

PETROLEUM GEOLOGY AND GEOCHEMISTRY

BMR

GEOLOGY AND
GEOPHYSICS

A U S T R A L I A

NORTHWEST

S H E L F

A U S T R A L I A

VOLUME 3
WELL SUMMARY REPORTS PART 1

CONSTITUTION AVE. CANBERRA ACT 2601

SS 819 #. 6(c)



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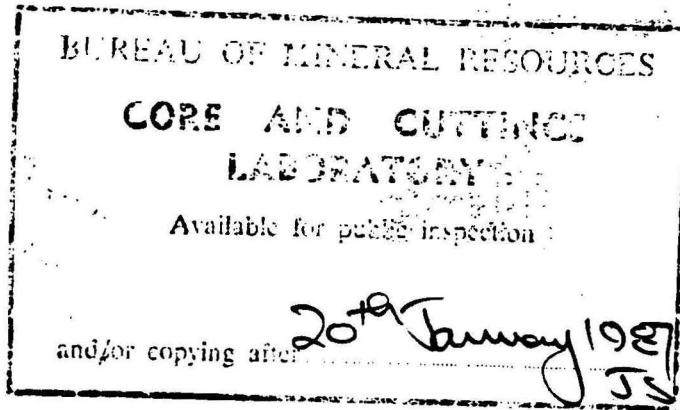


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VOLUME 3
WELL SUMMARY REPORTS
NORTHWEST SHELF, AUSTRALIA
— PHASE II
PETROLEUM GEOLOGY AND GEOCHEMISTRY

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INDEX	
D.A. NO.	R650
REPORT NO.	R650

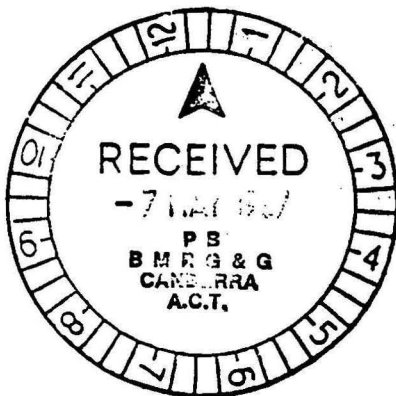
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PREFACE

Volumes 2 and 3 of the report contain a petroleum geochemistry summary for each well and gas chromatography-mass spectrometry data for source rocks, oils and migrant oil stains analysed.

Volume 2 contains the petroleum geochemistry well summaries, chemical analysis, gas chromatography and mass spectrometry and carbon isotope data for oils, migrant oil stains and source rocks from the Northern Carnarvon Basin. Volume 3 contains both the petroleum geochemistry well summaries for the Browse and Bonaparte Basins and oil analysis, carbon isotope and gas chromatography-mass spectrometry data for oils, migrant oil stains and source rocks from the Browse Basin and gas chromatography-mass spectrometry and carbon isotope data for source rocks and migrant oil stains from the Bonaparte Basin. Wells from the Bonaparte Basin which were only analysed for oil stains are included at the end of the well summaries of this basin.

A list of abbreviations used in the tables is shown on p. iv.

For each well studied, maturity data are presented in Table 1 and chemical analysis data in Table 2. Vitrinite reflectivity and spore colour index values against depth are presented in Figures 1 and 2 and Appendices 1 and 2. Alkane gas chromatography traces are shown in Figure 3. Tables of relevant geochemical data and gas chromatography-mass spectrometry traces for oils, migrant oil stains and source rocks from the Browse Basin are presented in Sections II, III and IV respectively. Tables of relevant geochemical data and gas chromatography-mass spectrometry data for source rocks and migrant oil stains from the Bonaparte Basin are presented in Sections V and VI.

Petroleum geochemistry charts at 1:5000 scale for each well are presented in Volume 5 of the report.

SUB-ERA PERIOD		EPOCH	AGE	ASHMORE REEF 1	SCOTT REEF 1	BREWSTER 1	SWAN 1	EAST SWAN 1	PRUDHOE 1	YAMPI 1	ROBBY 1			
TERTIARY	Neogene	PLIO	2	Piacenzian	H	H								
			1	Zanclean	H	H								
		MIOCENE	3	Messinian										
				Tortonian										
			2	Serravalinian	H	H								
				Langhian	H	H								
				Late Early										
		1	Burdigalian	H	H									
			Aquitanian											
		Palaeogene	OLIG	2	Chattian	H	H							
				1	Rupelian	H	H							
			EOCENE	3	Priabonian	H	H							
				2	Bartonian	H	H							
					Lutetian	H	H							
	PAL		1	Ypresian	H	H								
		2	Thanetian	H	H									
		1	Danian	H	H									
	CRETACEOUS	LATE	SEN	Maastrichtian	H	H								
				Campanian	H	H								
				Santonian	H	H								
				Comacian	H	H								
				Turonian	H	H								
				Cenomanian	H	H								
		EARLY	NEOC	Albian										
				Aptian										
				Barremian										
				Hauterivian										
Valanginian														
Berriasian														
Tithonian														
JURASSIC	LATE	MALM	Kimmeridgian											
			Oxfordian											
			Callovian											
	MIDDLE	DOG	Bathonian											
			Bajocian											
			Aalenian											
EARLY	LIAS	Toarcian												
		Plensbachian												
		Sinemurian												
TRASSIC	LATE		Hettangian											
			Rhaetian											
			Norian											
	MIDDLE		Carnian											
			Ladinian											
	EARLY		Anisian											
Olen			Smith											
PERMIAN	LATE		Induan	Gries										
			Tatarian											
			Kazanian											
	Early		Ufimian											
			Kungurian											
			Artinskian											
CARBONIFEROUS	Pennsylvanian		Sakmarian											
			Asselian											
			Noginski	C	Steph									
				B										
			Krevyakin	A										
			Myachkov	Cin										
	MOSC			A										
				B	West									
				C										
	BASHK		Yeadonian	H										
Mis.		SERPUK												
		VISEAN												
		TOUR												
DEVONIAN	LATE		Famennian											
			Frasnian											
			Givetian											
	MIDDLE		Elftian											
			Emsian											
	EARLY		Siegenian											
Gedinnian														
				Basement Pre-cambrian								T.D.		

ERA	SUB-ERA PERIOD		EPOCH	AGE			KIMMURE 1	PENGUIN 1	GULL 1	HERON 1	FLAMINGO 1	OSPREY 1		
CAINOZOIC	TERTIARY	Neogene	HOLOCENE											
			PLEISTOCENE											
			PLIO	2	Piacenzian									
				1	Zanclean									
			MIOCENE	3	Messinian									
					Tortonian									
				2	Serravalian									
			1	Langhian	Late									
					Early									
					Burdigalian									
			OLIG	2	Aquitanian									
				1	Chattian									
			Eocene	3	Rupelian									
					Priabonian									
				2	Bartonian									
			PAL	2	Lutetian									
				1	Ypresian									
				2	Thanetian									
MESOZOIC	CRETACEOUS	LATE	SEN	1	Danian									
					Maastrichtian									
					Campanian									
					Santonian									
					Comacian									
					Turonian									
		EARLY	NEOC		Cenomanian									
					Albian									
					Aptian									
					Barremian									
					Hauterivian									
					Valanginian									
	JURASSIC	LATE	MAL M		Berriasian									
					Tithonian									
					Kimmeridgian									
					Oxfordian									
					Callovian									
					Bathonian									
		MIDDLE	DOG		Bajocian									
					Aalenian									
					Toarcian									
					Pleinsbachian									
					Sinemurian									
					Hettangian									
	EARLY	LIAS		Rhaetian										
				Norian										
				Carnian										
				Ladinian										
				Anisian										
				Induan										
	TRASSIC	LATE			Olen	Spath								
					Smith									
					Dien									
		MIDDLE			Gries									
	PALAEOZOIC	CARBONIFEROUS	PERMIAN	LATE		Tatarian								
						Kazanian								
						Ulimian								
Early						Kungurian								
						Artinskian								
						Sakmarian								
Pennsylvanian		GZELIAN		Asselian										
				Noginski	C	Steph								
				Krevyakin	B									
			KASIM		Myachkov	A								
						Cib								
			MOSC			A	West							
				C										
Mis.	BASHK		Yeadonian											
		SERPUK												
		VISEAN		Holkerian										
				Ivorian										
		DEVONIAN	TOUR		Hastarian									
	Famennian													
LATE				Frasnian										
				Givetian										
MIDDLE				Elftian										
				Emsian										
EARLY		Siegenian												
		Gedinian												

Bonaparte Basin
Chronostratigraphic Chart

ABBREVIATIONS USED IN ANALYTICAL DATA SHEETS

LITHOLOGY

CHK	-	chalk
CHT	-	chert
CMT	-	cement
CGL	-	conglomerate
CLYST	-	claystone
DOL	-	dolomite/dolomitic
IGN	-	igneous rocks
LIG	-	lignite/lignitic
LST	-	limestone
MDST	-	mudstone
MET	-	metamorphic rock
MRL	-	marl(y)
QTZ	-	quartz
SH	-	shale
SND	-	sand
SLTST	-	siltstone
SST	-	sandstone
VOLC	-	volcanic rocks

COLOUR

bl	-	blue
blk	-	black
brn	-	brown
dk	-	dark
dsk	-	dusky
g	-	gold
gn	-	green
gy	-	grey
lt	-	light
ol	-	olive
org	-	orange
pal	-	pale
pnk	-	pink
pp	-	purple
rd	-	red
vgt	-	variegated
wht	-	white
yel	-	yellow
gy-gn	-	greyish green
gy/gn	-	grey-green (gradation)
gn-gy	-	greenish grey

DESCRIPTION

aren	-	arenaceous
arg	-	argillaceous
bd	-	bedded/bedding
bit	-	bitumen/bituminous
calc	-	calcareous
carb	-	carbonaceous
crs	-	coarse
cvd	-	caved
f	-	fine
fer	-	ferruginous
foss	-	fossils/fossiliferous
fr	-	friable
hd	-	hard
i/b	-	interbedded
med	-	medium
mic	-	mica/micaceous
mod	-	moderate
unr	-	minor
mtl	-	mottled
occ	-	occasional
ool	-	oolitic
OS	-	oil stain
pyr	-	pyrite/pyritic
rew	-	reworked
sft	-	soft
shly	-	shaly
sl	-	slight(ly)
slty	-	silty
sndy	-	sandy
tr	-	trace
v	-	very
xln	-	crystalline

GENERAL

-	-	sample not analysed
*	-	analysed but no data obtained
A/a	-	as above
Ctg	-	ditch cuttings
Fluo	-	fluorescence
NC	-	no calculation
NDP	-	no determination possible
Pop	-	population
Swc	-	sidewall core

LIST OF CONTENTS

SECTION I PETROLEUM GEOCHEMISTRY WELL REPORTS

BROWSE BASIN

Page No.

Anderdon-1	1
Ashmore Reef-1	5
Barcoo-1	7
Brewster-1A	10
Brown Gannet-1	13
Buffon-1	15
Caswell-1	18
East Swan-1	21
Leveque-1	24
Lombardina-1	26
Lynher-1	29
N. Hibernia-1	33
Prudhoe-1	37
Puffin-1	41
Rainbow-1	44
Rob Roy-1	46
Sahul Shoal-1	50
Scott Reef-1	52
Skua-1	55
Swan-1	59
Yampi-1	63

BONAPARTE BASIN

Bougainville-1	67
Eider-1	70
Flamingo-1	74
Flat Top-1	78
Gull-1	82
Heron-1	86
Kimmore-1	90
Lacrosse-1	93
Osprey-1	96
Penguin-1	98
Petrel-2	101
Plover-1	105
Tamar-1	109
Tern-1	112
Troubadour-1	116
Whimbrel-1	119

Wells Analysed Only For Migrant Oil Stains

Shearwater-1, Sunrise-1

SECTION II OIL ANALYSIS DATA FOR THE BROWSE BASIN

Table II.1 - Physical analysis and liquid and gas chromatography data for oils from the Browse Basin.

Table II.2 - Gasoline range hydrocarbon ratios for oils from the Browse Basin.

Table II.3 - Gas chromatography - mass spectrometry and carbon isotope data for oils from the Browse Basin.

Table II.4 - Gasoline hydrocarbon analysis data.

Figure II.1 $\delta^{13}\text{C}_{\text{sat}}/\delta^{13}\text{C}_{\text{ar}}$ against $\delta^{13}\text{C}_{\text{ar}}$ for oils from the Browse Basin.

Figure II.2 Ternary diagram showing the relative percentages of normal, iso and cyclic alkanes for oils from the Browse Basin.

Figure II.3 Ternary diagram showing the relative percentages of C_{27} , C_{28} and C_{29} $5\alpha(\text{H})$, $14\alpha(\text{H})$, $17\alpha(\text{H})$ -20R steranes in oils from the Browse Basin.

Figure II.4 Whole oil gas chromatograms for oils from the Browse Basin.

Figure II.5 C_{15+} Alkane gas chromatograms for oils from the Browse Basin.

Figure II.6 Mass fragmentograms for the m/z 191 (triterpane), 217 (regular steranes) and 259 (rearranged steranes) for oils from the Browse Basin.

SECTION III GAS CHROMATOGRAPHY-MASS SPECTROMETRY AND CARBON ISOTOPE DATA FOR MIGRANT OIL STAINS FROM THE BROWSE BASIN

Table III.1 Extraction, gas and liquid chromatography, gas chromatography-mass spectrometry and carbon isotope data for migrant oil stains from the Browse Basin.

Figure III.1 $\delta^{13}\text{C}_{\text{saturates}}$ against $\delta^{13}\text{C}_{\text{aromatics}}$ for migrant oil stains from the Browse Basin.

Figure III.2 Ternary diagram showing the relative percentages of C_{27} , C_{28} and C_{29} $5\alpha(\text{H})$, $14\alpha(\text{H})$, $17\alpha(\text{H})$ -20R steranes in migrant oil stains from the Browse Basin.

Figure III.3 Mass fragmentograms for the m/z 191 (triterpanes), 217 (regular steranes) and 259 (rearranged steranes) for migrant oil stains in the Browse Basin.

SECTION IV GAS CHROMATOGRAPHY-MASS SPECTROMETRY AND CARBON ISOTOPE DATA FOR SOURCE ROCKS FROM THE BROWSE BASIN

Table IV.1 Source rock, extraction, gas and liquid chromatography, gas chromatography-mass spectrometry and carbon isotope data for selected samples from source rock intervals in the Browse Basin.

Figure IV.1 $\delta^{13}\text{C}_{\text{saturates}}$ against $\delta^{13}\text{C}_{\text{aromatics}}$ for source rock extracts from the Browse Basin.

Figure IV.2 Ternary diagram showing the relative percentages of C_{27} , C_{28} and C_{29} $5\alpha(\text{H})$, $14\alpha(\text{H})$, $17\alpha(\text{H})$ -20R steranes in source rock extracts from the Browse Basin.

Figure IV.3 Mass fragmentograms for the m/z 191 (triterpanes), 217 (regular steranes) and 259 (rearranged steranes) for source rock extracts from the Browse Basin.

SECTION V GAS CHROMATOGRAPHY-MASS SPECTROMETRY AND CARBON ISOTOPE DATA FOR MIGRANT OIL STAINS FROM THE BONAPARTE BASIN

Table V.1 Extraction, gas and liquid chromatography, gas chromatography-mass spectrometry and carbon isotope data for migrant oil stains from the Bonaparte Basin.

Figure V.1 $\delta^{13}\text{C}_{\text{saturates}}$ against $\delta^{13}\text{C}_{\text{aromatics}}$ for migrant oil stains from the Bonaparte Basin.

Figure V.2 Ternary diagram for the relative percentages of C₂₇, C₂₈ and C₂₉ 5 α (H), 14 α (H), 17 α (H)-20R steranes in migrant oil stains from the Bonaparte Basin.

Figure V.3 Mass fragmentograms for the m/z 191 (triterpanes), 217 (regular steranes) and 259 (rearranged steranes) for migrant oil stains in the Bonaparte Basin.

SECTION VI GAS CHROMATOGRAPHY-MASS SPECTROMETRY AND CARBON ISOTOPE DATA FOR SOURCE ROCKS FROM THE BONAPARTE BASIN

Table VI.1 Source rock, extraction, gas and liquid chromatography, gas chromatography-mass spectrometry and carbon isotope data for selected samples from source rock intervals in the Bonaparte Basin.

Figure VI.1 $\delta^{13}\text{C}_{\text{sat}}$ against $\delta^{13}\text{C}_{\text{ar}}$ for source rock extracts from the Bonaparte Basin.

Figure VI.2 Ternary diagram showing the relative percentages of C₂₇, C₂₈ and C₂₉ 5 α (H), 14 α (H), 17 α (H)-20R steranes in source rock extracts from the Bonaparte Basin.

Figure VI.3 Mass fragmentograms for the m/z 191 (triterpanes), 217 (regular steranes) and 259 (rearranged steranes) for source rock extracts from the Bonaparte Basin.



SECTION I

PETROLEUM GEOCHEMISTRY

WELL REPORTS

BROWSE BASIN

ANDERDON-1 WELL

SUMMARY

Geochemical analysis of the interval 410m to 2905m TD of the Anderdon-1 well has shown that the well section is immature to 600m, early mature between 600m and 1700m, middle mature between 1700m and 2250m, late mature between 2250m and 2500m and post mature for oil generation below 2500m.

The maturity gradients indicate the presence of a large igneous body close to the base of the well section. They also show that the interval analysed is not presently at its maximum depth of burial. Maximum burial depths are estimated to be around 700m greater than those of the present day and were reached sometime during the Miocene to Recent. The vitrinite reflectance gradient shows 600m of missing Late Cretaceous to Palaeocene section at the unconformity at 1427m, 800m of missing Eocene to Miocene section at the unconformity at 481m and 1200m of missing Miocene to Recent section at seabed.

The intervals 2380m to 2455m and 2764m to 2905m TD have poor gas source potential. The interval 2764m to 2905m TD may also represent a spent oil source.

A migrant oil derived from mature terrestrially sourced waxy kerogen is present in the sample at 2380m to 2395m. Samples at 2809m to 2824m and 2890m to 2905m TD contain very small amounts of indigenous hydrocarbons derived from late to post mature waxy sapropel and a migrant biodegraded oil residue.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 12° 38' 47.1"S, 124° 47' 47.7"E.

Operator and date of drilling: BHP, 1985.

Well Status: Plugged and abandoned.

TD: 2905m.

Mud data: Seawater and high viscosity gel pills: Seabed to 1798m.
KCL/Polymer system: 1798m to 2905m TD.

Casing data: 30" at 130m, 20" at 303m, 13³/₈" at 1787m, 9⁵/₈" at 2457m.

ANDERDON-1 WELL

BHT data: 90°C at 2465m, after 6½ hours stopped circulation.
116°C at 2905m TD, after 12 hours stopped circulation.

Elevation: RT 8m ASL.

Water depth: 97m.

Interval analysed: 410m to 2905m TD.

Age of interval analysed:

	<u>Depths (in metres)</u>
Miocene-Recent	410- 481
Eocene	481- 759
Palaeocene	759- 998
Cretaceous	998-1427
Early Triassic	1427-2416
Late Permian	2416-2905 TD

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: All the samples analysed yielded enough vitrinite for measurement; measurements were complicated by content of reworked/inertinitic kerogen. Results: Fair.
- b) Spore Colour Index: All the samples analysed yielded sufficient sporomorphs for measurements. Samples in the upper part of the well section analysed contained abundant caved Cretaceous sporomorphs. Results: Good.

Source rock data quality: Good, but interpretation is difficult due to the high maturity of the section analysed.

