

Company: Esso Australia Pty. Ltd.

Well: COBIA A21A

Field: HALIBUT

Rig: Crane / Prod 4

Country: Australia

RST-C
Sigma Log
2-June-2010

Rig: Crane / Prod 4
Field: HALIBUT
Location: Gippsland
Well: COBIA A21A
Company: Esso Australia Pty. Ltd.

LOCATION	
Gippsland	Elev.: K.B. 40.99 m
Basin	G.L. -79.00 m
Bass Strait	D.F. 40.99 m
Permanent Datum:	M.S.L. _____
Log Measured From:	K.B. _____
Drilling Measured From:	K.B. _____
Elev.:	40.99 m
	-40.99 m above Perm. Datum

State: Victoria	Max. Well Deviation 60.2 deg	Longitude 148°18'33.005"E	Latitude 038° 26' 57.568" S
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Logging Date 2-Jun-2010

Run Number 1

Depth Driller 3919 m

Schlumberger Depth 3824 m

Bottom Log Interval 3824 m

Top Log Interval 3660 m

Casing Fluid Type Production Fluid

Casing Fluid Type

Salinity

Density

Fluid Level 630 m

BIT/CASING/TUBING STRING

Bit Size 8.500 in

From 589 m

To 3925 m

Casing/Tubing Size 7.000 in

Weight 26 lbm/ft

Grade L-80

From 20.7 m

To 3919 m

Maximum Recorded Temperatures 226 degF

Logger On Bottom 2-Jun-2010 10:23

Unit Number 889 AUSL

Recorded By S Gilbert

Witnessed By B White

Run 1

PVT DATA

Oil Density	
Water Salinity	
Gas Gravity	
Bo	
Bw	
1/Bg	
Bubble Point Pressure	
Bubble Point Temperature	
Solution GOR	
Maximum Deviation	60.2 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

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: 2-JUN-2010 10:25:19

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:	208558
Calibration Date:	22-Apr-2010	Calibration Date:	6-Jun-2010	Length:	5800 M
Calibrator Serial Number:	31	Calibrator Serial Number:	1170	Conveyance Method: Wireline Rig Type: Offshore Fixed	
Calibration Cable Type:	2-32ZT	Number of Calibration Points:	10		
Wheel Correction 1:	1	Calibration RMS:	18		
Wheel Correction 2:	0	Calibration Peak Error:	38		

Depth Control Parameters

Log Sequence:	Subsequent Trip To the Well
Reference Log Name:	Cobia A21a Correlation Logs
Reference Log Run Number:	
Reference Log Date:	6-Jun-2009
Subsequent Trip Down Log Correction:	

Depth Control Remarks

1. Rigged up on main deck using platform crane
2. Tool zero referenced from tubing hanger at 20.7m
3. Depth correlated over interval 3800m – 3660m MDKB
4. IDW used as primary depth control, Z-chart as secondary
5. .
6.

DISCLAIMER

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OTHER SERVICES1
OS1: None

REMARKS: RUN NUMBER 1
Log Objective: Complete 2 x static RST-C (Sigma) surveys over the interval HUD to 3660m MDKB
Log correlated to Solar Composite Log provided by client
Maximum Well Deviation = 60.2 deg @ 3685m MDKB
Logged background GR/CCL log from HUD – 3650m at 1800ft/hr
Logged two shut-in Sigma passes from HUD – 3660m at 900ft/hr

HUD was tagged at 3824m MDKB					
SBHP: 3260.6 psia					
SBHT: 225.9 degf					
All depths are MDKB					
Crew: B Glover , D Watts					

RUN 1					
SERVICE ORDER #:		4500660358			
PROGRAM VERSION:		17C0-154			
FLUID LEVEL:		630 m			
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION					
RUN 1			RUN 2		

SURFACE EQUIPMENT					
WITM-A PSC_16MHZ					
DOWNHOLE EQUIPMENT					
SWBS-B 785		13.34			
SWBS-B 786		12.65			
SWBS-B 787		11.95			
SWBS-B 788		11.25			
SWBS-B 789		10.55			
SWHS-A 759		9.86			
PSPT	Detail MT				
PSC-A 2760	TelStatus				
PSPT-B	CTEM	9.54			
PSTC-A 2760		9.54			
PBMS-B 1750					
CQG_F_Mano 1750	GR	8.41			
RTD_Thermometer 1750					
GR 1750					
CCL 1750	Well_Temp	7.48			
PBMS	CQG Manom	7.37			
	CCL	7.25			
	PBMS PSTC	7.02			
RST-C		7.02			
RSCH-A 111					
RSC-E					
RSS-A 106					
RSXH-A 145					
RSX-F					

RSC-A Far
RSC-A PNG
RSC-A Nea
RSX-A PNG

4.24
4.09

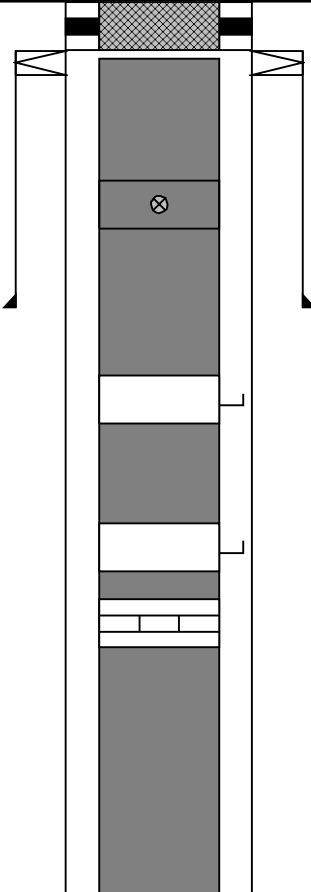
Tension HV 0.00
TOOL ZERO

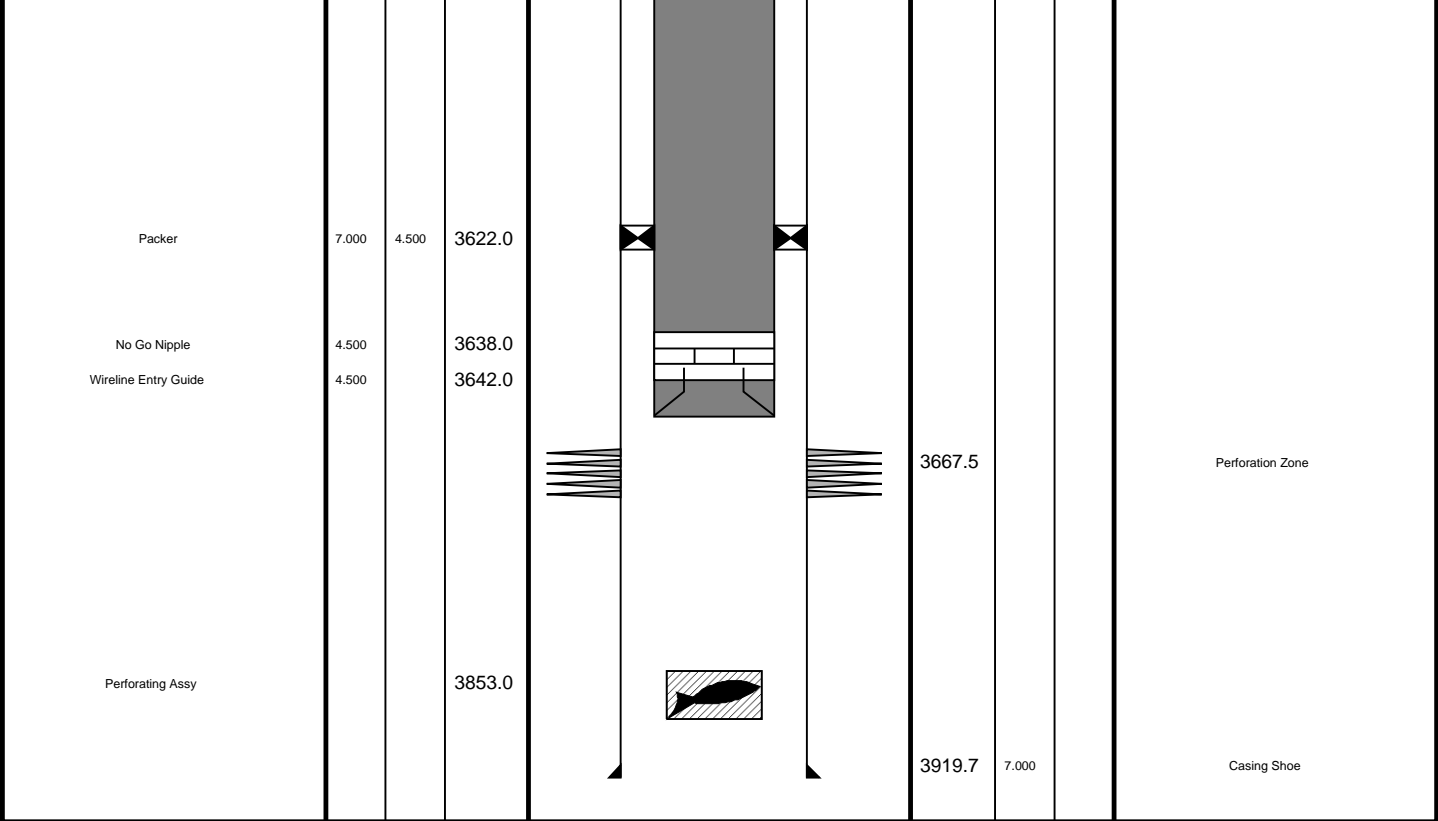
MAXIMUM STRING DIAMETER 1.72 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Client: Esso Australia
Well: CBA A21A
Field: HALIBUT
State: Victoria
Country: Australia

Drawing Date: 5/30/2010
API #:

Rig Name: Crane / Prod 4
Reference Datum: Kelly Bushing
Elevation:

Production String	(in)		(m)	Well Schematic	(m)	(in)		Casing String
	OD	ID	MD		MD	OD	ID	
Tubing Hanger	7.000	4.500	20.7		21.3	10.750	7.000	Casing String Liner Hanger
Tubing	4.500		20.7		21.3	10.750		
Shutin Valve	4.500		448.3		637.7	10.750		Casing Shoe
Gas Lift Mandrel	4.500		958.0					
Gas Lift Mandrel	4.500		1409.5					
Nipple	4.500		1424.0					



Job Events Summary

MAXIS Field Log

Schlumberger Job Event Summary

	Time	Elapsed Time	Depth (M)	File
Log Pass (up) GR PASS	2-Jun-2010 9:41	000:22	3834.8 - 3624.8	RST_PSP_013LUP
Log Pass (up) SIGMA PASS 1	2-Jun-2010 10:25	000:43	3836.5 - 3649.8	RST_PSP_016LUP
Log Pass (up) SIGMA PASS 2	2-Jun-2010 11:13	000:47	3830.4 - 3649.2	RST_PSP_018LUP

Company: Esso Australia Pty. Ltd.

