



COAL PETROGRAPHY ANALYSIS REPORT

Of

SHEL 27 109-1 & SHEL 27 109-2

For

CENTRAL PETROLEUM

By

WEATHERFORD LABORATORIES PTY LTD



17 March 2011

Metts/CENTRAL PETROLEUM

Attention: Dr. Michael Clark

COAL PETROGRAPHY ANALYSIS - REPORT WL0015 – WL0018

SHEL 27 109-1 & SHEL 27 109-2

Please find enclosed results of the coal petrography study for the samples taken from the above well.

If Weatherford Labs can assist you in any way, or if you require any further information, please do not hesitate to contact the undersigned.

ELVIRA BARCELONA
Senior Coal Petrologist

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1.0 INTRODUCTION

2.0 SUMMARY OF RESULTS

APPENDIX

1: Maceral and Vitrinite Reflectance results

Maceral Analysis and Vitrinite Reflectance measurements for SHEL 27 109-1 & SHEL 27 109-2 wells.

1.0 Introduction

Four samples from SHEL 27 109-1 & 109-2 wells, were received for maceral analysis and vitrinite reflectance measurement. The samples were crushed to +1mm, sub sample using a ripple splitter; set into coal blocks 25mm x 25mm using a mixture of epoxy resin and hardener into a vacuum vessel for 8 hours. The surfaces of the coal block were polished using series of polishing paper and a diamond suspension. The polished coal blocks were let to dry in the desiccator's cabinet for 8 hours before analysis.

Maceral analysis classifies the different maceral (vitrinite, liptinite and inertinite) composition of coal according to its morphology and its reflectance. It is often used to determine the proportions of reactivities to inerts and associated mineral to determine the coal quality and coal characteristics. The maceral analysis performed based on the maceral nomenclatures of the International Committee for Coal and Organic Petrologist (ICCP Classification System 1994) and was recognized by various standard organization such as ASTM, ISO and Australian Standard (AS). A petrographic microscope with incident white light illumination, in oil immersion (with RI =1.518 at 23° C), objective of 20x magnification and a point counting system were used in the maceral analysis. Supplementary fluorescence light was also used to identify the liptinite component of the coal. Minimum of 500 points were counted and results reported on a volume percentage basis for each maceral groups; vitrinite, liptinite and inertinite, in a mineral matter or mineral matter free (mmf) basis. The maceral reports were presented based on the AS2856-2 Australian Standard format.

Vitrinite Reflectance analysis is the determination of the percentage of incident light reflected on the surface of the polished block. Vitrinite is one of the most abundant maceral in coal and its physical and chemical properties changes through the course of coalification. The vitrinite reflectance progressively increases with rank; hence vitrinite reflectance is one of the most useful indicators of rank of coal.

The measurements of maximum vitrinite reflectance were carried out using a petrographic microscope measurement system. A known standards YAG (0.902%) and a black reference (0.0%) was used to calibrate the microscope before and after each analysis. One hundred (100) maximum vitrinite reflectance (in some case were less due few vitrinite in the sample) were measured and statistics parameters; mean maximum reflectance (%) and standard deviation of the readings, the calculated mean random reflectance were reported together with histogram of the vitrinite reflectance distribution in V-types (V1- V20).


2.0 Summary of Results

Sample No.	Vitrinite %	Liptinite%	Inertinite%	Mineral Matter	Mean Max. VR
RANK #1	24.6	2.2	59.2	14	0.35
RANK #2	21.6	2.4	65.7	10.4	0.36
RANK #3	29.1	7.7	58.3	4.9	0.36
RANK #4	21.8	1.2	74.1	3	0.37

The coal is mainly inertinite (up to 74%) with minor vitrinite, liptinite and mineral matter. The mean maximum vitrinite reflectance (VR) ranges from 0.35% to 0.37% which is the characteristic VR for Brown Coal based on Australian Standard (AS) 2096, see Figure 1.0.

