma Formation Far Apparent (SFFA_FIL)
60 (CU) 0

RST Capture to Inelastic Ratio Near (CIRN_FIL)
2.5 (−−−− 0

Minitron Arc Detection (MARC)
0 (−−−− 5

RST Sigma Difference (DSIG)
−30 (CU) 30

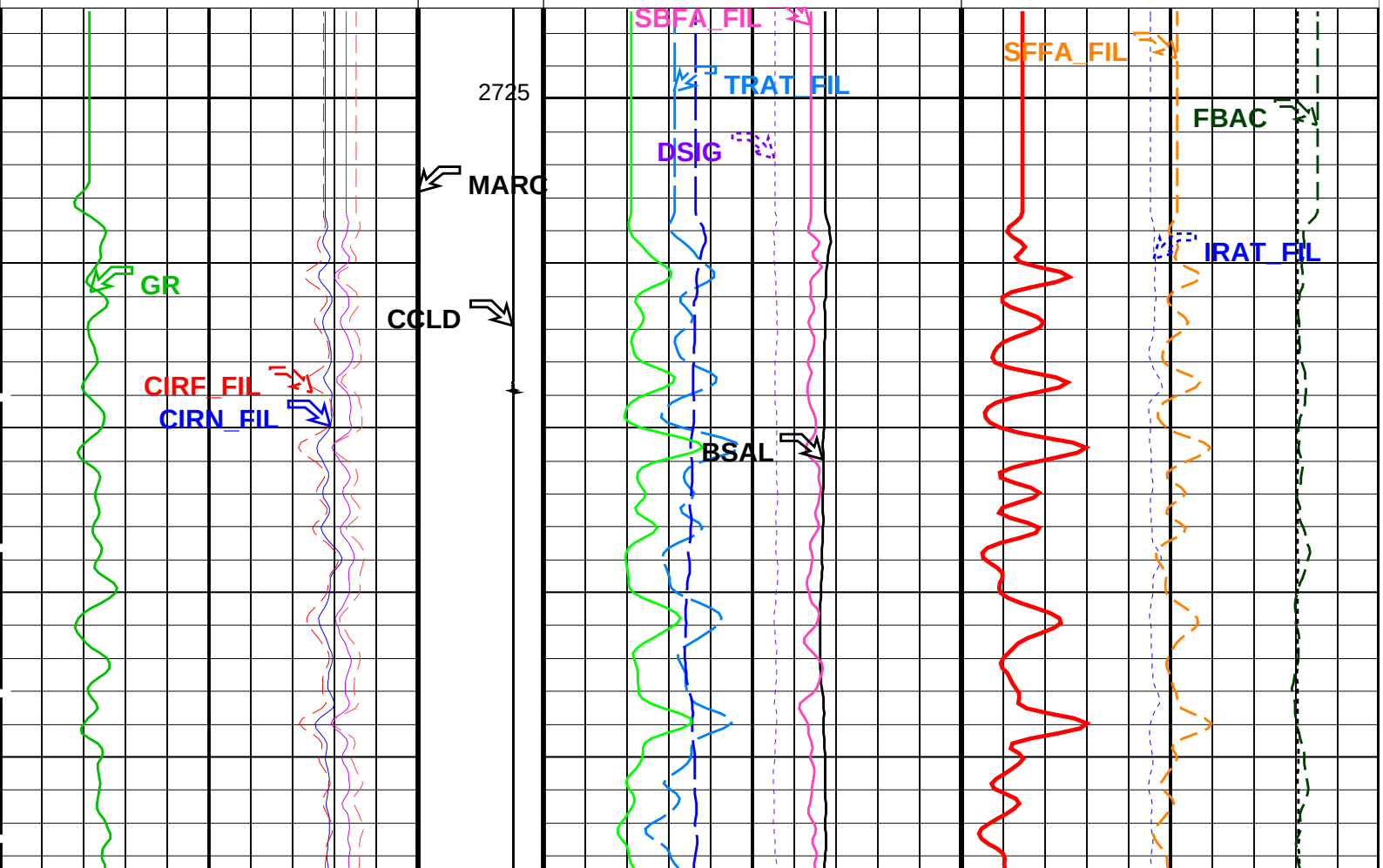
MCS Far Background (filtered) (FBAC)
0 (CPS) 5000

