Schlumberger

Company: **Esso Australia Pty Ltd.**

Well: **FLA A25a**
Field: **Flounder**
Rig: **Prod 3 / Flounder** Country: **Australia**

Rig: Prod 3 / Flounder
Field: Flounder
Location: Bass Srait
Well: FLA A25a
Company: Esso Australia Pty Ltd.

RST−C
Sigma Log
25−Aug−2007

LOCATION

Bass Srait	Elev.:	K.B.	40.8 m
Gippsland		G.L.	−94 m
Basin		D.F.	40.8 m

Permanent Datum:	Mean Sea Level	Elev.:	40.8 m
Log Measured From:	Drill Floor	−40.8 m	above Perm. Datum
Drilling Measured From:	Drill Floor		

State:	Max. Well Deviation	Longitude	Latitude
Victoria	59.15 deg	148* 06' 15.1"E	38* 18'45.24"S

Logging Date		25−Aug−2007					
Run Number		1					
Depth Driller		3935 m					
Schlumberger Depth		3561 m					
Bottom Log Interval		3557 m					
Top Log Interval		3510 m					
Casing Fluid Type		Produced Fluids					
Salinity							
Density		1.05 g/cm3					
Fluid Level		1625 m					
BIT/CASING/TUBING STRING							
Bit Size		9.875 in					
From		816 m					
To		3935 m					
Casing/Tubing Size		7.625 in					
Weight		29.7 lbm/ft					
Grade		L−80					
From		19.56 m					
To		3903 m					
Maximum Recorded Temperatures		227 degF					
Logger On Bottom	Time	25−Aug−2007	12:15				
Unit Number	Location	93	AUSL				
Recorded By		C.Rowand, B.Donahoe					
Witnessed By		Mr M. Wilson					

		Run 1	Run 2	Run
PVT DATA	Oil Density			
	Water Salinity			
	Gas Gravity			
	Bo			
	Bw			
	1/Bg			
	Bubble Point Pressure			
	Bubble Point Temperature			
	Solution GOR			
Maximum Deviation		59.15 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							

Run 3

Run 4

DEPTH SUMMARY LISTING

Date Created: 26−AUG−2007 18:26:31

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW−H	Type:	CMTD−B/A	Type:	2−32ZT
Serial Number:	797	Serial Number:	1721	Serial Number:	24016
Calibration Date:	11−May−2007	Calibration Date:	15−Aug−2007	Length:	5377.89 M
Calibrator Serial Number:	1	Calibrator Serial Number:	1173	Conveyance Method:	Wireline
Calibration Cable Type:	2−32ZT	Calibration Gain:	0.89	Rig Type:	Offshore_Fixed
Wheel Correction 1:	−3	Calibration Offset:	−731.00		
Wheel Correction 2:	−1				

Depth Control Parameters

Log Sequence:	Subsequent Log In the Well
Reference Log Name:	Solar Composite
Reference Log Run Number:	
Reference Log Date:	30−Jan−2004

Depth Control Remarks

1. Log correlated to Solar Composite Log provided by Esso.
2. Correlated to the Sigma curve, as the GR is affected by NORM.
3.
4.
5.
6. Tool zeroed in the Toolcatcher at 5.5 M.

DISCLAIMER
THE USE OF AND RELIANCE UPON THIS RECORDED−DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED−DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE OF AND RELIANCE UPON THE RECORDED−DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED−DATA.

OTHER SERVICES1		OTHER SERVICES2
OS1:		OS1:
OS2:	2−1/8" Phased	OS2:
OS3:	Powerjet	OS3:
OS4:	MPBT	OS4:
OS5:	Cement Bailers	OS5:

REMARKS: RUN NUMBER 1 | REMARKS: RUN NUMBER 2

Correlated to Esso Solar Composite Log provided by client.

Objective: to conduct an RST (Sigma mode) over the interval HUD to 3510m,

making two passes at 900 ft/hr with the well shut in. Locating formation gas/water contact.

Matrix = Sandstone, BS = 9−7/8", CSIZ = 7−5/8", CWEI = 29.7 lb/ft

GOC found at 1625 m

OWC found at 1690 m

HUD tagged at 3561.0 M

High GR observed.

Schlumberger Crew:

Days: Kevin Kerr (Crew chief), Nathan Simmons

RUN 1			RUN 2		
SERVICE ORDER #:			SERVICE ORDER #:		
PROGRAM VERSION:		15C0−309	PROGRAM VERSION:		
FLUID LEVEL:		1625 m	FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1 | RUN 2

SURFACE EQUIPMENT

WITM−A
PSC_16MHZ

DOWNHOLE EQUIPMENT

MH−22 — 13.68
MH−22

EQF−43 — 13.20
EQF−43 281

EQF−43 — 11.37
EQF−43 2749

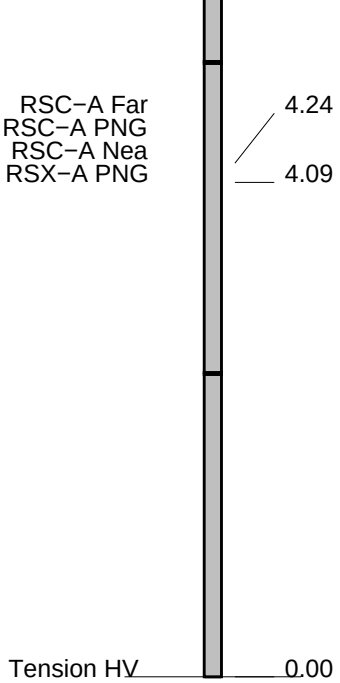
Detail MT
TelStatus
CTEM — 9.54

PSPT−B — 9.54
PSC−A
PSPT−B
PSTC 1768
PBMS−B 1747
CQG_F_Mano
RTD_Thermometer
GR
CCL
PBMS

GR — 8.41

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

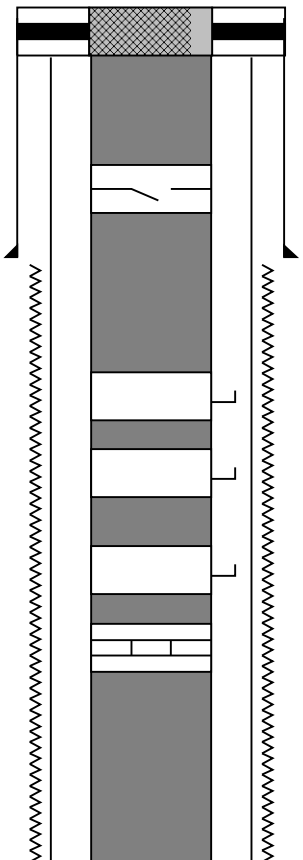
RST−C — 7.02
RSCH−A 98
RSC−C 116
RSS−A 94
RSXH−A 179
RSX−C 101



