



GAS AND FUEL EXPLORATION N.L.

P.E.P. 119

OTWAY BASIN

GEOLOGICAL STUDY

PETROLEUM DIVISION

06 OCT 1989

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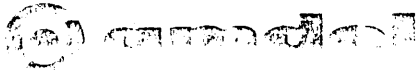
1. Core and cuttings descriptions (Tullich-1, Casterton-1).
2. Organic Petrology of Core Samples (Nos. 18, 19, 20, 22) from Casterton - 1 (Amdel Report 1989).
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APPENDIX 2

Organic petrology of core samples (No's 18, 19, 20, 22)
from Casterton-1 (Amdel Report 1989).



technology and enterprise

24th August 1989

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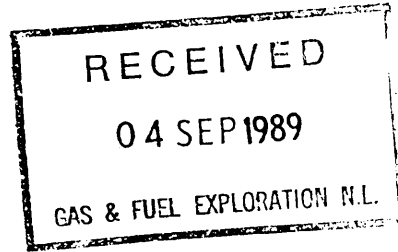
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REPORT F 7630/89

CLIENT REFERENCE:	Trans 11/8/89
TITLE:	Organic Petrology of Core Samples from Casterton -1, Otway Basin, Victoria
SAMPLE IDENTIFICATION:	7385 - 7957 feet depth interval
MATERIAL:	Core
LOCALITY:	Casterton -1
DATE RECEIVED:	14 August 1989
WORK REQUIRED:	Vitrinite Reflectance and Maceral Descriptions

Investigation and Report by: Brian Watson

Dr Brian G Steveson
Manager, Petroleum Services Section

apk

1. INTRODUCTION

Four core samples from Casterton -1 were received for vitrinite reflectance determinations and descriptions of dispersed organic matter. Results of these samples were reported by phone and facsimile as work was completed.

2. ANALYTICAL PROCEDURE

Representative portions of each sample (crushed to -14+35 BSS mesh) were obtained with a sample splitter and then mounted in cold setting Glasscraft resin using a 2.5 cm diameter mould. Each block was ground flat using diamond impregnated laps and carborundum paper. The surface was then polished with aluminium oxide and finally magnesium oxide.

Reflectance measurements were made with a Leitz MPV1.1 microphotometer fitted to a Leitz Ortholux microscope and calibrated against synthetic standards. All measurements were taken using oil immersion ($n = 1.518$) and incident monochromatic light (wavelength 546 nm) at a temperature of $23 \pm 1^\circ\text{C}$. Fluorescence observations were made on the same microscope utilising a 3 mm BG3 excitation filter, a TK400 dichroic mirror and a K510 suppression filter.

3. RESULTS

Vitrinite reflectance determinations are summarised in Table 1. Histogram plots of this data are presented in Appendix 1. Descriptions of the dispersed organic matter in these samples are presented in Tables 2-4. Important aspects of these descriptions are illustrated by a series of plates in Appendix 2.

TABLE 1:

SUMMARY OF VITRINITE REFLECTANCE MEASUREMENTS, CASTERTON -1

Depth (ft)	Mean Maximum Reflectance (%)	Standard Deviation	Range	Number of Determinations
7385-95	0.63	0.05	0.53 - 0.72	27
7739-49	0.68	0.05	0.59 - 0.80	28
7858-62	6.22*	0.33	5.64 - 6.92	11
7947-57	0.69	0.08	0.59 - 0.92	28

* This highly reflecting vitrinite indicates that this sample was taken from a depth adjacent to an intrusion (probably a sill).



TABLE 2:

PERCENTAGE OF VITRINITE, INERTINITE AND EXINITE
IN DISPERSED ORGANIC MATTER, CASTERTON -1

Depth (ft)	Percentage of		
	Vitrinite	Inertinite	Exinite
7385-95	15	75	10
7739-49	15	75-80	5-10
7858-62	----- 100 -----	-----	-
7947-57	25	55	20

TABLE 3:

ORGANIC MATTER TYPE AND ABUNDANCE, CASTERTON -1

Depth (ft)	Estimated Volume of		Exinite Macerals
	DOM	Exinites	
7385-95	3-5%	Ra-Sp	lama, lipto, bmite, ?tela
7739-49	~5%	Ra	cut, lipto, res, lama
7858-62	~1%	-	-
7947-57	1-2%	Co	lama, bmite, Spo