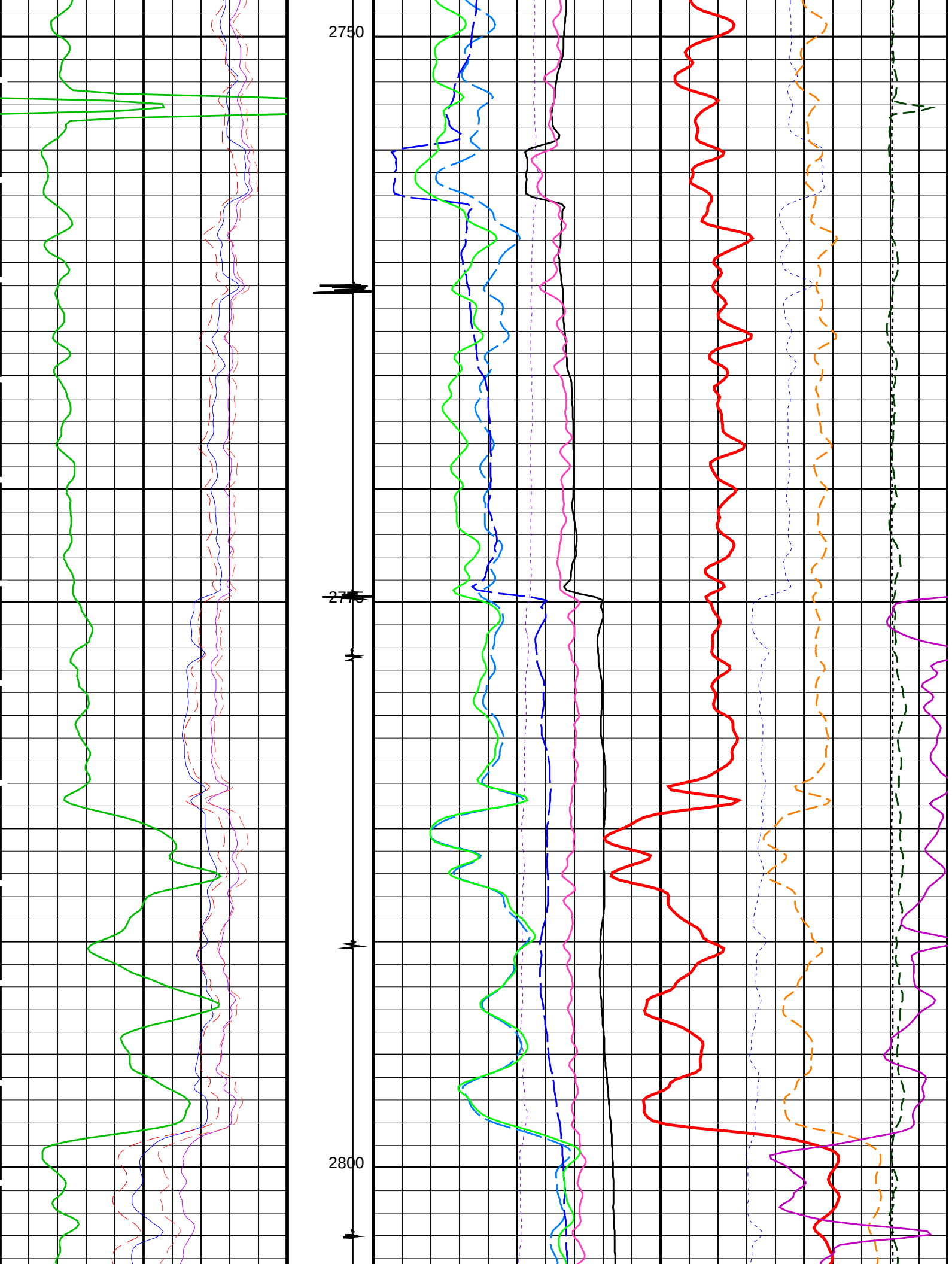
Gamma Ray (GR)
0 (GAPI) 150

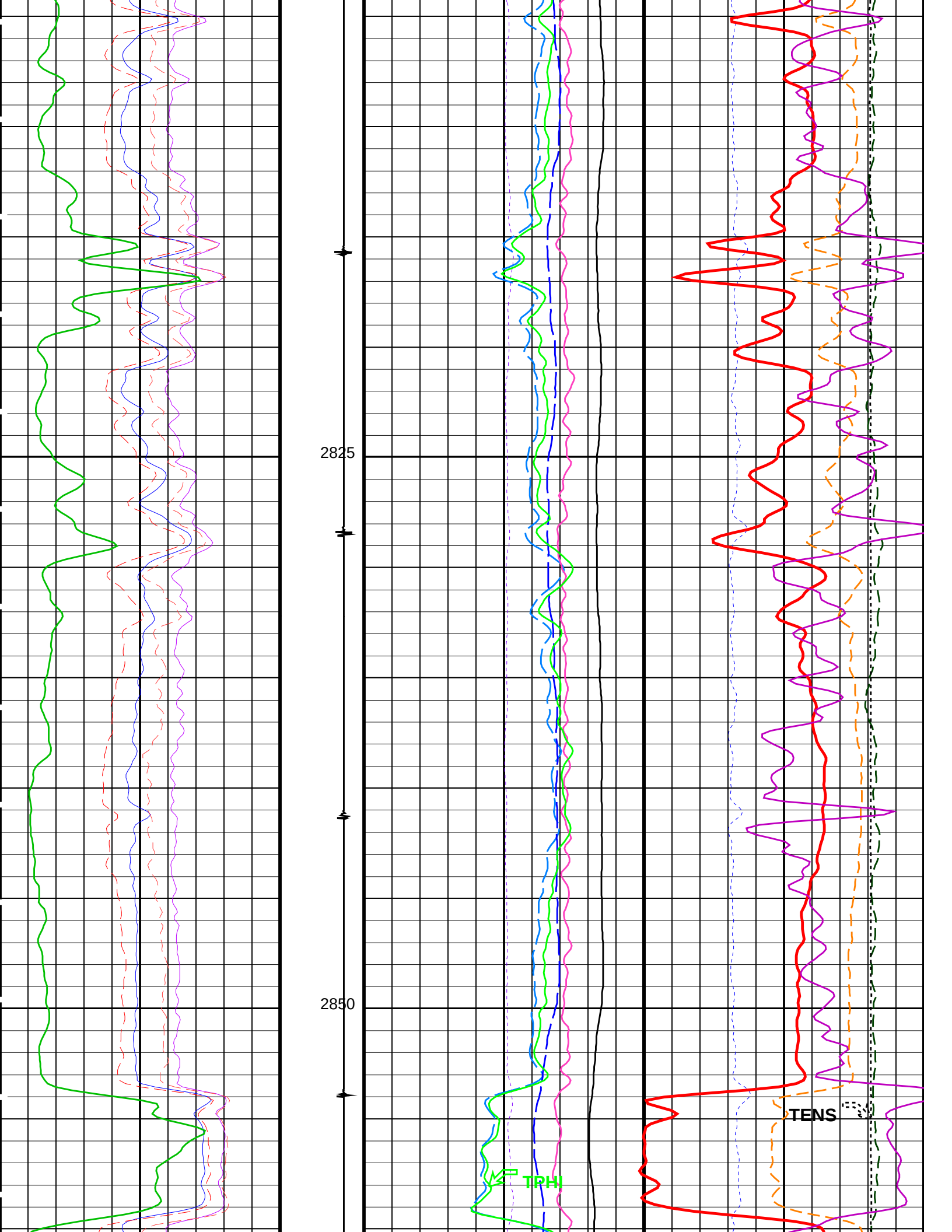