Well: COBIA A21A

Output DLIS Files

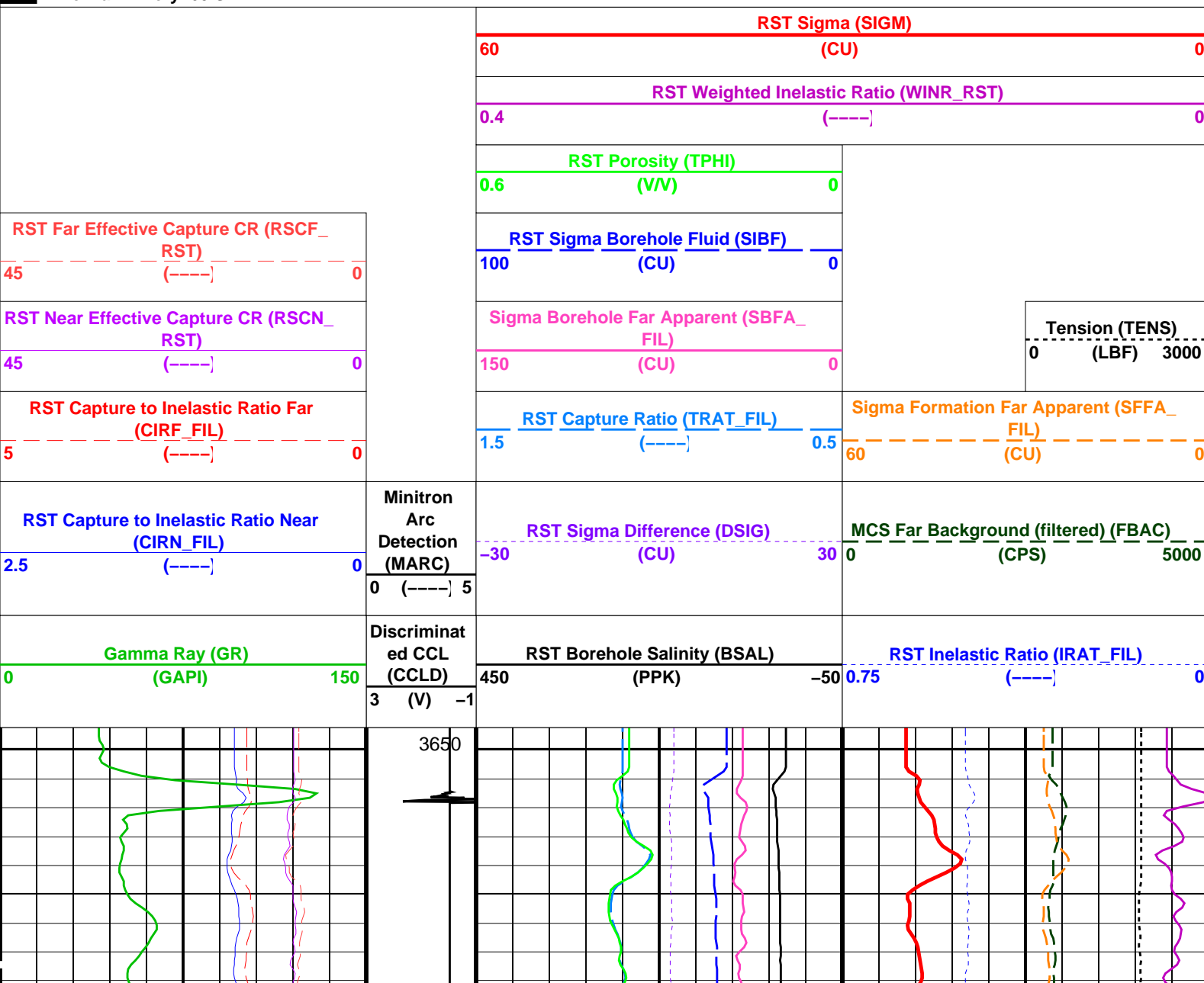
DEFAULT	RST_PSP_018LUP	FN:25	PRODUCER	02-Jun-2010 11:13
CUSTOMER	RST_PSP_018LUC	FN:26	CUSTOMER	02-Jun-2010 11:13

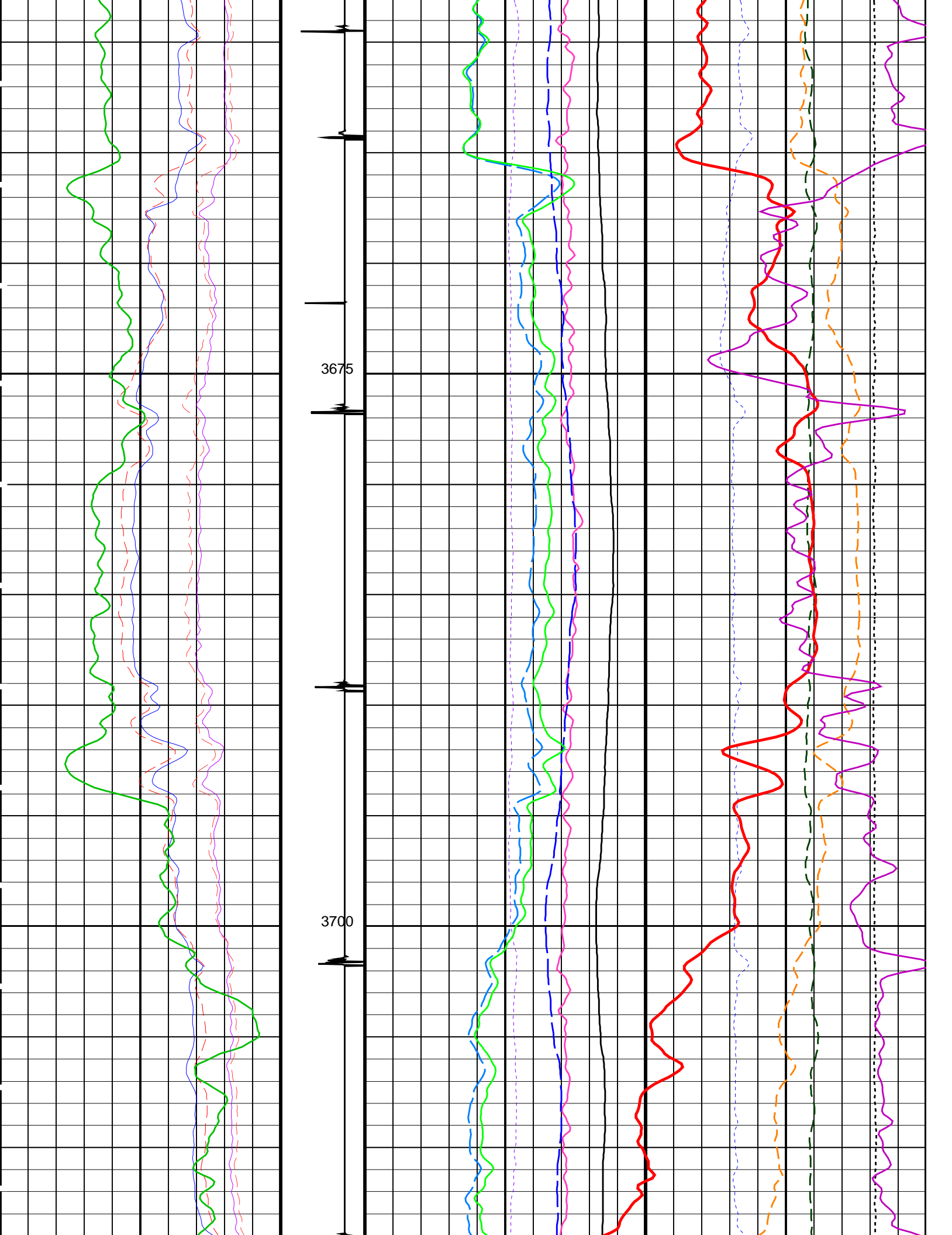
OP System Version: 17C0-154

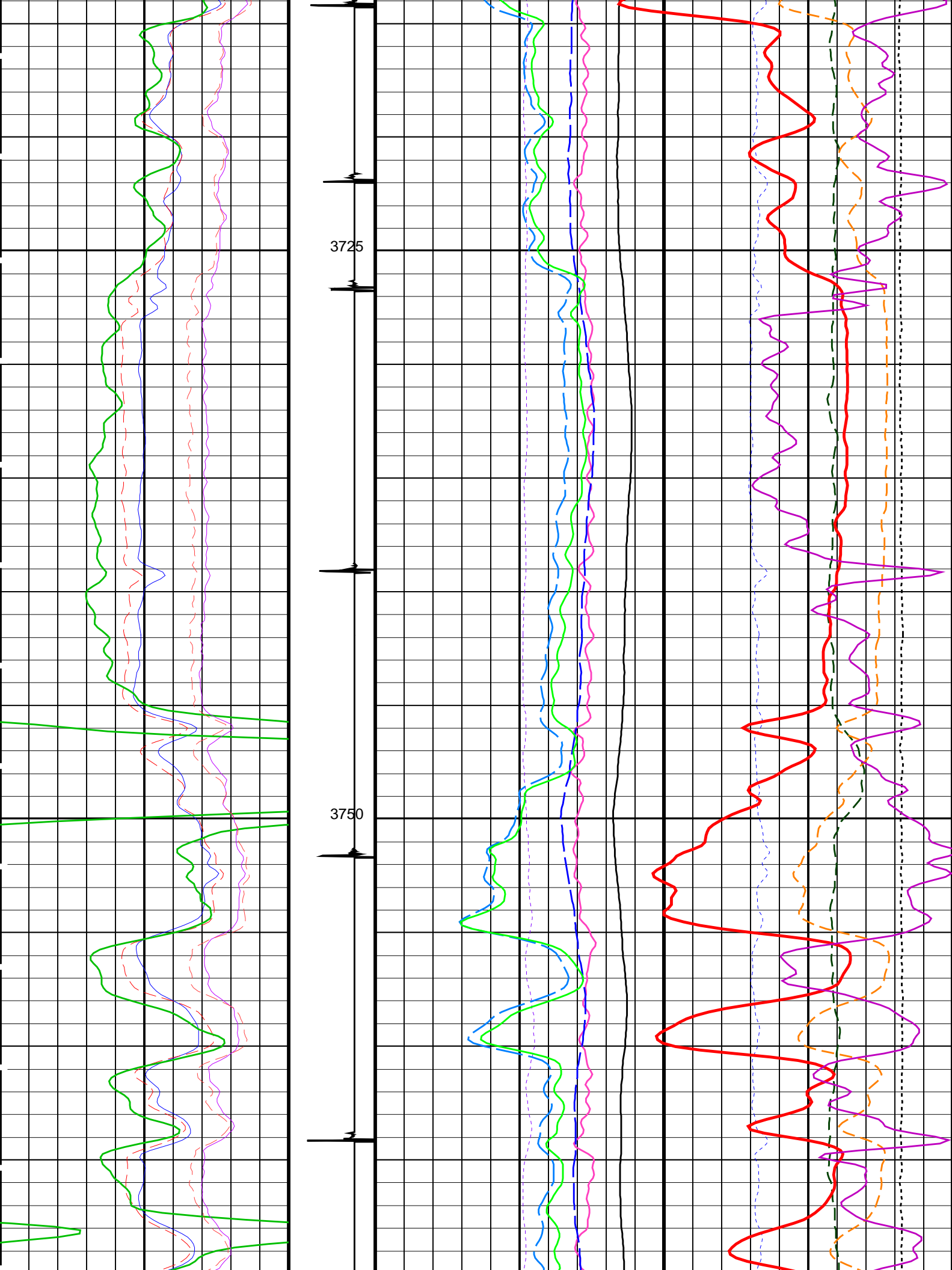
RST-C	SRPC-3971-Q1_2010_OP17	PSPT	SRPC-3971-Q1_2010_OP17
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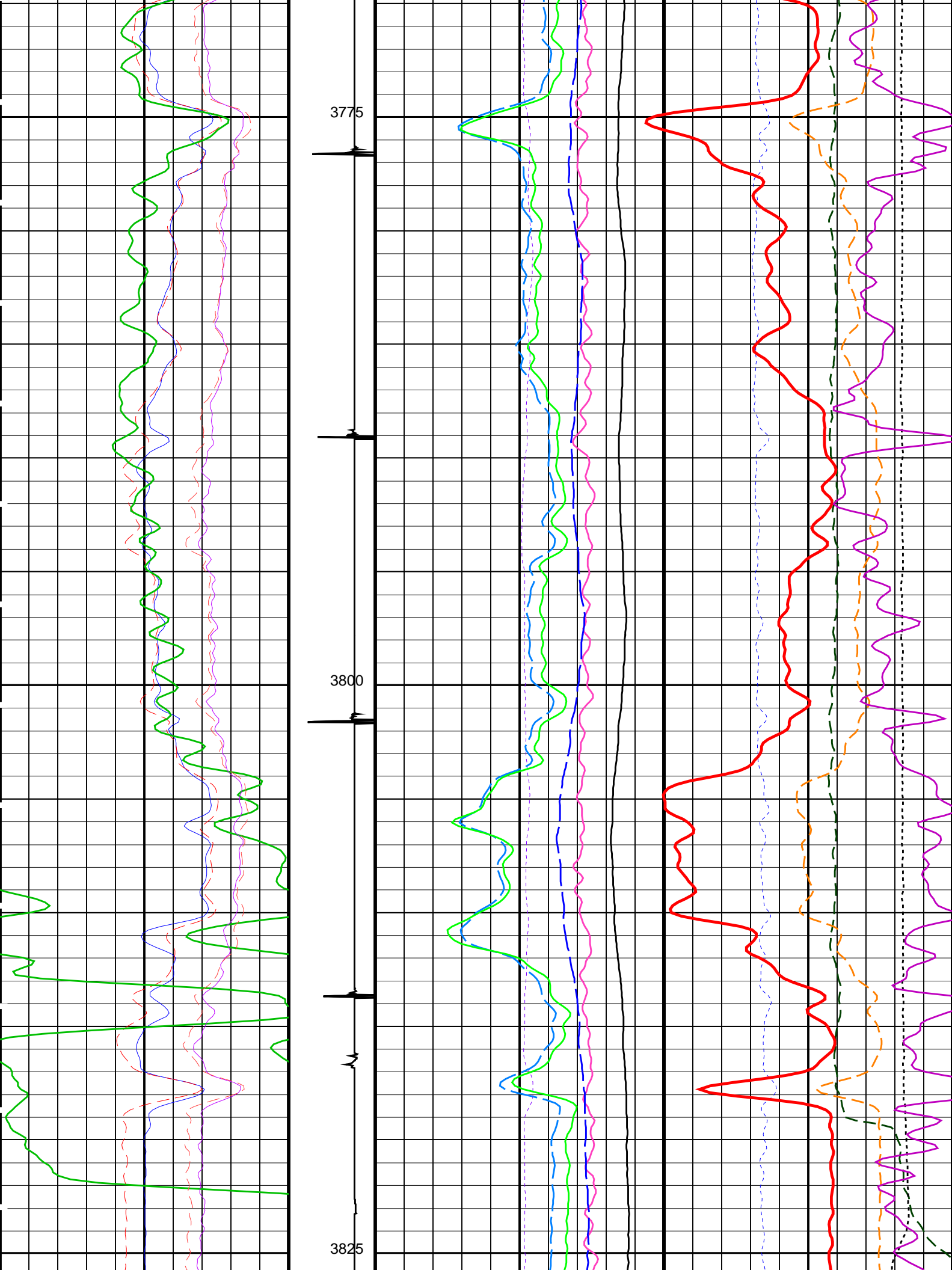
PIP SUMMARY