FIGURE 1.0 AS 2096 RANK CLASSIFICATION

RANK CLASSIFICATION																
Australian classification (AS 2096)			Rank variables						Overseas classification							
Rank stages	Coal class	Description	R max Percent Vitrinite/ Huminite	VM daf percent Vitrinite/ Huminite	Moisture daf percent Vitrinite/ Huminite	C daf percent Vitrinite/ Huminite	SE (See Note) moist ash-free MJ/kg	Sporinite fluorescence M ax nm	Germany DIN	U.S.A. ASTM	U.S.S.R.					
Peat	Brown coal (soft coal)	Brown coal (soft coal)	0.2	68	75	60	12.6	500 to 600	Peat	Peat	B1					
Brown coal			64	Soft					Lignite							
			60		55	70										
			56									35	16.8			
			52												20.9	
			0.4													48
0.5			27.1													
0.6				28.4												
0.7					80	32.0										
0.8								36	84							
0.9	32	2.0														
1											28	87		36.2		
1.2				24												90
1.5					20	92										
2								16	94.5							
2.5	8	94.5														
3											4	94.5				
5				0										94.5		
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VR= 0.35% - 0.37%


WEATHERFORD LABORATORIES



MACERAL ANALYSIS

Client: **CENTRAL PETROLEUM**
 Well Name: **SHEL 27 109-1**
 Sample No: **RANK #1**
 Sample Details: **741 m - 784 m**
 Date: **16/01/1900**

Maceral Group	Volume (%)	Volume (%) (mmf)	Subgroup	Maceral	Volume (%)	Volume (%) (mmf)
VITRINITE	24.6	28.6	Telovitrinite	Textinite		
				Textu-ulminite		
				Eu-ulminite		
				Telecollinite	21.0	24.4
VITRINITE	24.6	28.6	Detrovitrinite	Attrinite		
				Densinite		
				Desmocollinite	3.4	4.0
VITRINITE	24.6	28.6	Gelovitrinite	Corpogelinite	0.2	0.2
				Porigelinite		
				Eugelinite		
LIPTINITE	2.2	2.6		Sporinite	2.2	2.6
				Cutinite		
				Resinite		
				Liptodetrinite		
				Alginite		
				Suberinite		
				Fluorinite		
				Exsudante		
				Bituminite		
INERTINITE	59.2	68.8	Telo-inertinite	Fusinite	2.8	3.3
				Semifusinite	46.8	54.4
				Funginite		
			Detro-inertinite	Inertodetrinite	8.8	10.2
				Micrinite	0.6	0.7
			Gelo-inertinite	Macrinite	0.2	0.2
MINERALS	14.0				14.0	
TOTAL	100	100			100	100
TOTAL POINTS COUNTED		500				

Comments: Minerals mainly disseminated clay and carbonates, minor shale.

Maceral Analysis based on ICCP classification and AS2856.

ICCP Accredited for Maceral Analysis and Vitrinite Random Reflectance Analysis.

Certificate No.ICCP/SCAP-012/AB

Reported by:

Elizabet

Report No.

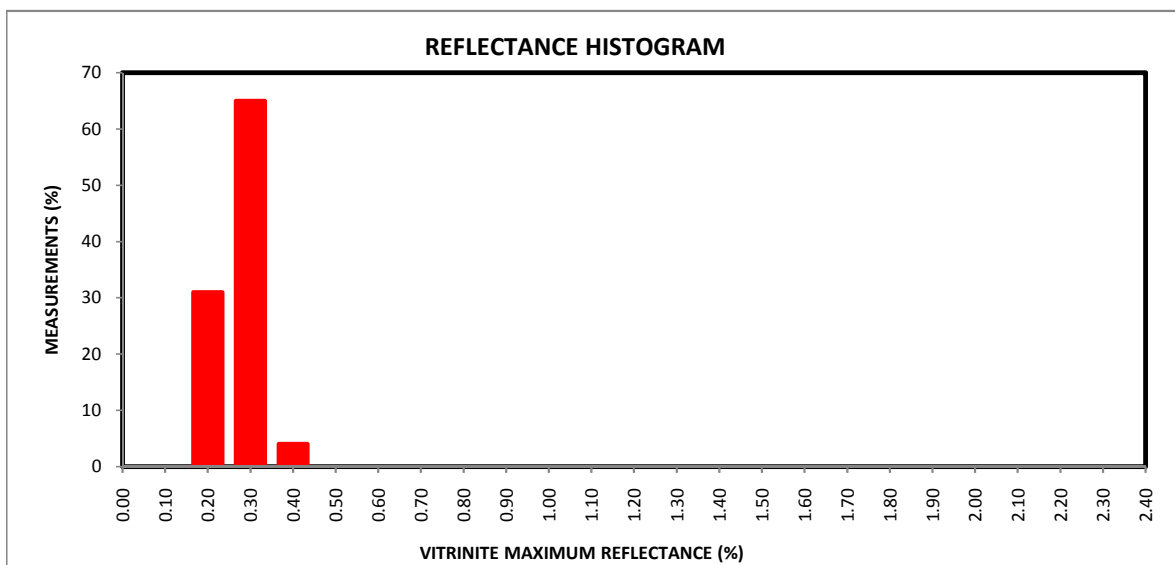
WL0015

WEATHERFORD LABORATORIES



VITRINITE REFLECTANCE ANALYSIS

Client: CENTRAL PETROLEUM
Well Name: SHEL 27 109-1
Sample No: RANK #1
Sample Details: 741 m - 784 m
Date Reported: 17/3/2011