Discriminated CCL (CCLD)
3 (V) −1

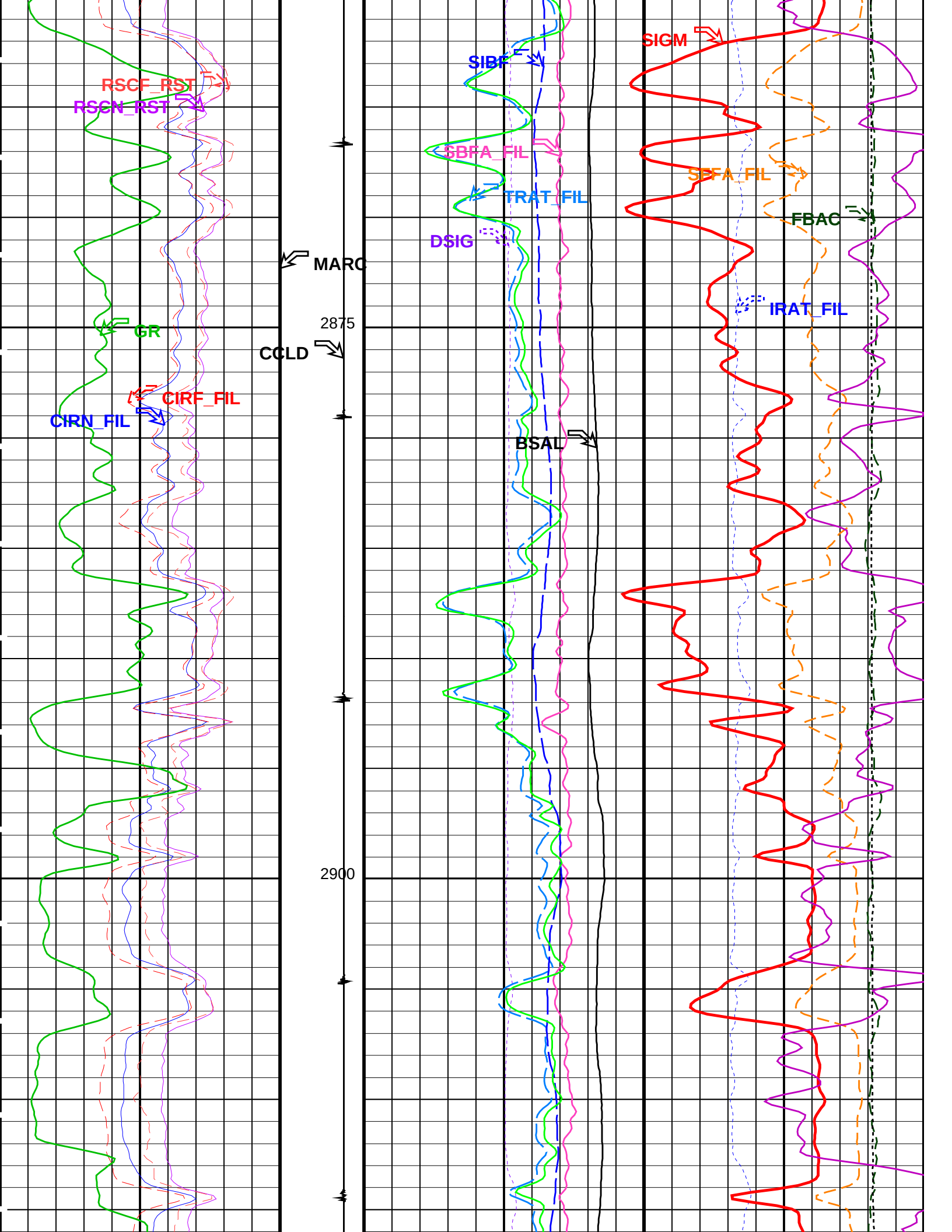
RST Borehole Salinity (BSAL)
450 (PPK) −50