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

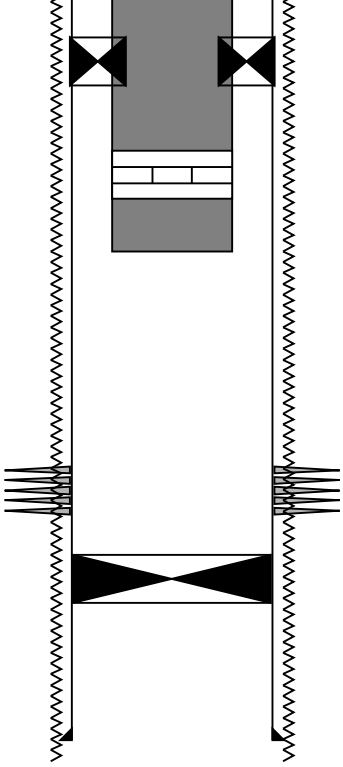
Production String	(in) OD	(in) ID	(m) MD
Tubing Hanger	7.625	3.500	19.0
Tubing	3.500	2.992	
SSSV	3.500	2.750	449.0
Side Pocket Mandrel	3.500	2.800	1043.0
Side Pocket Mandrel	3.500	2.810	1786.0
Side Pocket Mandrel	3.500	2.800	2084.0
Nipple	3.500	2.750	2100.0

Well Schematic



(m) MD	(in) OD	(in) ID	Casing String
	10.750		Casing String
19.0	7.625	6.875	Casing String
786.0	10.750		Casing Shoe
816.0	9.875		9−7/8" Bit Size

Packer	7.625	3.500	3073.0					
Nipple	3.500	2.400	3094.0					
WEG	3.500	2.992	3097.0					
					3558.0 3559.0			Perforations
MPBT Bridge Plug	7.625	0.000	3561.0					
					3903.0 3935.0	7.625 9.875	6.875	Casing Shoe Borehole Segment Bottom



Schlumberger

Merged Sigma Pass

MAXIS Field Log

Company: Esso Australia Pty Ltd. **Well: FLA A25a**

Input DLIS Files

DEFAULT	RST_PSP_016PUP	FN:41	PRODUCER	25−Aug−2007 13:38	3562.0 M	3508.4 M
DEFAULT	RST_PSP_017PUP	FN:42	PRODUCER	25−Aug−2007 13:42	3562.0 M	3508.4 M

Output DLIS Files

DEFAULT	RST_PSP_020PUP	FN:45	PRODUCER	26−Aug−2007 18:33	3562.0 M	3508.9 M

OP System Version: 15C0−309

MCM

RST−C	15C0−309	PSPT−A/B	15C0−309

PIP SUMMARY

Time Mark Every 60 S

WINR_REP Curve (WINR_RST_REP)
0.8 (---- 0

SIBF_REP Curve (SIBF_REP)
100 (CU) 0

TPHI_REP Curve (TPHI_REP)
0.6 (V/V) 0

IRAT_FIL_REP Curve (IRAT_FIL_REP)
0.75 (---- 0

RSCF_REP Curve (RSCF_RST_REP)
45 (---- 0

SIGM_REP Curve (SIGM_REP)
60 (CU) 0

RSCN_REP Curve (RSCN_RST_REP)
45 (---- 0

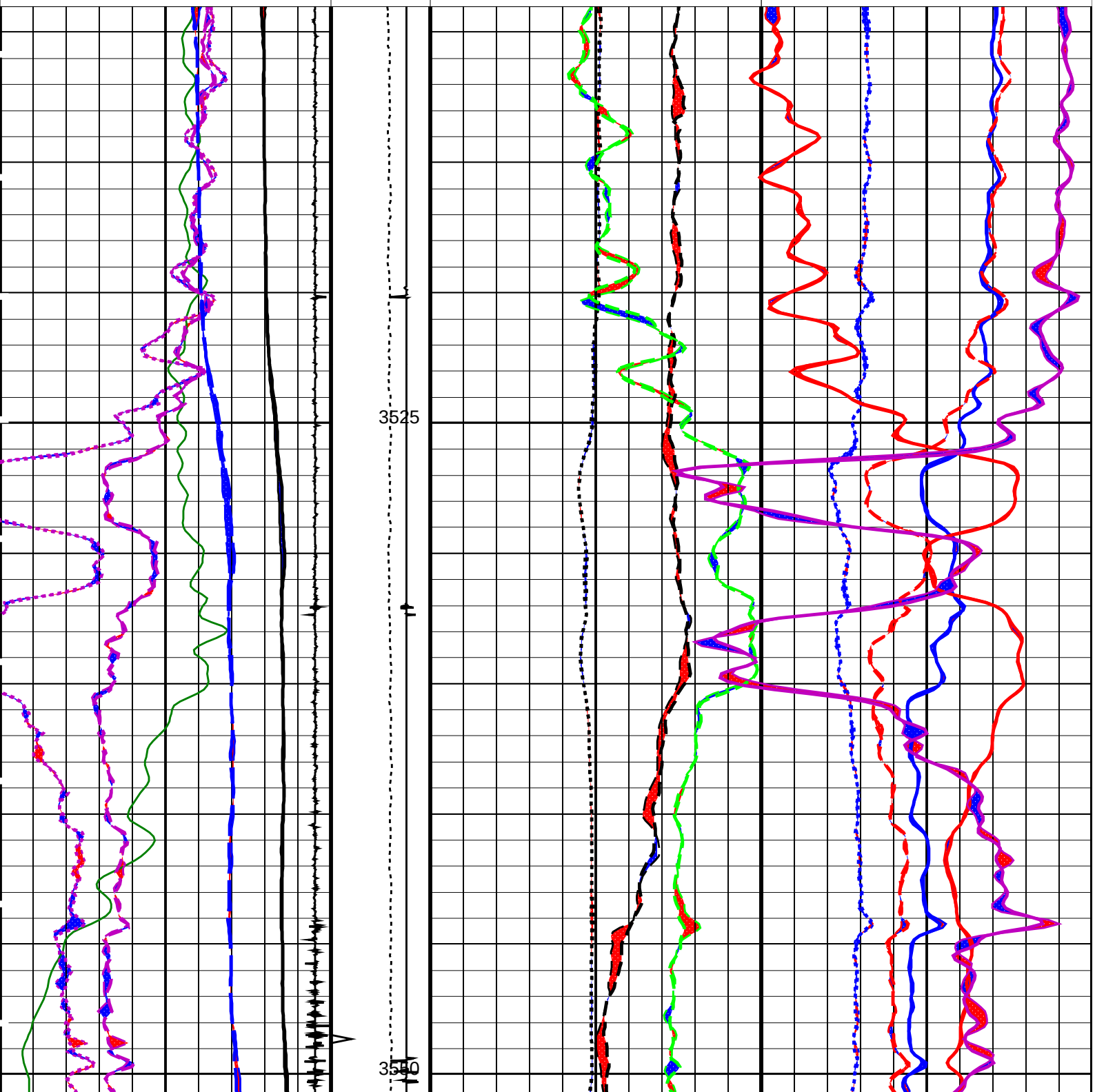
PRST/FBAC/Curve_REP Curve (FBAC_REP)
0 (CPS) 5000