Time Mark Every 60 S









CSID	Casing Size I.D.	6.276	IN
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	59	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	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
PBPO	PBMS Tool position on CAN	2	
PCCG	PBMS CCL Gain	DB24	
PSTP	PSTC Tool Position on CAN Bus	1	
SHT	Surface Hole Temperature	25	DEGC
BORDYN: BorDyn (Well Test Validation)			
CSID	Casing Size I.D.	6.276	IN
System and Miscellaneous			
ALTDPCHAN	Name of alternate depth channel	SpeedCorrectedDepth	
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
DFD	Drilling Fluid Density	-50000.00	G/C3
DORL	Depth Offset for Repeat Analysis	0.0	M
FLEV	Fluid Level	630.00	M
MST	Mud Sample Temperature	-50000.00	DEGC
PBVSADP	Use alternate depth channel for playback	NO	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
TD	Total Depth	3824	M
TDD	Total Depth - Driller	3919.00	M
TDL	Total Depth - Logger	3824.00	M
TWS	Temperature of Connate Water Sample	37.78	DEGC

Format: RST_SIG_ANSW Vertical Scale: 1:200 Graphics File Created: 02-Jun-2010 11:13

OP System Version: 17C0-154

RST-C SRPC-3971-Q1_2010_OP17 PSPT SRPC-3971-Q1_2010_OP17

Output DLIS Files

DEFAULT	RST_PSP_018LUP	FN:25	PRODUCER	02-Jun-2010 11:13
CUSTOMER	RST_PSP_018LUC	FN:26	CUSTOMER	02-Jun-2010 11:13

Schlumberger

Static SIGMA Pass # 1

MAXIS Field Log

Company: Esso Australia Pty. Ltd. Well: COBIA A21A

Input DLIS Files

DEFAULT	RST_PSP_016LUP	FN:21	PRODUCER	02-Jun-2010 10:25	3836.5 M	3649.8 M
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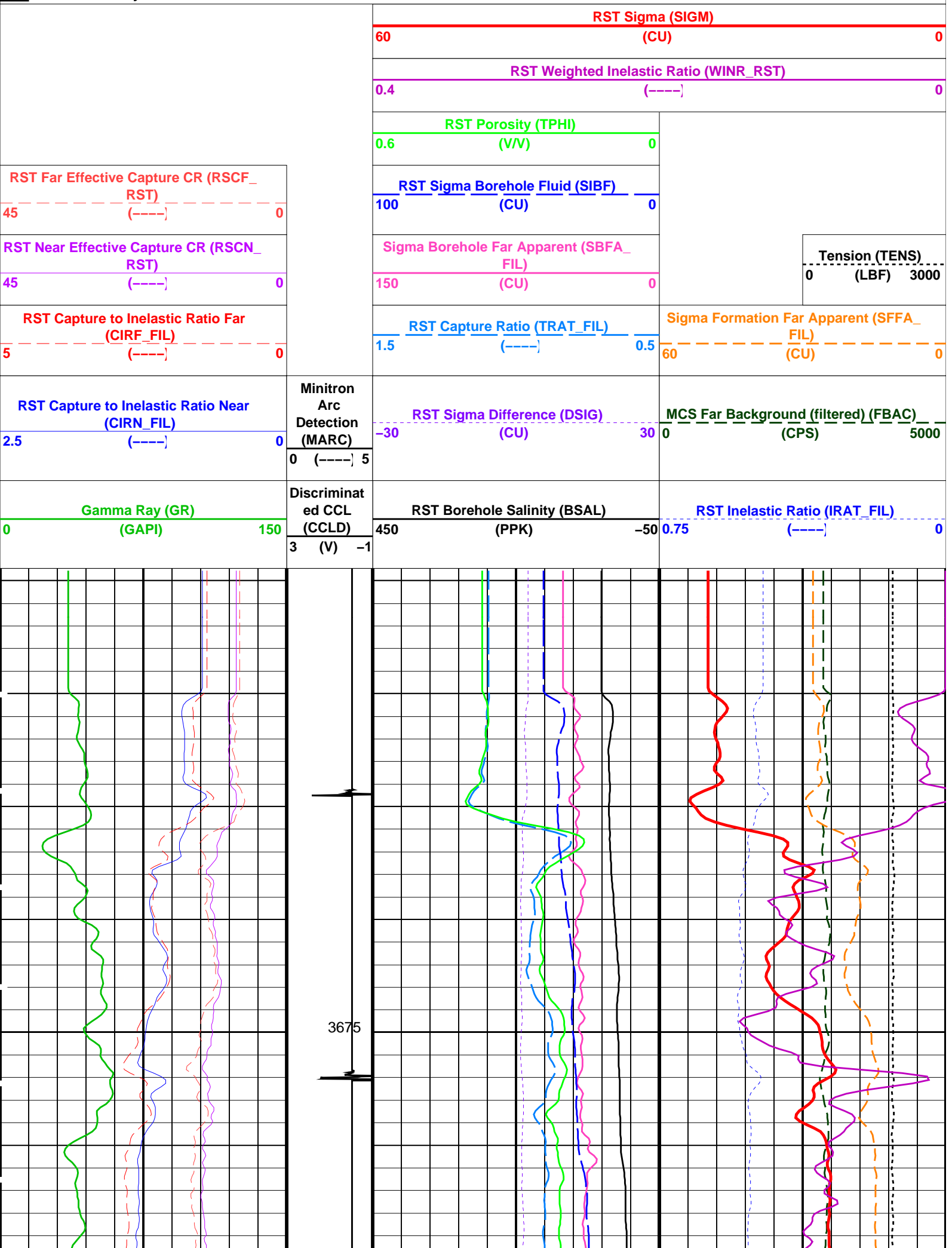
Output DLIS Files

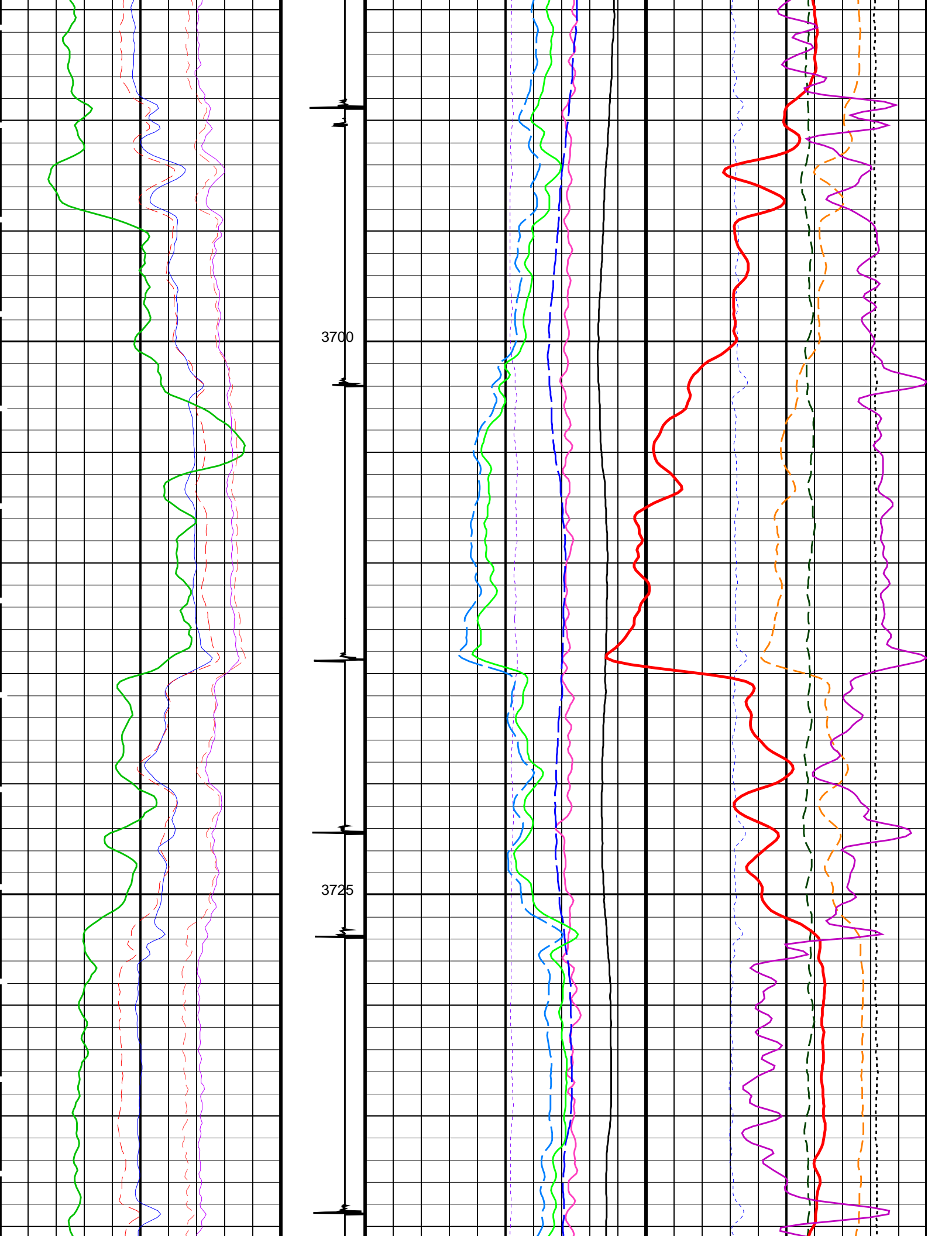
DEFAULT	RST_PSP_017PUP	FN:23	PRODUCER	02-Jun-2010 11:09	3827.1 M	3654.4 M
CUSTOMER	RST_PSP_017PUC	FN:24	CUSTOMER	02-Jun-2010 11:09	3827.1 M	3654.4 M