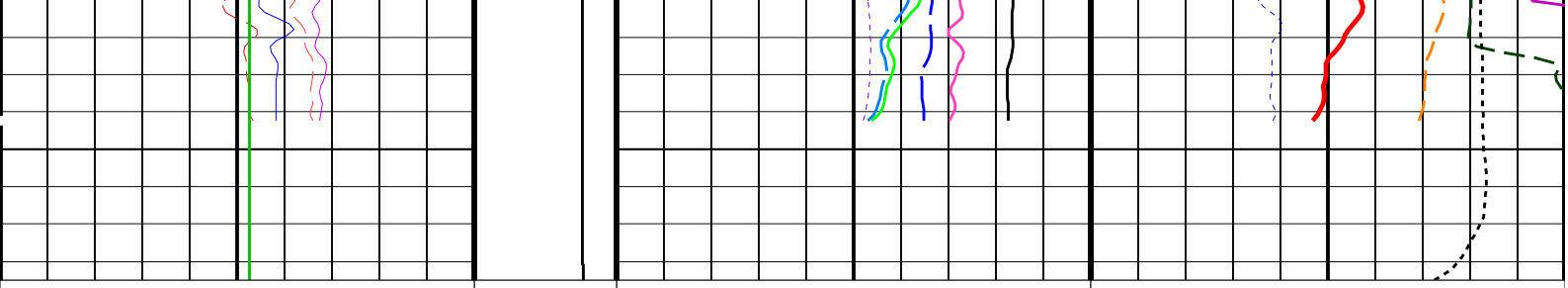
RST Inelastic Ratio (IRAT_FIL)
0.75 (−−−− 0




2750
2775
2800


2825
2850
TENS
TPHI


RSCF_RST
RSCN_RST
GR
CIRF_FIL
CIRN_FIL
MARC
CCLD
2875
2900
SIBF
SBFA_FIL
TRAT_FIL
DSIG
BSAL
SIGM
SFFA_FIL
FBAC
IRAT_FIL



Gamma Ray (GR)	Discriminated CCL (CCLD)	RST Borehole Salinity (BSAL)	RST Inelastic Ratio (IRAT_FIL)
0 (GAPI) 150	3 (V) −1	450 (PPK) −50	0.75 (---- 0

RST Capture to Inelastic Ratio Near (CIRN_FIL)	Minitron Arc Detection (MARC)	RST Sigma Difference (DSIG)	MCS Far Background (filtered) (FBAC)
2.5 (---- 0	0 (---- 5	−30 (CU) 30	0 (CPS) 5000

RST Capture to Inelastic Ratio Far (CIRF_FIL)	RST Capture Ratio (TRAT_FIL)	Sigma Formation Far Apparent (SFFA_FIL)
5 (---- 0	1.5 (---- 0.5	60 (CU) 0

RST Near Effective Capture CR (RSCN_RST)	Sigma Borehole Far Apparent (SBFA_FIL)	Tension (TENS)
45 (---- 0	150 (CU) 0	0 (LBF) 3000

RST Far Effective Capture CR (RSCF_RST)	RST Sigma Borehole Fluid (SIBF)
45 (---- 0	100 (CU) 0

RST Porosity (TPHI)
0.6 (V/V) 0

RST Weighted Inelastic Ratio (WINR_RST)
0.4 (---- 0

RST Sigma (SIGM)
60 (CU) 0

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
	RST−C: Reservoir Saturation Pro Tool C		
AIRB	RST Air Borehole	No	
BHS	Borehole Status	CASED	
BSALOPT	RST Borehole Salinity Option	Unknown	
BSFL	RST Borehole Salinity Filter Length	51	
DFPC	RST Depth Filter Processing Constant	One	
DFPC_TDTL	RST Depth Filter Processing Constant (TDT−like)	Two	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
NORM_IRAT_RST	RST Normalized Inelastic Ratio	0.48	
NORM_SIGM_RST	RST Normalized Sigma	30	CU
RGAI	Near/Far Gain Calibration Ratio	1	
TIER_SIGM	RST Sigma Acquisition Mode	0_RST_Sigma	
	PSPT−B: Production Services Logging Platform		
BHS	Borehole Status	CASED	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
	System and Miscellaneous		
BS	Bit Size	8.500	IN
BSAL	Borehole Salinity	−50000.00	PPM
CSIZ	Current Casing Size	7.000	IN
CWEI	Casing Weight	26.00	LB/F
DO	Depth Offset for Playback	0.2	M
PP	Playback Processing	NORMAL	

Format: RST_SIG_ANSW Vertical Scale: 1:200 Graphics File Created: 21−Jan−2008 16:52