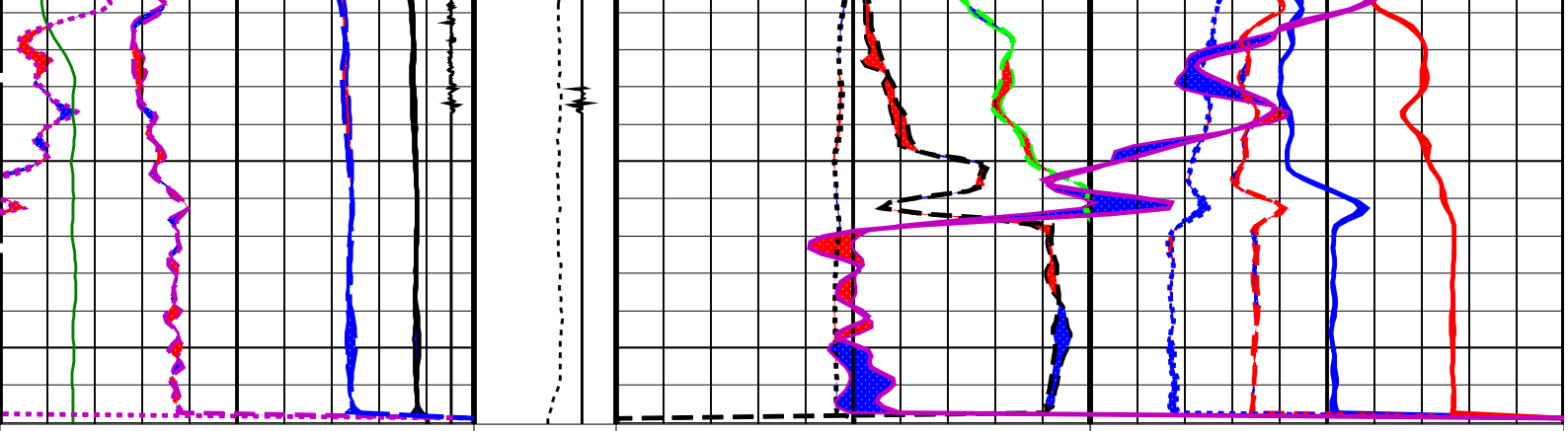
CIRF_FIL_REP Curve (CIRF_FIL_REP)
5 (---- 0

BSAL_REP Curve (BSAL_REP)
450 (PPK) −50

PRST/DSIG/Curve_REP Curve (DSIG_REP)
−30 (CU) 30

CIRN_FIL_REP Curve (CIRN_FIL_REP)
2.5 (---- 0





BSAL_REP Curve (BSAL_REP) 450 (PPK) −50	PRST/DSIG/Curve_REP Curve (DSIG_REP) −30 (CU) 30	CIRN_FIL_REP Curve (CIRN_FIL_REP) 2.5 (---- 0
RSCN_REP Curve (RSCN_RST_REP) 45 (---- 0	PRST/FBAC/Curve_REP Curve (FBAC_REP) 0 (CPS) 5000	CIRF_FIL_REP Curve (CIRF_FIL_REP) 5 (---- 0
RSCF_REP Curve (RSCF_RST_REP) 45 (---- 0	SIGM_REP Curve (SIGM_REP) 60 (CU) 0	
SIBF_REP Curve (SIBF_REP) 100 (CU) 0	TPHI_REP Curve (TPHI_REP) 0.6 (V/V) 0	IRAT_FIL_REP Curve (IRAT_FIL_REP) 0.75 (---- 0
	WINR_REP Curve (WINR_RST_REP) 0.8 (---- 0	

PIP SUMMARY

Time Mark Every 60 S

Format: RST_SIG_ANSW_REP Vertical Scale: 1:200 Graphics File Created: 26−Aug−2007 18:33

OP System Version: 15C0−309

MCM

RST−C	15C0−309	PSPT−A/B	15C0−309

Input DLIS Files

DEFAULT	RST_PSP_016PUP	FN:41	PRODUCER	25−Aug−2007 13:38	3562.0 M	3508.4 M
DEFAULT	RST_PSP_017PUP	FN:42	PRODUCER	25−Aug−2007 13:42	3562.0 M	3508.4 M