	Mean Max. Reflectance (Rmax%)	Min. Reflectance (%)	Max. Reflectance (%)	Standard Deviation (σ)	No. of Measurements	Calc. Random Reflectance (R_r %)
Telovitrinite	0.35	0.26	0.45	0.04	95	0.33
Detrovitrinite	0.32	0.28	0.37	0.04	5	0.30
All Vitrinite	0.35	0.26	0.45	0.04	100	0.33

REFLECTANCE DISTRIBUTION

V - Steps	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
Telovitrinite (%)	28	63	4								
Detrovitrinite (%)	3	2									
All Vitrinite (%)	31	65	4								

V - Steps	V13	V14	V15	V16	V17	V18	V19	V20	TOTAL
Telovitrinite (%)									95
Detrovitrinite (%)									5
All Vitrinite (%)									100

Vitrinite Reflectance Analysis in accordance with ISO 7404-5.

ICCP Accredited for Maceral Analysis and Vitrinite Random Reflectance Analysis.

Certificate No.ICCP/SCAP-012/AB

Reported by: *Aliy Ahmed*

Report No.

WL0015

WEATHERFORD LABORATORIES



MACERAL ANALYSIS

Client: **CENTRAL PETROLEUM**
 Well Name: **SHEL 27 109-1**
 Sample No: **RANK #2**
 Sample Details: **798.40 m - 837.60 m**
 Date: **16/01/1900**

Maceral Group	Volume (%)	Volume (%) (mmf)	Subgroup	Maceral	Volume (%)	Volume (%) (mmf)
VITRINITE	21.6	24.1	Telovitrinite	Textinite		
				Textu-ulminite		
				Eu-ulminite		
				Telecollinite	18.0	20.1
			Detrovitrinite	Attrinite		
				Densinite		
				Desmocollinite	2.5	2.8
LIPTINITE	2.4	2.6	Gelovitrinite	Corpogelinite	1.0	1.1
				Porigelinite		
				Eugelinite		
				Sporinite	2.4	2.6
				Cutinite		
				Resinite		
				Liptodetrinite		
				Alginite		
				Suberinite		
				Fluorinite		
				Exsudante		
				Bituminite		
INERTINITE	65.7	73.3	Telo-inertinite	Fusinite	1.6	1.8
				Semifusinite	51.0	56.9
				Funginite		
			Detro-inertinite	Inertodetrinite	12.7	14.2
				Micrinite	0.4	0.4
			Gelo-inertinite	Macrinite		
MINERALS	10.4				10.4	
TOTAL	100	100			100	100
TOTAL POINTS COUNTED		510				

Comments: Minerals mainly disseminated clay and carbonates, minor shale.

Maceral Analysis based on ICCP classification and AS2856.

ICCP Accredited for Maceral Analysis and Vitrinite Random Reflectance Analysis.

Certificate No.ICCP/SCAP-012/AB

Reported by:

Report No.