OP System Version: 15C0−309

MCM

RST−C	SRPC−3474−Q4_2007	PSPT−B	SRPC−3474−Q4_2007

Input DLIS Files

DEFAULT	RST_PSP_020LUP	FN:19	PRODUCER	21−Jan−2008 12:46	2923.3 M	2727.0 M

Output DLIS Files

DEFAULT	RST_PSP_025PUP	FN:24	PRODUCER	21−Jan−2008 16:52		

Schlumberger

Correlation Pass @ 1800ft/hr

MAXIS Field Log

Company: Esso Australia Pty Ltd. **Well: A−24**

Input DLIS Files

DEFAULT	RST_PSP_014LUP	FN:13	PRODUCER	21−Jan−2008 12:00	2921.7 M	2728.1 M

Output DLIS Files

DEFAULT	RST_PSP_018PUP	FN:17	PRODUCER	21−Jan−2008 12:28	2920.4 M	2721.9 M

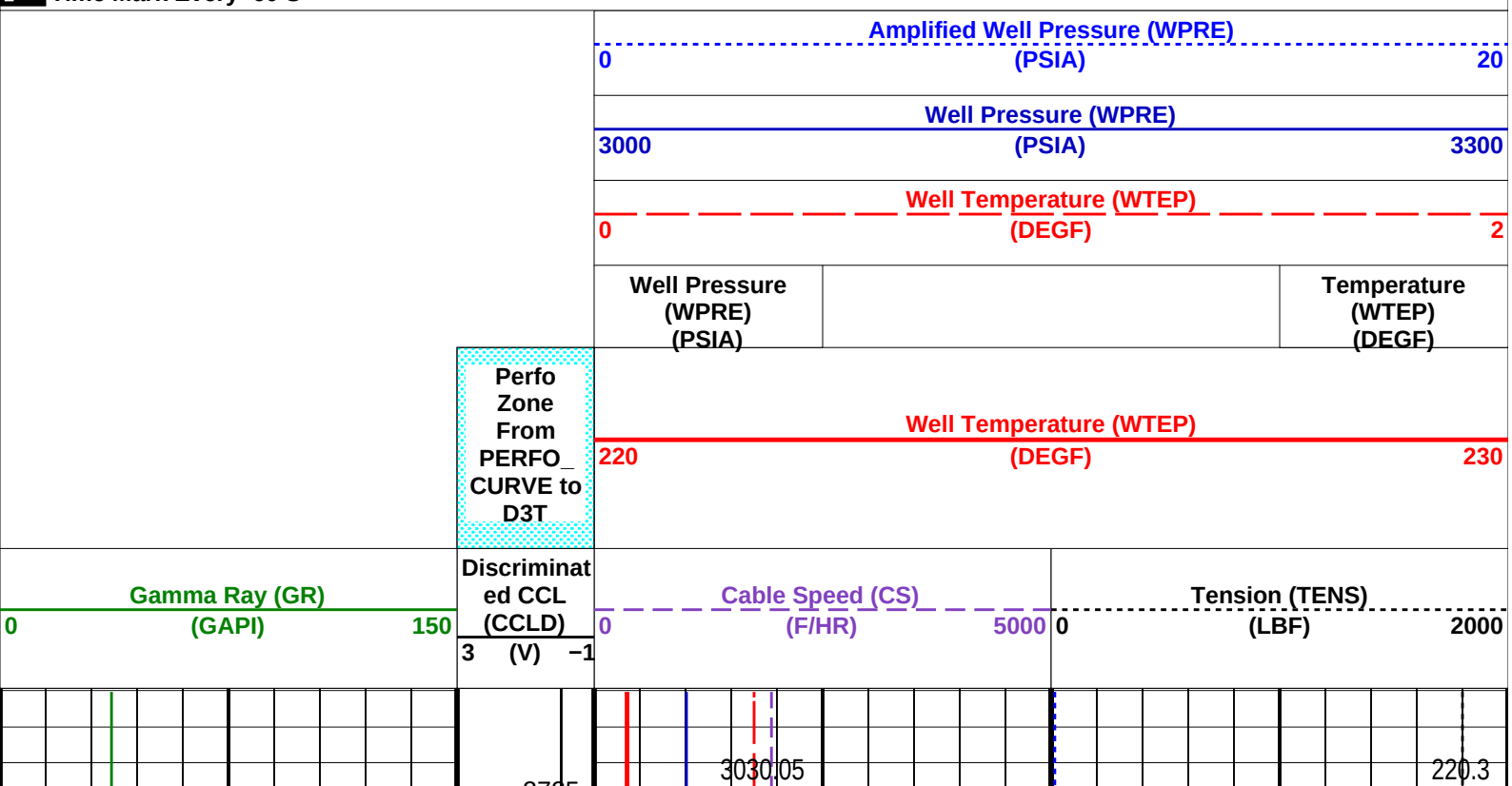
OP System Version: 15C0−309

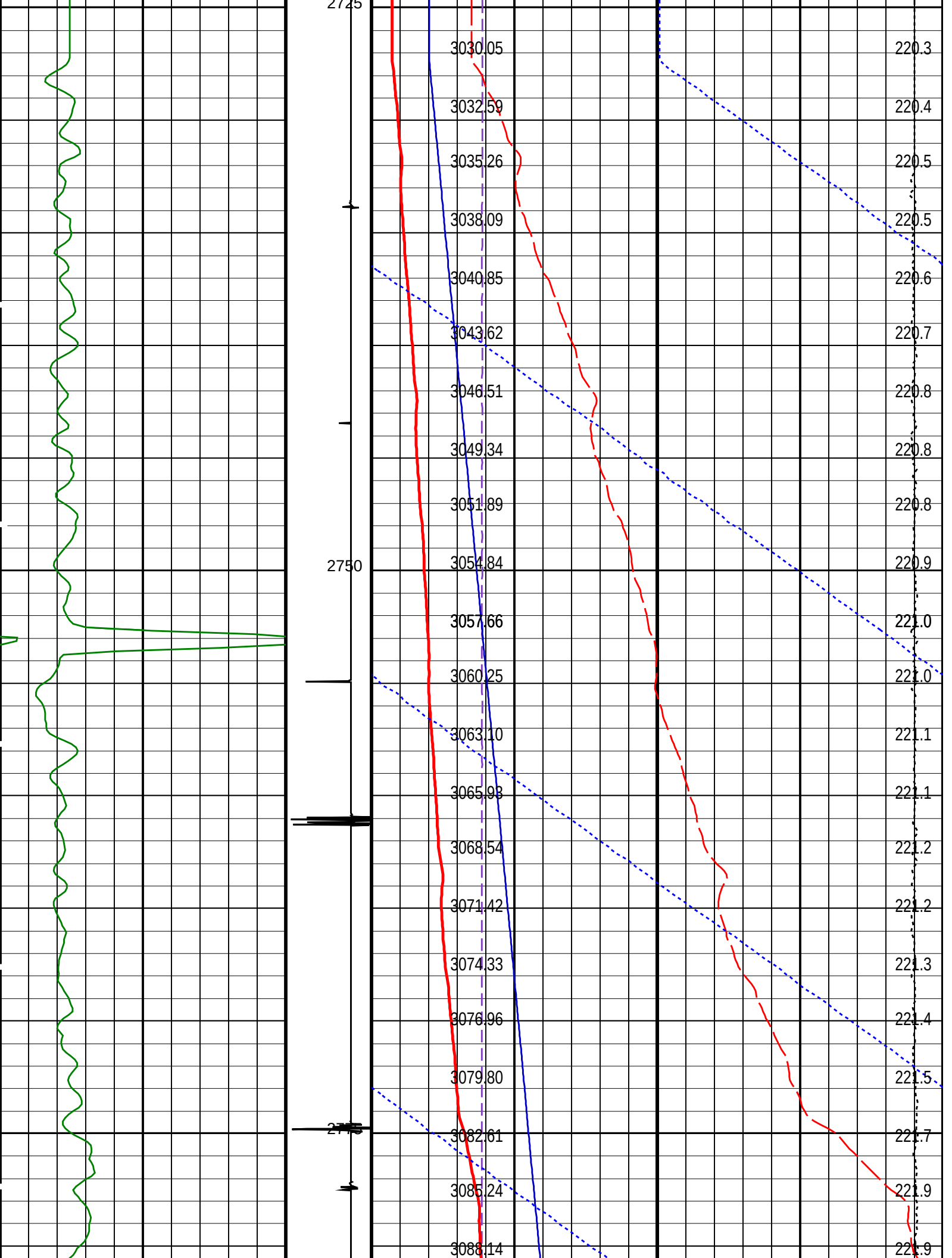
MCM

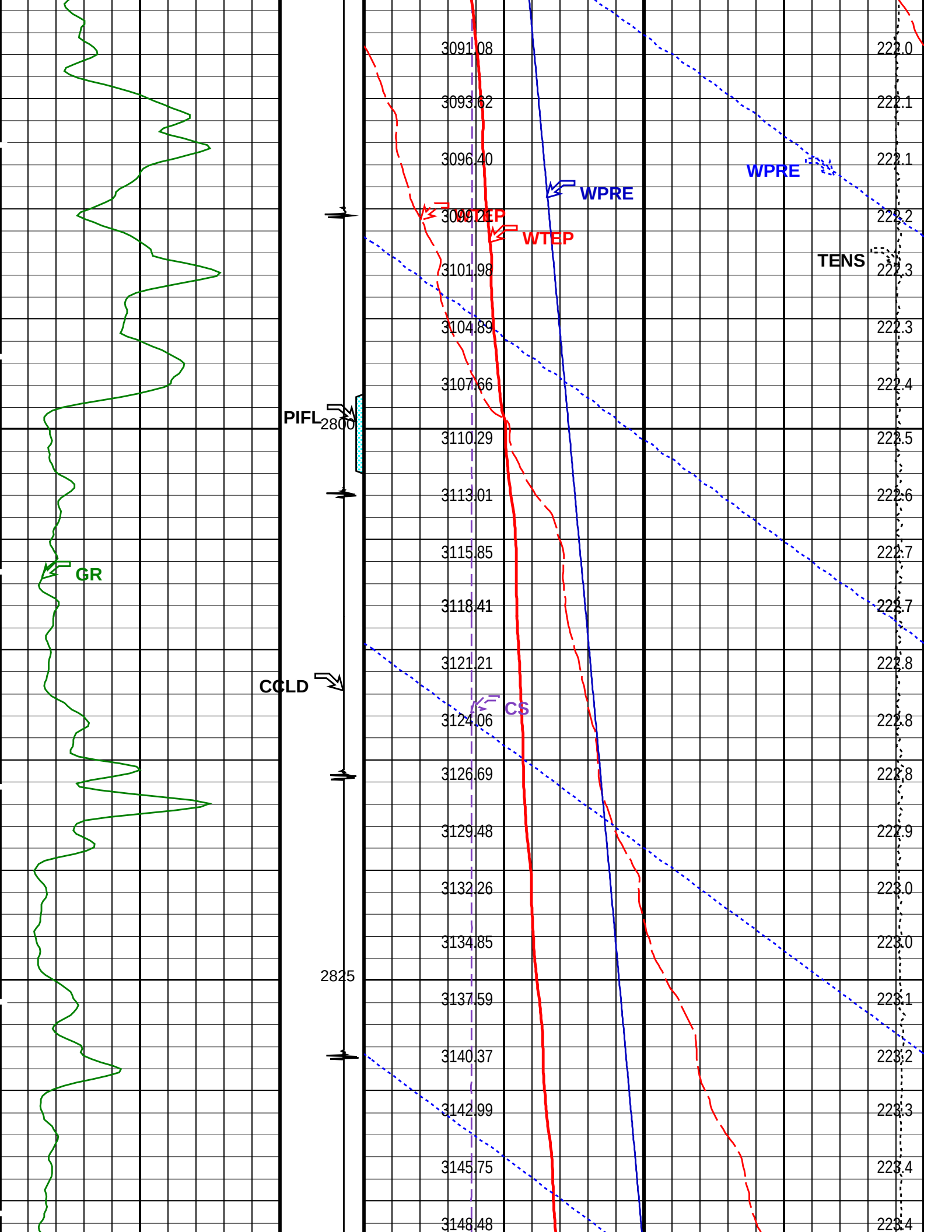
RST−C	SRPC−3474−Q4_2007	PSPT−B	SRPC−3474−Q4_2007