Gas chromatography run at: 2380m to 2395m, 2809m to 2824m and 2890m to 2905m TD.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise steadily from values of around 3 SCI units at 410m to around 6 to 6.5 units at 2000m. Below this depth the spore colour index gradient shows a non-linear increase

ANDERDON-1 WELL

with depth, increasing rapidly to around 10 units at 2750m.

Vitrinite reflectance values increase from interpreted values of 0.35% at 410m to around 1.10% at 2200m. Below this depth the vitrinite reflectance gradient shows a non-linear increase with depth. There are marked discontinuities in the reflectance gradient consistent with 600m of missing Late Cretaceous to Palaeocene section at the unconformity at 1427m, 800m of Eocene to Miocene missing at the unconformity 481m and 1200m of missing Miocene to Recent section at seabed.

The non-linear increase in the maturity gradients seen below around 2000m is most probably due to the presence of a large igneous intrusive close to the base of the well section. Extrapolation of the regional spore colour gradient seen above 2000m to a surface value shows that the well section is not presently at its maximum depth of burial and that maximum burial depths of the section were around 700m greater than those of the present day and were reached during the Miocene to Recent.

Based on the spore colour index data the well section is immature to 600m, early mature between 600m and 1700m, middle mature between 1700m and 2250m, late mature between 2250m and 2500m and post mature for oil generation below 2500m.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

Medium grey mudstones analysed in the interval 2380m to 2416m in the Early Triassic, and light to medium grey and olive grey mudstones in the intervals 2419m to 2455m and 2764m to 2905m TD respectively in the Late Permian, contain average to above average organic carbon contents of between 1.02% and 2.14%. Pyrolysis analysis of samples in these intervals shows low hydrogen indices in the interval 2380m to 2455m indicating that these samples contain only humic kerogen. Samples in the interval 2764m to 2905m TD are of too high a maturity for pyrolysis data to be a useful indicator of kerogen type. Visual kerogen analysis shows that only humic kerogen is present in samples from this interval.

Calculations based on the organic carbon content, kerogen composition and maturity of samples show that the intervals 2380m to 2455m and 2764m to 2905m TD will have generated around $5.4 \times 10^4 \text{m}^3$ and $1.12 \times 10^6 \text{m}^3$ of gas per acre respectively. The interval 2764m to 2905m TD may also represent a spent oil source.

ANDERDON-1 WELL

Extraction of samples at 2380m to 2395m, 2809m to 2824m and 2890m to 2905m TD shows that the sample at 2380m to 2395m is stained by a migrant oil derived from mature terrestrially sourced waxy sapropel. The other two samples contain small amounts of indigenous extracts derived from late mature waxy sapropel mixed with small quantities of a biodegraded oil.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

The remaining mudstones analysed in the interval 1460m to 2350m in the Early Triassic contain below average organic carbon contents of between 0.02% and 0.78%. Visual kerogen analysis suggests only humic indigenous kerogen content in samples analysed in this interval. These sediments have no oil or gas source potential.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
105		Miocene-Recent									
410-430	Ctg	LST, wht	2.5-3.0	0.35(1)	40	55	5				
481		Eocene									
530-550	"	LST, off-wht	3.0-3.5	0.52(9)	50	40	10				
740-760	"	LST, a/a + mnr MDST, blk	9.0-9.5rew	1.00(21)rew	65	35	mnr				
759		Palaeocene									
998		Cretaceous									
990-1010	"	LST, wht-off wht	8.5-10.0rew	1.09(34)rew	70	25	5				
1240-1260	"	LST, lt gy + mnr SND	5.5-10.0rew	0.59(9)	60	30	10				
1427		Mt Goodwin Rm									
1460-1490	"	MDST, lt gy gn, v calc	5.0-5.5	0.87(5)	70	30	mnr				
1570-1590	"	SST, lt gy-yel gy + 40% MDST, med gy	5.0-5.5	0.86(22)	40	60	mnr				
1640-1660	"	MDST, med gy + 50% SST, wht + mnr LST, wht	2.5-4.0cud	0.88(5)	55	40	5				
1750-1770	"	MDST, a/a + 50% SST, wht	5.5-6.0	0.92(10)	70	25	5				
1843-1858	"	MDST, med gy	6.0	*	60	20	20				
1945-1960	"	MDST, a/a	6.0-6.5	*	65	15	20				
2080-2095	"	MDST, med gy + 80% SLTST, lt gy	6.0-6.5	0.95(6)	55	15	30				
2197-2212	"	MDST, lt-med gy	6.5-7.0	1.10(1)	60	20	20				
2290-2305	"	MDST, a/a	7.0-7.5	*	85	15	mnr				
2380-2395	"	MDST, med gy	7.5-8.0	1.25(4)	60	40	tr	40	50	*	10
2416		Hyland Bay Rm									
2419-2434	"	MDST, med gy						50	50	*	*
2440-2455	"	MDST, lt-med gy						30	70	*	*
2506-2515	"	LST, pnk gy + 40% LST, lt-med gy	8.0-8.5	1.69(20)	45	55	*				
2608-2623	"	LST, pnk gy + 40% LST, lt-med gy	8.5-9.0	1.84(19)	40	60	*				
2764-2779	"	MDST, ol gy	10.0	2.72(2)	60	40	*				
2890-2905	"	MDST, ol gy + 10% LST, wht	10.0	2.13(6)cud	70	30	*				

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
1427		Mt Goodwin Fan													
1460-1490	Ctg	MDST, lt gy gn, v calc	0.14												
1490-1505	"	MDST, med gy	0.05												
1570-1590	"	SST, lt gy-yel gy + 40% MDST, med gy	-												
	P	MDST, med gy	0.74												
1600-1620	Ctg	MDST, med gy + 80% SST, wht + mnr LST, wht	-												
	P	MDST, med gy	0.72												
1640-1660	Ctg	MDST, med gy + 50% SST, a/a	-												
	P	MDST, med gy	0.24												
1700-1720	Ctg	MDST, med gy + 70% SST, wht - v lt gy	-												
	P	MDST, med gy	0.63												
1750-1770	Ctg	MDST, med gy + 50% SST, wht	-												
	P	MDST, med gy	0.12												
1798-1813	Ctg	MDST, med gy	0.03												
1843-1858	"	MDST, a/a	0.02												
1900-1915	"	MDST, a/a	0.03												
1945-1960	"	MDST, a/a	0.09												
2032-2047	"	MDST, med gy, occ slty	0.03												
2080-2095	"	MDST, med gy + 80% SLTST, lt gy	-												
	P	MDST, med gy	0.02												
2113-2128	Ctg	MDST, med-med dk gy	0.07												
2158-2173	"	MDST, a/a	0.19												
2197-2212	"	MDST, lt-med gy	0.41												
2242-2257	"	MDST, a/a	0.50												
2290-2305	"	MDST, a/a	0.63												
2335-2350	"	MDST, a/a	0.78												
2380-2395	"	MDST, med gy	1.33	436	123	47	0.16	1.94	1605	121	1435	108	84	6	10
2416		Byland Bay Fan													
2419-2434	"	MDST, a/a	1.19	440	68	99	0.12	0.92							
2440-2455	"	MDST, lt-med gy	1.40	424	45	103	0.25	0.65							
2506-2515	"	LST, pak gy + 40% LST, lt-med gy	-												
	P	LST, lt-med gy	0.02												

Table 2a Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T O C)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T O C)	EXTRACT COMPOSITION (%)			
														SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
2608-2623	Ctg	LST, pnk gy + 40% LST, lt-med gy	-													
	P	LST, lt-med gy	0.02													
2764-2779	Ctg	MDST, ol gy	2.14	452	25	121	0.27	0.74								
2809-2824	"	MDST, ol gy	1.64	440	41	129	0.23	0.87	630	38	330	20	40	12	48	
2854-2869	"	MDST, ol gy	1.86	450	25	97	0.27	0.63								
2854-2869	"	MDST, ol gy	1.86	450	25	97	0.27	0.63								
2890-2905	"	MDST, ol gy + 10% LST, wht	1.02	404	37	125	0.27	0.52	595	58	405	40	52	16	32	

Table 2b Chemical Analysis Data

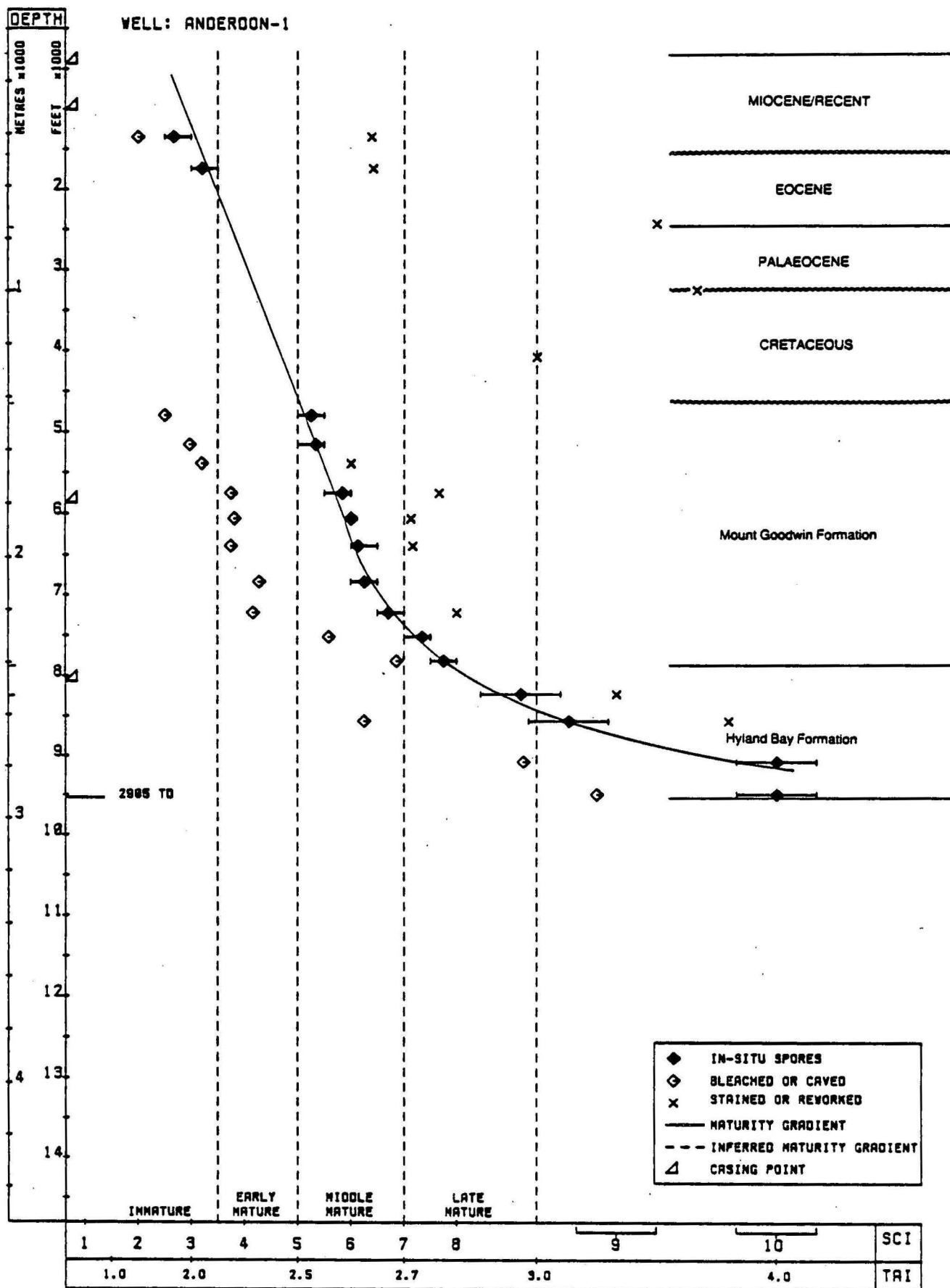


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

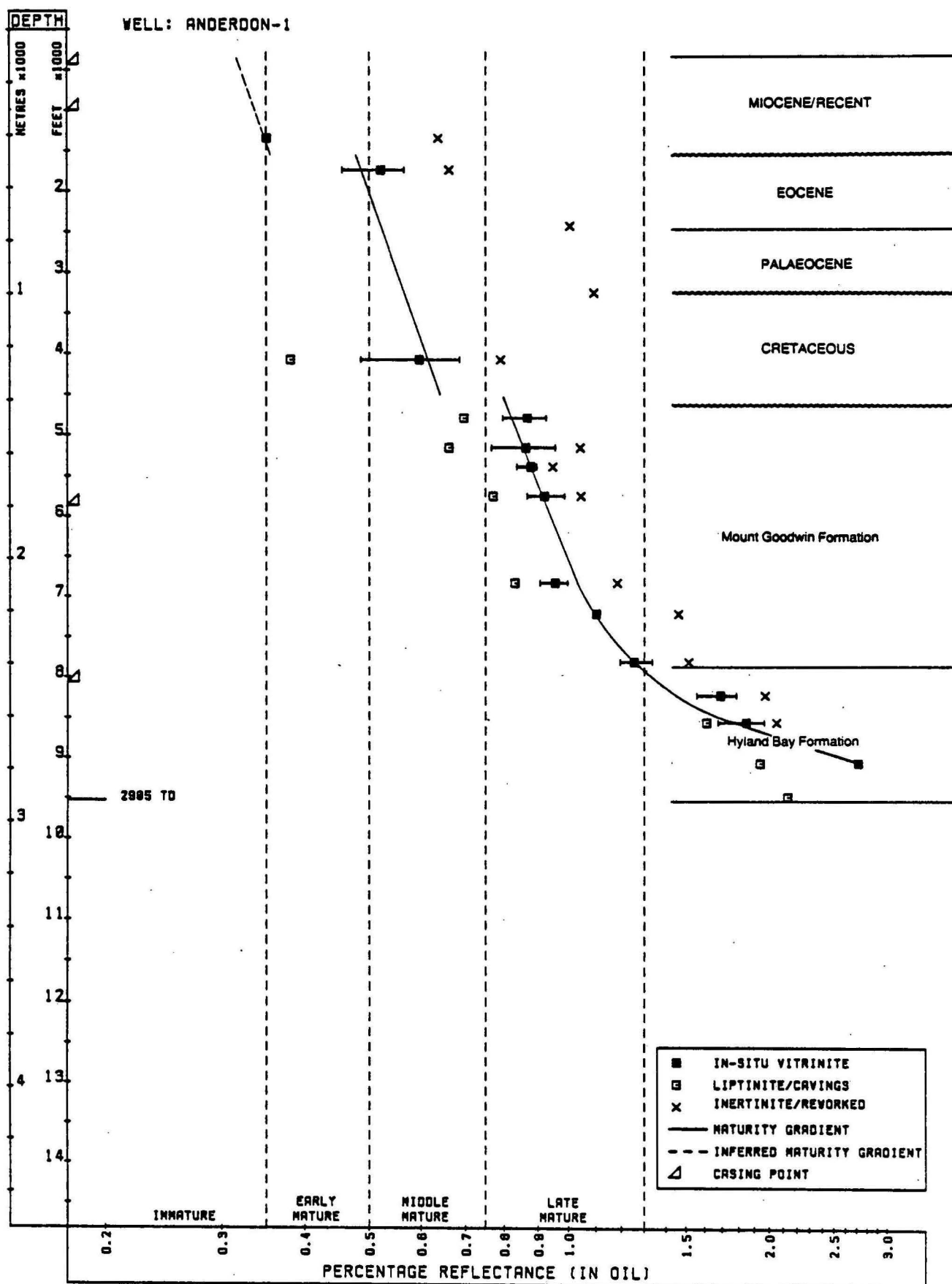
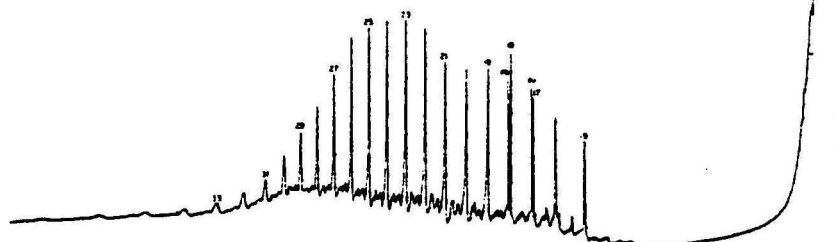
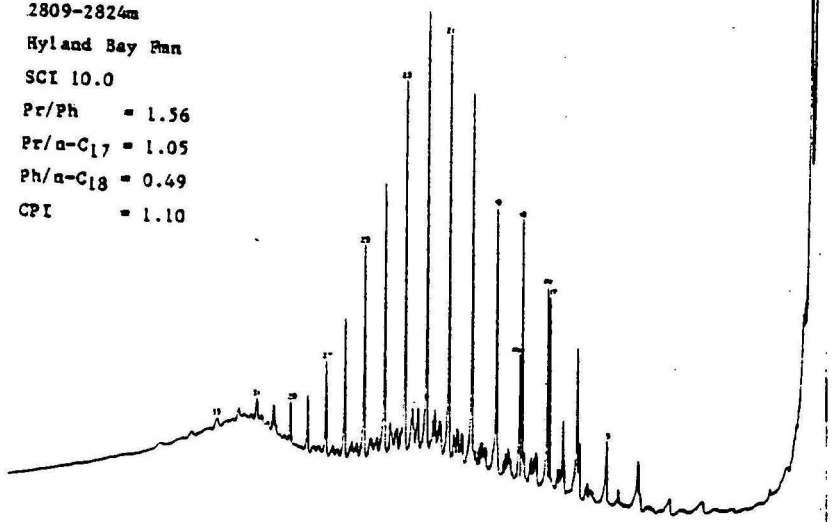


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Anderdon-1
 2380-2395m
 Mt Goodwin Fan
 SCI 7.5-8.0
 Pr/Ph = 0.96
 Pr/n-C₁₇ = 1.08
 Ph/n-C₁₈ = 0.84
 CPI = 0.98



Anderdon-1
 2809-2824m
 Hyland Bay Fan
 SCI 10.0
 Pr/Ph = 1.56
 Pr/n-C₁₇ = 1.05
 Ph/n-C₁₈ = 0.49
 CPI = 1.10



Anderdon-1
 2890-2905m
 Hyland Bay Fan
 SCI 10.0
 Pr/Ph = 1.39
 Pr/n-C₁₇ = 0.86
 Ph/n-C₁₈ = 0.57
 CPI = NDP

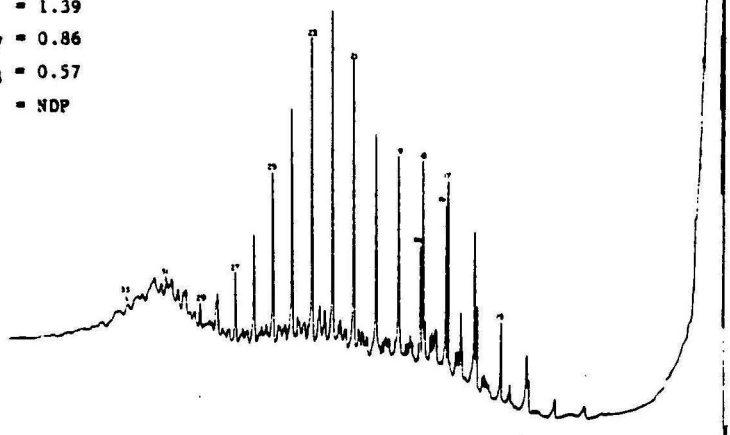


Figure 3

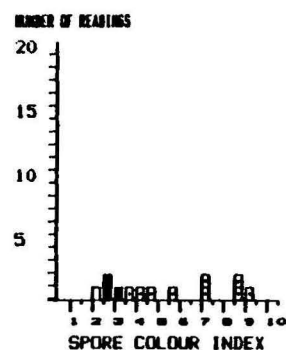
ANDERDON-1

IN SITU POPULATION

SAMPLE 410-430M

2.0 2.5 2.5 3.0 3.5 4.0 4.5 5.5 7.0 7.0
8.5 8.5 9.0

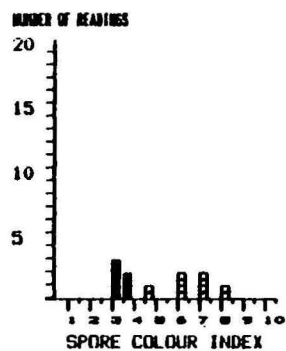
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.5-3.0	3
BLEACHED/CAVINGS	2.0-2.0	1
STAINED/REWORKED	3.5-9.0	9