TABLE 4:

EXINITE MACERAL ABUNDANCE AND FLUORESCENCE CHARACTERISTICS, CASTERTON -1

Depth (ft)	Exinite Macerals	Lithology/Comments
7385-95	lipto(Ra-Sp;m0), lama(Ra;m0), bmite(Vr;d0-dB), ?tela(Tr;m0)	Shale, ?telalginite appears to be ?biodegraded ? <i>Botryococcus</i> algae
7739-49	cut(Ra;m0-d0), lipto(Ra;m0), res(Vr;d0-nofl), lama(Vr;m0-d0)	Silty shale; DOM is very rare in the silty bands
7858-62	-	
7947-57	lama(Co;m0-dB), bmite(Co;d0-dB), spo(Vr;m0-dB)	Shale; DOM is abundant in some bands



APPENDIX 1

HISTOGRAM PLOTS OF VITRINITE REFLECTANCE DETERMINATIONS

VITRINITE REFLECTANCE VALUES

Well Name: CASTERTON-1
Depth: 7385-95 ft

Sorted List

0.53	0.61	0.66
0.53	0.62	0.67
0.56	0.64	0.69
0.57	0.64	0.69
0.57	0.64	0.70
0.59	0.65	0.71
0.60	0.65	0.72
0.61	0.65	
0.61	0.65	
0.61	0.65	

Number of values= 27

Mean of values 0.63
Standard Deviation 0.05

HISTOGRAM OF VALUES

Reflectance values multiplied by 100

53-55	**
56-58	***
59-61	*****
62-64	****
65-67	*****
68-70	***
71-73	**

VITRINITE REFLECTANCE VALUES

Well Name: CASTERTON-1
Depth: 7739-49 ft

Sorted List

0.59	0.67	0.71
0.60	0.67	0.71
0.60	0.68	0.72
0.64	0.68	0.72
0.64	0.69	0.73
0.65	0.69	0.75
0.65	0.70	0.75
0.65	0.70	0.80
0.65	0.70	
0.66	0.71	

Number of values= 28

Mean of values 0.68

Standard Deviation 0.05

HISTOGRAM OF VALUES

Reflectance values multiplied by 100

59-61	***
62-64	**
65-67	*****
68-70	*****
71-73	*****
74-76	**
77-79	
80-82	*

VITRINITE REFLECTANCE VALUES

Well Name: CASTERTON-1
Depth: 7858-62 ft

Sorted List

5.64 6.92
5.84
6.04
6.08
6.16
6.16
6.24
6.42
6.42
6.50

Number of values= 11

Mean of values 6.22
Standard Deviation 0.33

HISTOGRAM OF VALUES

Reflectance values multiplied by 100

564-568 *
569-573
574-578
579-583
584-588 *
589-593
594-598
599-603
604-608 **
609-613
614-618 **
619-623
624-628 *
629-633
634-638
639-643 **

VITRINITE REFLECTANCE VALUES

Well Name: CASTERTON-1
Depth: 7947-7957 ft

Sorted List

0.59	0.66	0.75
0.59	0.66	0.75
0.60	0.67	0.76
0.60	0.67	0.76
0.61	0.68	0.77
0.61	0.68	0.79
0.63	0.70	0.82
0.63	0.71	0.92
0.64	0.74	
0.66	0.74	

Number of values= 28

Mean of values 0.69
Standard Deviation 0.08

HISTOGRAM OF VALUES

Reflectance values multiplied by 100

59-61	*****
62-64	***
65-67	*****
68-70	***
71-73	*
74-76	*****
77-79	**
80-82	*
83-85	
86-88	
89-91	
92-94	*