Output DLIS Files

DEFAULT	RST_PSP_020PUP	FN:45	PRODUCER	26−Aug−2007 18:33

Schlumberger

RST Sigma Pass 2

MAXIS Field Log

Company: Esso Australia Pty Ltd. Well: FLA A25a

Input DLIS Files

DEFAULT	RST_PSP_017LUP	FN:16	PRODUCER	25−Aug−2007 13:05	3565.6 M	3491.6 M

Output DLIS Files

DEFAULT RST_PSP_017PUP FN:42 PRODUCER 26−Aug−2007 18:17 3562.0 M 3508.4 M

OP System Version: 15C0−309

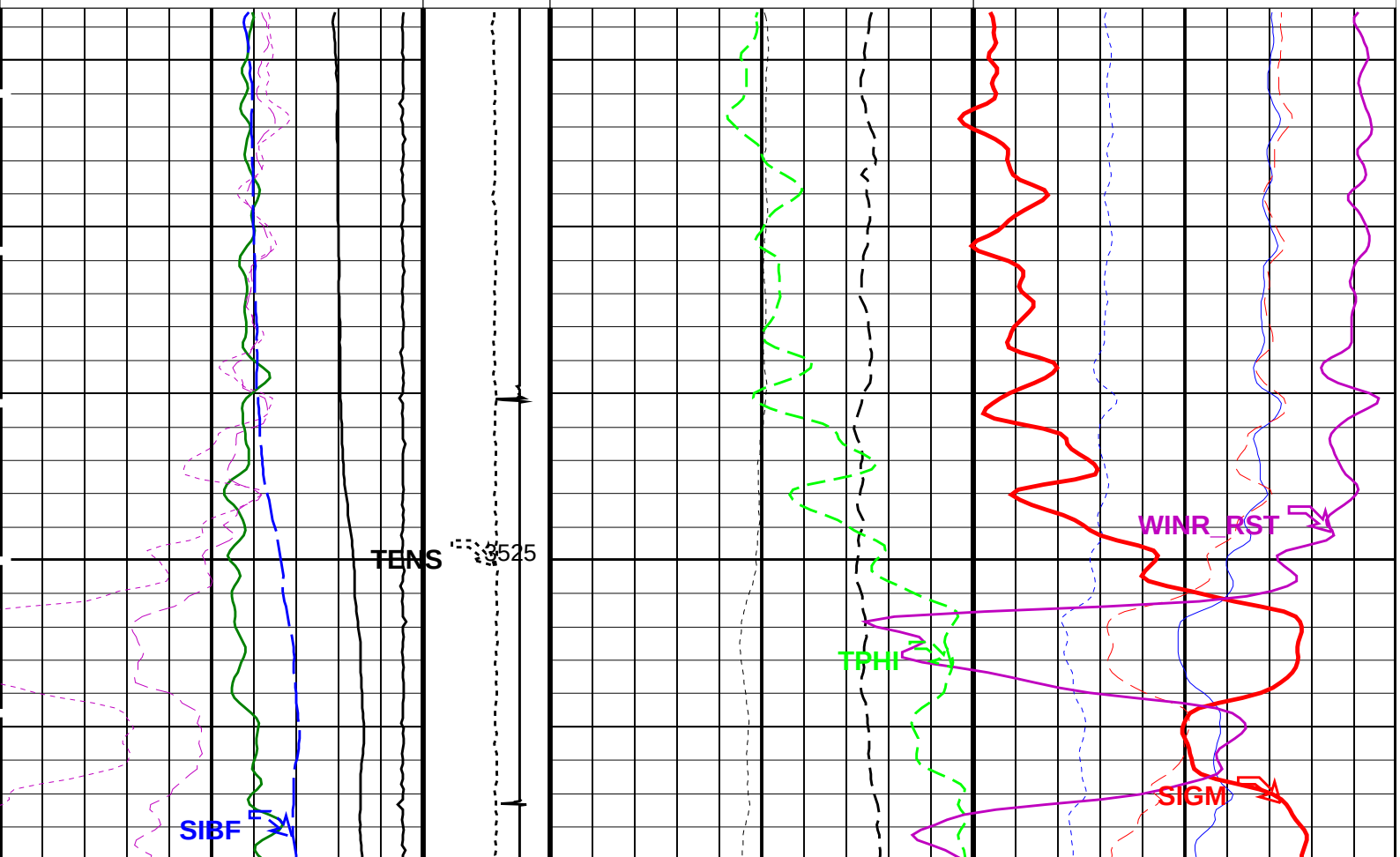
MCM

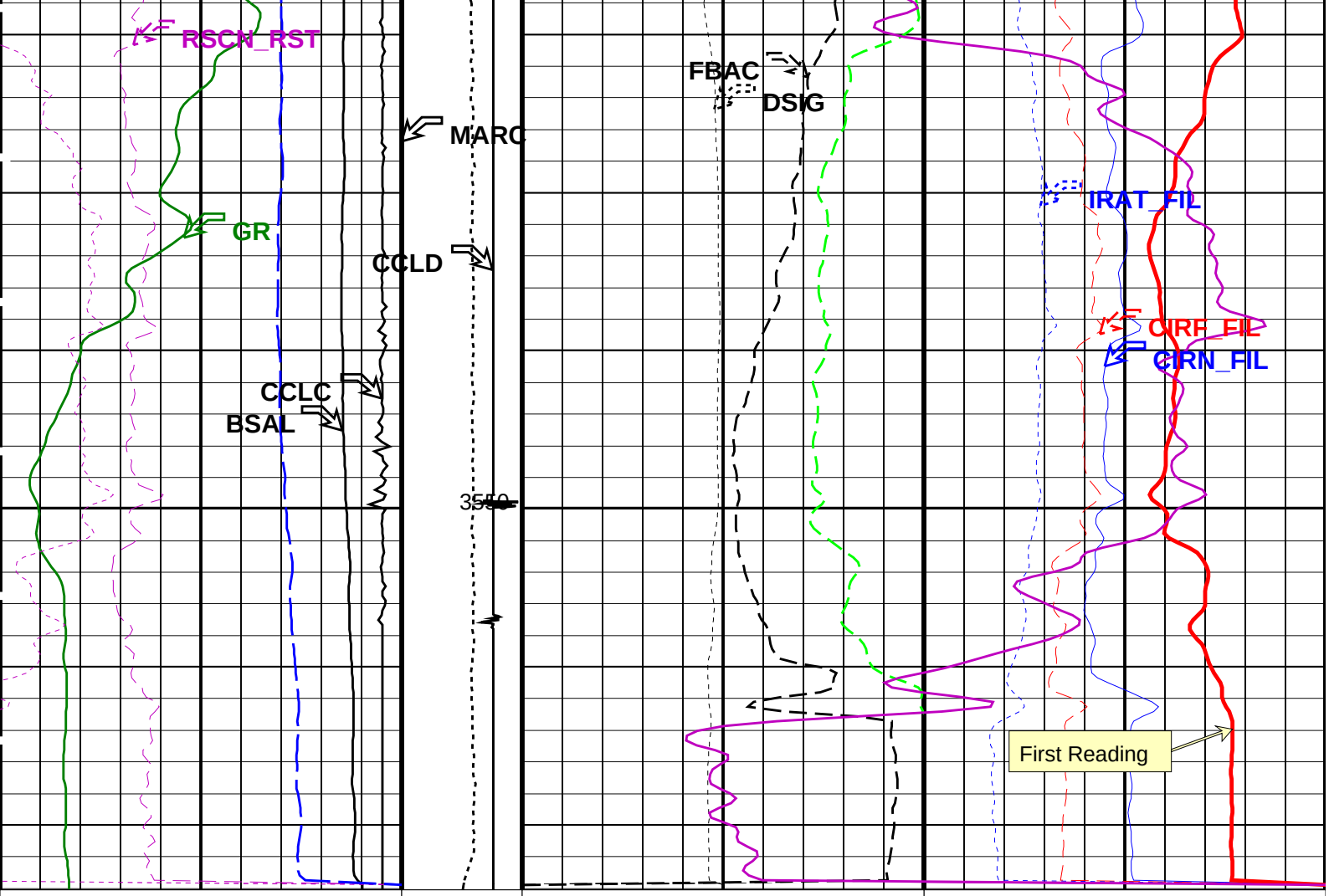
RST−C 15C0−309 PSPT−A/B 15C0−309

PIP SUMMARY

Time Mark Every 60 S

RST Far Effective Capture CR (RSCF_RST)	45 (−−−− 0	
RST Near Effective Capture CR (RSCN_RST)	45 (−−−− 0	
RST Weighted Inelastic Ratio (WINR_RST)	0.8 (−−−− 0	
RST Sigma Borehole Fluid (SIBF)	100 (CU) 0	
RST Porosity (TPHI)	0.6 (V/V) 0	
RST Inelastic Ratio (IRAT_FIL)	0.75 (−−−− 0	
Gamma Ray (GR)	0 (GAPI) 2000	
Minitron Arc Detection (MARC)	0 (−−−− 5	
RST Sigma (SIGM)	60 (CU) 0	
(CCLC)	−19 (V) 1	
Tension (TENS) (LBF)	1000 3000	
MCS Far Background (filtered) (FBAC)	0 (CPS) 5000	
RST Capture to Inelastic Ratio Far (CIRF_FIL)	5 (−−−− 0	
RST Borehole Salinity (BSAL)	450 (PPK) −50	
Discriminated CCL (CCLD)	3 (V) −1	
RST Sigma Difference (DSIG)	−30 (CU) 30	