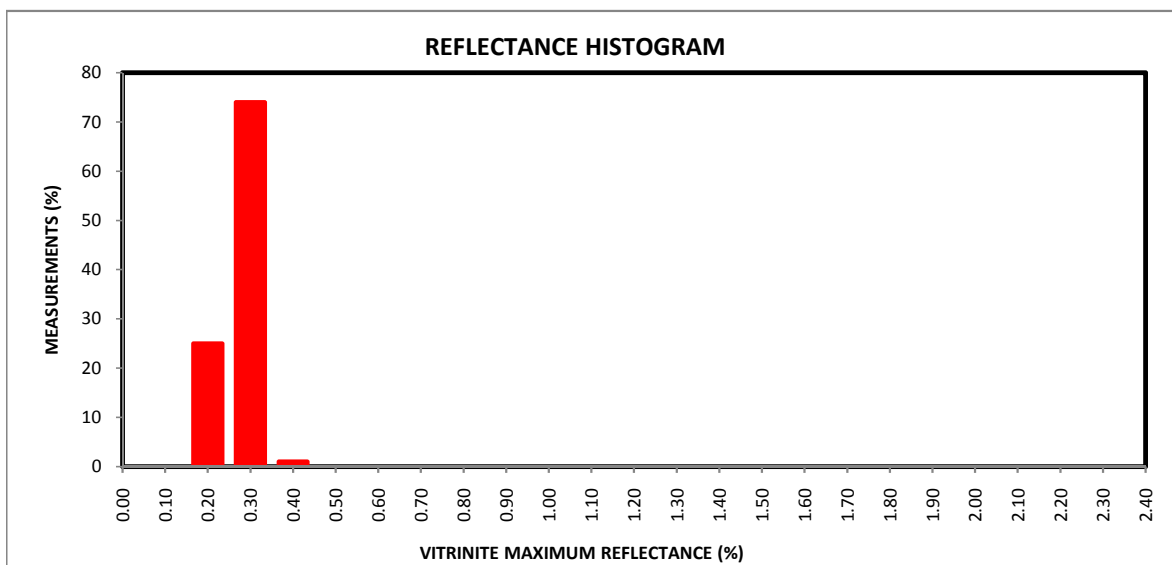
WL0016

WEATHERFORD LABORATORIES



VITRINITE REFLECTANCE ANALYSIS

Client: CENTRAL PETROLEUM
Well Name: SHEL 27 109-1
Sample No: RANK #2
Sample Details: 798.40m - 837.60m
Date Reported: 17/03/2011



	Mean Max. Reflectance (R _{max} %)	Min. Reflectance (%)	Max. Reflectance (%)	Standard Deviation (σ)	No. of Measurements	Calc. Random Reflectance (R _r %)
Telovitrinite	0.36	0.26	0.44	0.04	100	0.33
Detrovitrinite						
All Vitrinite	0.36	0.26	0.44	0.04	100	0.33

REFLECTANCE DISTRIBUTION

V - Steps	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
Telovitrinite (%)	25	74	1								
Detrovitrinite (%)											
All Vitrinite (%)	25	74	1								

V - Steps	V13	V14	V15	V16	V17	V18	V19	V20	TOTAL
Telovitrinite (%)									100
Detrovitrinite (%)									
All Vitrinite (%)									100

Vitrinite Reflectance Analysis in accordance with ISO 7404-5.

ICCP Accredited for Maceral Analysis and Vitrinite Random Reflectance Analysis.

Certificate No.ICCP/SCAP-012/AB

Reported by: *Aliy Ahmed*

Report No. **WL0016**

WEATHERFORD LABORATORIES



MACERAL ANALYSIS

Client: **CENTRAL PETROLEUM**
 Well Name: **SHEL 27 109-1**
 Sample No: **RANK #3**
 Sample Details: **941m - 1034.80m**
 Date: **17/02/2011**

Maceral Group	Volume (%)	Volume (%) (mmf)	Subgroup	Maceral	Volume (%)	Volume (%) (mmf)
VITRINITE	29.1	30.6	Telovitrinite	Textinite	25.0	26.3
				Textu-ulminite		
				Eu-ulminite		
				Telecollinite		
			Detrovitrinite	Attrinite	3.7	3.9
				Densinite		
				Desmocollinite		
			Gelovitrinite	Corpogelinite	0.4	0.4
				Porigelinite		
Eugelinite						
LIPTINITE	7.7	8.1		Sporinite	6.7	7.0
				Cutinite	0.4	0.4
				Resinite	0.6	0.6
				Liptodetrinite		
				Alginite		
				Suberinite		
				Fluorinite		
				Exsudante		
				Bituminite		
				INERTINITE	58.3	61.3
Semifusinite	42.5	44.7				
Funginite						
Detro-inertinite	Inertodetrinite	11.8	12.4			
	Micrinite	0.8	0.8			
Gelo-inertinite	Macrinite					
	MINERALS	4.9				
TOTAL	100	100			100	100
TOTAL POINTS COUNTED		508				

Comments: Minerals mainly disseminated clay and carbonates, minor shale.

Maceral Analysis based on ICCP classification and AS2856.

ICCP Accredited for Maceral Analysis and Vitrinite Random Reflectance Analysis.

Certificate No.ICCP/SCAP-012/AB

Reported by:

Report No.