APPENDIX 2**PLATES**

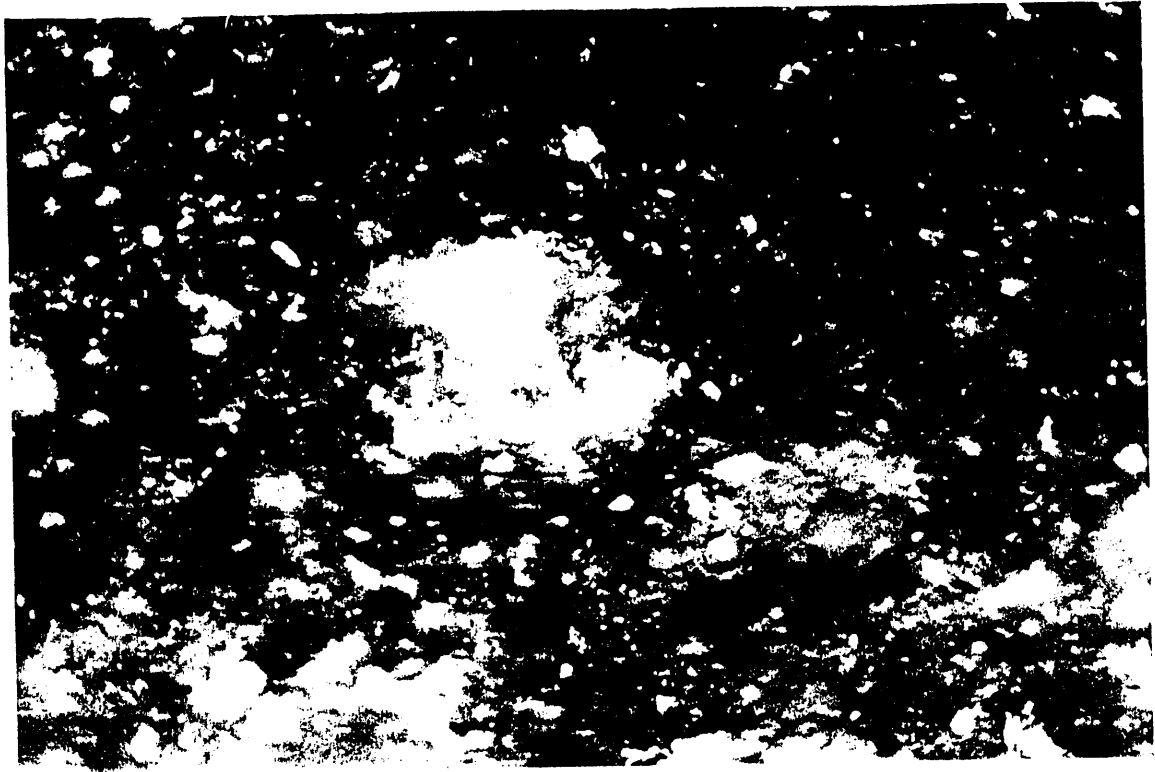


Plate 1: 7385 - 7395 ft. Reflected Light
The majority of the organic matter in this shale is inertinite (white).
Field dimensions: 0.26 x 0.18 mm.