RST Capture to Inelastic Ratio Near (CIRN_FIL)	2.5 (−−−− 0	





RST Borehole Salinity (BSAL) 450 (PPK) −50	Discriminated CCL (CCLD) 3 (V) −1	RST Sigma Difference (DSIG) −30 (CU) 30	RST Capture to Inelastic Ratio Near (CIRN_FIL) 2.5 (---- 0
(CCLC) −19 (V) 1	Tension (TENS) (LBF) 1000 3000	MCS Far Background (filtered) (FBAC) 0 (CPS) 5000	RST Capture to Inelastic Ratio Far (CIRF_FIL) 5 (---- 0
Gamma Ray (GR) 0 (GAPI) 2000	Minitron Arc Detection (MARC) 0 (---- 5	RST Sigma (SIGM) 60 (CU) 0	
RST Sigma Borehole Fluid (SIBF) 100 (CU) 0		RST Porosity (TPHI) 0.6 (V/V) 0	RST Inelastic Ratio (IRAT_FIL) 0.75 (---- 0
RST Near Effective Capture CR (RSCN_RST) 45 (---- 0		RST Weighted Inelastic Ratio (WINR_RST) 0.8 (---- 0	
RST Far Effective Capture CR (RSCF_RST) 45 (---- 0			

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
	RST−C: Reservoir Saturation Pro Tool C	
AIRR	RST Air Borehole	No

AIRB	RST All 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	
SMBMO	RST Sigma Mode Background (Minitron Off)	No	
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	9.875	IN
BSAL	Borehole Salinity	−50000.00	PPM
DO	Depth Offset for Playback	4.0	M
PP	Playback Processing	NORMAL	

Format: RST_SIG_ANSW Vertical Scale: 1:200 Graphics File Created: 26−Aug−2007 18:17