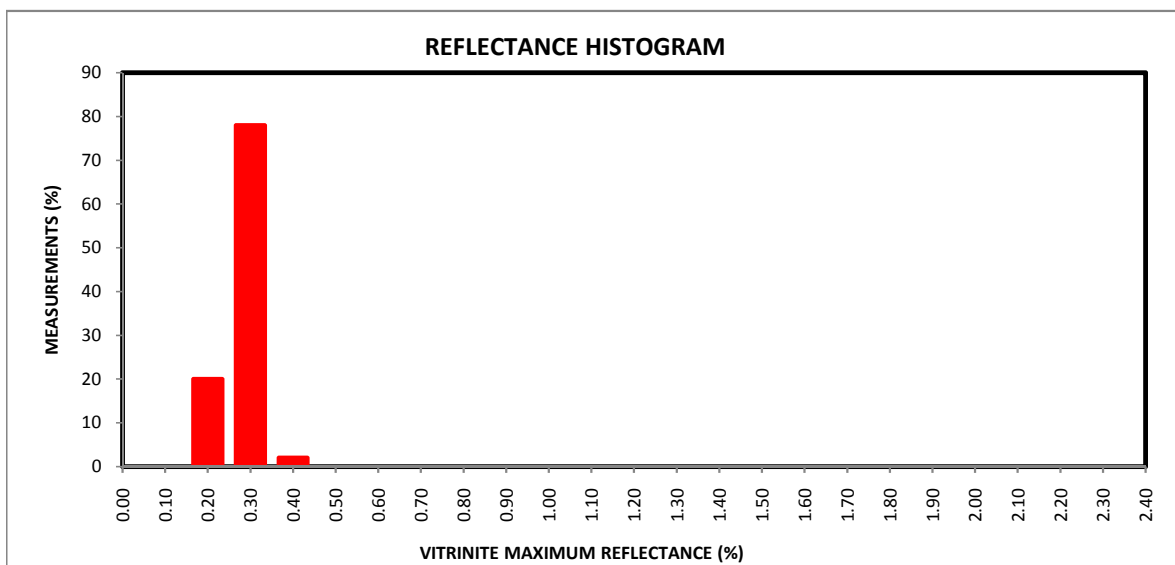
WL0017

WEATHERFORD LABORATORIES



VITRINITE REFLECTANCE ANALYSIS

Client: CENTRAL PETROLEUM
Well Name: SHEL 27 109-1
Sample No: RANK #3
Sample Details: 941m - 1034.80m
Date: 17/03/2011



	Mean Max. Reflectance (Rmax%)	Min. Reflectance (%)	Max. Reflectance (%)	Standard Deviation (σ)	No. of Measurements	Calc. Random Reflectance (R_r %)
Telovitrinite	0.36	0.26	0.45	0.04	94	0.34
Detrovitrinite	0.34	0.28	0.41	0.05	6	0.32
All Vitrinite	0.36	0.26	0.45	0.04	100	0.34

REFLECTANCE DISTRIBUTION

V - Steps	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
Telovitrinite (%)	18	74	2								
Detrovitrinite (%)	2	4									
All Vitrinite (%)	20	78	2								

V - Steps	V13	V14	V15	V16	V17	V18	V19	V20	TOTAL
Telovitrinite (%)									94
Detrovitrinite (%)									6
All Vitrinite (%)									100

Vitrinite Reflectance Analysis in accordance with ISO 7404-5.

ICCP Accredited for Maceral Analysis and Vitrinite Random Reflectance Analysis.

Certificate No.ICCP/SCAP-012/AB

Reported by: *Aliy Ahmed*

Report No. **WL0017**

WEATHERFORD LABORATORIES



MACERAL ANALYSIS

Client: **CENTRAL PETROLEUM**
 Well Name: **SHEL 27 109-2**
 Sample No: **RANK #4**
 Sample Details: **884m - 1069m**
 Date: **17/02/2011**

Maceral Group	Volume (%)	Volume (%) (mmf)	Subgroup	Maceral	Volume (%)	Volume (%) (mmf)
VITRINITE	21.8	22.4	Telovitrinite	Textinite	17.0	17.6
				Textu-ulminite		
				Eu-ulminite		
				Telecollinite		
			Detrovitrinite	Attrinite	4.4	4.5
				Densinite		
				Desmocollinite		
			Gelovitrinite	Corpogelinite	0.4	0.4
				Porigelinite		
Eugelinite						
LIPTINITE	1.2	1.2		Sporinite	1.2	1.2
				Cutinite		
				Resinite		
				Liptodetrinite		
				Alginite		
				Suberinite		
				Fluorinite		
				Exsudante		
				Bituminite		
				INERTINITE		
Semifusinite	55.6	57.3				
Funginite						
Detro-inertinite	Inertodetrinite	11.3	11.6			
	Micrinite	0.4	0.4			
Gelo-inertinite	Macrinite					
	MINERALS	3.0				3.0
TOTAL	100	100			100	100
TOTAL POINTS COUNTED		505				

Comments: Minerals mainly disseminated clay and carbonates, minor shale.