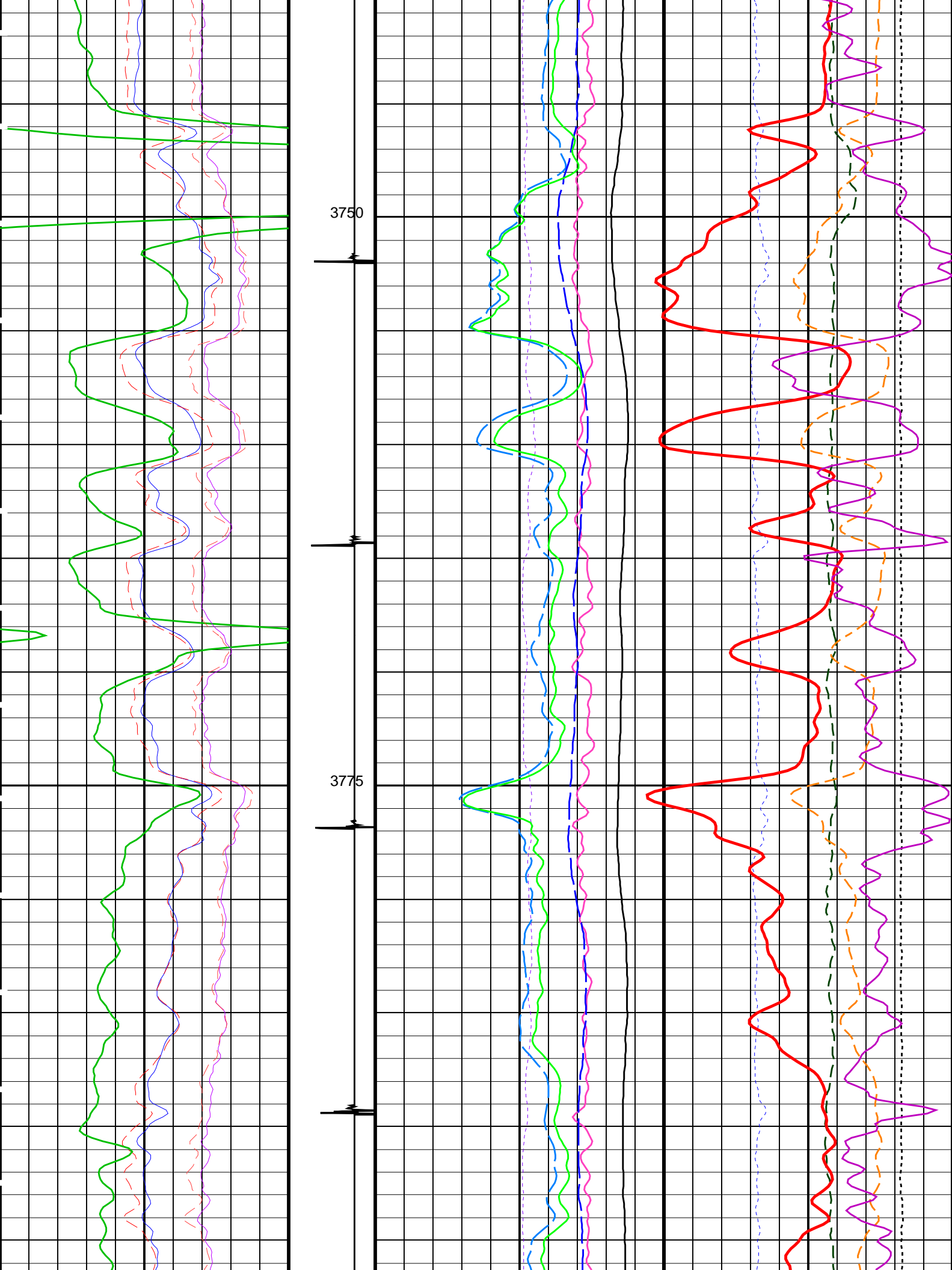
OP System Version: 17C0-154

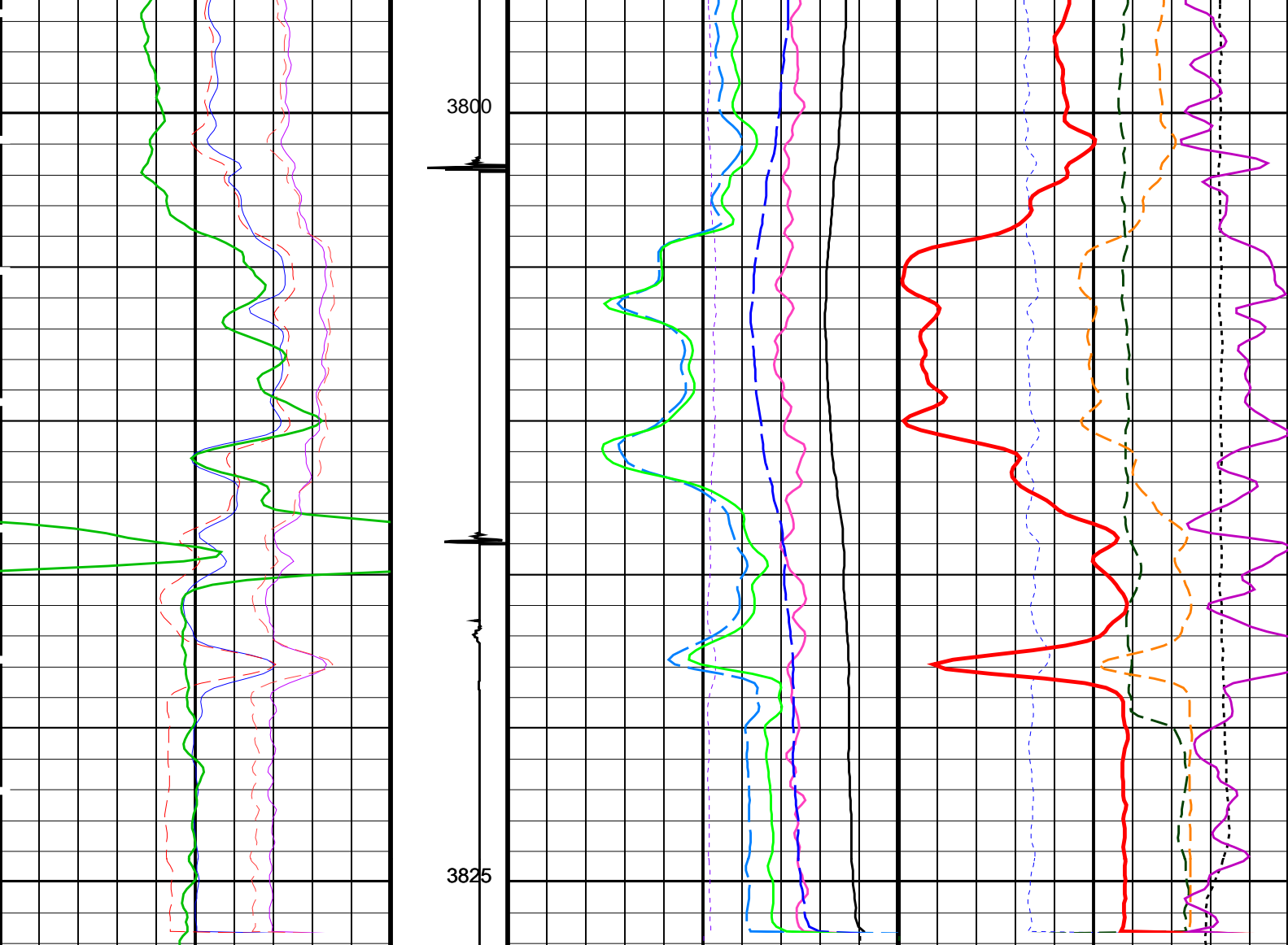
RST-C SRPC-3971-Q1_2010_OP17 PSPT SRPC-3971-Q1_2010_OP17

PIP SUMMARY









Gamma Ray (GR) (GAPI)	Discriminat ed CCL (CCLD)	RST Borehole Salinity (BSAL)		RST Inelastic Ratio (IRAT_FIL)				
		450	(PPK)	-50	0.75	(----)	0	
	3 (V) -1							
RST Capture to Inelastic Ratio Near (CIRN_FIL)	Minitron Arc Detection (MARC)	RST Sigma Difference (DSIG)		MCS Far Background (filtered) (FBAC)				
2.5		-30	(CU)	30	0	(CPS)	5000	
	0 (----) 5							
RST Capture to Inelastic Ratio Far (CIRF_FIL)		RST Capture Ratio (TRAT_FIL)		Sigma Formation Far Apparent (SFFA_				
5		1.5	(----)	0.5	60	FIL)	(CU)	0
RST Near Effective Capture CR (RSCN_		Sigma Borehole Far Apparent (SBFA_		Tension (TENS)				
RST)		FIL)						
45		150	(CU)			0		
RST Far Effective Capture CR (RSCF_		RST Sigma Borehole Fluid (SIBF)						
RST)		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			