SAMPLE 530-550M

3.0 3.0 3.0 3.5 3.5 4.5 6.0 6.0 7.0 7.0
8.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.5	5
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	4.5-8.0	6



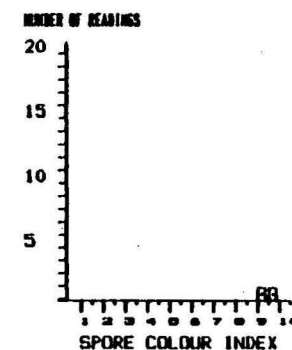
ANDERDON-1

IN SITU POPULATION

SAMPLE 740-760M

9.0 9.5

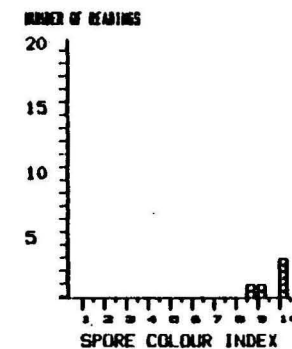
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	9.0-9.5	2



SAMPLE 990-1010M

8.5 9.0 10.0 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.5-10.0	5



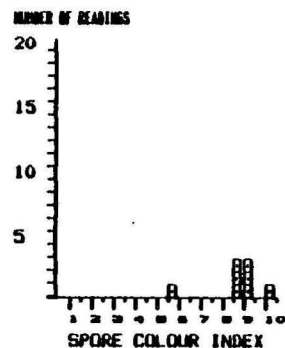
ANDERDON-1

IN SITU POPULATION

SAMPLE 1240-1260M

5.5 8.5 8.5 8.5 9.0 9.0 9.0 10.0

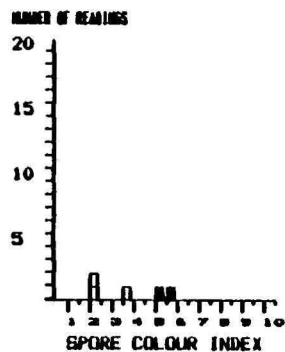
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	5.5-10.0	8



SAMPLE 1460-1490M

2.0 2.0 3.5 5.0 5.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.5	2
BLEACHED/CAVINGS	2.0-3.5	3
STAINED/REWORKED	-	0



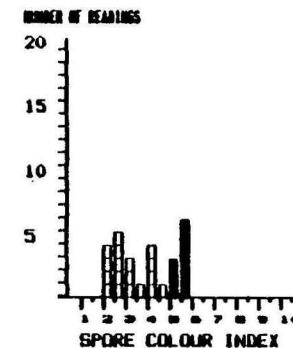
ANDERDON-1

IN SITU POPULATION

SAMPLE 1570-1590M

2.0 2.0 2.0 2.0 2.5 2.5 2.5 2.5 2.5 3.0
3.0 3.0 3.5 4.0 4.0 4.0 4.0 4.5 5.0 5.0
5.0 5.5 5.5 5.5 5.5 5.5 5.5

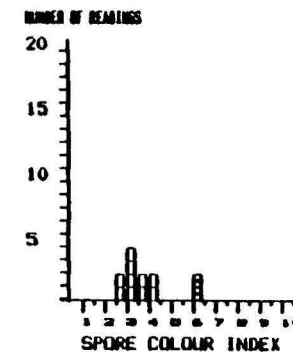
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.5	9
BLEACHED/CAVINGS	2.0-4.5	18
STAINED/REWORKED	-	0



SAMPLE 1640-1660M

2.5 2.5 3.0 3.0 3.0 3.0 3.5 3.5 4.0 4.0
6.0 6.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	2.5-4.0	10
STAINED/REWORKED	6.0-6.0	2



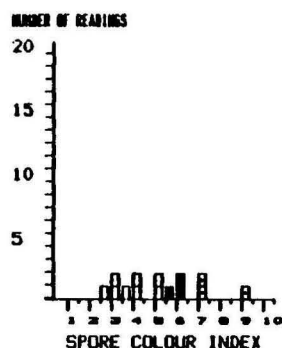
ANDERDON-1

IN SITU POPULATION

SAMPLE 1750-1770M

2.5 3.0 3.0 3.5 4.0 4.0 5.0 5.0 5.5 6.0
6.0 7.0 7.0 9.0

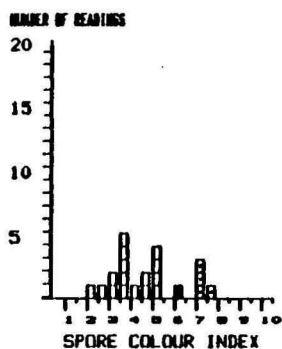
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-6.0	3
BLEACHED/CAVINGS	2.5-5.0	8
STAINED/REWORKED	7.0-9.0	3



SAMPLE 1843-1858M

2.0 2.5 3.0 3.0 3.5 3.5 3.5 3.5 4.0
4.5 4.5 5.0 5.0 5.0 5.0 6.0 7.0 7.0 7.0
7.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.0	1
BLEACHED/CAVINGS	2.0-5.0	16
STAINED/REWORKED	7.0-7.5	4



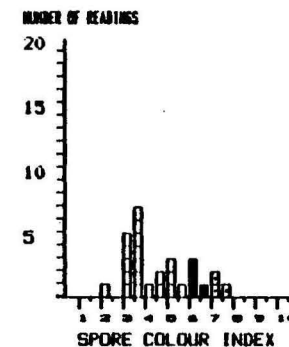
ANDERDON-1

IN SITU POPULATION

SAMPLE 1945-1960M

2.0 3.0 3.0 3.0 3.0 3.0 3.5 3.5 3.5 3.5
3.5 3.5 3.5 4.0 4.5 4.5 5.0 5.0 5.0 5.5
6.0 6.0 6.0 6.5 7.0 7.0 7.5

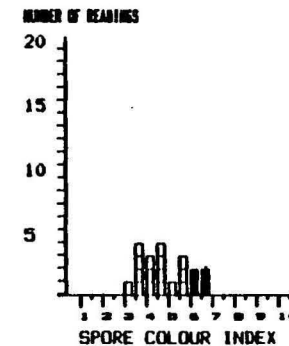
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.5	4
BLEACHED/CAVINGS	2.0-5.5	20
STAINED/REWORKED	7.0-7.5	3



SAMPLE 2080-2095M

3.0 3.5 3.5 3.5 3.5 4.0 4.0 4.0 4.5 4.5
4.5 4.5 5.0 5.5 5.5 5.5 6.0 6.0 6.5 6.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.5	4
BLEACHED/CAVINGS	3.0-5.5	16
STAINED/REWORKED	-	0



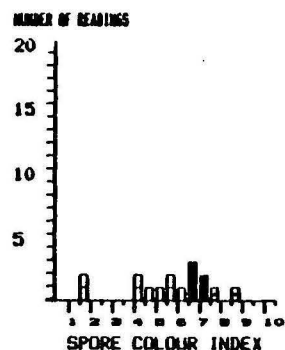
ANDERDON-1

IN SITU POPULATION

SAMPLE 2197-2212M

1.5 1.5 4.0 4.0 4.5 5.0 5.5 5.5 6.0 6.5
6.5 6.5 7.0 7.0 7.5 8.5

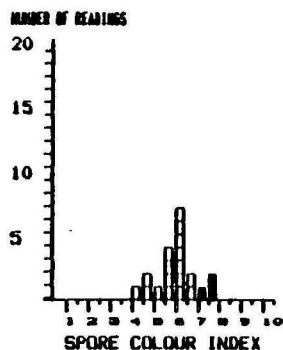
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.5-7.0	5
BLEACHED/CAVINGS	1.5-6.0	9
STAINED/REWORKED	7.5-8.5	2



SAMPLE 2290-2305M

4.0 4.5 4.5 5.0 5.5 5.5 5.5 5.5 6.0 6.0
6.0 6.0 6.0 6.0 6.0 6.5 6.5 7.0 7.5 7.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.0-7.5	3
BLEACHED/CAVINGS	4.0-6.5	17
STAINED/REWORKED	-	0



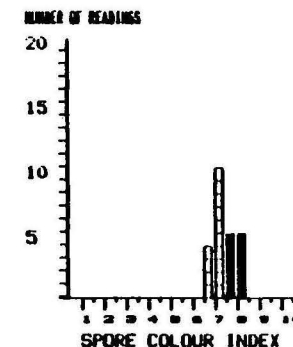
ANDERDON-1

IN SITU POPULATION

SAMPLE 2380-2395M

6.5 6.5 6.5 6.5 7.0 7.0 7.0 7.0 7.0
7.0 7.0 7.0 7.0 7.5 7.5 7.5 7.5 7.5 8.0
8.0 8.0 8.0 8.0

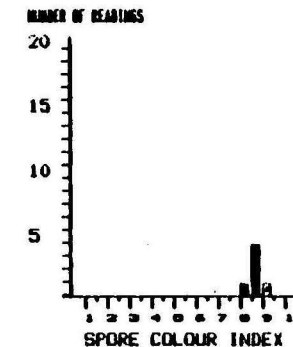
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.5-8.0	10
BLEACHED/CAVINGS	6.5-7.0	14
STAINED/REWORKED	-	0



SAMPLE 2506-2515M

8.0 8.5 8.5 8.5 8.5 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	8.0-8.5	5
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	9.0-9.0	1



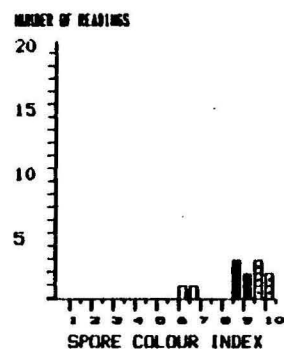
ANDERDON-1

IN SITU POPULATION

SAMPLE 2608-2623M

6.0 6.5 8.5 8.5 9.0 9.0 9.5 9.5 9.5
10.0 10.0

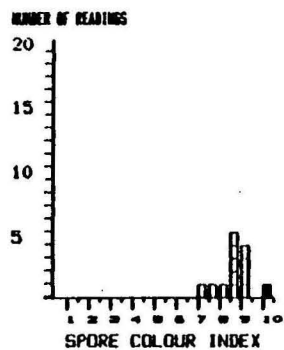
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	8.5-9.0	5
BLEACHED/CAVINGS	6.0-6.5	2
STAINED/REWORKED	9.5-10.0	5



SAMPLE 2764-2779M

7.0 7.5 8.0 8.5 8.5 8.5 8.5 8.5 9.0 9.0
9.0 9.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	10.0-10.0	1
BLEACHED/CAVINGS	7.0-9.0	12
STAINED/REWORKED	-	0



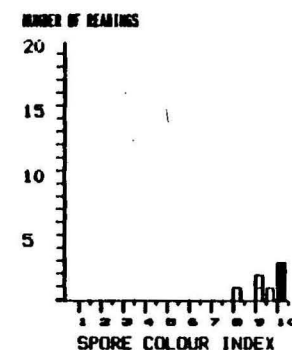
ANDERDON-1

IN SITU POPULATION

SAMPLE 2890-2905M

8.0 9.0 9.0 9.5 10.0 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	10.0-10.0	3
BLEACHED/CAVINGS	8.0-9.5	4
STAINED/REWORKED	-	0



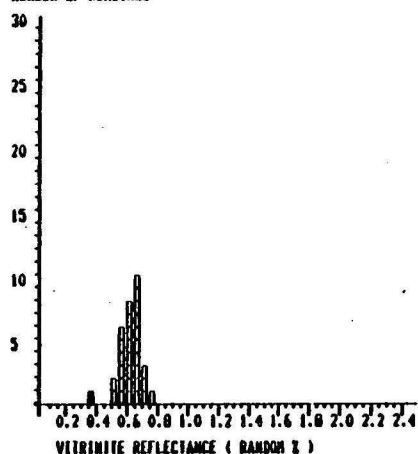
ANDERDON-1

SAMPLE 410-430M

0.35 0.51 0.54 0.56 0.57 0.58 0.58 0.58 0.59 0.60
0.60 0.61 0.61 0.63 0.64 0.64 0.64 0.65 0.65 0.65
0.65 0.66 0.66 0.67 0.68 0.69 0.69 0.70 0.72 0.73
0.77

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	0.35-0.35	1	0.35	
INERTINITE/REWORKED	0.51-0.77	30	0.64	0.06

NUMBER OF READINGS

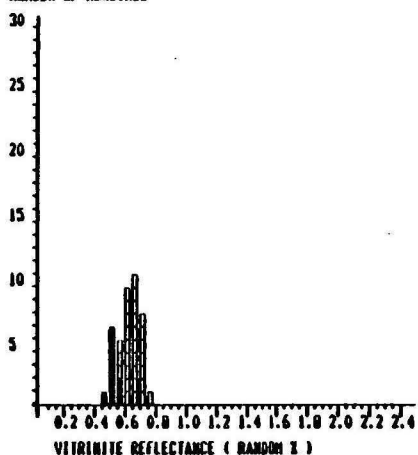


SAMPLE 530-550M

0.46 0.50 0.50 0.51 0.52 0.54 0.54 0.55 0.56 0.58
0.59 0.59 0.60 0.60 0.61 0.62 0.62 0.63 0.63 0.64
0.64 0.65 0.65 0.66 0.66 0.67 0.67 0.68 0.69
0.69 0.70 0.70 0.70 0.73 0.73 0.74 0.74 0.75

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	0.46-0.56	9	0.52	0.03
INERTINITE/REWORKED	0.58-0.75	30	0.66	0.05

NUMBER OF READINGS



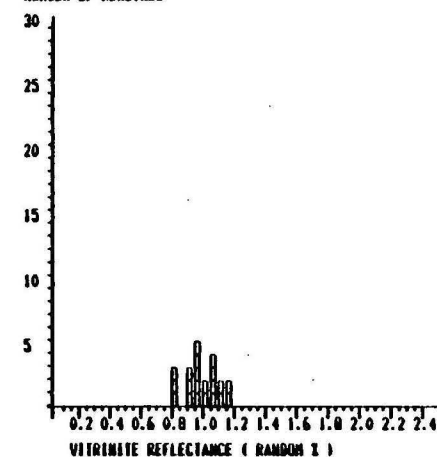
ANDERDON-1

SAMPLE 740-760M

0.83 0.83 0.83 0.91 0.93 0.94 0.96 0.97 0.98 0.98
0.99 1.02 1.04 1.05 1.08 1.09 1.09 1.10 1.13 1.16
1.16

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
INERTINITE/REWORKED	0.83-1.16	21	1.00	0.10

NUMBER OF READINGS

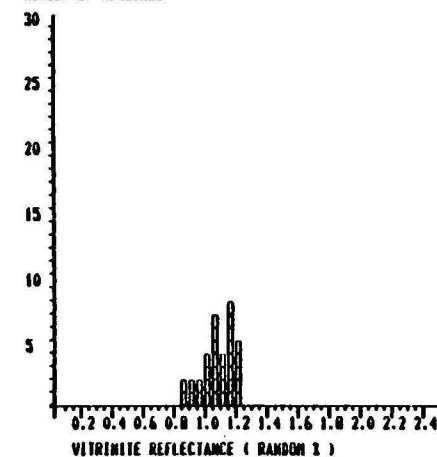


SAMPLE 990-1010M

0.88 0.89 0.93 0.94 0.96 0.99 1.00 1.02 1.03 1.04
1.05 1.05 1.05 1.06 1.06 1.07 1.08 1.10 1.10 1.12
1.13 1.16 1.17 1.18 1.18 1.18 1.18 1.19 1.21
1.21 1.22 1.22 1.23

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
INERTINITE/REWORKED	0.88-1.23	34	1.09	0.10

NUMBER OF READINGS



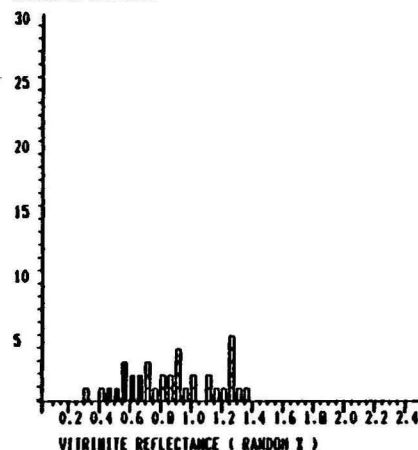
ANDERSON-1

SAMPLE 1240-1260H

0.34 0.42 0.49 0.52 0.57 0.58 0.59 0.60 0.64 0.68
0.68 0.71 0.72 0.73 0.76 0.82 0.83 0.85 0.89 0.92
0.93 0.93 0.94 0.95 1.03 1.03 1.10 1.11 1.16 1.20
1.25 1.25 1.26 1.28 1.28 1.32 1.36

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.49-0.68	9	0.59	0.07
LIPTINITE/CAVINGS	0.34-0.42	2	0.38	0.06
REWORKED	0.71-0.89	8	0.79	0.07
INERTINITE	0.92-1.36	10	1.13	0.15

NUMBER OF READINGS

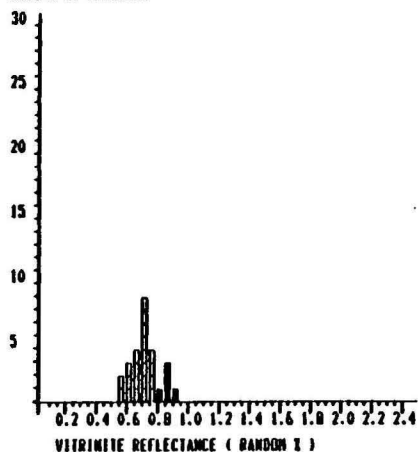


SAMPLE 1460-1490H

0.56 0.59 0.62 0.62 0.64 0.66 0.68 0.69 0.69 0.71
0.71 0.72 0.72 0.72 0.73 0.73 0.74 0.75 0.76 0.78
0.78 0.80 0.85 0.87 0.89 0.92

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.80-0.92	5	0.87	0.05
LIPTINITE/CAVINGS	0.56-0.78	21	0.70	0.06

NUMBER OF READINGS



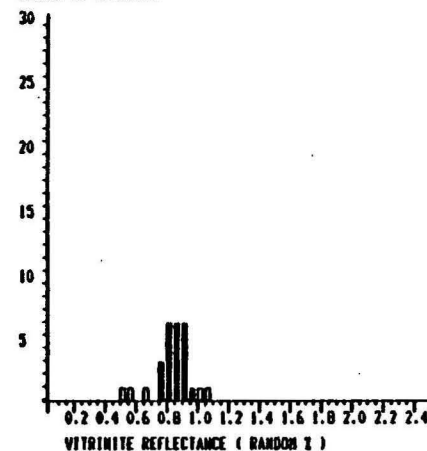
ANDERSON-1

SAMPLE 1370-1390H

0.50 0.55 0.66 0.77 0.77 0.78 0.81 0.81 0.81 0.82
0.82 0.84 0.85 0.86 0.86 0.89 0.89 0.89 0.90 0.91
0.91 0.92 0.93 0.94 0.95 1.01 1.07