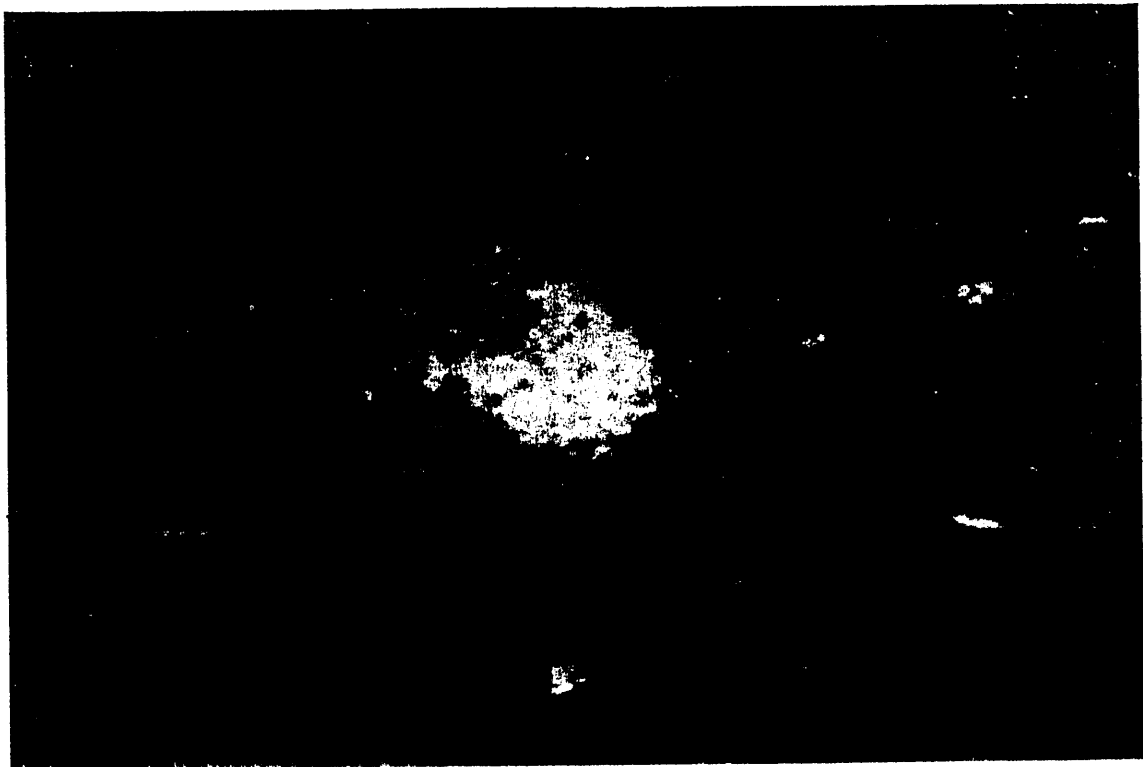


Plate 2: Same Field as above. Fluorescence Mode
Telalginite (intense yellow; centre) is biodegraded ?Botryococcus-related algae.