Parameters

DLIS Name	Description	Value	
RST-C: Reservoir Saturation Pro Tool C			
	Tractor Available in Tool String	NO	
AIRB	RST Air Borehole	No	
BHS	Borehole Status	CASED	
BHT	Bottom Hole Temperature (used in calculations)	110	DEGC
BSALOPT	RST Borehole Salinity Option	Unknown	
BSFL	RST Borehole Salinity Filter Length	51	
CSID	Casing Size I.D.	6.276	IN
DFPC	RST Depth Filter Processing Constant	One	
DFPC_TDTL	RST Depth Filter Processing Constant (TDT-like)	Two	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	59	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	
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
PTIER	RST Tiered Presentation Selection	0_Customer	
PVL_PSNT_PRST	PVL Peak Signal/Noise Threshold	3	
RGAI	Near/Far Gain Calibration Ratio	1	
SHT	Surface Hole Temperature	25	DEGC
TIER_IC	RST IC Acquisition Mode	0_CO_Yield_and_Spectrolith	
TIER_SIGM	RST Sigma Acquisition Mode	0_RST_Sigma	
WOFSL_PRST	RST WFL-Off Subcycle Length	0	
WONSL_PRST	RST WFL-On Subcycle Length	0	
WSCOM_PRST	RST Station Log Comment		
PSPT: Production Services Logging Platform			
BHS	Borehole Status	CASED	
BHT	Bottom Hole Temperature (used in calculations)	110	DEGC
CSID	Casing Size I.D.	6.276	IN
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	59	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	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
PBPO	PBMS Tool position on CAN	2	
PCCG	PBMS CCL Gain	DB24	
PSTP	PSTC Tool Position on CAN Bus	1	
SHT	Surface Hole Temperature	25	DEGC
BORDYN: BorDyn (Well Test Validation)			
CSID	Casing Size I.D.	6.276	IN
System and Miscellaneous			
ALTDPCCHAN	Name of alternate depth channel	SpeedCorrectedDepth	
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
DFD	Drilling Fluid Density	-50000.00	G/C3
DO	Depth Offset for Playback	0.2	M
FLEV	Fluid Level	630.00	M
MST	Mud Sample Temperature	-50000.00	DEGC
PBVSADP	Use alternate depth channel for playback	NO	
PP	Playback Processing	NORMAL	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
TD	Total Depth	3824	M
TDD	Total Depth - Driller	3919.00	M
TDL	Total Depth - Logger	3824.00	M
TWS	Temperature of Connate Water Sample	37.78	DEGC

Format: RST_SIG_ANSW Vertical Scale: 1:200

Graphics File Created: 02-Jun-2010 11:09

OP System Version: 17C0-154

RST-C SRPC-3971-Q1_2010_OP17 PSPT SRPC-3971-Q1_2010_OP17

Input DLIS Files

DEFAULT RST_PSP_016LUP FN:21 PRODUCER 02-Jun-2010 10:25 3836.5 M 3649.8 M

Output DLIS Files

DEFAULT	RST_PSP_017PUP	FN:23	PRODUCER	02-Jun-2010 11:09
CUSTOMER	RST_PSP_017PUC	FN:24	CUSTOMER	02-Jun-2010 11:09

Schlumberger

Gamma Ray Pass

MAXIS Field Log

Company: Esso Australia Pty. Ltd.

Well: COBIA A21A

Input DLIS Files

DEFAULT	RST_PSP_013LUP	FN:15	PRODUCER	02-Jun-2010 09:41	3834.8 M	3624.8 M
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Output DLIS Files

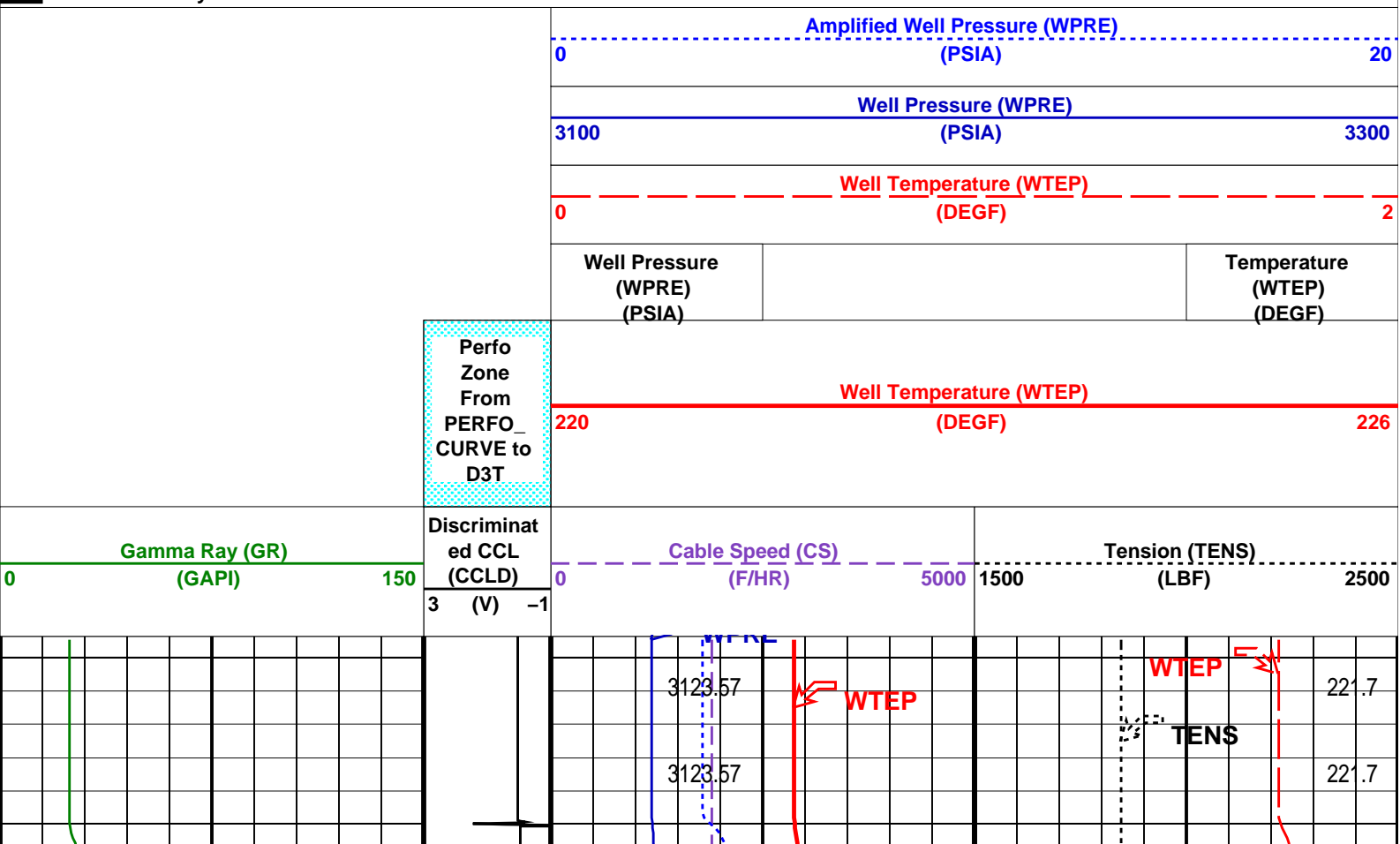
DEFAULT	RST_PSP_015PUP	FN:19	PRODUCER	02-Jun-2010 10:18
CUSTOMER	RST_PSP_015PUC	FN:20	CUSTOMER	02-Jun-2010 10:18