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.77-0.95	22	0.86	0.06
LIPTINITE/CAVINGS	0.66-0.70	1	0.66	
INERTINITE/REWORKED	1.01-1.07	2	1.04	0.04

NUMBER OF READINGS

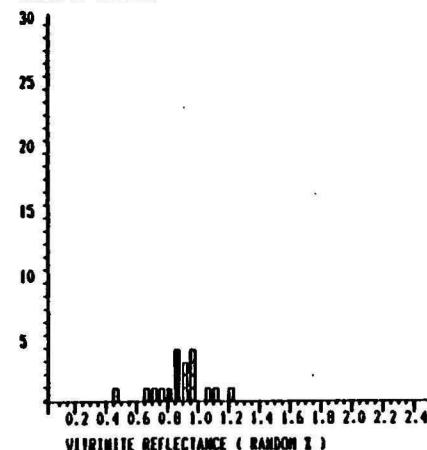


SAMPLE 1640-1660H

0.48 0.67 0.74 0.79 0.84 0.88 0.88 0.89 0.89 0.92
0.93 0.94 0.95 0.95 0.96 0.97 1.09 1.10 1.23

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.84-0.89	5	0.88	0.02
INERTINITE/REWORKED	0.92-0.97	7	0.95	0.02

NUMBER OF READINGS



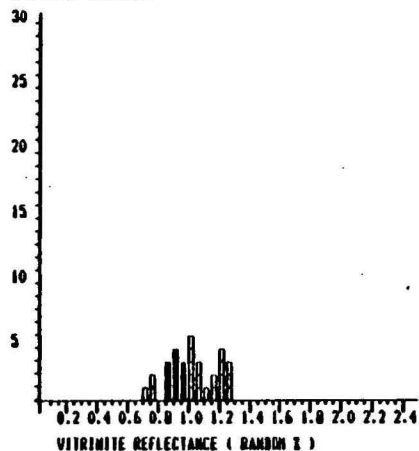
ANDERSON-1

SAMPLE 1750-1770M

0.74 0.78 0.79 0.87 0.88 0.89 0.90 0.90 0.91 0.92
0.96 0.97 0.98 1.00 1.00 1.01 1.02 1.02 1.06 1.06
1.08 1.14 1.19 1.19 1.20 1.22 1.22 1.23 1.27 1.28
1.29

SELECTED CLASS	RANGE (X)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.87-0.98	10	0.92	0.04
LIPITINITE/CAVINGS	0.74-0.79	3	0.77	0.03
INERTINITE/REWORKED	1.00-1.14	9	1.04	0.05

NUMBER OF READINGS

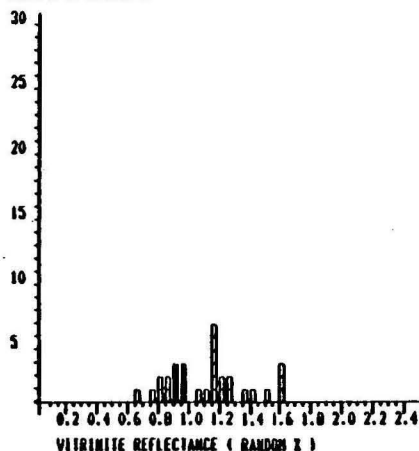


SAMPLE 2080-2095M

0.68 0.78 0.81 0.82 0.85 0.89 0.91 0.94 0.94 0.95
0.99 0.99 1.09 1.10 1.15 1.16 1.16 1.19 1.19 1.19
1.22 1.23 1.25 1.25 1.35 1.42 1.53 1.60 1.62 1.64

SELECTED CLASS	RANGE (X)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.91-0.99	6	0.95	0.03
LIPITINITE/CAVINGS	0.78-0.89	5	0.83	0.04
INERTINITE/REWORKED	1.09-1.25	12	1.18	0.05

NUMBER OF READINGS



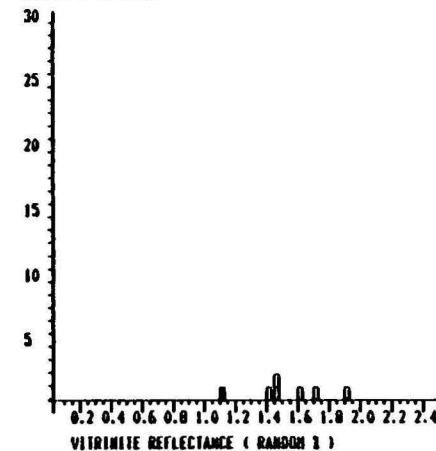
ANDERSON-1

SAMPLE 2197-2212M

1.10 1.44 1.46 1.48 1.60 1.71 1.90

SELECTED CLASS	RANGE (X)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	1.10-1.10	1	1.10	
INERTINITE/REWORKED	1.44-1.48	3	1.46	0.02

NUMBER OF READINGS

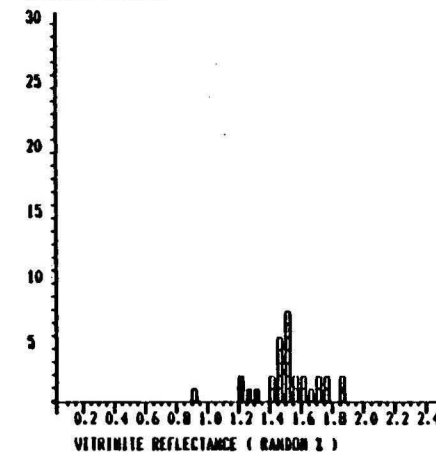


SAMPLE 2380-2395M

0.90 1.20 1.22 1.26 1.33 1.40 1.42 1.45 1.47 1.48
1.48 1.49 1.50 1.51 1.51 1.53 1.53 1.53 1.54 1.55
1.58 1.64 1.64 1.67 1.71 1.71 1.75 1.76 1.86 1.88

SELECTED CLASS	RANGE (X)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	1.20-1.33	4	1.25	0.06
INERTINITE/REWORKED	1.40-1.64	18	1.51	0.06

NUMBER OF READINGS



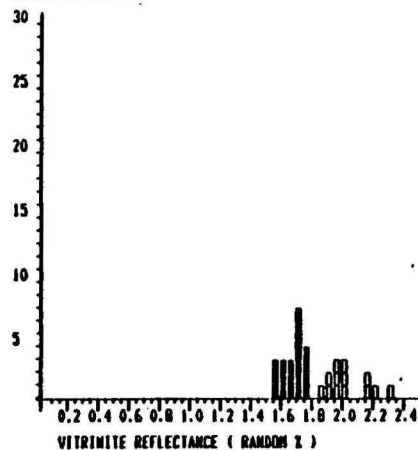
ANDERSON-1

SAMPLE 2506-2515H

1.56 1.56 1.59 1.61 1.62 1.64 1.67 1.68 1.69 1.70
1.70 1.71 1.71 1.73 1.74 1.74 1.77 1.78 1.78 1.78
1.87 1.92 1.94 1.96 1.98 1.99 2.01 2.04 2.04 2.16
2.16 2.22 2.33

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.56-1.78	20	1.69	0.07
IMERTINITE/REWORKED	1.87-2.04	9	1.97	0.06

NUMBER OF READINGS

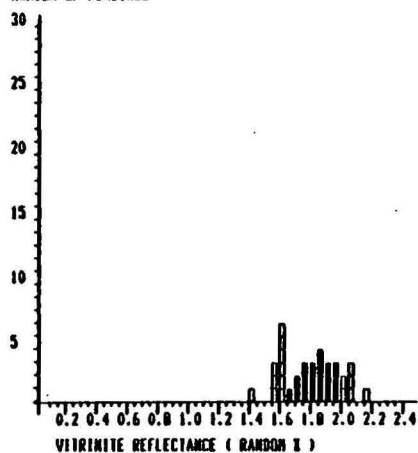


SAMPLE 2608-2623H

1.42 1.56 1.56 1.59 1.60 1.60 1.62 1.63 1.63 1.64
1.68 1.71 1.74 1.75 1.76 1.79 1.83 1.84 1.84 1.85
1.87 1.89 1.89 1.90 1.91 1.91 1.96 1.96 1.96 2.02
2.03 2.06 2.07 2.07 2.19 2.57

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.68-1.96	19	1.84	0.09
LIPITINITE/CAVINGS	1.56-1.68	10	1.61	0.04
IMERTINITE/REWORKED	2.02-2.07	5	2.05	0.02

NUMBER OF READINGS



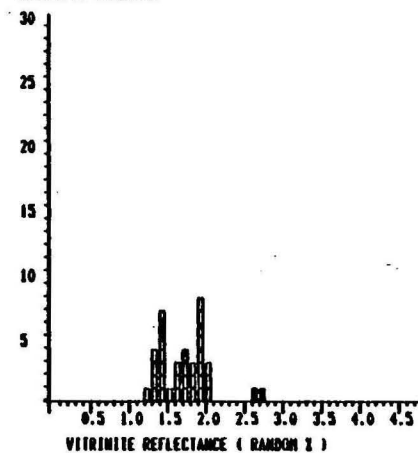
ANDERSON-1

SAMPLE 2764-2779H

1.26 1.33 1.35 1.36 1.39 1.40 1.43 1.44 1.45 1.46
1.47 1.49 1.50 1.61 1.62 1.64 1.70 1.73 1.78 1.79
1.85 1.85 1.88 1.90 1.92 1.92 1.92 1.93 1.94 1.97
1.99 2.00 2.01 2.06 2.69 2.74

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	2.69-2.74	2	2.72	0.04
LIPITINITE/CAVINGS	1.85-2.06	14	1.94	0.06

NUMBER OF READINGS

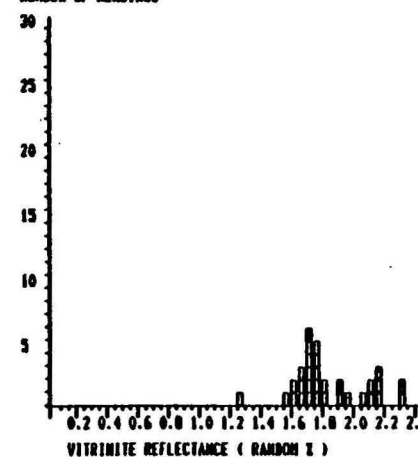


SAMPLE 2890-2905H

1.29 1.57 1.63 1.64 1.67 1.67 1.67 1.71 1.72 1.73
1.74 1.74 1.74 1.77 1.78 1.78 1.78 1.79 1.82 1.82
1.91 1.92 1.97 2.05 2.10 2.11 2.15 2.18 2.19 2.30
2.32

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
LIPITINITE/CAVINGS	2.05-2.19	6	2.13	0.05

NUMBER OF READINGS



ASHMORE REEF-1 WELL

SUMMARY

Vitrinite reflectance and spore colour index analysis of samples from the interval 274m to 3914m TD of the Ashmore Reef-1 well shows that the well section is immature to 2000m, early mature between 2000m and 3200m and middle mature between 3200m and 3914m TD. The vitrinite reflectance gradient has a marked discontinuity between 2443m and 2448m consistent with uplift and erosion of 700m of Late Jurassic to Cretaceous sediments at the unconformity at 2447m. Extrapolation of the maturity gradients to seabed indicates that little Palaeocene and younger section is missing above 1052m and that the well section is currently at or near its maximum depth of burial.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 12° 10' 49.7"S, 123° 05' 10.6"E.

Operator and date of drilling: Bocal, 1968.

Well Status: Plugged and abandoned.

TD: 3914m.

Mud data: Seawater with gel slugs: Seabed to 2492m.
Oil emulsion mud system: 2492m to 3914m TD.

Casing data: 30" at 101m, 20" at 300m, 13³/₈" at 1094m, 9⁵/₈" at 2481m.

BHT data: 27.5°C at 1108m, stopped circulation time unknown.
62.5°C at 1948m, stopped circulation time unknown.
71.5°C at 2491m, stopped circulation time unknown.
103°C at 3098m, stopped circulation time unknown.
114°C at 3539m, stopped circulation time unknown.
138°C at 3912m, stopped circulation time unknown.

Elevation: RT 10m ASL.

Water depth: 39m.

Interval analysed: 274m to 3914m TD.

ASHMORE REEF-1 WELL

Age of interval analysed:

Depths (in metres)

Pliocene-Quaternary	274- 321
Middle-Late Miocene	321- 803
Early Miocene	803- 933
Oligocene	933-1222
Eocene	1222-2090
Palaeocene	2090-2191
Cretaceous	2191-2447
Late Jurassic	2447-2786
Late Triassic	2786-3914 TD

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed in Phase II yielded only sparse quantities of vitrinitic kerogen. Results: Poor. Phase I data quality unknown.
- b) Spore Colour Index: The samples analysed in Phase II yielded sufficient sporomorphs for analysis. Results: Good. Phase I data quality unknown.

Source rock data quality: No analyses performed.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index results rise steadily from 2 to 2.5 SCI units at 945m to 6 SCI units at 3914m TD. Interpreted vitrinite reflectance results rise from 0.32% at 1189m to 0.90% at 3914m TD. There is a large discontinuity in the reflectance between 2443m and 2348m consistent with uplift and erosion of around 700m of Late Jurassic to Cretaceous section at the unconformity at 2447m. Extrapolation of the interpreted gradients to seabed indicates that little Palaeocene to Recent section is missing above 1052m and that the sediments analysed are currently at or near their maximum depths of burial.

The results show that the well section is immature to 2000m, early mature between 2000m and 3200m and middle mature between 3200m and 3914m TD.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
49		Pliocene-Quaternary									
274-290	Ctg	LST, wht	*								
321		Middle-Late Miocene									
803		Early Miocene									
933		Oligocene									
945-960	"	LST, off wht-lt gy gn, arg	2.0-2.5	*							
1052-1067	"	MDST, lt gn-gy + 10% CHK/MARL, yel gy	*	0.21(8)cvd							
1113-1128	"	MDST, a/a + 10% CHK/ MARL, a/a	2.0-2.5	*							
1189-1204	"	MDST, lt ol gy, calc	2.5-3.0	0.32(5)rew							
1222		Eocene									
1280-1296	"	CHK, yel-gy + 10% MDST, gn-gy/brn-gy	*	0.31(3)							
1530	Core	CHK, lt gy/yel-gy	3.0	*							
1839	"	CHK, a/a	3.0	*							
2043-2058	Ctg	MDST, lt med gy	8.5-9.0rew	0.50(1)rew							
2052	Core	MDST, lt gy/gn-gy	*	*							
2090		Palaeocene									
2165-2180	Ctg	CHK/MARL, wht/yel-gy + 30% MDST, lt gn-gy	*	*							
2191		Cretaceous									
2348-2363	"	MDST, pal rd-gy rd, occ sndy	1.5cvd	0.60(1)rew							
2424-2439	"	MDST, med gy/gn-gy + 30% DOL/LST, lt gy	4.0	0.34(7)							
2439-2454	"	MDST, lt med gy + 20% SLIST, v lt gy, sndy	7.0rew	0.64(44)rew							
2444	Core	MDST, med-dk gy	4.0	0.38(1)							
2447		Late Jurassic									
2469		Volcanics									
2786		Late Triassic									
2837	Core	MDST, med-dk gy	4.5	0.58(6)							
2912-2927	Ctg	VOLC, dk gn-gy + 20% MDST, a/a	4.5-5.0	0.66(16)							
3003-3018	"	SST, lt gy + 30% VOLC, a/a + 20% MDST, a/a	4.5-5.0	0.64(12)							
3079-3095	"	MDST, a/a + 20% SST, a/a + 20% MDST, gn- gy + 10% VOLC, a/a	4.5-5.0	0.67(11)							

Table 1a Maturity and Kerogen Composition Data

WELL: ASHMORE REEF-1

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
3232-3247	Ctg	MDST, med gy + 15% SST, lt gy	5.0	0.65(3)							
3338-3354	"	MDST, a/a + 5% SST, a/a	5.0	0.73(5)							
3476-3491	"	MDST, med-dk gy + 50% SST, lt gy	5.0-5.5	0.71(3)							
3573	Core	MDST, med-lt gy	5.5	*							
3677	"	MDST, med gy	*	0.73(16)							
3902-3914	Ctg	MDST, med gy + 40% LST, yel-brn	6.0	0.76(17)							