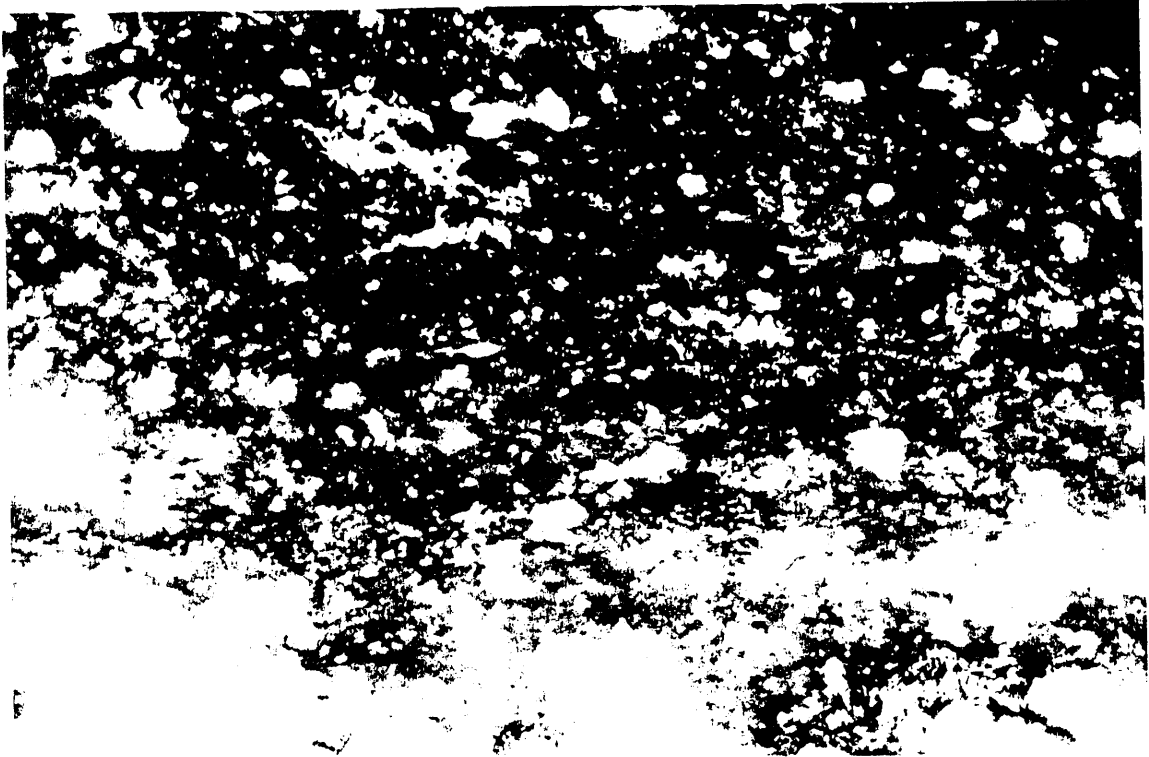


Plate 3: 7385 - 7395 ft. Reflected Light
Bituminite (brown bands; centre) occur here with inertinite (white).
Field Dimensions: 0.26 x 0.18 mm.



Plate 4: Same Field as above. Fluorescence Mode
The bituminite fluorescence is significantly duller than the liptodetrinite in this sample.



Plate 5: 7947 - 7957 ft. Reflected Light
Vitrinite (light grey) occurs here with bituminite (dark grey) and exinite (brown).
Field Dimensions: 0.26 x 0.18 mm.

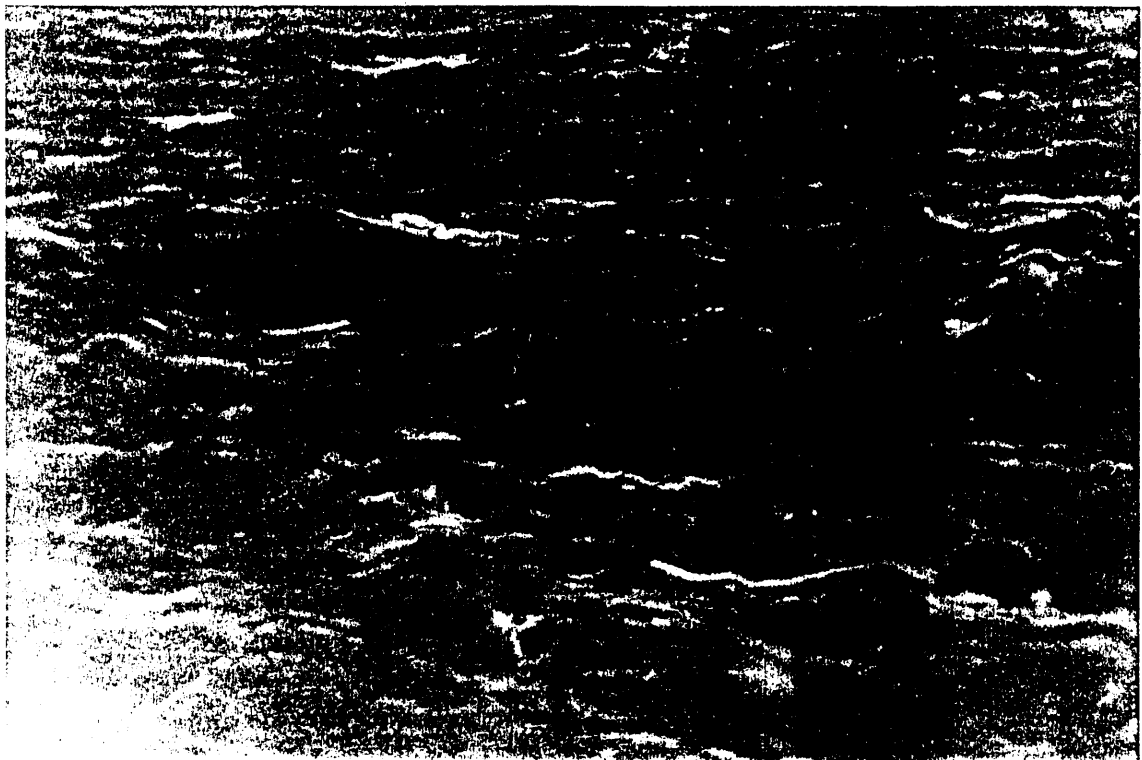


Plate 6: Same Field as above. Fluorescence Mode
The exinites in this field are comprised largely of bituminite (dull orange; top) and lamalginite (moderate orange). Sporinite (top centre) is a minor component.