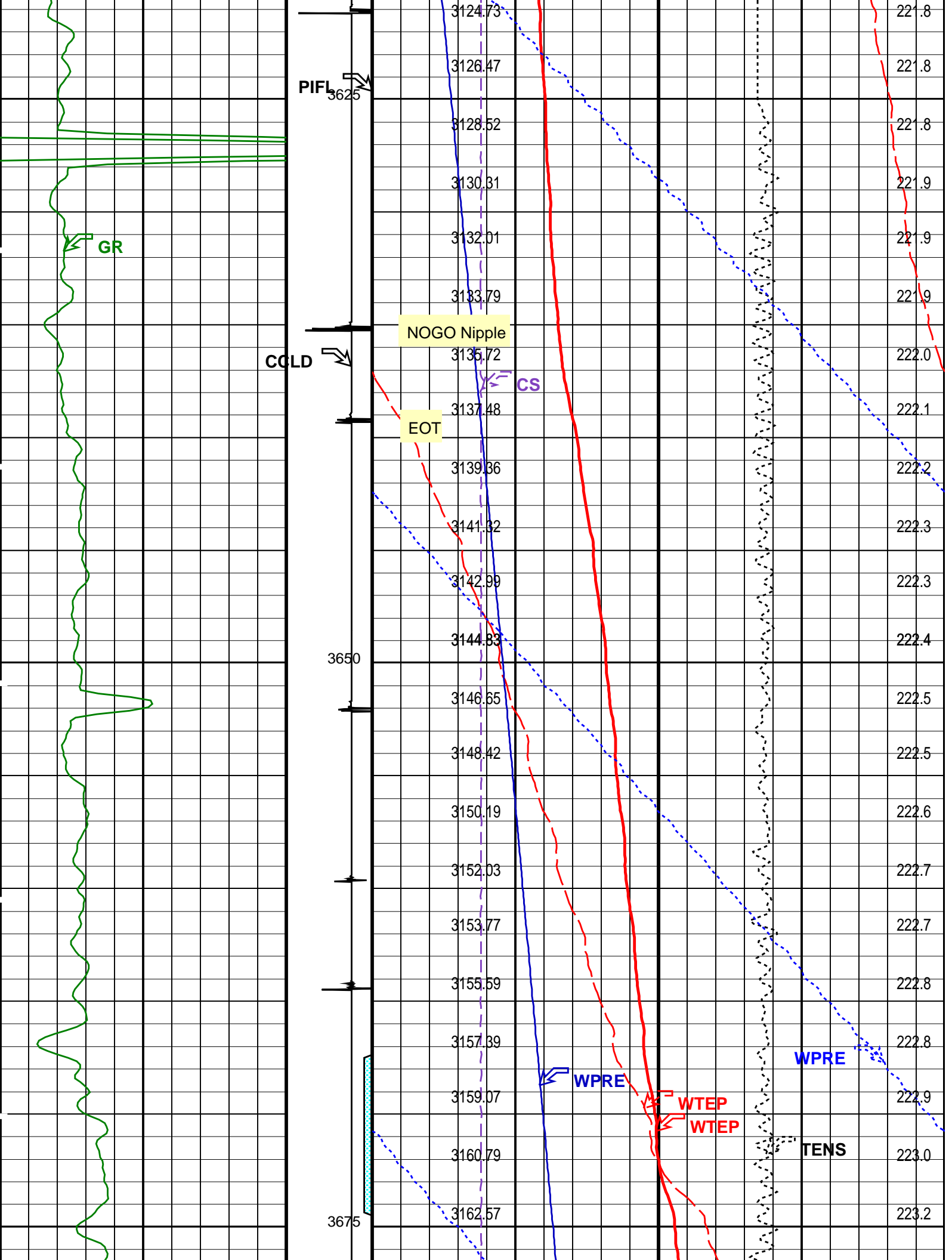
OP System Version: 17C0-154

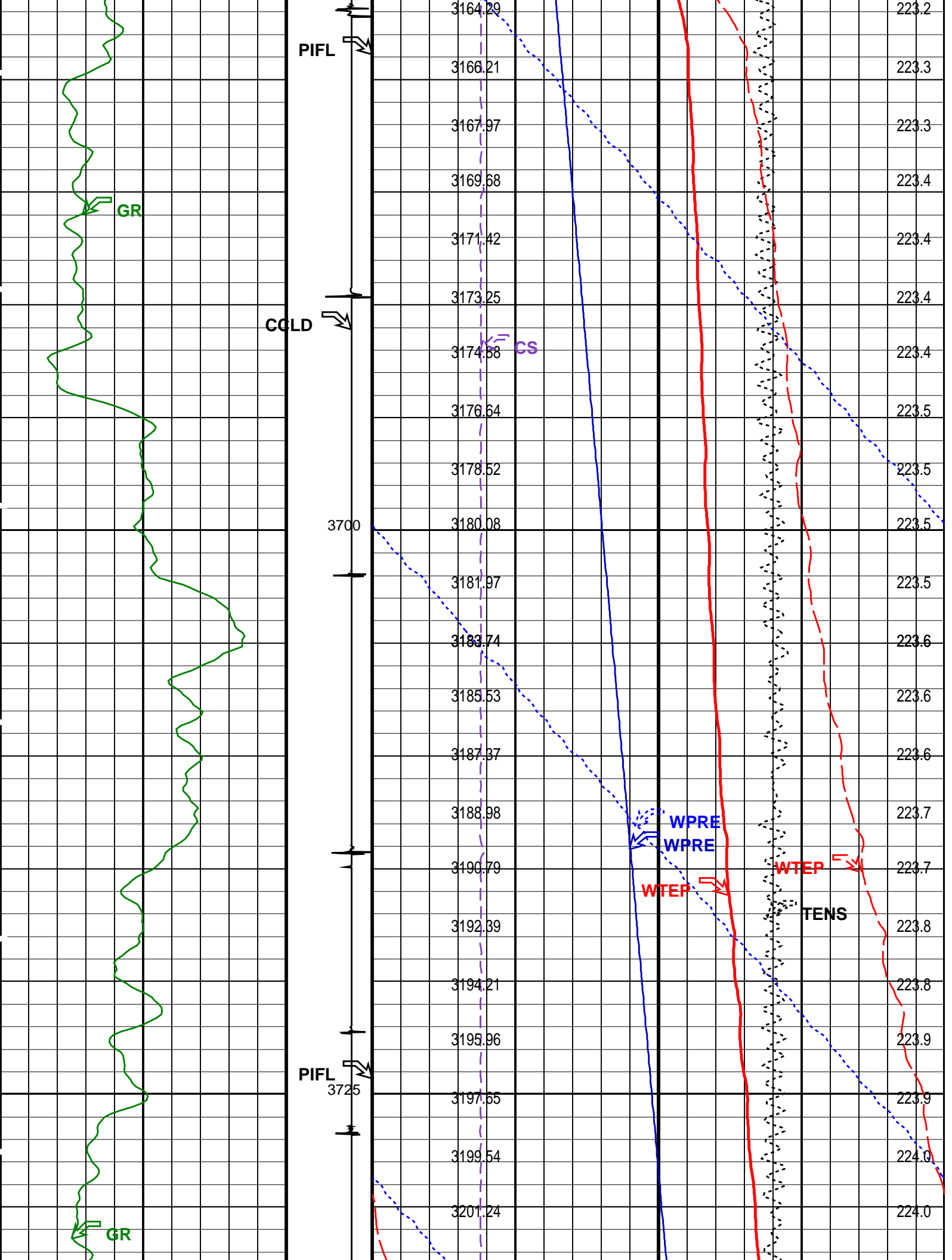
RST-C	SRPC-3971-Q1_2010_OP17	PSPT	SRPC-3971-Q1_2010_OP17
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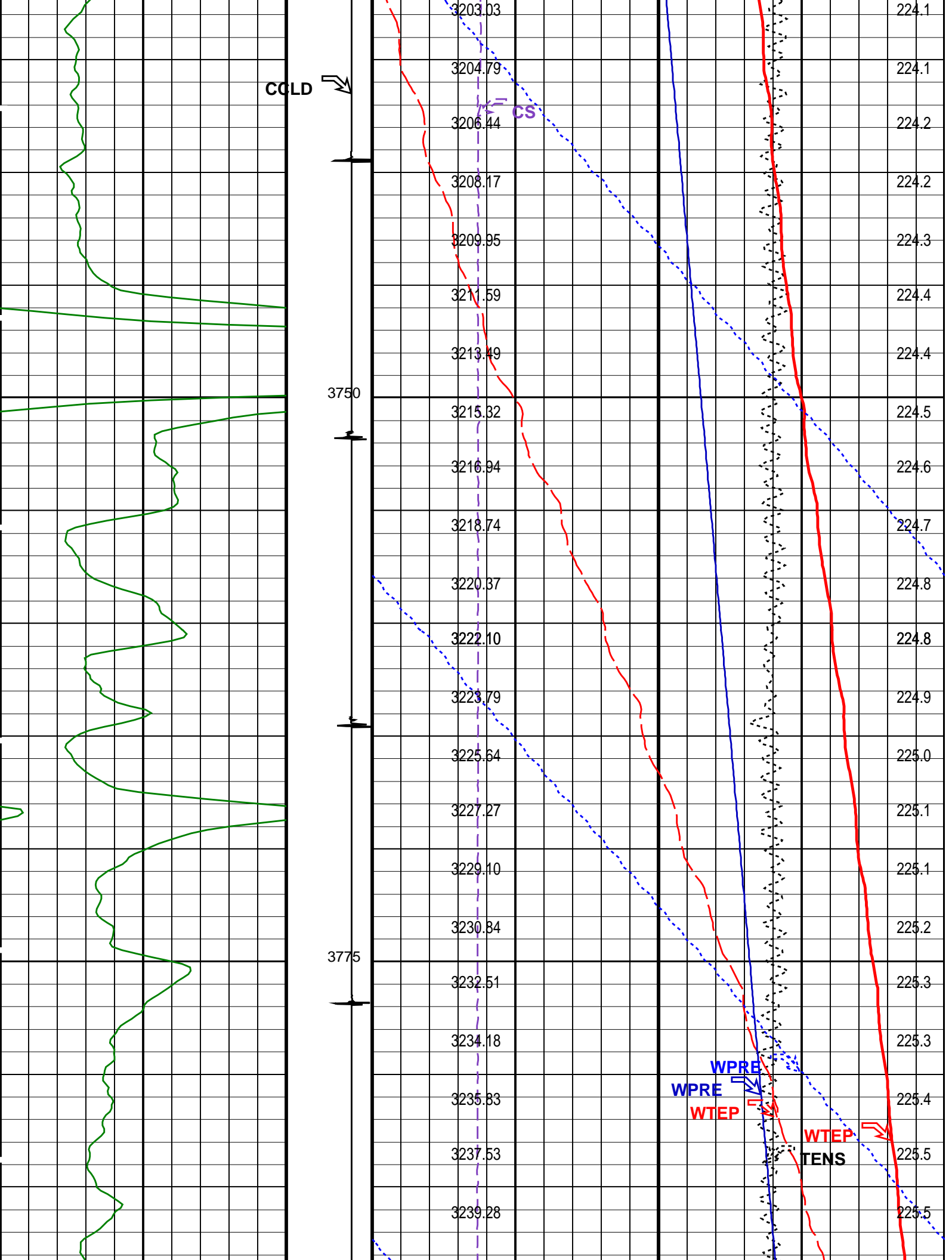
PIP SUMMARY