OP System Version: 15C0−309

MCM

RST−C 15C0−309 PSPT−A/B 15C0−309

Input DLIS Files

DEFAULT	RST_PSP_017LUP	FN:16	PRODUCER	25−Aug−2007 13:05	3565.6 M	3491.6 M

Output DLIS Files

DEFAULT	RST_PSP_017PUP	FN:42	PRODUCER	26−Aug−2007 18:17

Schlumberger

RST Sigma Pass 1

MAXIS Field Log

Company: Esso Australia Pty Ltd. Well: FLA A25a

Input DLIS Files

DEFAULT	RST_PSP_016LUP	FN:15	PRODUCER	25−Aug−2007 12:40	3567.4 M	3488.9 M

Output DLIS Files

DEFAULT	RST_PSP_016PUP	FN:41	PRODUCER	26−Aug−2007 18:13	3562.0 M	3508.4 M

OP System Version: 15C0−309

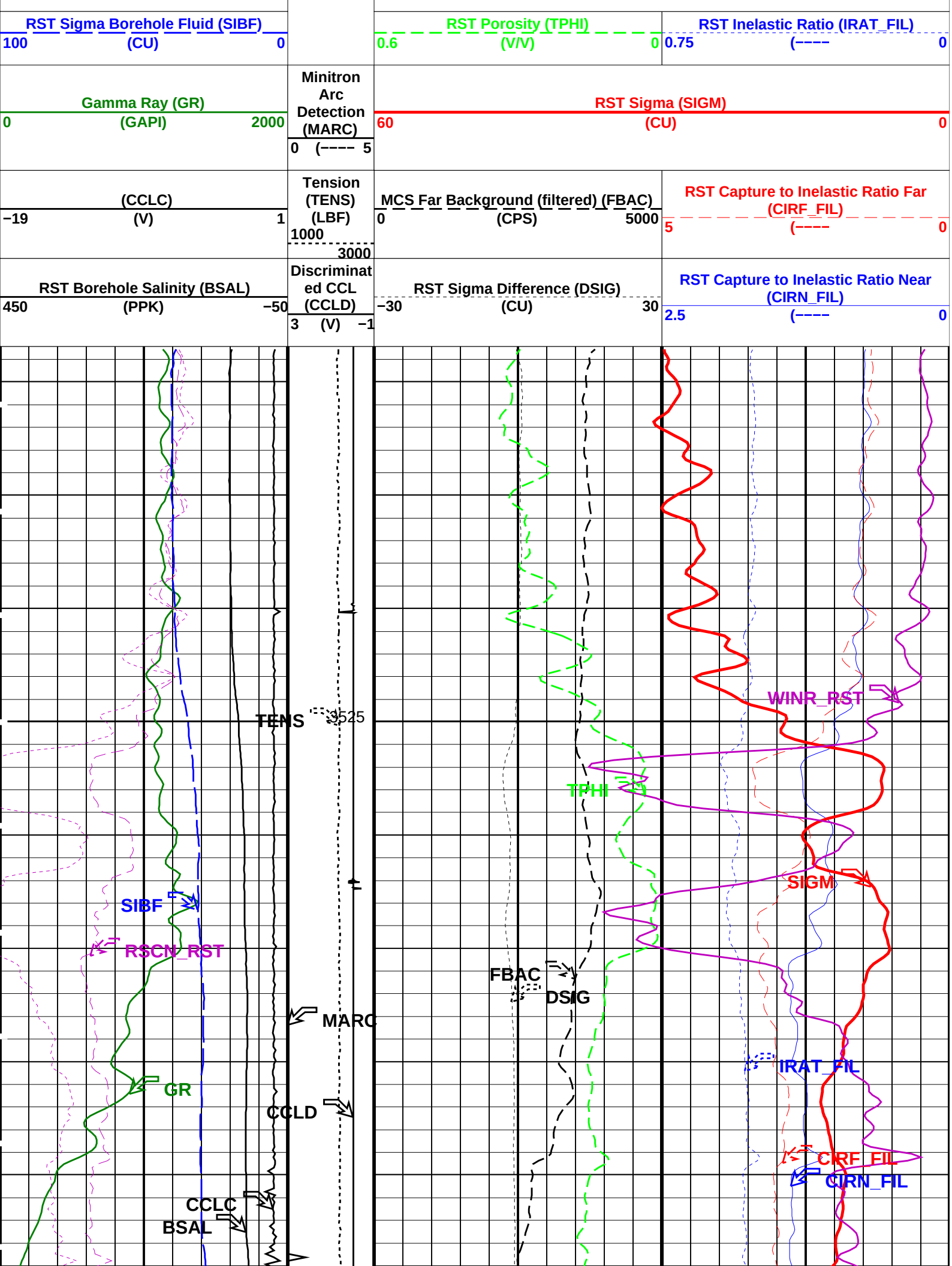
MCM

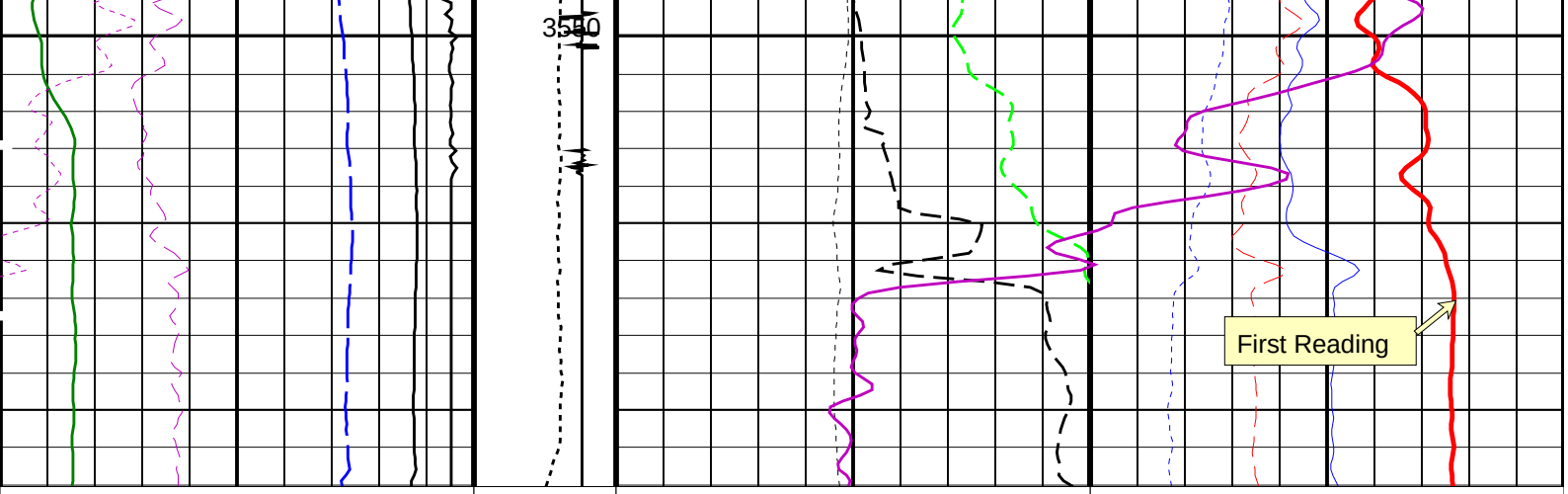
RST−C 15C0−309 PSPT−A/B 15C0−309

PIP SUMMARY

Time Mark Every 60 S

RST Far Effective Capture CR (RSCF_RST)		
45	(−−−−	0
RST Near Effective Capture CR (RSCN_RST)		
45	(−−−−	0
RST Weighted Inelastic Ratio (WINR_RST)		
0.8	(−−−−	0


RST Sigma Borehole Fluid (SIBF)
100 (CU) 0
RST Porosity (TPHI)
0.6 (V/V) 0
RST Inelastic Ratio (IRAT_FIL)
0.75 (---- 0
Gamma Ray (GR)
0 (GAPI) 2000
Minitron Arc Detection (MARC)
0 (---- 5
RST Sigma (SIGM)
60 (CU) 0
(CCLC)
-19 (V) 1
Tension (TENS) (LBF)
1000
3000
MCS Far Background (filtered) (FBAC)
0 (CPS) 5000
RST Capture to Inelastic Ratio Far (CIRF_FIL)
5 (---- 0
RST Borehole Salinity (BSAL)
450 (PPK) -50
Discriminated CCL (CCLD)
3 (V) -1
RST Sigma Difference (DSIG)
-30 (CU) 30
RST Capture to Inelastic Ratio Near (CIRN_FIL)
2.5 (---- 0
TENS
3525
WINR_RST
TPHI
SIGM
SIBF
RSCN_RST
FBAC
DSIG
MARC
IRAT_FIL
GR
CCLD
CIRF_FIL
CIRN_FIL
CCLC
BSAL