Table 1b Maturity and Kerogen Composition Data

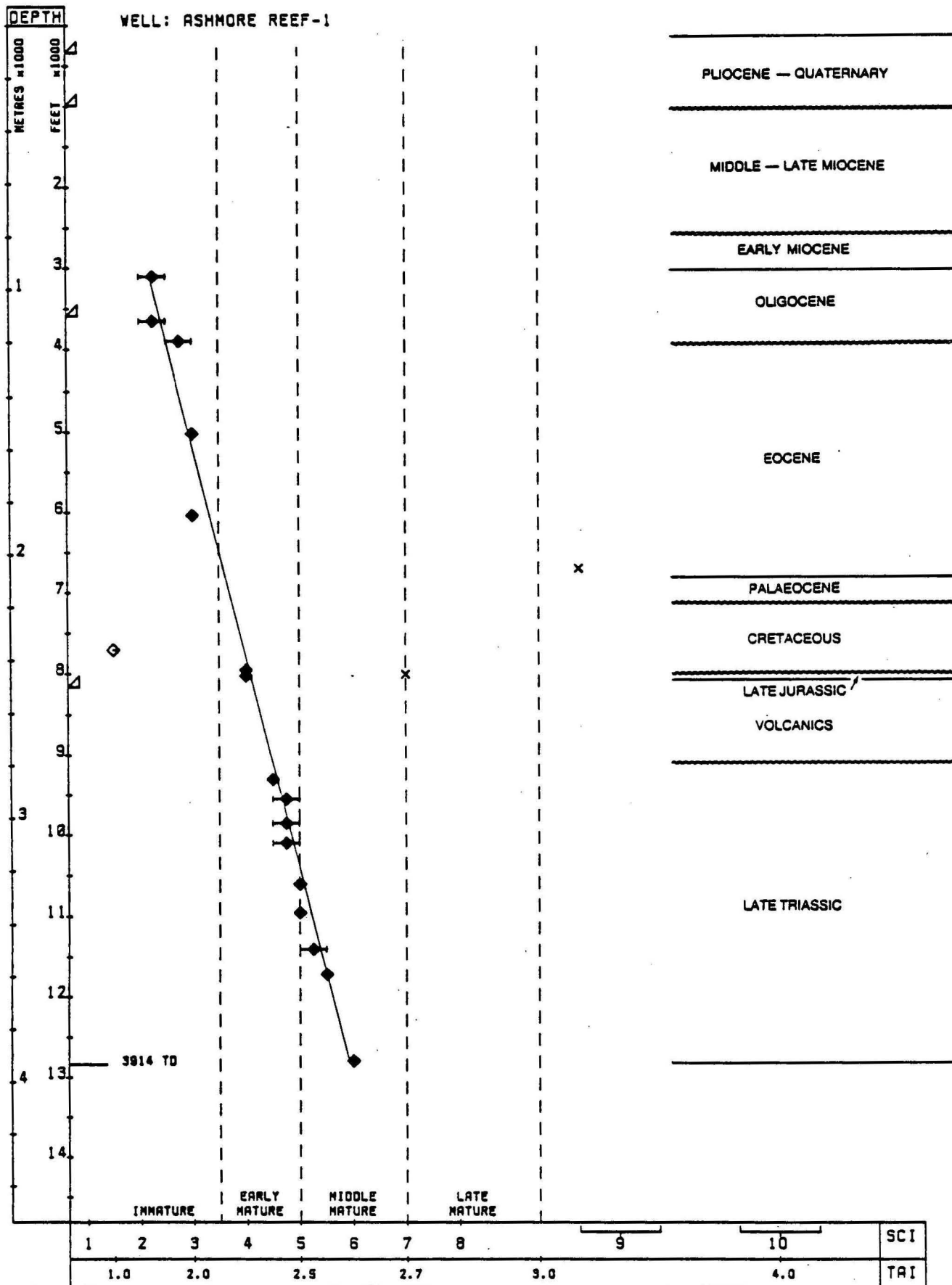


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

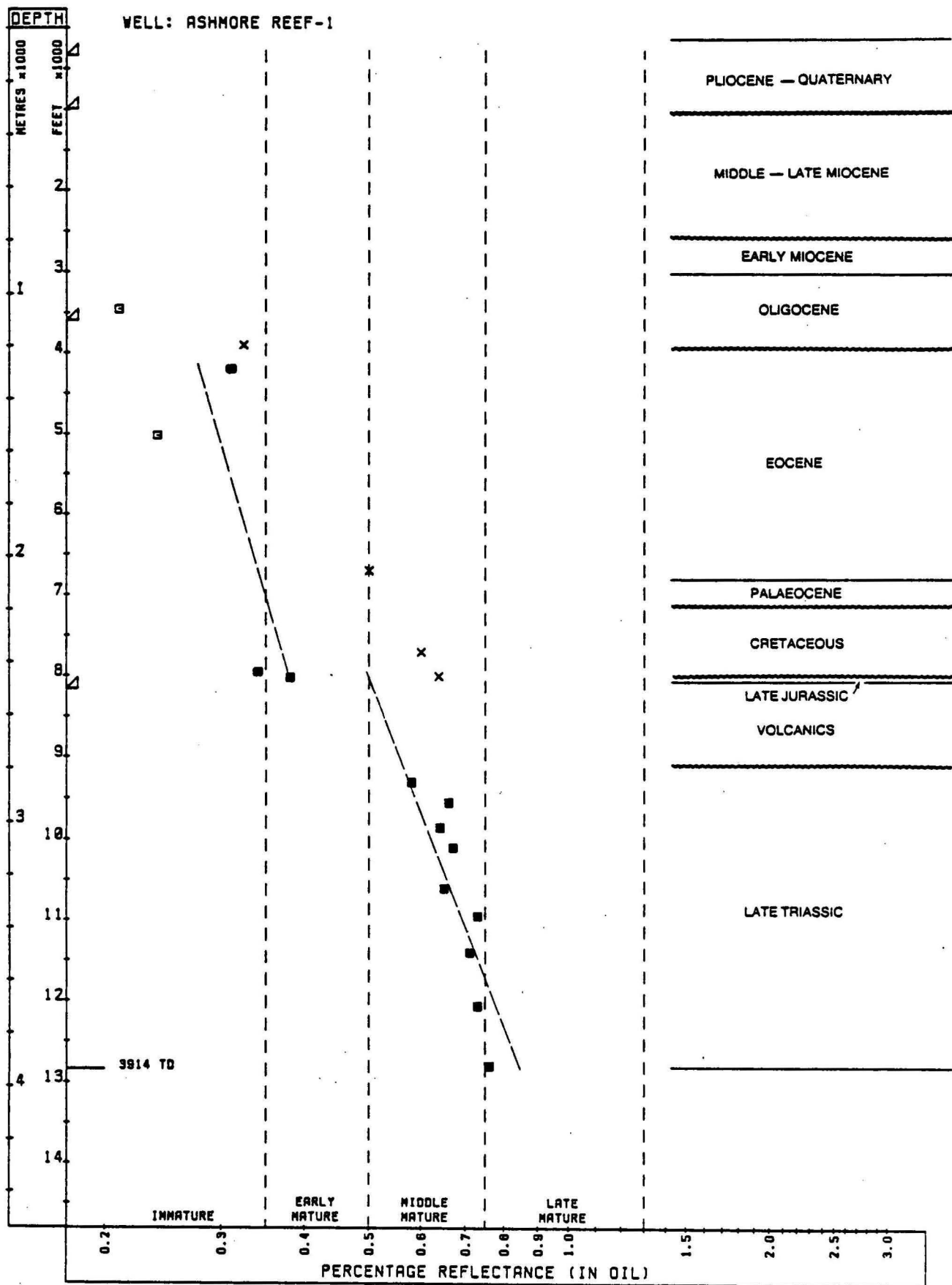


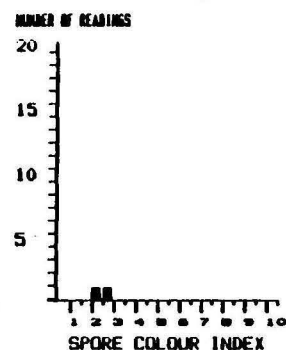
FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

ASHMORE REEF-1

IN SITU POPULATION

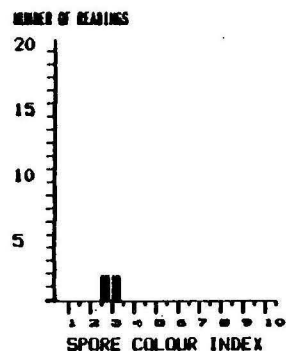
SAMPLE 945-960M
2.0 2.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.0-2.5	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0



SAMPLE 1189-1204M
2.5 2.5 3.0 3.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.5-3.0	4
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0

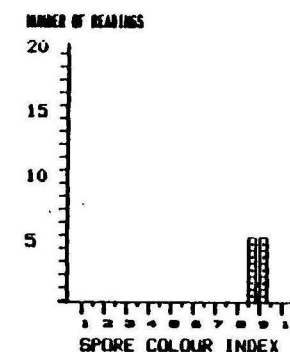


ASHMORE REEF-1

IN SITU POPULATION

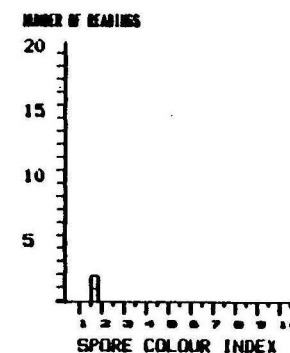
SAMPLE 2043-2058M
8.5 8.5 8.5 8.5 8.5 9.0 9.0 9.0 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.5-9.0	10



SAMPLE 2348-2363M
1.5 1.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	1.5-1.5	2
STAINED/REWORKED	-	0



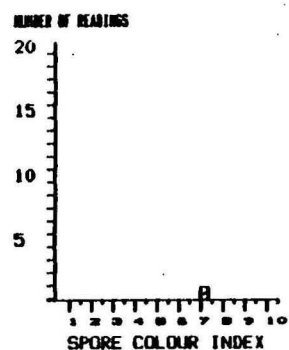
ASHMORE REEF-1

IN SITU POPULATION

SAMPLE 2439-2454M

7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.0-7.0	1



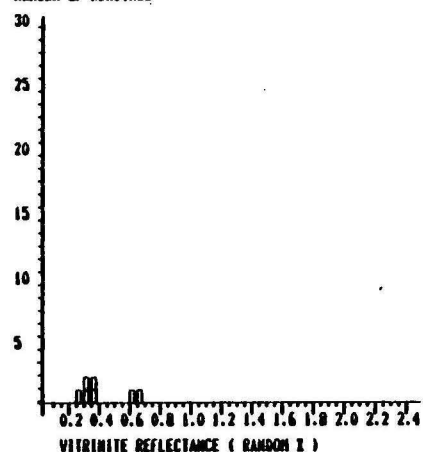
SAMPLE 1189-1204H

0.28 0.30 0.31 0.35 0.38 0.63 0.66

SELECTED CLASS RANGE (1) COUNT AV(1) ST.DEV

INERTINITE/REWORKED	0.28-0.38	5	0.32	0.04
REWORKED	0.63-0.66	2	0.65	0.02

NUMBER OF READINGS



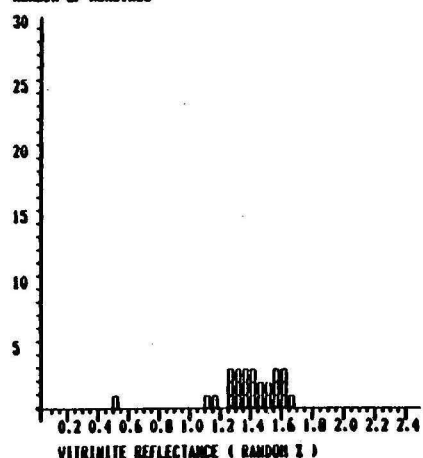
SAMPLE 2043-2058H

0.50 1.13 1.17 1.26 1.28 1.29 1.30 1.30 1.32 1.35
1.35 1.37 1.40 1.41 1.44 1.46 1.49 1.52 1.55
1.57 1.57 1.60 1.62 1.63 1.67

SELECTED CLASS RANGE (1) COUNT AV(1) ST.DEV

INERTINITE/REWORKED	0.50-0.50	1	0.50	
REWORKED	1.13-1.67	25	1.42	0.15

NUMBER OF READINGS



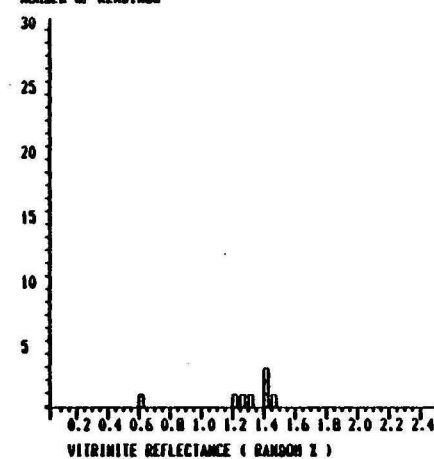
SAMPLE 2348-2363H

0.60 1.21 1.29 1.33 1.41 1.42 1.42 1.49

SELECTED CLASS RANGE (1) COUNT AV(1) ST.DEV

INERTINITE/REWORKED	0.60-0.60	1	0.60	
REWORKED	1.21-1.49	7	1.37	0.10

NUMBER OF READINGS



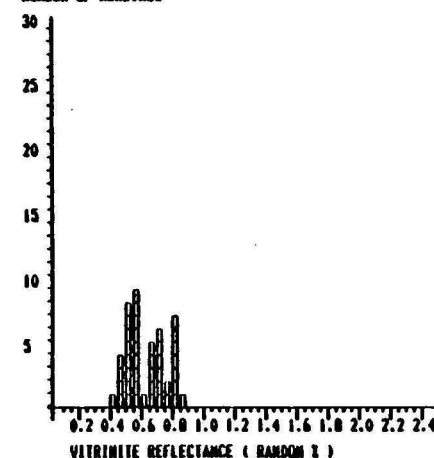
SAMPLE 2439-2454H

0.41 0.45 0.45 0.47 0.48 0.50 0.51 0.52 0.53 0.53
0.53 0.54 0.54 0.56 0.57 0.57 0.57 0.58 0.58 0.59
0.59 0.59 0.61 0.65 0.65 0.65 0.66 0.69 0.71 0.72
0.72 0.72 0.73 0.74 0.77 0.78 0.80 0.80 0.81 0.82
0.82 0.83 0.83 0.89

SELECTED CLASS RANGE (1) COUNT AV(1) ST.DEV

INERTINITE/REWORKED	0.41-0.89	44	0.64	0.13
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NUMBER OF READINGS



BARCOO-1 WELL

SUMMARY

Geochemical analysis of selected samples from the interval 2740m to 5080m of the Barcoo-1 well shows that the well section becomes middle mature at around 3650m and late mature at 5100m. The vitrinite reflectance gradient suggests there are no major erosional unconformities within the section analysed. Extrapolation of the reflectance gradient to seabed also suggests that no major post Cretaceous uplift and erosion has occurred at the well location. The sediments analysed are currently at or near their maximum depths of burial.

Source rock analysis suggests that the intervals 2740m to 2790m and 3220m to 3350m of Late Cretaceous age possibly have poor oil source potential. The interval 3350m to 3380m of Middle Cenomanian to Early Aptian age has good to very good oil source potential on maturation. At their present level of maturity these intervals will not have generated significant quantities of oil.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 15° 20' 37.0"S, 120° 38' 12.2"E

Operator and date of drilling: Woodside Petroleum Pty Ltd, 1980.

Well Status: Plugged and abandoned.

TD: 5109m.

Mud data: Seawater: Seabed to 765m.

Seawater and high viscosity gel pills: 765m to 1125m.

Seawater/CMC system: 1125m to 2250m.

Casing data: 30" at 765m, 20" at 1111m, 13³/₈" at 2226m, 9⁵/₈" at 3106m, 7" at 4202m.

BHT data: 54°C at 3118m, after 6 hours stopped circulation.

94°C at 4019m, after 4 hours stopped circulation.

99°C at 4196m, after 26 hours stopped circulation.

126°C at 5009m, after 16.5 hours stopped circulation.

Elevation: RT 11m ASL.

Water Depth: 720m.

BARCOO-1 WELL

Interval analysed: 2740m to 5080m.

Age of interval analysed:

	<u>Depths (in metres)</u>
Late Cretaceous	2740-3007
Early-Late Cretaceous	3007-3695
Early Cretaceous	3695-3795
Middle-Late Jurassic	3795-3830
Middle Jurassic	3830-4128
Early Jurassic	4128-4728
Late Triassic	4748-5080

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed contained abundant reworked material which hindered analysis. Results: Poor to fair.
- b) Spore Colour Index: The samples analysed contain abundant caved sporomorphs which hindered measurements. Results: Fair.

Source Rock data quality: Good.

Gas chromatography run at: 2740m to 2790m and 3370m to 3400m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from around 4 SCI units at 2740m to around 6.5 to 7 units at 5080m. Vitrinite reflectance values rise from 0.4% to 0.75% over the same interval. The results show that the well section becomes middle mature at around 3650m and late mature at around 5100m. The vitrinite reflectance gradient suggests that there are no major erosional unconformities within the section analysed. Extrapolation of the gradient to seabed suggests that no major post Cretaceous uplift and erosion has occurred at the well location and that the present day depths of burial of the sediments analysed are the maximum, or near maximum, burial depths of these sediments.

BARCOO-1 WELL

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

Mudstones in the interval 2740m to 3400m contain average to above average organic carbon contents of between 1.11% and 4.74%. Pyrolysis analysis of these samples shows moderate to high hydrogen indices of between 132 and 312, which associated with low oxygen indices indicates significant content of waxy and algal kerogen. This is confirmed by visual kerogen analysis which shows 20%, 10% and 40% oil-prone kerogen content at 2740m to 2790m, 3290m to 3340m and 3370m to 3400m respectively.

Analysis of electric logs supplied suggests a cumulative thickness of 20m of shaly source rocks between 2740m and 2790m, and 160m between 3220m and 3380m. In the latter interval, analyses suggest that the interval 3220m to 3350m has an average organic carbon content of around 1.42% and an oil-prone kerogen content of 10%, while the interval 3350m to 3380m has an organic carbon content of 4.75% and an oil-prone kerogen content of 40%. The data shows only poor oil source potential for the intervals 2740m to 2790m and 3220m to 3350m and good to very good oil source potential for the Early Aptian to Middle Cenomanian interval 3350m to 3380m.

Solvent extraction analysis of the sample at 3370m to 3400m shows very low organic carbon normalized extract and hydrocarbon yields of 38 mg/g Corg and 22 mg/g Corg respectively, typical of good quality source rocks at low maturity levels. The gas chromatogram of this sample shows a wide alkane distribution pattern ranging from n-C₁₁ to n-C₃₆ with dominant waxy compounds showing strong even-over-odd preference in n-C₂₄ to n-C₃₂.

Extraction, fractionation and gas chromatography of the sample at 2740m to 2790m shows it to contain small quantities of indigenous hydrocarbons derived from early mature terrestrially sourced waxy kerogen.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

Of the remaining samples analysed only the mudstones at 3880m to 3930m contain above 1% total organic carbon. Pyrolysis analysis of this sample shows it to contain only humic kerogen. The remaining samples contain below average organic carbon contents of between 0.02% and 0.85%. Visual kerogen typing of samples in the interval 3695m to 5080m shows that they contain predominantly humic kerogen with a maximum of 10% oil-prone kerogen content.

These samples have no significant oil or gas source potential.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALCAL SAPROPEL	WAXY SAPROPEL
2702		Maastrichtian									
2749		Late Turonian-Late Campanian									
2740-2790	Ctg	MDST, lt gy, slty + 50% LST, v lt gy, arg	4.5	0.40(5)	20	60	20				
	P	MDST, lt gy, slty						40	40	*	20
3007		Barremian-Middle Cenomanian									
3290-3340	Ctg	MDST, med gy, slty + 40% LST, wht-lt-gy, slty	4.5-5.0	0.49(15)	30	60	10				
	P	MDST, med gy, slty						60	30	*	10
3370-3400	P	MDST, med-med dk gy, occ carb						50	10	10	30
3695		Late Neocomian									
3760-3790	Ctg	MDST, med-lt gy + 50% LST, wht, v lt gy	5.0-5.5	0.56(11)	60	35	5				
3795		Late Callovian-Oxfordian									
3830		Aalenian-Bathonian									
3880-3930	P	MDST, med lt gy-med gy, v slty						70	30	*	*
4128		Early Jurassic									
4140-4190	Ctg	SND + mnr MDST, med lt gy-med gy	5.0-5.5	0.53(1)	70	30	tr				
4210-4260	"	SND + mnr MDST, a/a	5.0-5.5	0.51(6)	65	30	5				
4420-4430	"	SND, arkosic	5.5-6.0	0.57(3)	65	30	5				
4560-4600	"	MDST, med gy + 20% SLTST, lt gy-wht	5.5-6.0	0.69(6)	50	40	10				
4748		Norian-Rhaetian									
4750-4800	"	MDST, v lt gy + 20% SND/SST, wht	6.0-6.5	0.74(9)	55	40	5				
4950-5000	"	MDST, med-lt-gy + 70% SLTST, v lt gy + mnr SND/SST, wht	6.5-7.0	0.66(2)	55	40	5				
5050-5080	"	MDST, v lt gy-lt gy	6.5-7.0	0.76(1)	50	45	5				

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
2749		Late Turonian-Late Campanian													
2740-2790	Ctg	MDST, lt gy, slty + 50% LST, v lt gy, arg	0.87						530	61	230	26	36	6	58
	P	MDST, lt gy, slty	1.11	435	247	23	0.04	2.85							
3007		Barremian-Middle Cenomanian													
3290-3340	Ctg	MDST, med gy, slty + 40% LST, wht-lt gy, slty	-												
	P	MDST, med gy, slty	1.42	432	132	15	0.06	1.98							
3370-3400	Ctg	MDST, med-med dk gy, occ carb + 40% LST, wht, lt gy + 10% SLTST, lt gy, mic	2.40						915	38	530	22	45	13	42
	P	MDST, a/a	4.74	432	312	7	0.02	15.13							
3695		Late Neocomian													
3760-3790	Ctg	MDST, med-lt gy + 50% LST, wht, v lt gy	-												
	P	MDST, med-lt gy	0.85												
3795		Late Callovian-Oxfordian													
3830		Aalenian-Bathonian													
3880-3930	Ctg	MDST, med lt gy-med gy, v slty + 20% LST, wht, v lt gy	-												
	P	MDST, med lt gy-med gy, v slty	1.15	430	44	28	0.15	0.60							
4128		Early Jurassic													
4140-4190	Ctg	SND + mnr MDST, a/a	-												
4210-4260	"	SND + mnr MDST, a/a	-												
4270-4300	"	SND, arkosic	-												
4420-4450	"	SND, a/a	-												
4560-4600	"	MDST, med gy + 20% SLTST, lt gy-wht	-												
	P	MDST, med gy	0.66												
4748		Morian-Rhaetian													
4750-4800	Ctg	MDST, v lt gy + 20% SND/ SST, wht	-												
	P	MDST, v lt gy	0.28												
4800-4850	Ctg	MDST, a/a, v slty	0.02												