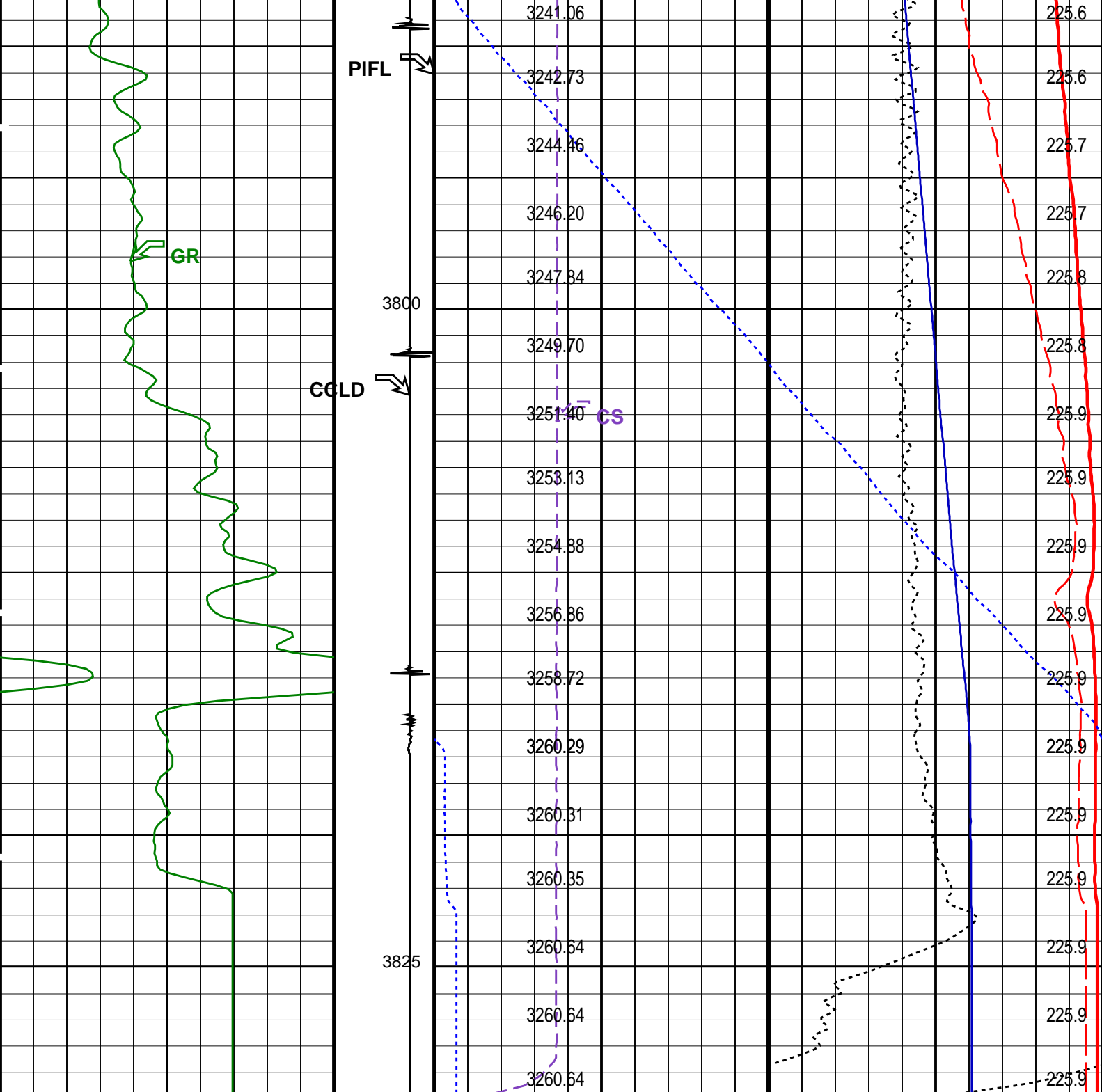
Time Mark Every 60 S







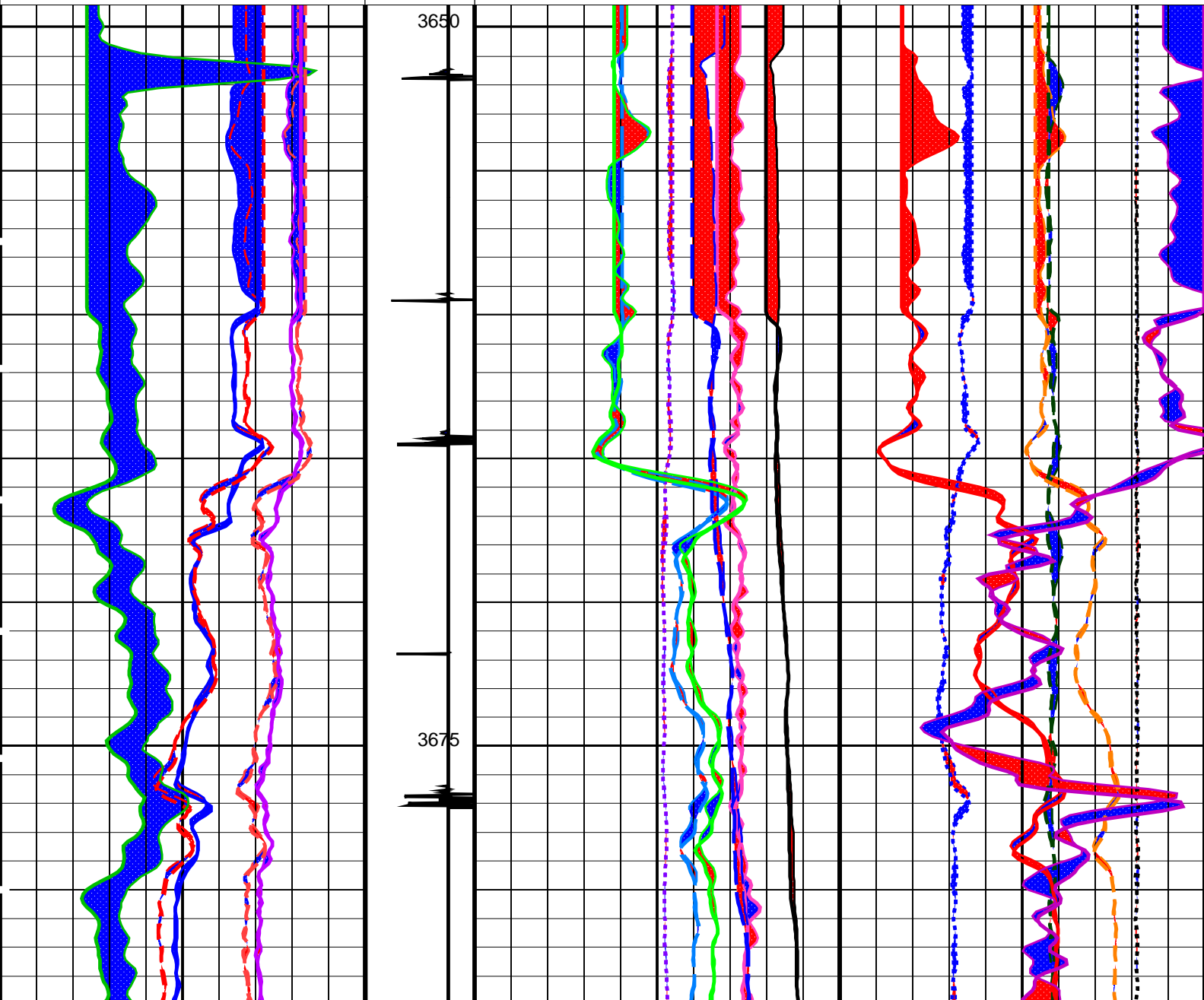
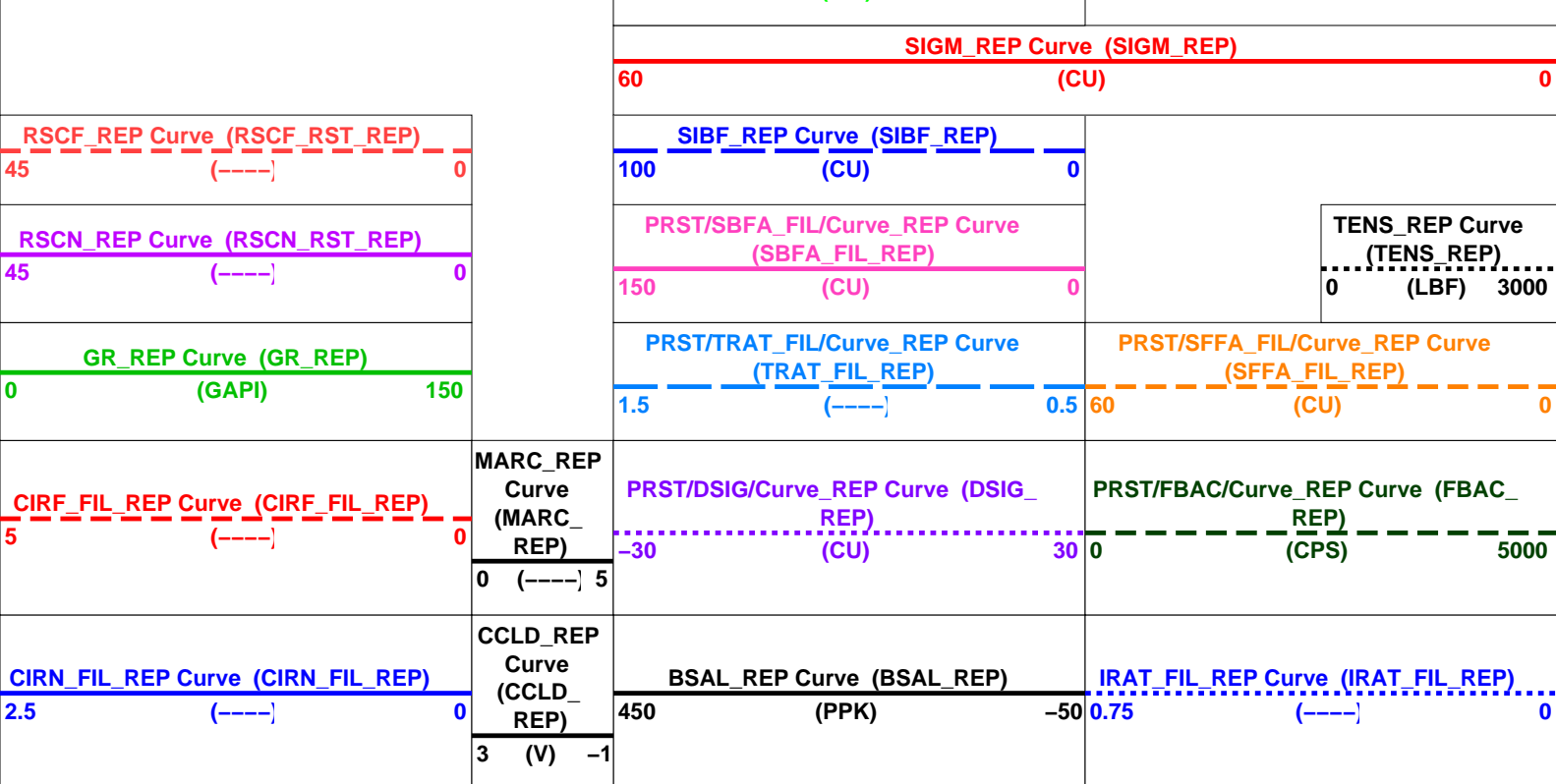