Maceral Analysis based on ICCP classification and AS2856.

ICCP Accredited for Maceral Analysis and Vitrinite Random Reflectance Analysis.

Certificate No.ICCP/SCAP-012/AB

Reported by:

Report No.

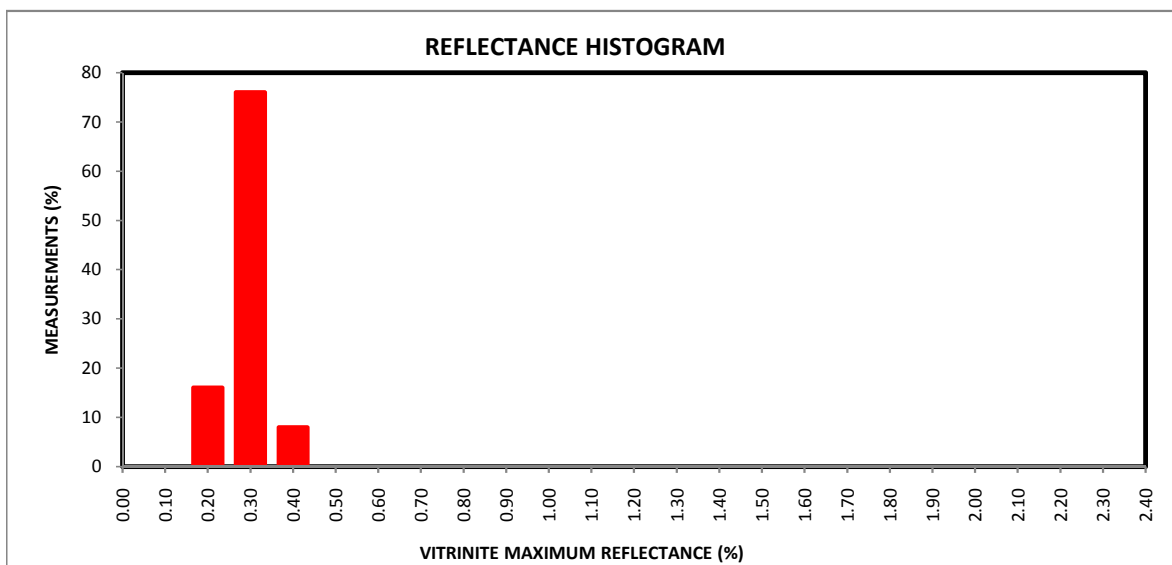
WL0018

WEATHERFORD LABORATORIES



VITRINITE REFLECTANCE ANALYSIS

Client: CENTRAL PETROLEUM
Well Name: SHEL 27 109-2
Sample No: RANK #4
Sample Details: 884m - 1069m
Date: 17/03/2011



	Mean Max. Reflectance (Rmax%)	Min. Reflectance (%)	Max. Reflectance (%)	Standard Deviation (σ)	No. of Measurements	Calc. Random Reflectance (R_r %)
Telovitrinite	0.37	0.29	0.45	0.04	95	0.35
Detrovitrinite	0.30	0.26	0.33	0.03	5	0.28
All Vitrinite	0.37	0.26	0.45	0.04	100	0.35

REFLECTANCE DISTRIBUTION

V - Steps	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
Telovitrinite (%)	12	75	8								
Detrovitrinite (%)	4	1									
All Vitrinite (%)	16	76	8								

V - Steps	V13	V14	V15	V16	V17	V18	V19	V20	TOTAL
Telovitrinite (%)									95
Detrovitrinite (%)									5
All Vitrinite (%)									100

Vitrinite Reflectance Analysis in accordance with ISO 7404-5.

ICCP Accredited for Maceral Analysis and Vitrinite Random Reflectance Analysis.

Certificate No.ICCP/SCAP-012/AB

Reported by: *Aliy Ahmed*

Report No. **WL0018**