Table 2a Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA										
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION				
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g TOC)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g TOC)	EXTRACT COMPOSITION (%)
													SATURATED HYDROCARBONS
													AROMATIC HYDROCARBONS
													POLAR COMPOUNDS
4950-5000	Ctg	MDST, med-lt-gy + 70% SLTST, v lt gy + mnr SND/ SST, wht	-										
	P	MDST, med-lt-gy	0.10										
	P	SLTST, v lt gy	0.05										
5025-5050	Ctg	MDST, v lt gy-lt gy, v slty	0.04										
5050-5080	"	MDST, a/a	0.30										

Table 2b Chemical Analysis Data

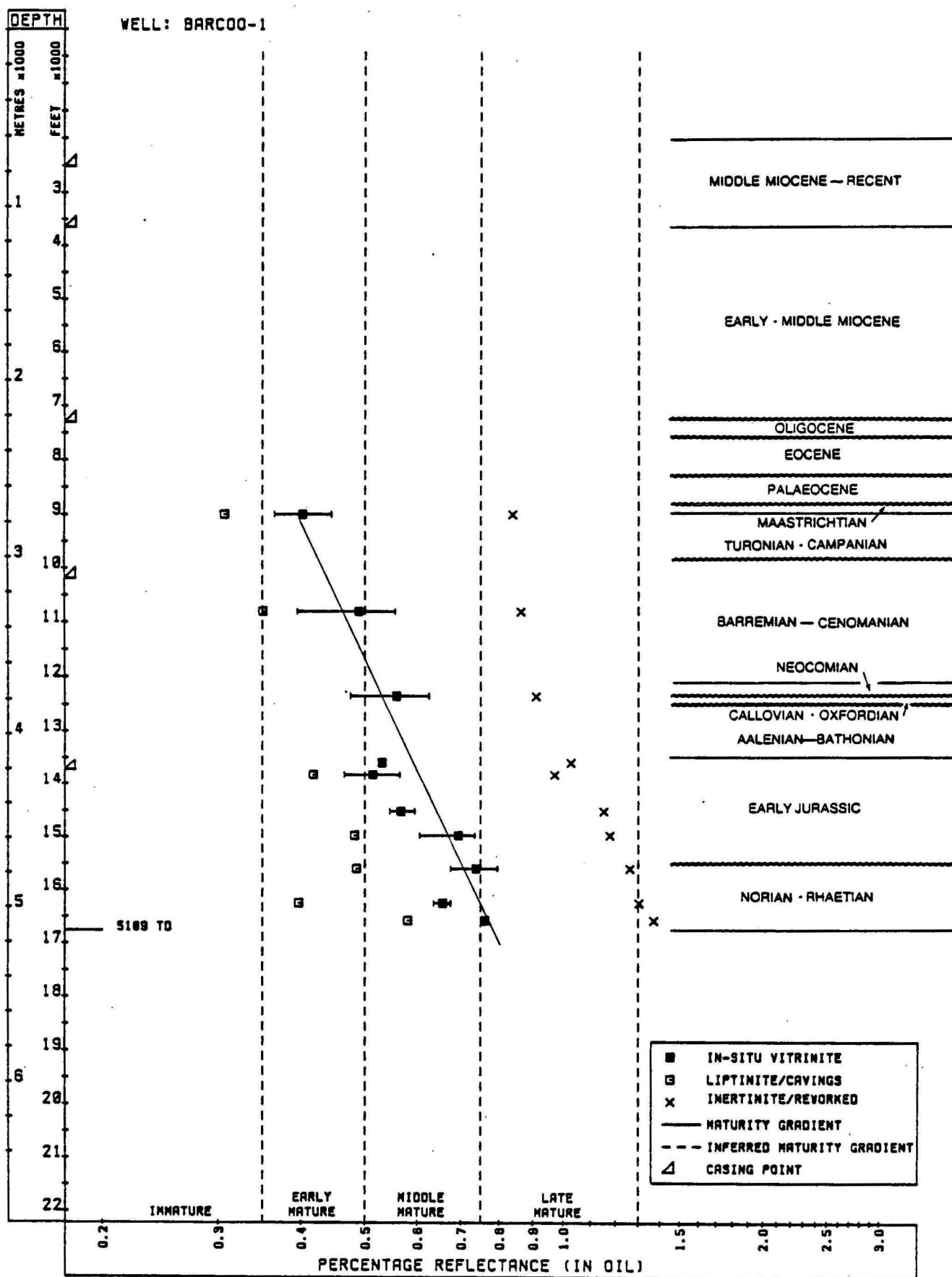
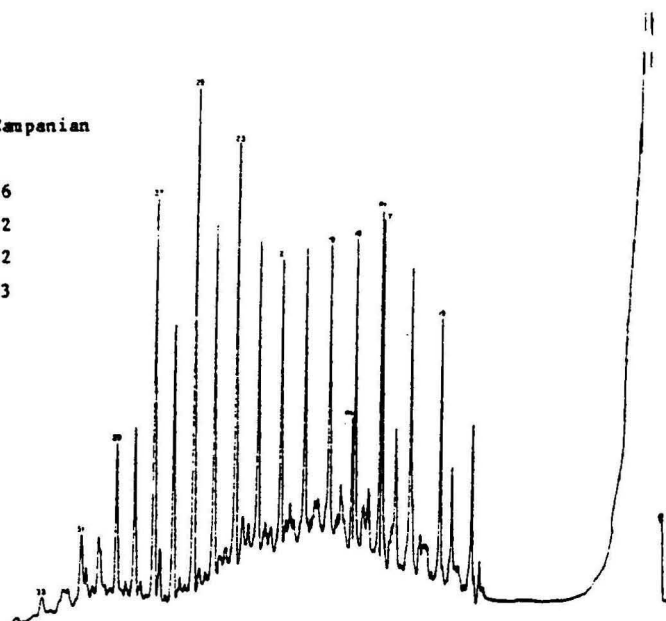


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Barcoo-1
2740-2790m
L. Turonian-L. Campanian
SCI 4.5
Pr/Ph = 2.76
Pr/n-C₁₇ = 1.02
Ph/n-C₁₈ = 0.42
CPI = 1.53



Barcoo-1
3370-3400m
Barremian-M. Cenomanian
SCI 4.75
Pr/Ph = 1.68
Pr/n-C₁₇ = 0.55
Ph/n-C₁₈ = 0.89
CPI = 0.70

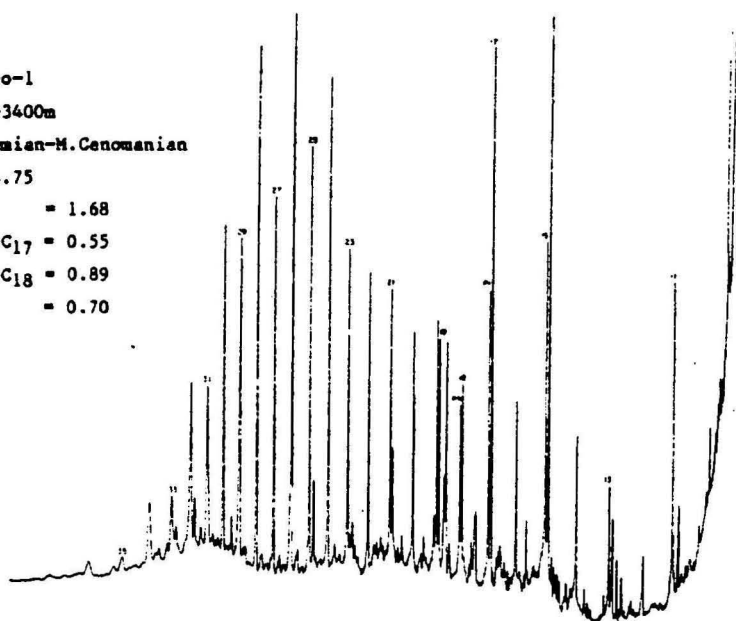


Figure 3

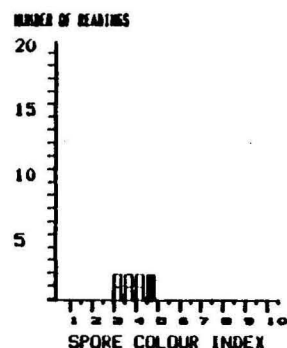
BARCOD-1

IN SITU POPULATION

SAMPLE 2740-2790M

3.0 3.0 3.5 3.5 4.0 4.0 4.5 4.5

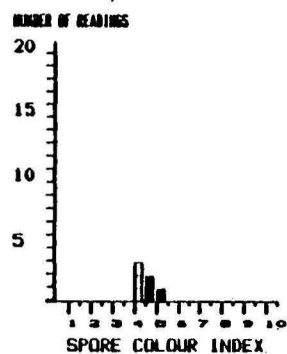
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	4.5-4.5	2
BLEACHED OR CAVED	3.0-4.0	6
STAINED OR REWORKED	-	0



SAMPLE 3290-3340M

4.0 4.0 4.0 4.5 4.5 5.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	4.5-5.0	3
BLEACHED OR CAVED	4.0-4.0	3
STAINED OR REWORKED	-	0



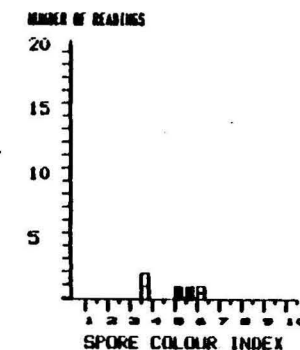
BARCOD-1

IN SITU POPULATION

SAMPLE 3760-3790M

3.5 3.5 5.0 5.5 6.0

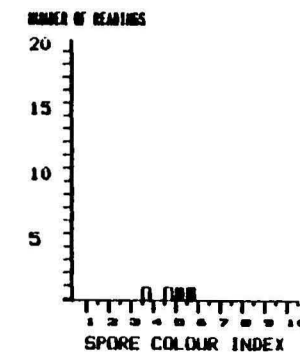
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.0-5.5	2
BLEACHED OR CAVED	3.5-3.5	2
STAINED OR REWORKED	6.0-6.0	1



SAMPLE 4140-4190M

3.5 4.5 5.0 5.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.0-5.5	2
BLEACHED OR CAVED	3.5-4.5	2
STAINED OR REWORKED	-	0

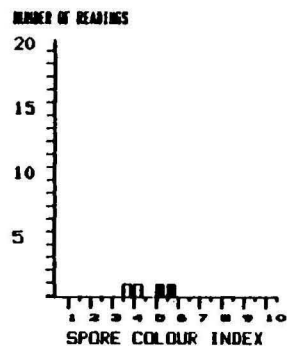


BARCOO-1

IN SITU POPULATION

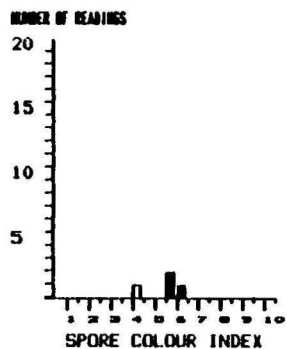
SAMPLE 4210-4260M
3.5 4.0 5.0 5.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.0-5.5	2
BLEACHED OR CAVED	3.5-4.0	2
STAINED OR REWORKED	-	0



SAMPLE 4420-4450M
4.0 5.5 5.5 6.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.5-6.0	3
BLEACHED OR CAVED	4.0-4.0	1
STAINED OR REWORKED	-	0

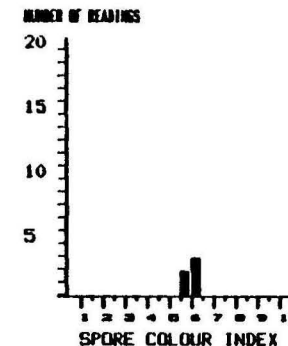


BARCOO-1

IN SITU POPULATION

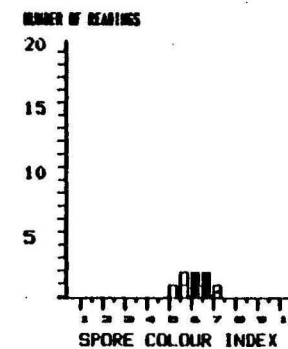
SAMPLE 4560-4600M
5.5 5.5 6.0 6.0 6.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.5-6.0	5
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	-	0



SAMPLE 4750-4800M
5.0 5.5 5.5 6.0 6.0 6.5 6.5 7.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.0-6.5	4
BLEACHED OR CAVED	5.0-5.5	3
STAINED OR REWORKED	7.0-7.0	1



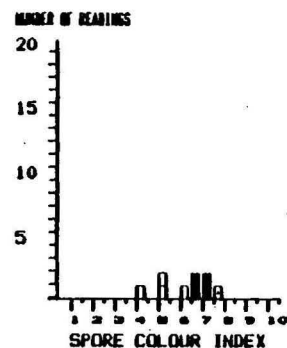
BARCOO-1

■ IN SITU POPULATION

SAMPLE 4950-5000M

4.0 5.0 5.0 6.0 6.5 6.5 7.0 7.0 7.5

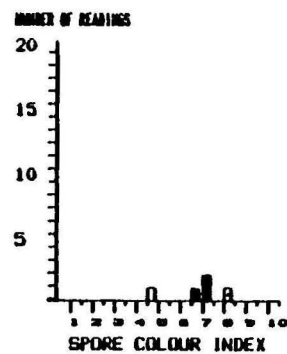
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-7.0	4
BLEACHED OR CAVED	4.0-6.0	4
STAINED OR REWORKED	7.5-7.5	1



SAMPLE 5050-5080M

4.5 6.5 7.0 7.0 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-7.0	3
BLEACHED OR CAVED	4.5-4.5	1
STAINED OR REWORKED	8.0-8.0	1



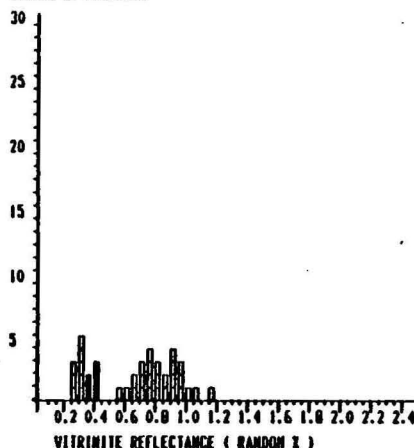
BARCOO-1

SAMPLE 2740-2790M

0.26 0.26 0.29 0.31 0.33 0.33 0.33 0.34 0.37 0.39
0.40 0.41 0.44 0.59 0.61 0.65 0.66 0.72 0.72 0.73
0.75 0.77 0.78 0.78 0.80 0.81 0.83 0.89 0.89 0.90
0.90 0.91 0.94 0.95 0.96 0.97 1.00 1.08 1.17

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.37-0.44	5	0.40	0.03
LIPITINITE/CAVINGS	0.26-0.34	8	0.31	0.03
INERTINITE/REWORKED	0.59-1.17	26	0.84	0.14

NUMBER OF READINGS

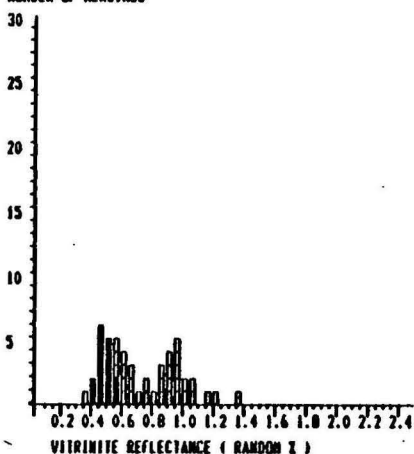


SAMPLE 3290-3340M

0.35 0.40 0.43 0.45 0.46 0.48 0.48 0.49 0.49 0.50
0.50 0.51 0.52 0.52 0.55 0.55 0.57 0.58 0.59 0.61
0.61 0.64 0.64 0.65 0.66 0.68 0.71 0.75 0.78 0.84
0.88 0.88 0.89 0.90 0.93 0.93 0.94 0.95 0.95 0.96
0.96 0.99 1.00 1.04 1.06 1.09 1.17 1.22 1.38

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.40-0.55	15	0.49	0.04
LIPITINITE/CAVINGS	0.35-0.35	1	0.35	
INERTINITE/REWORKED	0.57-1.38	33	0.86	0.20

NUMBER OF READINGS



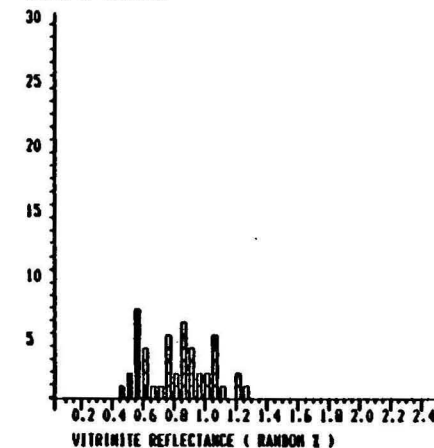
BARCOO-1

SAMPLE 3760-3790M

0.48 0.51 0.54 0.55 0.56 0.56 0.56 0.58 0.58 0.59
0.62 0.64 0.64 0.64 0.69 0.72 0.75 0.77 0.78 0.79
0.79 0.81 0.84 0.85 0.85 0.87 0.88 0.88 0.89 0.90
0.90 0.90 0.91 0.95 0.95 1.01 1.01 1.05 1.06 1.06
1.08 1.09 1.12 1.24 1.24 1.27

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.48-0.62	11	0.56	0.04
INERTINITE/REWORKED	0.64-1.27	35	0.91	0.17

NUMBER OF READINGS

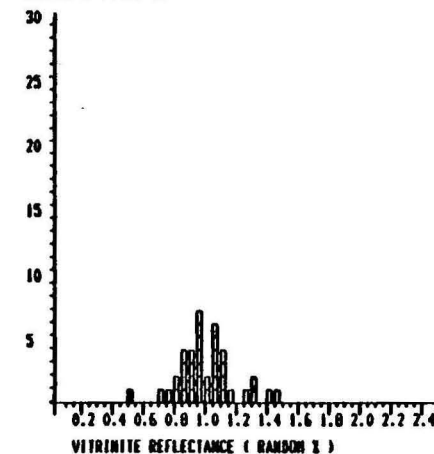


SAMPLE 4140-4190M

0.53 0.74 0.75 0.82 0.83 0.85 0.86 0.86 0.87 0.91
0.92 0.92 0.93 0.95 0.96 0.96 0.97 0.98 0.99 0.99
1.02 1.03 1.05 1.06 1.07 1.07 1.07 1.07 1.10 1.10
1.11 1.13 1.17 1.20 1.32 1.34 1.41 1.49

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.53-0.53	1	0.53	
INERTINITE/REWORKED	0.74-1.49	37	1.03	0.17

NUMBER OF READINGS



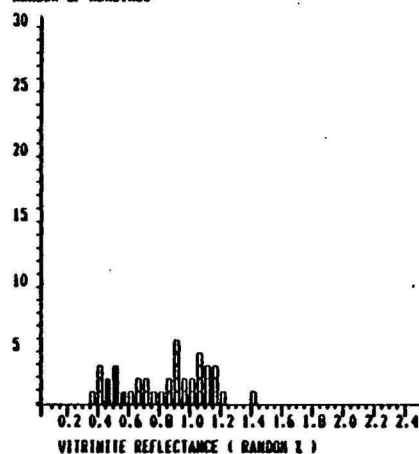
BARCOO-1

SAMPLE 4210-4260H

0.39 0.41 0.43 0.44 0.47 0.49 0.51 0.52 0.53 0.56
0.63 0.65 0.67 0.72 0.73 0.77 0.82 0.85 0.88 0.90
0.92 0.92 0.92 0.93 0.99 0.99 1.01 1.02 1.05 1.06
1.08 1.08 1.10 1.11 1.14 1.16 1.17 1.18 1.21 1.42