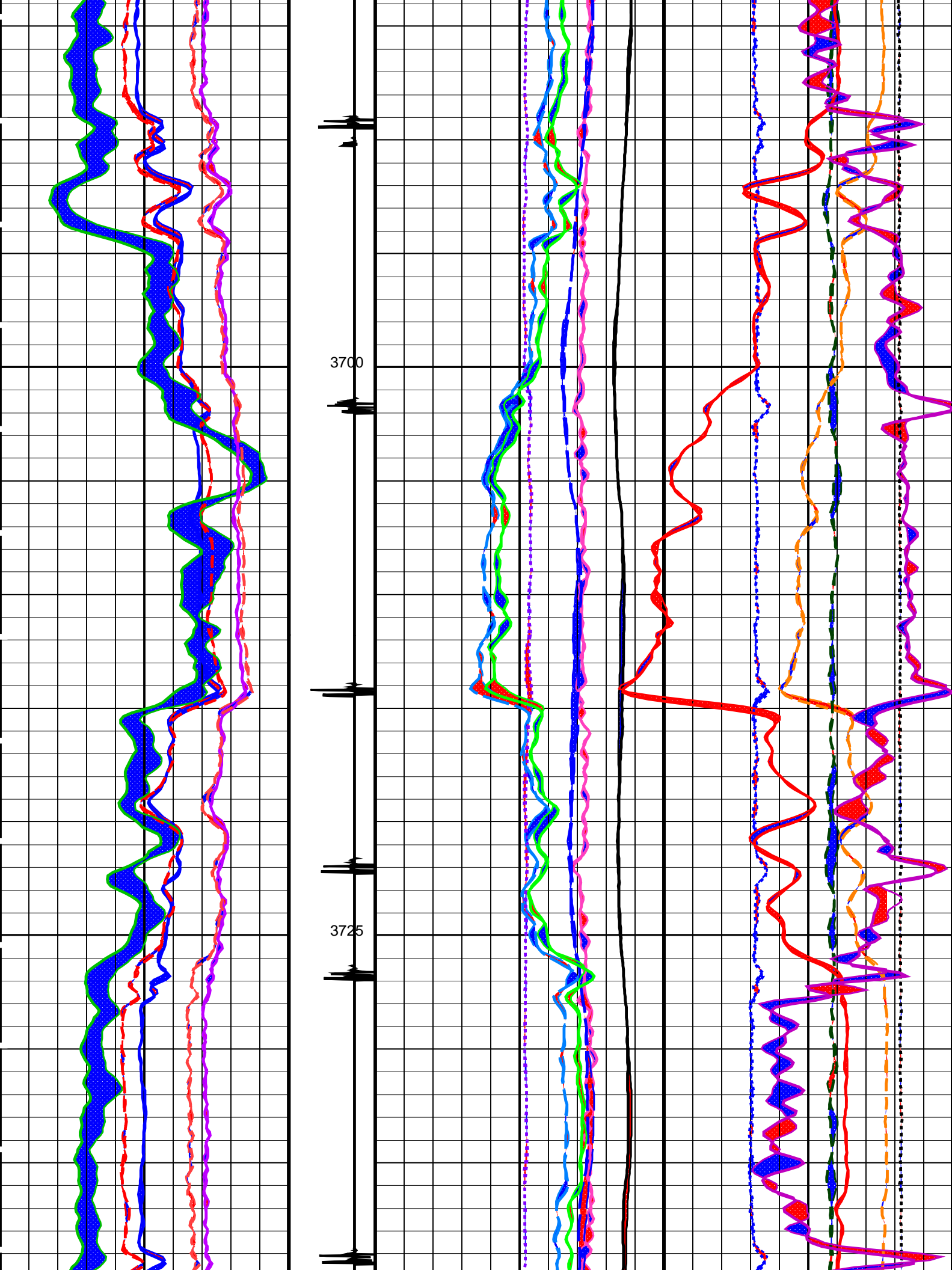


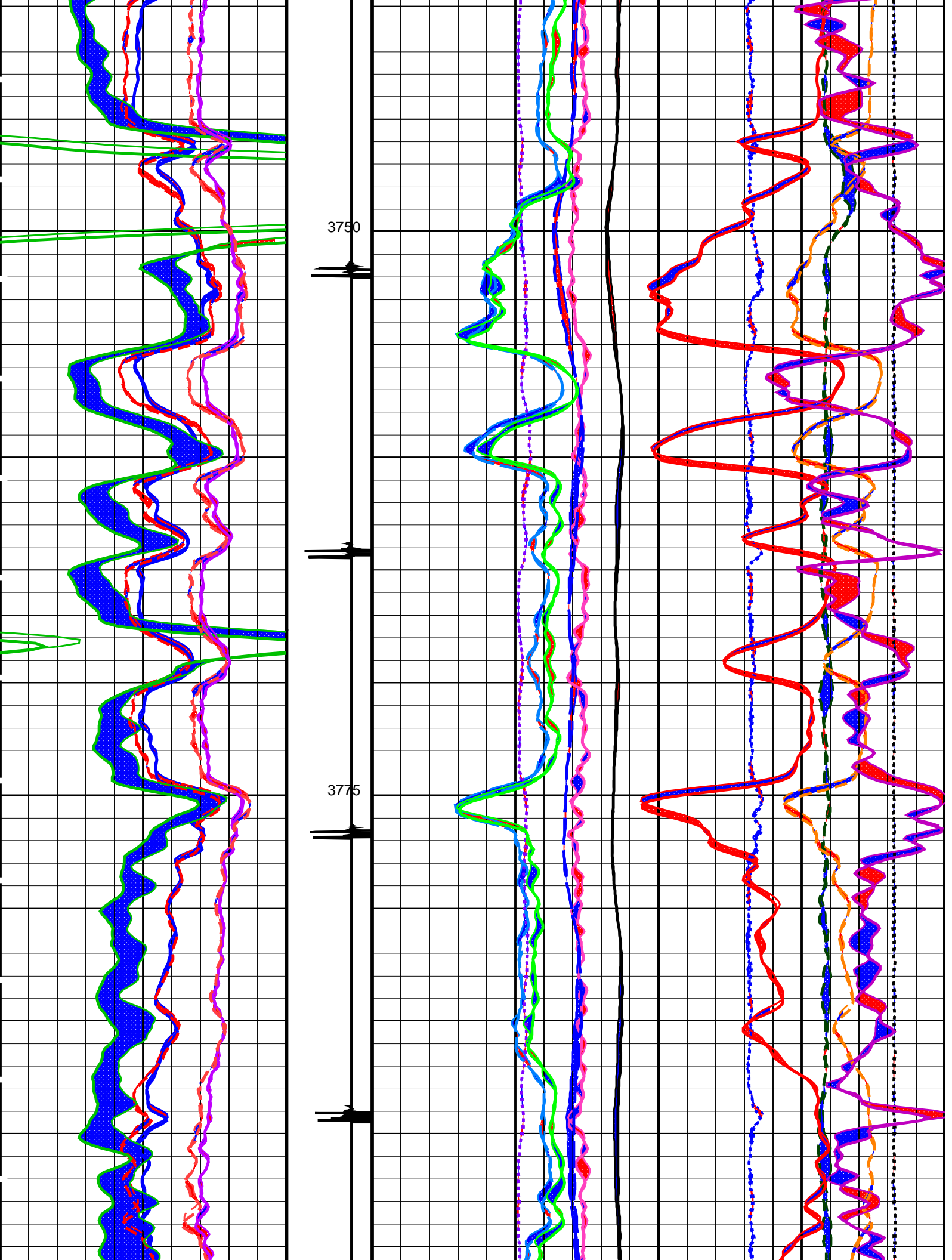
Gamma Ray (GR) (GAPI)		Discriminat ed CCL (CCLD)	Cable Speed (CS) (F/HR)		Tension (TENS) (LBF)	
0	150	3 (V) -1	0	5000	1500	2500

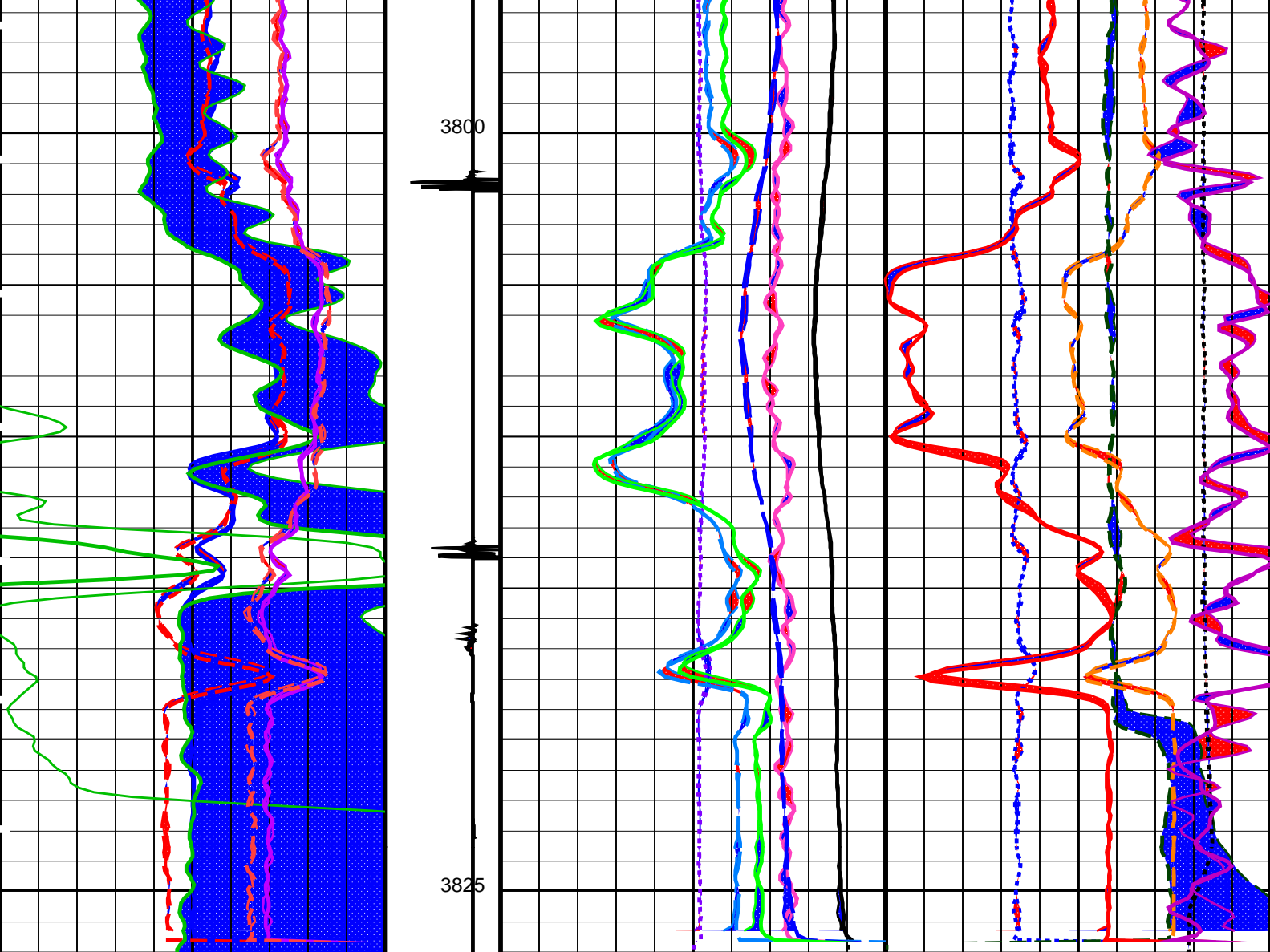
Perfo Zone From PERFO_ CURVE to D3T	Well Temperature (WTEP)		
	220	(DEGF)	226
	Well Pressure (WPRE) (PSIA)		Temperature (WTEP) (DEGF)
	Well Temperature (WTEP)		
	0	(DEGF)	2

		Well Pressure (WPRES)				
		3100	(PSIA)			3300
		Amplified Well Pressure (WPRES)				
		0	(PSIA)			20
PIP SUMMARY						
Time Mark Every 60 S						
Format: PSP_1_1		Vertical Scale: 1:200		Graphics File Created: 02-Jun-2010 10:18		
OP System Version: 17C0-154						
RST-C	SRPC-3971-Q1_2010_OP17		PSPT	SRPC-3971-Q1_2010_OP17		
Parameters						
DLIS Name		Description			Value	
System and Miscellaneous						
DO	Depth Offset for Playback				-5.0	M
PP	Playback Processing				NORMAL	
Input DLIS Files						
DEFAULT	RST_PSP_013LUP	FN:15	PRODUCER	02-Jun-2010 09:41	3834.8 M	3624.8 M
Output DLIS Files						
DEFAULT	RST_PSP_015PUP	FN:19	PRODUCER	02-Jun-2010 10:18		
CUSTOMER	RST_PSP_015PUC	FN:20	CUSTOMER	02-Jun-2010 10:18		









CIRN_FIL_REP Curve (CIRN_FIL_REP) 2.5 (----) 0	CCLD_REP Curve (CCLD_REP) 3 (V) -1	BSAL_REP Curve (BSAL_REP) 450 (PPK) -50	IRAT_FIL_REP Curve (IRAT_FIL_REP) 0.75 (----) 0
CIRF_FIL_REP Curve (CIRF_FIL_REP) 5 (----) 0	MARC_REP Curve (MARC_REP) 0 (----) 5	PRST/DSIG/Curve_REP Curve (DSIG_REP) -30 (CU) 30	PRST/FBAC/Curve_REP Curve (FBAC_REP) 0 (CPS) 5000
GR_REP Curve (GR_REP) 0 (GAPI) 150		PRST/TRAT_FIL/Curve_REP Curve (TRAT_FIL_REP) 1.5 (----) 0.5	PRST/SFFA_FIL/Curve_REP Curve (SFFA_FIL_REP) 60 (CU) 0
RSCN_REP Curve (RSCN_RST_REP) 45 (----) 0		PRST/SBFA_FIL/Curve_REP Curve (SBFA_FIL_REP) 150 (CU) 0	TENS_REP Curve (TENS_REP) 0 (LBF) 3000
RSCF_REP Curve (RSCF_RST_REP) 45 (----) 0		SIBF_REP Curve (SIBF_REP) 100 (CU) 0	
		SIGM_REP Curve (SIGM_REP) 60 (CU) 0	
		TPHI_REP Curve (TPHI_REP) 0.6 (V/V) 0	
		WINR_REP Curve (WINR_RST_REP) 0.4 (----) 0	

Time Mark Every 60 S

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
RGA1	Near/Far Gain Calibration Ratio	1	
TIER_SIGM	RST Sigma Acquisition Mode	0_RST_Sigma	
PSPT: 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
DORL	Depth Offset for Repeat Analysis	0.0	M

Format: RST SIG ANSW REP Vertical Scale: 1:200 Graphics File Created: 02-Jun-2010 11:13

RST-C	SRPC-3971-Q1 2010 OP17	PSPT	SRPC-3971-Q1 2010 OP17
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DEFAULT	RST PSP 017PUP	FN:23	PRODUCER	02-Jun-2010 11:09	3827.1 M	3654.4 M
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DEFAULT	RST_PSP_018LUP	FN:25	PRODUCER	02-Jun-2010 11:13
CUSTOMER	RST PSP 018LUC	FN:26	CUSTOMER	02-Jun-2010 11:13

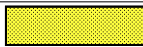

Measurement	Nominal	Master	Before	After	Change	Limit	Units
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Gamma-Ray Jig-Bkg	130.0	N/A	137.0	N/A	N/A	N/A	GAPI
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Production Logging Platform (CQG-F)
PSP Basic Measurement Sonde (CQG_F)
PSP Basic measurement module
PSP CCL
PSP GR
PSP RTD Well Temperature
PSP Crystal Quartz Gauge Type F
PSP Telemetry and bus master cartridge

PSPT – B	
PBMS – B	1750
PBMS –	
CCL –	1750
GR –	1750
RTD_ –	1750
CQG_ –	1750
PSTC – A	2760

Auxiliary Equipment:

Production Services Logging Platform Wellsite Calibration									
Detector Calibration									
Phase	Gamma-Ray Background GAPI			Value	Phase	Gamma-Ray Jig-Bkg GAPI			Value
Before				3.163	Before				137.0
0 (Minimum)				30.00 (Nominal)	120.0 (Maximum)				
					115.0 (Minimum)				130.0 (Nominal)
									145.0 (Maximum)
Before: 30-May-2010 13:21									

Company:	Esso Australia Pty. Ltd.	Schlumberger
Well:	COBIA A21A	
Field:	HALIBUT	
Rig:	Crane / Prod 4	
Country:	Australia	
RST-C		
Sigma Log		
2-June-2010		