RST Borehole Salinity (BSAL) 450 (PPK) −50	Discriminated CCL (CCLD) 3 (V) −1	RST Sigma Difference (DSIG) −30 (CU) 30	RST Capture to Inelastic Ratio Near (CIRN_FIL) 2.5 (---- 0
(CCLC) −19 (V) 1	Tension (TENS) (LBF) 1000 3000	MCS Far Background (filtered) (FBAC) 0 (CPS) 5000	RST Capture to Inelastic Ratio Far (CIRF_FIL) 5 (---- 0
Gamma Ray (GR) 0 (GAPI) 2000	Minitron Arc Detection (MARC) 0 (---- 5	RST Sigma (SIGM) 60 (CU) 0	
RST Sigma Borehole Fluid (SIBF) 100 (CU) 0		RST Porosity (TPHI) 0.6 (V/V) 0	RST Inelastic Ratio (IRAT_FIL) 0.75 (---- 0
RST Near Effective Capture CR (RSCN_RST) 45 (---- 0		RST Weighted Inelastic Ratio (WINR_RST) 0.8 (---- 0	
RST Far Effective Capture CR (RSCF_RST) 45 (---- 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	
SMBMO	RST Sigma Mode Background (Minitron Off)	No	
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	9.875	IN
BSAL	Borehole Salinity	−50000.00	PPM
DO	Depth Offset for Playback	3.9	M
PP	Playback Processing	NORMAL	

Format: RST_SIG_ANSW Vertical Scale: 1:200 Graphics File Created: 26−Aug−2007 18:13

OP System Version: 15C0−309
MCM

RST−C	15C0−309	PSPT−A/B	15C0−309

Input DLIS Files

DEFAULT	RST_PSP_016LUP	FN:15	PRODUCER	25−Aug−2007 12:40	3567.4 M	3488.9 M

Output DLIS Files

DEFAULT	RST_PSP_016PUP	FN:41	PRODUCER	26−Aug−2007 18:13

Schlumberger

Background GR Pass

MAXIS Field Log

Company: Esso Australia Pty Ltd.	Well: FLA A25a

Input DLIS Files

DEFAULT	RST_PSP_015LUP	FN:14	PRODUCER	25−Aug−2007 12:11	3567.8 M	3484.5 M

Output DLIS Files

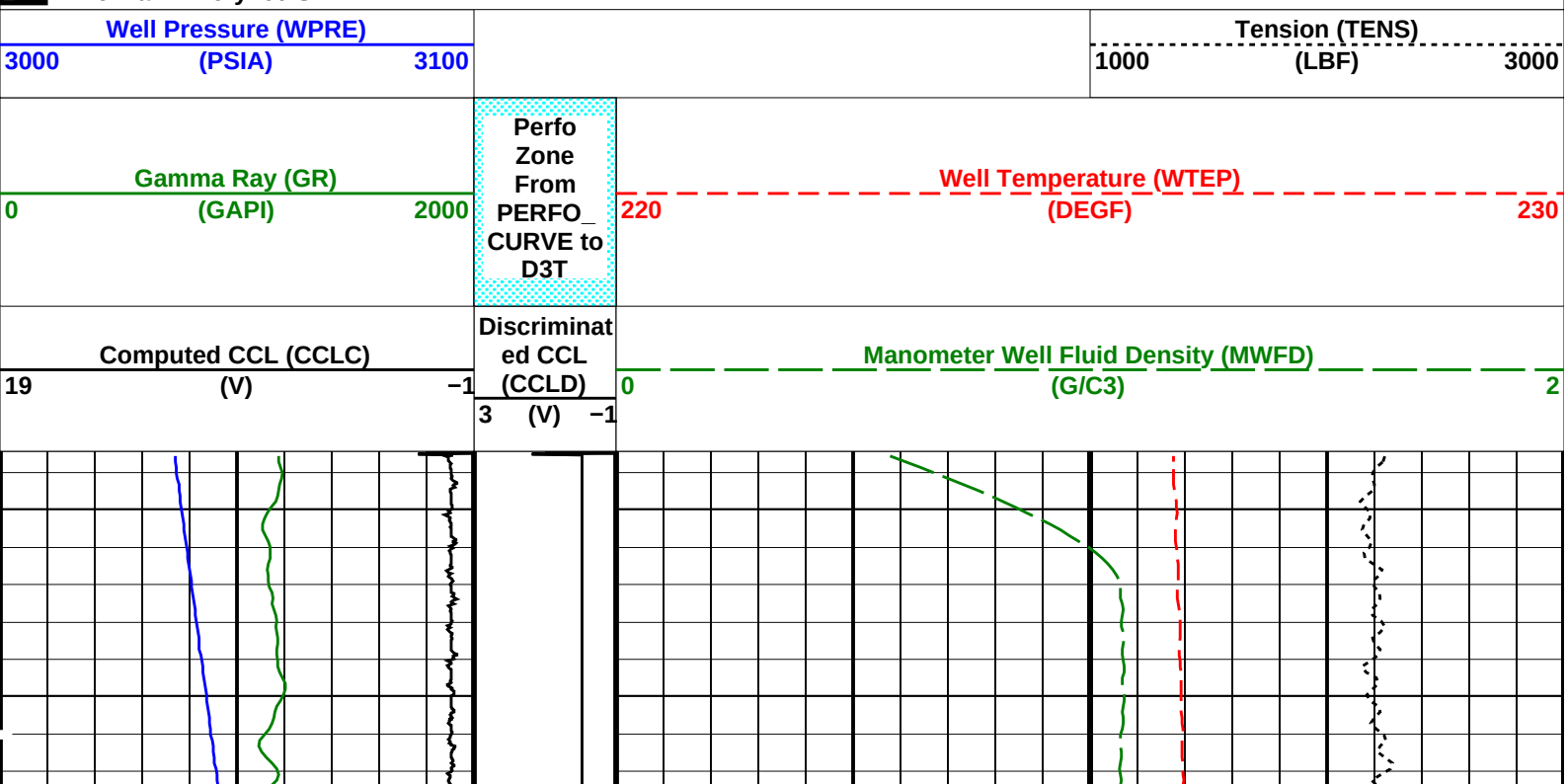
DEFAULT	RST_PSP_015PUP	FN:40	PRODUCER	26−Aug−2007 18:10	3562.0 M	3508.4 M