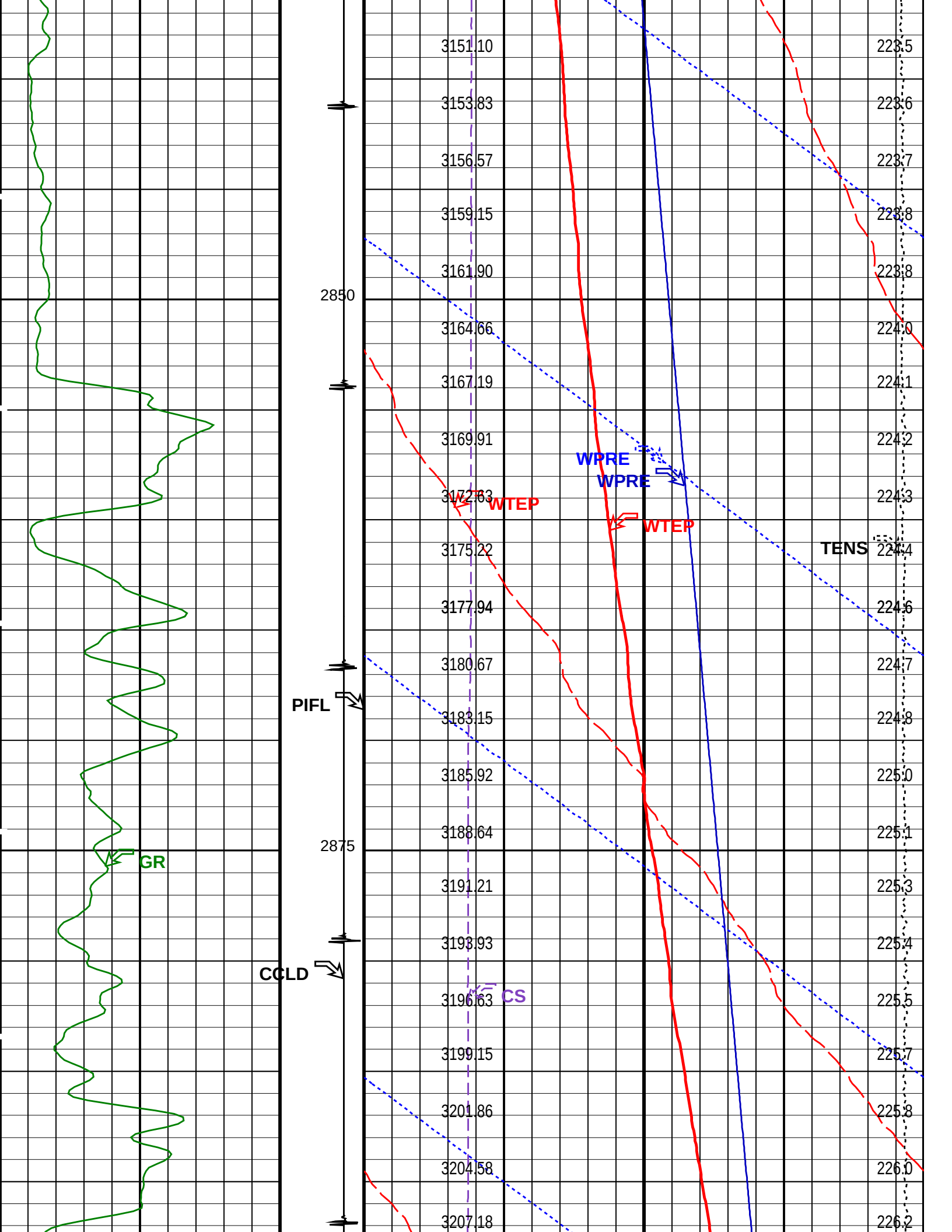
PIP SUMMARY

Time Mark Every 60 S




2745
3030.05
3032.59
3035.26
3038.09
3040.85
3043.62
3046.51
3049.34
3051.89
2750
3054.84
3057.66
3060.25
3063.10
3065.98
3068.54
3071.42
3074.33
3076.96
3079.80
3082.61
3085.24
3088.14
220.3
220.4
220.5
220.5
220.6
220.7
220.8
220.8
220.8
220.9
221.0
221.0
221.1
221.1
221.2
221.2
221.3
221.4
221.5
221.7
221.9
221.9