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.47-0.56	6	0.51	0.03
LIPTINITE/CAVINGS	0.39-0.44	4	0.42	0.02
INERTINITE/REWORKED	0.63-1.42	30	0.97	0.19

NUMBER OF READINGS

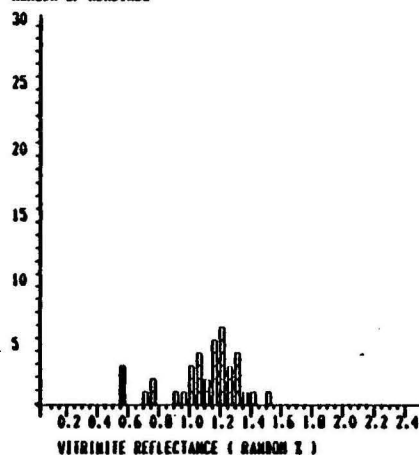


SAMPLE 4420-4450H

0.55 0.56 0.59 0.70 0.75 0.76 0.90 0.97 1.02 1.03
1.04 1.05 1.05 1.07 1.09 1.13 1.14 1.16 1.17 1.17
1.18 1.19 1.20 1.22 1.22 1.22 1.23 1.25 1.26
1.29 1.32 1.32 1.33 1.33 1.39 1.43 1.51

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.55-0.59	3	0.57	0.02
INERTINITE/REWORKED	0.70-1.51	35	1.15	0.18

NUMBER OF READINGS



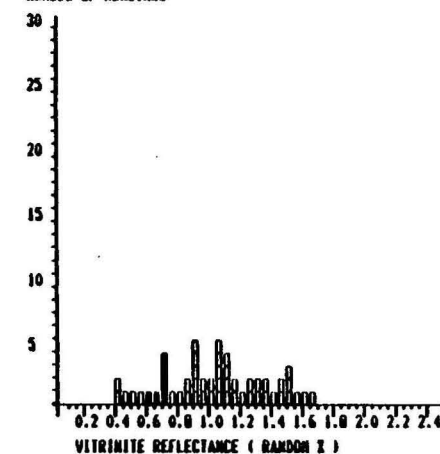
BARCOO-1

SAMPLE 4560-4600H

0.43 0.44 0.49 0.50 0.55 0.61 0.65 0.71 0.73 0.73
0.73 0.79 0.83 0.86 0.88 0.92 0.92 0.93 0.93 0.94
0.98 0.99 1.00 1.01 1.05 1.06 1.07 1.08 1.09 1.11
1.12 1.12 1.13 1.16 1.19 1.23 1.25 1.27 1.31 1.32
1.35 1.39 1.40 1.45 1.48 1.51 1.53 1.54 1.57 1.61
1.66

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.61-0.73	6	0.69	0.05
LIPTINITE/CAVINGS	0.43-0.55	5	0.48	0.05
INERTINITE/REWORKED	0.79-1.66	40	1.18	0.24

NUMBER OF READINGS

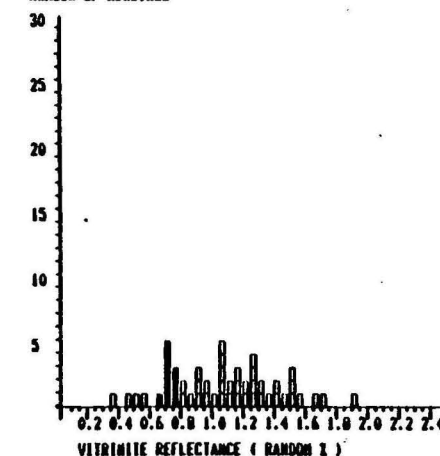


SAMPLE 4750-4800H

0.39 0.48 0.51 0.56 0.68 0.71 0.71 0.72 0.72 0.74
0.78 0.79 0.79 0.82 0.84 0.89 0.92 0.94 0.94 0.98
0.99 1.00 1.05 1.06 1.07 1.08 1.08 1.10 1.12 1.17
1.18 1.19 1.20 1.24 1.25 1.26 1.28 1.29 1.31 1.33
1.37 1.40 1.42 1.46 1.50 1.52 1.52 1.57 1.69 1.74
1.91 2.49

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.68-0.79	9	0.74	0.04
LIPTINITE/CAVINGS	0.39-0.56	4	0.49	0.07
INERTINITE/REWORKED	0.82-2.49	39	1.26	0.33

NUMBER OF READINGS



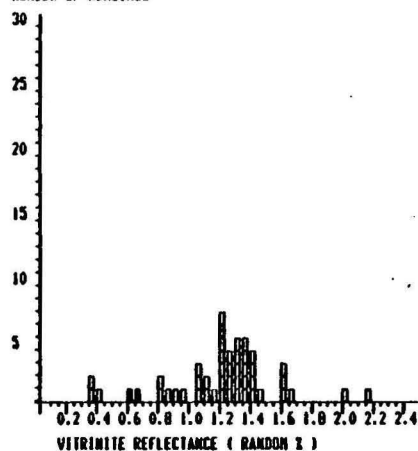
BARCOO-1

SAMPLE 4950-5000H

0.39 0.39 0.41 0.64 0.67 0.82 0.84 0.89 0.92 0.99
1.06 1.08 1.09 1.11 1.12 1.18 1.21 1.21 1.21 1.22
1.22 1.23 1.24 1.25 1.26 1.27 1.27 1.31 1.31 1.32
1.32 1.33 1.35 1.36 1.37 1.38 1.39 1.40 1.41 1.42
1.43 1.48 1.60 1.62 1.64 1.65 2.04 2.17

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST. DEV
IN SITU VITRINITE	0.64-0.67	2	0.66	0.02
LIPTINITE/CAVINGS	0.39-0.41	3	0.40	0.01
INERTINITE/REWORKED	0.82-2.17	43	1.30	0.27

NUMBER OF READINGS

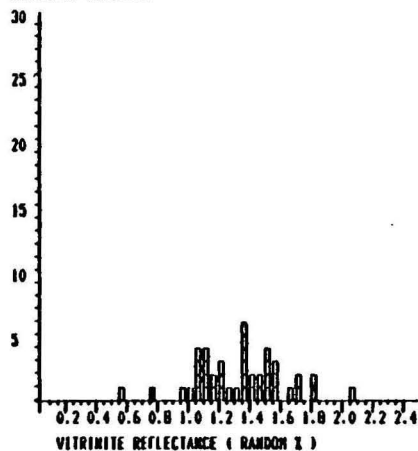


SAMPLE 5050-5080H

0.58 0.76 0.97 1.00 1.06 1.06 1.07 1.08 1.10 1.12
1.13 1.14 1.18 1.19 1.21 1.22 1.23 1.26 1.33 1.35
1.36 1.37 1.37 1.37 1.39 1.40 1.41 1.45 1.47 1.50
1.52 1.53 1.54 1.55 1.58 1.58 1.65 1.70 1.72 1.80
1.81 2.06

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST. DEV
IN SITU VITRINITE	0.76-0.76	1	0.76	
LIPTINITE/CAVINGS	0.58-0.58	1	0.58	
INERTINITE/REWORKED	0.97-2.06	40	1.37	0.25

NUMBER OF READINGS



BREWSTER-1A WELL

SUMMARY

Geochemical analysis of selected samples from the interval 2000m to 4650m of the Brewster-1A shows that the well section becomes middle mature at around 2000m, late mature at around 2850m and post mature for oil generation at 3900m. The interpreted reflectance gradient shows no major erosional unconformities within the section analysed. Extrapolation of the gradient to seabed suggests no major post Campanian uplift and erosion at the well location. The sediments analysed are currently at or near their maximum burial depths.

The samples analysed have no significant oil or gas source potential. Samples at 3275m to 3295m and 3610m to 3620m contain migrant oil derived from mature waxy kerogens. The sample at 3610m to 3620m may also contain small quantities of a biodegraded oil residue.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 13° 54' 49.3"S, 123° 15' 28.5"E.

Operator and date of drilling: Woodside Petroleum Pty Ltd, 1980.

Well Status: Plugged and abandoned with gas shows.

TD: 4703m.

Mud data: Seawater/Gel system: Seabed to 2401m.

Seawater/Brine/Polymer system: 2401m to 4703m TD.

Casing data: 30" at 299m, 20" at 624m, 13³/₈" at 2366m, 9⁵/₈" at 3658m, 7" at 4220m.

BHT data: 50°C at 2401m, after 6.8 hours stopped circulation.
94°C at 3675m, after 10.4 hours stopped circulation.
121°C at 4178m, after 8.8 hours stopped circulation.
148°C at 4554m, after 10.25 hours stopped circulation.
154°C at 4683.5m, after 10.75 hours stopped circulation.
152°C at 4699m, after 7.75 hours stopped circulation.

Elevation: RT 8m ASL.

Water Depth: 256m.

BREWSTER-1A WELL

Interval analysed: 2000m to 4650m.

Age of interval analysed:

	<u>Depths (in metres)</u>
Late Cretaceous	2000-2425
Early-Late Cretaceous	2425-3310
Early Cretaceous	3310-3942
Late Jurassic	3942-4455
Middle-Late Jurassic	4455-4650

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed yielded sufficient vitrinite for measurements but interpretation was hampered by high content of reworked kerogen. Results: Fair.
- b) Spore Colour Index: The samples analysed yielded sufficient in situ sporomorphs for measurements. Results: Good.

Source Rock data quality: Fair.

Gas chromatography run at: 3220m to 3230m, 3275m to 3295m, 3610m to 3620m and 4355m to 4370m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from interpreted values of around 5 SCI units at 2000m to around 10 SCI units at 4650m. Vitrinite reflectance values rise from 0.5% to around 1.8% over the same interval. The results show that the well section becomes middle mature at around 2000m, late mature at around 2850m, and post mature at 3900m. The section below 3900m is post mature for oil generation and mature for gas generation.

The interpreted reflectance gradient shows no major erosional unconformities within the section analysed. Extrapolation of the gradient to seabed suggests no major post Late Cretaceous uplift and erosion at the well location. The sediments analysed are currently at or near their maximum burial depths.

BREWSTER-1A WELL

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

No oil or gas source rocks have been identified within the section analysed.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

Of the samples analysed, mudstones at 2000m to 2010m, 3220m to 3230m and within the intervals 3460m to 3770m and 4355m to 4650m contained average to slightly above average organic carbon contents of between 1.14% and 2.44%. Pyrolysis analysis of these samples yielded low hydrogen indices (24 to 53) and high Tmax values (452-481°C) for the samples at 3760m to 3770m, the extracted residue of the samples at 4355m to 4370m and samples in the interval 4420m to 4650m. Samples at 3220m to 3230m and in the interval 3460m to 3620m gave higher hydrogen indices (86 to 171) and lower Tmax values (433 to 443°C). The data for these samples suggests that they contain either small quantities of caved or contaminant material, the Tmax values being anomalously low at the high level of maturity of the sample (SCI 7.5). Visual kerogen data show the samples analysed to contain only humic indigenous kerogens.

Extraction data shows that samples at 3220m to 3230m and 4355m to 4370m contain very low total extract and hydrocarbon yields. Very low organic carbon normalized hydrocarbon yields confirm the late mature stage of these samples. Gas chromatography analyses of the alkane fractions show wide distribution patterns characteristic of hydrocarbons generated from a waxy kerogen at middle to late maturity level. The relatively high proportion of hydrocarbons in the extracts (54.6% and 73.6%) suggests that these samples are stained by a migrant oil which is slightly biodegraded.

Extraction of samples at 3275m to 3295m and 3610m to 3620m yielded greater quantities of extractable bitumen. Fractionation and gas chromatography analysis of these extracts shows that represent migrant hydrocarbons derived from mature waxy kerogens. The extract at 3610m to 3620m may also contain some biodegraded oil residue.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
1900		Coniacian-Maastrichtian									
2000-2010	P	SLTST, yel gy						65	35	*	*
2110-2120	Ctg	MDST, gy gn, calc	6.5-7.0rew	0.50(4)	40	50	10				
2310-2320	"	LQM (fibre + cellophane flake) + mnr LST, lt gn gy	7.0rew	0.34(6)cvd	20	10	70				
2425		Aptian-Cenomanian									
2450-2460	"	MDST, lt ol gy + mnr SND	6.0-6.5	0.59(5)	55	40	5				
2560-2570	"	MDST, med gy, calc	6.5	0.61(19)	50	45	5				
2670-2680	"	MDST, a/a	6.5	0.68(3)	40	50	10				
2780-2790	"	MDST, med-dk gy, calc	6.5-7.0	0.73(12)	50	40	10				
2890-2900	"	MDST, a/a	6.5-7.0	0.80(12)	30	60	10				
3000-3010	"	MDST, med gy, calc	7.5	0.82(11)	40	60	mnr				
3110-3120	"	MDST, a/a	5.5cvd	0.92(7)	35	60	5				
3220-3230	"	MDST, a/a	8.0	0.89(7)	70	30	tr				
3310		Late Neocomian									
3310-3320	"	MDST, med gy, calc	7.5-8.0	0.89(9)	55	40	5				
3460-3470	"	MDST, dk yel brn	8.0-8.5	1.17(3)	40	60	mnr				
3610-3620	"	MDST, dk yel brn	8.0-8.5	1.17(10)	90	10	tr				
3760-3770	"	MDST, dusky yel brn	8.5	1.19(7)	80	20	*				
3863		Berriasian									
3885-3895	"	MDST, yel gy	8.5	1.37(8)	70	20	10				
3942		Petrel Fm Mbr "A" Eqv									
4173		Petrel Fm Mbr "B" Eqv									
4225-4240	"	MDST, yel gy-med gy, slty + mnr SND	9.0	1.65(13)	70	30	*				
4355-4370	"	MDST, med gy, slty	9.0	1.74(14)	80	10	10				
4420-4435	"	MDST, a/a + mnr SND + mica contam	9.0	1.72(9)	80	20	*				
4455		Petrel Fm Mbr "C" Eqv									
4525-4540	"	MDST, brn gy + mic contam	9.0	1.99(3)	75	25	*				
4635-4650	"	MDST, med gy + 20% SND	8.5cvd	2.10(4)	80	20	*				

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
1900		Coniacian-Maastrichtian													
2000-2010	Ctg	SND, yel gy, arg + 50% SLTST, yel gy	-												
	P	SLTST, yel gy	1.28	428	61	153	0.08	0.85							
2110-2120	Ctg	MDST, gy gn, calc	0.10												
2245-2250	"	Mnr MDST, gy gn + LCM (Cellophane flakes)	-												
	P	MDST, gy gn	0.05												
2310-2320	Ctg	Mnr LST, lt gn gy + LCM (fibre + Cellophane flakes)	-												
	P	LST, lt gn gy	0.02												
2340-2350	Ctg	MDST, yel gy, v calc + abnt fibre contam + mnr SND	-												
	P	MDST, yel gy, v calc	0.36												
2425		Aptian-Cenomanian													
2450-2460	Ctg	MDST, lt ol gy + mnr SND	-												
	P	MDST, lt ol gy	0.28												
2560-2570	Ctg	MDST, med gy, calc	0.23												
2670-2680	"	MDST, a/a	0.87												
2780-2790	"	MDST, med-dk gy, calc	0.81												
2890-2900	"	MDST, a/a	0.99												
3000-3010	"	MDST, med gy, calc	0.94												
3110-3120	"	MDST, a/a	0.75												
3220-3230	"	MDST, a/a	1.14	443	171	161	0.29	2.74	315	28	170	6	21	2	77
3275-3295	"	MDST, lt-med gy	0.83						725	87	380	46	42	11	47
3310		Late Neocomian													
3310-3320	"	MDST, med gy, calc	0.54												
3460-3470	"	MDST, dk yel brn	1.51	437	152	249	0.14	2.67							
3610-3620	"	MDST, dk yel brn	1.92	433	86	123	0.21	2.09	2090	109	1140	59	45	10	45
3760-3770	"	MDST, dusky yel, brn	2.37	452	26	65	0.33	0.93							
3863		Berriasian													
3885-3895	"	MDST, yel gy	0.38												
3942		Petrel Fm Mbr "A" Eqv													
4173		Petrel Fm Mbr "B" Eqv													
4225-4240	"	MDST, yel gy-med gy, silty + mnr SND	0.50												
4355-4370	"	MDST, med gy, silty	1.23	NDP	188	116	0.37	3.68	380	31	180	15	46	2	52
	P	After extraction	0.85	455	48	154	0.11	0.46							

Table 2a Chemical Analysis Data

WELL: BREWSTER-1A

GENERAL DATA			CHEMICAL ANALYSIS DATA										
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION				
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)
4420-4435	Ctg	MDST, med gy, slty + mnr SND	1.51	454	38	148	0.28	0.81					
4455		Patrel Fan Mbr "C" Eqv											
4525-4540	"	MDST, brn gy	1.46	489	24	179	0.22	0.45					
4635-4650	"	MDST, med gy + 20% SND + fibre/cellophane flake content	-										
	P	MDST, med gy	2.44	481	53	37	0.17	1.55					