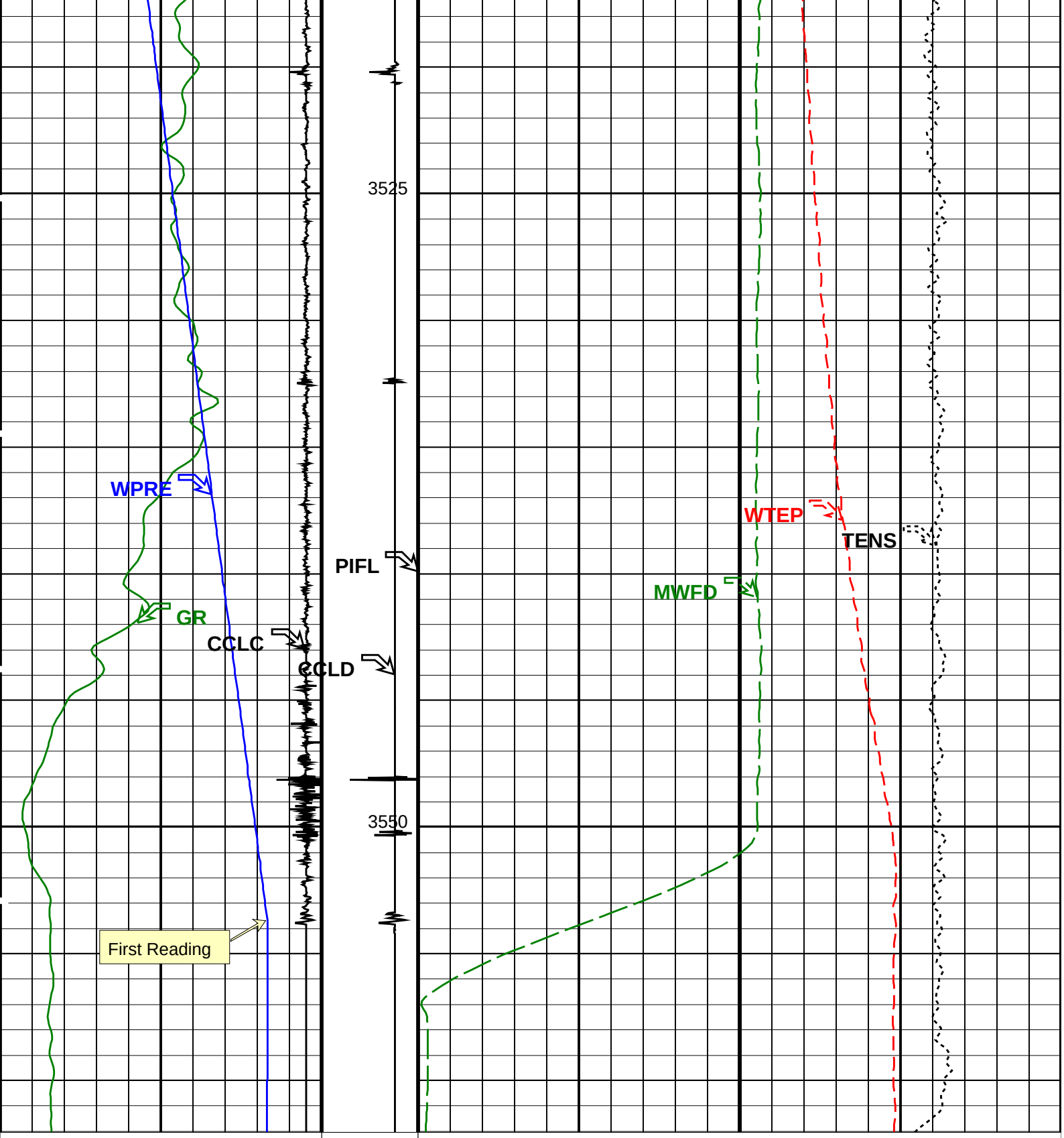
OP System Version: 15C0−309
MCM

RST−C	15C0−309	PSPT−A/B	15C0−309

PIP SUMMARY

Time Mark Every 60 S





Computed CCL (CCLC)	Discriminated CCL (CCLD)	Manometer Well Fluid Density (MWFD)
19 (V) −1	3 (V) −1	0 (G/C3) 2
Gamma Ray (GR)	Perfo Zone From PERFO_CURVE to D3T	Well Temperature (WTEP)
0 (GAPI) 2000		220 (DEGF) 230
Well Pressure (WPRE)		Tension (TENS)
3000 (PSIA) 3100		1000 (LBF) 3000

PIP SUMMARY

Time Mark Every 60 S

Format: PBMS Correlation Vertical Scale: 1:200 Graphics File Created: 26−Aug−2007 18:10

OP System Version: 15C0−309

MCM

RST−C	15C0−309	PSPT−A/B	15C0−309

Parameters

DLIS Name	Description	Value	
	RST−C: Reservoir Saturation Pro Tool C		
GDEV	Average Angular Deviation of Borehole from Normal	47	DEG
	PSPT−B: Production Services Logging Platform		
GDEV	Average Angular Deviation of Borehole from Normal	47	DEG
	System and Miscellaneous		
DO	Depth Offset for Playback	4.2	M
PP	Playback Processing	NORMAL	

Input DLIS Files

DEFAULT	RST_PSP_015LUP	FN:14	PRODUCER	25−Aug−2007 12:11	3567.8 M	3484.5 M

Output DLIS Files

DEFAULT	RST_PSP_015PUP	FN:40	PRODUCER	26−Aug−2007 18:10

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Before Survey Calibrations

MAXIS Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Production Services Logging Platform Wellsite Calibration − Detector Calibration							
Before: 24−Aug−2007 10:28							
Gamma−Ray Jig−Bkg	165.0	N/A	176.4	N/A	N/A	N/A	GAPI

Production Services Logging Platform / Equipment Identification

Primary Equipment:

Production Logging Platform (CQG−F)	PSPT − B	
PSP Basic Measurement Sonde (CQG_F)	PBMS − B	1747
PSP Basic measurement module	PBMS −	
PSP CCL	CCL −	
PSP GR	GR −	
PSP RTD Well Temperature	RTD_ −	
PSP Crystal Quartz Gauge Type F	CQG_ −	
PSP Telemetry and bus master cartridge	PSTC −	1768

Auxiliary Equipment:

Production Services Logging Platform Wellsite Calibration

Detector Calibration

Phase	Gamma−Ray Background GAPI	Value	Phase	Gamma−Ray Jig−Bkg GAPI	Value
Before		9.560	Before		176.4
0 (Minimum)	30.00 (Nominal) 120.0 (Maximum)		150.0 (Minimum)	165.0 (Nominal) 180.0 (Maximum)	

Before: 24−Aug−2007 10:28

Company: **Esso Australia Pty Ltd.**

Schlumberger

Well: **FLA A25a**
Field: **Flounder**
Rig: **Prod 3 / Flounder**
Country: **Australia**

RST−C
Sigma Log
25−Aug−2007