3091.08
3093.62
3096.40
3099.21
3101.98
3104.89
3107.66
3110.29
3113.01
3115.85
3118.41
3121.21
3124.06
3126.69
3129.48
3132.26
3134.85
3137.59
3140.37
3142.99
3145.75
3148.48
222.0
222.1
222.1
222.2
222.3
222.3
222.4
222.5
222.6
222.7
222.7
222.8
222.8
222.8
222.9
223.0
223.0
223.1
223.2
223.3
223.4
223.4
WPRE
WPRE
WTEP
WTEP
TENS
PIFL
2800
GR
CCLD
CS
2825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223.5
3153.83
223.6
3156.57
223.7
3159.15
223.8
3161.90
223.8
2850
3164.66
224.0
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224.1
3169.91
224.2
WPRE
WPRE
3172.63
224.3
WTEP
WTEP
TENS
3175.22
224.4
3177.94
224.6
3180.67
224.7
PIFL
3183.15
224.8
3185.92
225.0
3188.64
225.1
2875
GR
3191.21
225.3
3193.93
225.4
CCLD
CS
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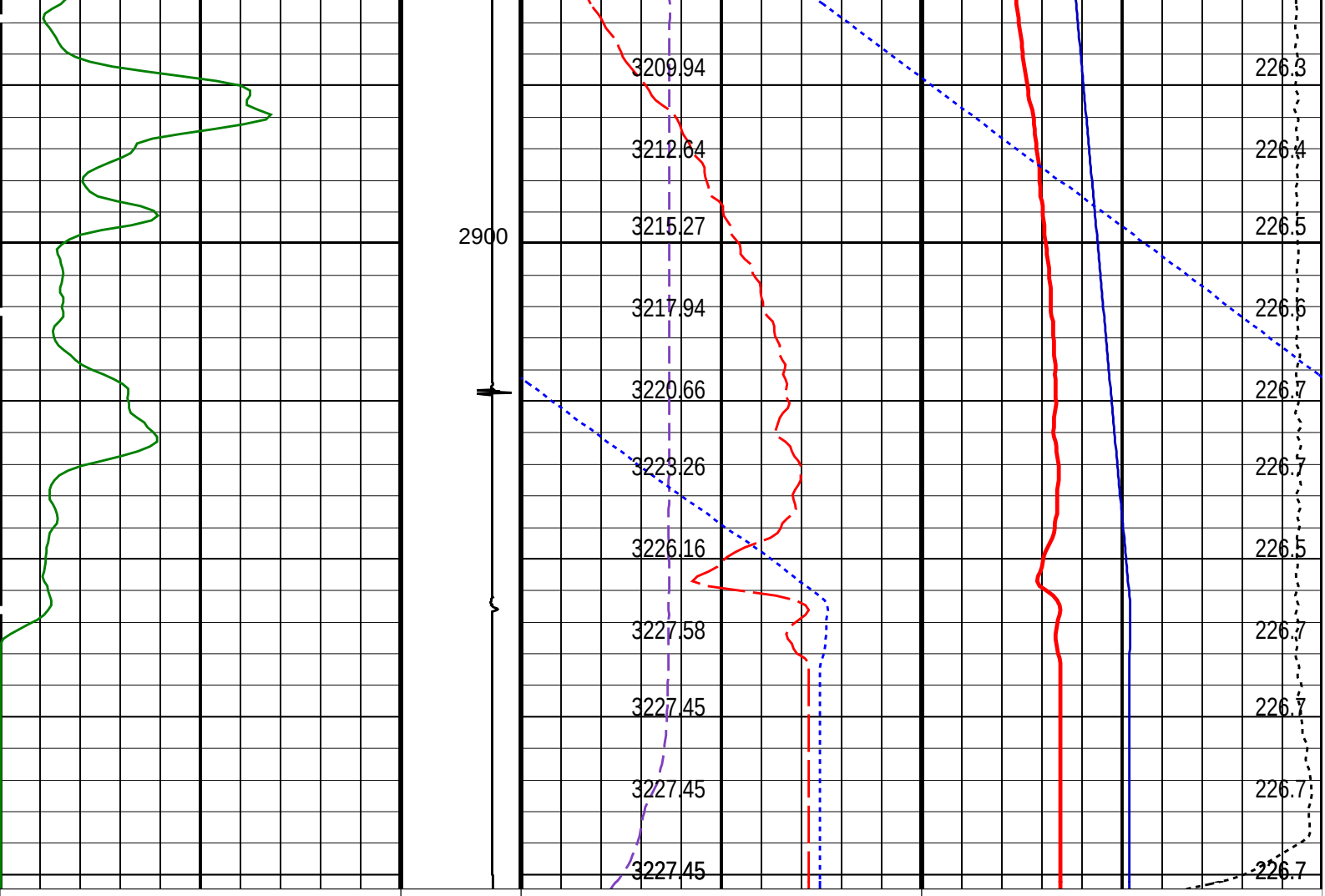
226.0
3207.18
226.2



Gamma Ray (GR)
0 (GAPI) 150

Discriminated CCL (CCLD)
3 (V) −1

Cable Speed (CS)
0 (F/HR) 5000

Tension (TENS)
0 (LBF) 2000

Perfo Zone From PERFO_CURVE to D3T

Well Temperature (WTEP)
220 (DEGF) 230

Well Pressure (WPRE) (PSIA)

Temperature (WTEP) (DEGF)

Well Temperature (WTEP)
0 (DEGF) 2

Well Pressure (WPRE)
3000 (PSIA) 3300

Amplified Well Pressure (WPRE)
0 (PSIA) 20

PIP SUMMARY

Time Mark Every 60 S

Format: PSP_1_1 Vertical Scale: 1:200 Graphics File Created: 21−Jan−2008 12:28

OP System Version: 15C0−309

MCM

RST−C	SRPC−3474−Q4_2007	PSPT−B	SRPC−3474−Q4_2007

Parameters

Parameters

DLIS Name	Description	Value
	System and Miscellaneous	
DO	Depth Offset for Playback	−1.2 M
PP	Playback Processing	NORMAL

Input DLIS Files

DEFAULT	RST_PSP_014LUP	FN:13	PRODUCER	21−Jan−2008 12:00	2921.7 M	2728.1 M

Output DLIS Files

DEFAULT	RST_PSP_018PUP	FN:17	PRODUCER	21−Jan−2008 12:28

Company: **Esso Australia Pty Ltd.**

Schlumberger

Well: **A−24**
Field: **Halibut**
Rig: **Crane**
Country: **Australia**

RST−C Sigma
Survey