Table 2b Chemical Analysis Data

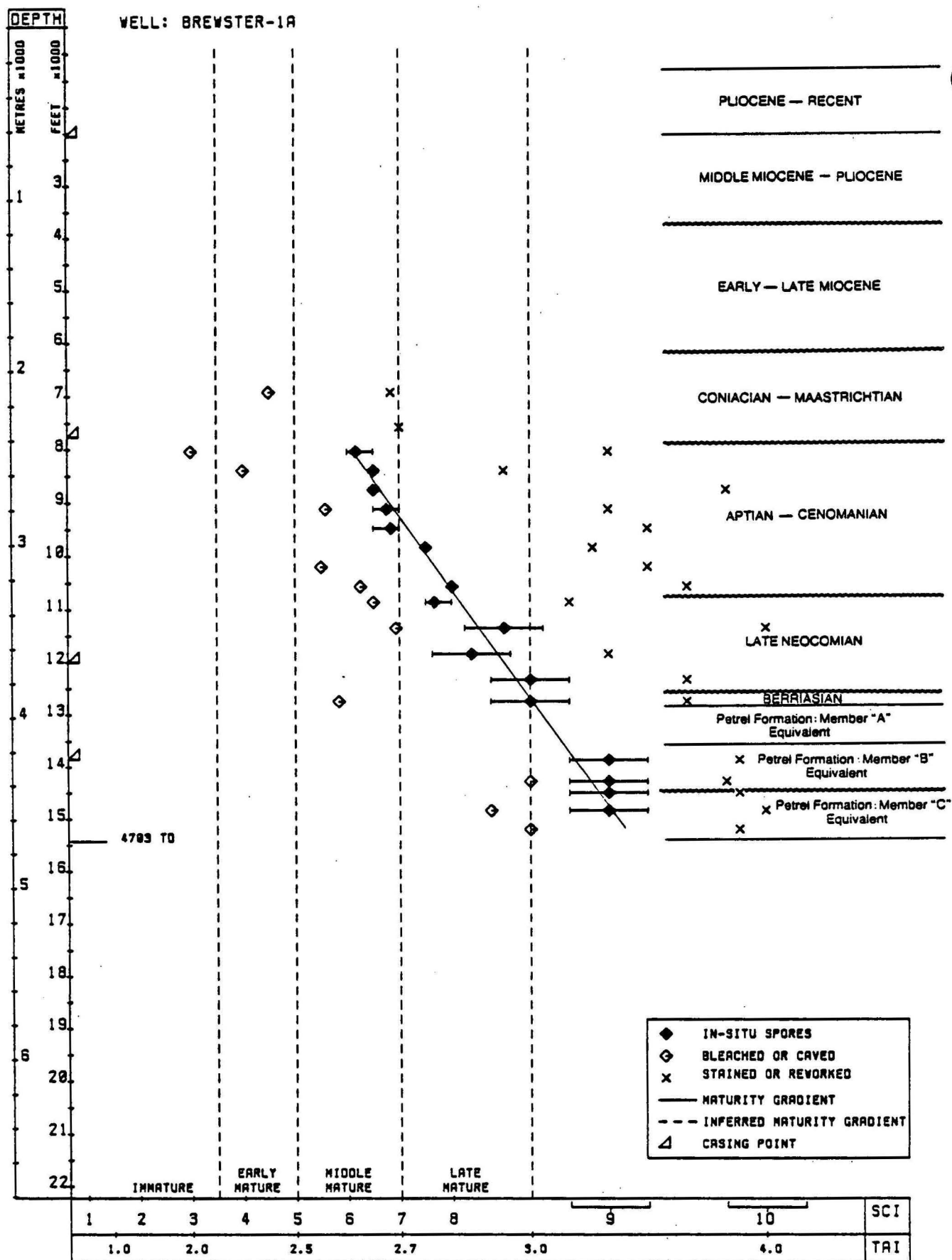


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

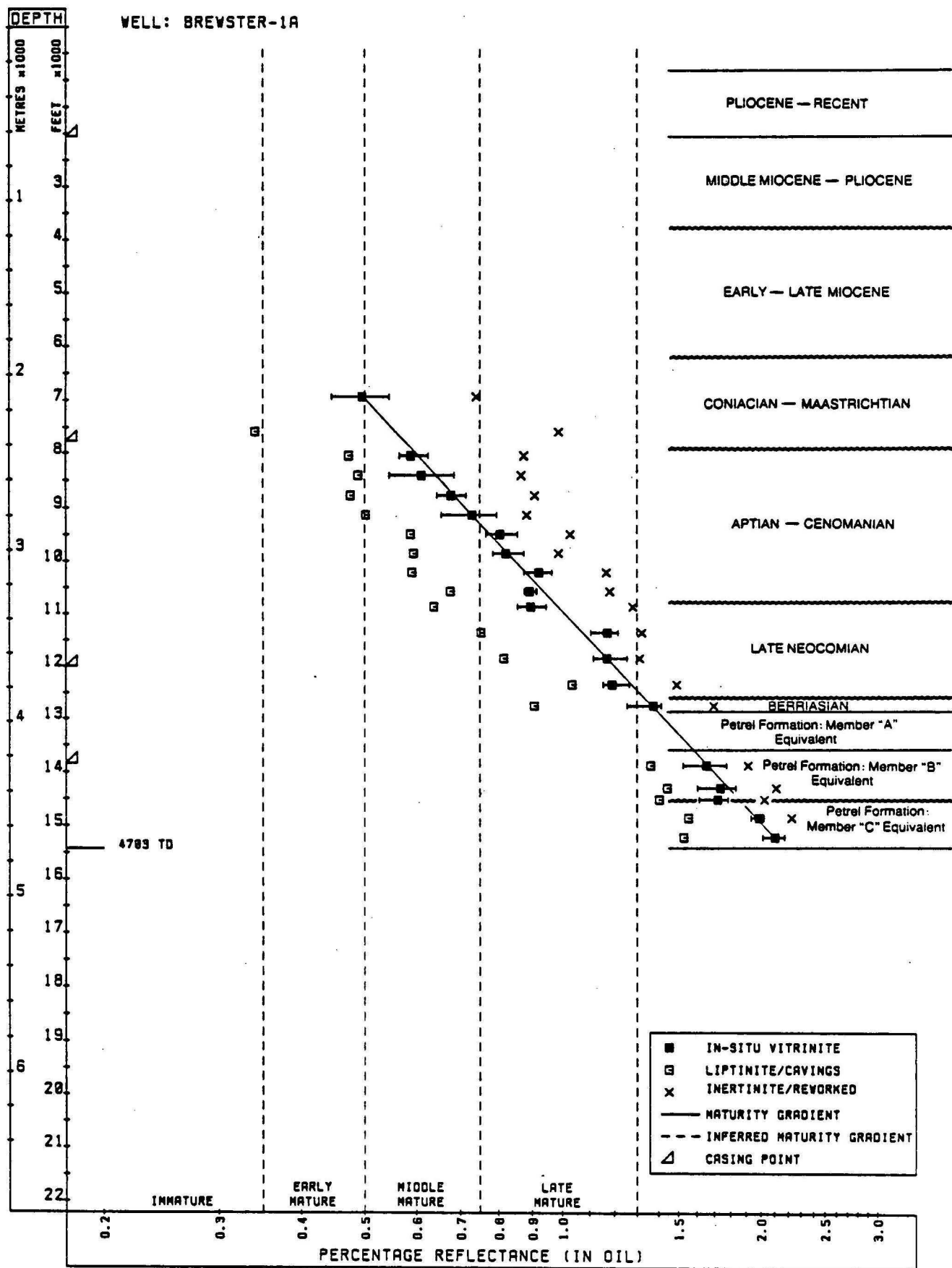
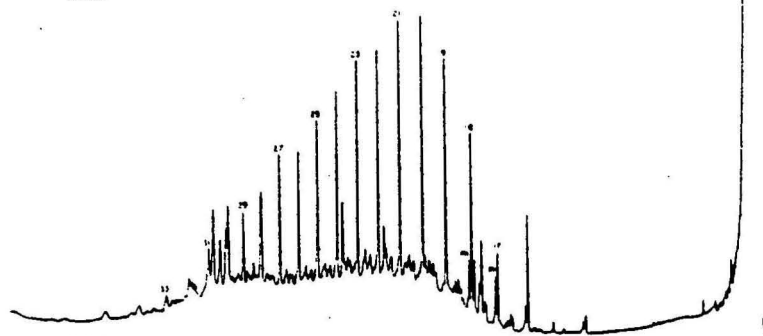
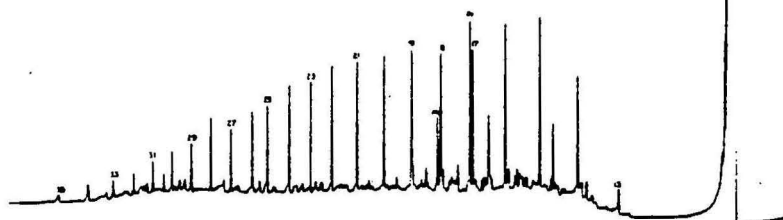


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Brewster-1A
 3220-3230m
 Aptian-Cenomanian
 SCI 8.0
 Pr/Ph = 0.83
 Pr/n-C₁₇ = 0.66
 Ph/n-C₁₈ = 0.30
 CPI = 1.15



Brewster-1A
 3275-3295m
 Aptian-Cenomanian
 SCI 8.0
 Pr/Ph = 2.27
 Pr/n-C₁₇ = 1.20
 Ph/n-C₁₈ = 0.53
 CPI = 0.92



Brewster-1A
 3610-3620m
 Late Neocomian
 SCI 8.0-8.5
 Pr/Ph = 1.91
 Pr/n-C₁₇ = 0.61
 Ph/n-C₁₈ = 0.26
 CPI = 0.97

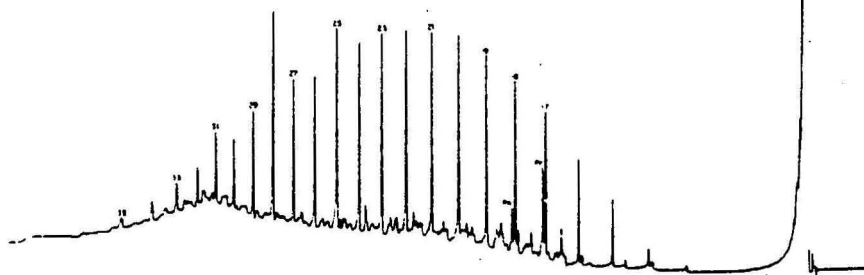


Figure 3a

Brewster-1A

4355-4370m

Petrel Fm Mbr "B"

SCI 9.0

Pr/Ph = 2.45

Pr/n-C₁₇ = 1.43

Ph/n-C₁₈ = 0.28

CPI = 0.98

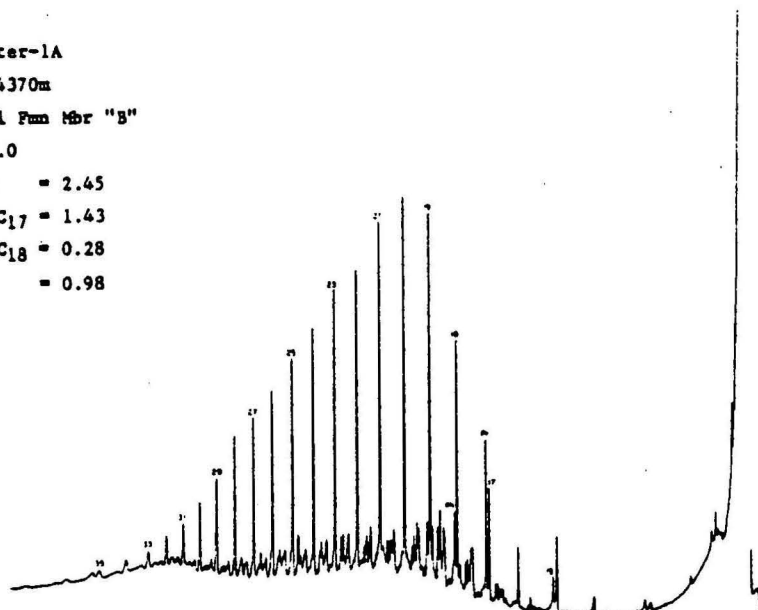


Figure 3b

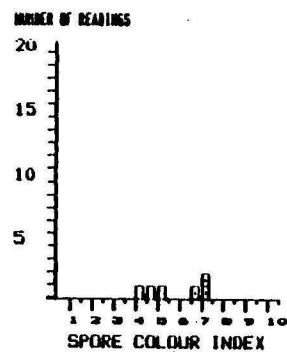
BREWSTER-1A

IN SITU POPULATION

SAMPLE 2110-2120M

4.0 4.5 5.0 6.5 7.0 7.0

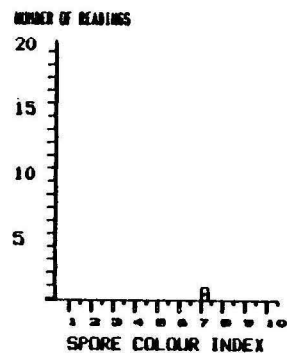
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IN-SITU SPORES	-	0
BLEACHED OR CAVED	4.0-5.0	3
STAINED OR REWORKED	6.5-7.0	3



SAMPLE 2310-2320M

7.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	7.0-7.0	1



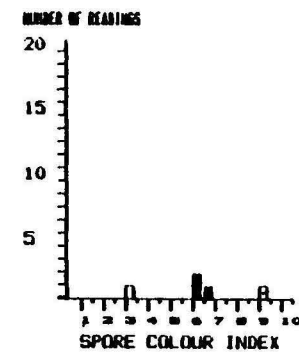
BREWSTER-1A

IN SITU POPULATION

SAMPLE 2450-2460M

3.0 6.0 6.0 6.5 9.0

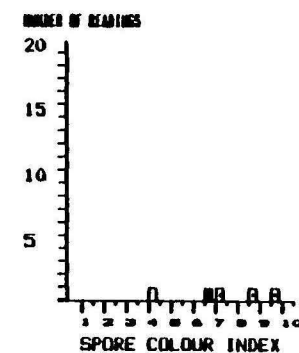
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IN-SITU SPORES	6.0-6.5	3
BLEACHED OR CAVED	3.0-3.0	1
STAINED OR REWORKED	9.0-9.0	1



SAMPLE 2560-2570M

4.0 6.5 7.0 8.5 9.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-6.5	1
BLEACHED OR CAVED	4.0-4.0	1
STAINED OR REWORKED	7.0-9.5	3

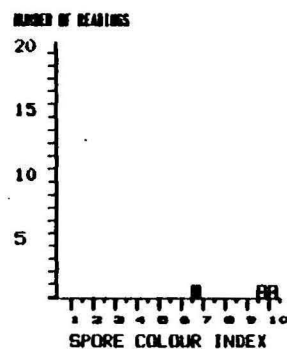


BREWSTER-1A

IN SITU POPULATION

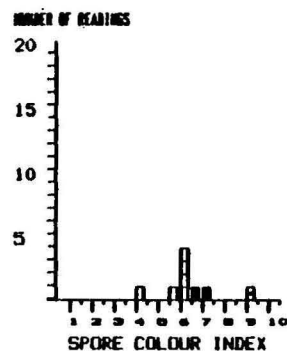
SAMPLE 2670-2680M
6.5 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-6.5	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	9.5-10.0	2



SAMPLE 2780-2790M
4.0 5.5 6.0 6.0 6.0 6.0 6.5 7.0 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-7.0	2
BLEACHED OR CAVED	4.0-6.0	6
STAINED OR REWORKED	9.0-9.0	1

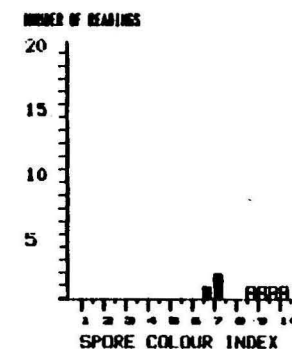


BREWSTER-1A

IN SITU POPULATION

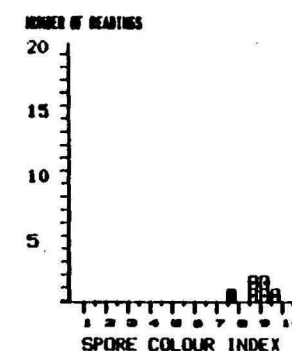
SAMPLE 2890-2900M
6.5 7.0 7.0 8.5 9.0 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-7.0	3
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	8.5-10.0	4



SAMPLE 3000-3010M
7.5 8.5 8.5 9.0 9.0 9.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.5-7.5	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	8.5-9.5	5



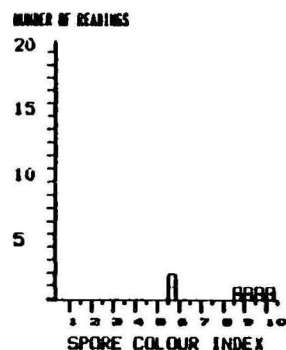
BREWSTER-1A

IN SITU POPULATION

SAMPLE 3110-3120M

5.5 5.5 8.5 9.0 9.5 10.0

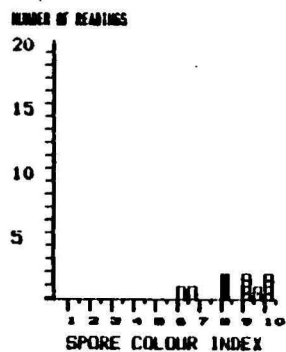
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	5.5-5.5	2
STAINED OR REMORKED	8.5-10.0	4



SAMPLE 3220-3230M

6.0 6.5 8.0 8.0 9.0 9.0 9.5 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-8.0	2
BLEACHED OR CAVED	6.0-6.5	2
STAINED OR REMORKED	9.0-10.0	5



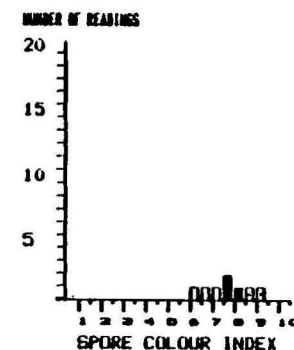
BREWSTER-1A

IN SITU POPULATION

SAMPLE 3310-3320M

6.0 6.5 7.0 7.5 7.5 8.0 8.5 9.0

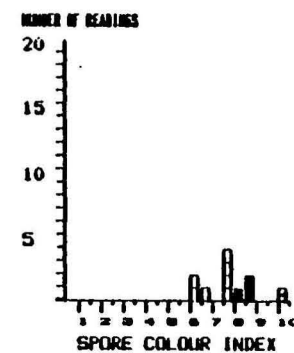
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.5-8.0	3
BLEACHED OR CAVED	6.0-7.0	3
STAINED OR REMORKED	8.5-9.0	2



SAMPLE 3460-3470M

6.0 6.0 6.5 7.5 7.5 7.5 7.5 8.0 8.5 8.5 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-8.5	3
BLEACHED OR CAVED	6.0-7.5	7
STAINED OR REMORKED	10.0-10.0	1

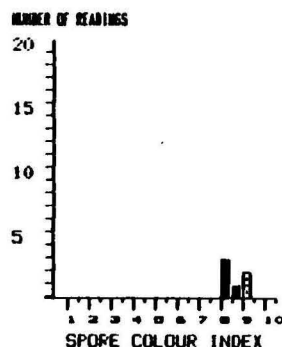


BREWSTER-1A

IN SITU POPULATION

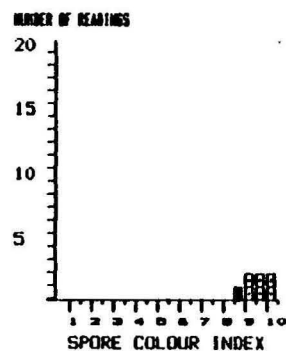
SAMPLE 3610-3620M
8.0 8.0 8.0 8.5 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-8.5	4
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	9.0-9.0	2



SAMPLE 3760-3770M
8.5 9.0 9.0 9.5 9.5 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.5-8.5	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	9.0-10.0	6

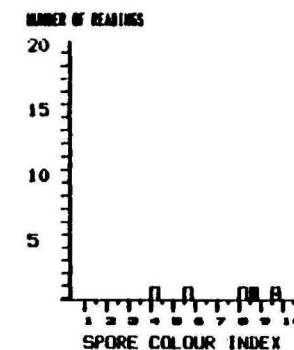


BREWSTER-1A

IN SITU POPULATION

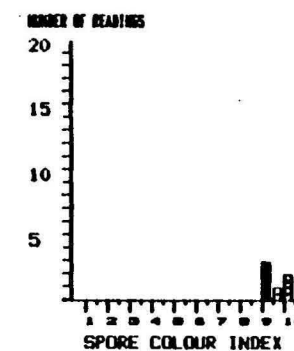
SAMPLE 3885-3895M
4.0 5.5 8.0 8.5 9.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.5-8.5	1
BLEACHED OR CAVED	4.0-8.0	3
STAINED OR REWORKED	9.5-9.5	1



SAMPLE 4225-4240M
9.0 9.0 9.0 9.5 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.0-9.0	3
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	9.5-10.0	3

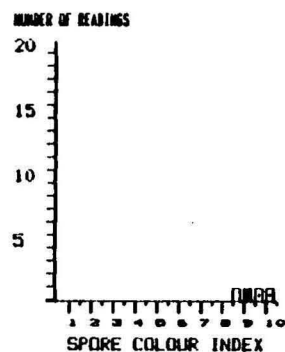


BREWSTER-1A

IN SITU POPULATION

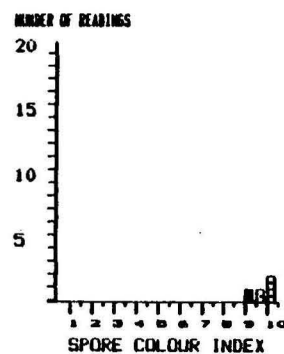
SAMPLE 4355-4370M
8.5 9.0 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.0-9.0	1
BLEACHED OR CAVED	8.5-8.5	1
STAINED OR REWORKED	9.5-10.0	2



SAMPLE 4420-4435M
9.0 9.5 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.0-9.0	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	9.5-10.0	3

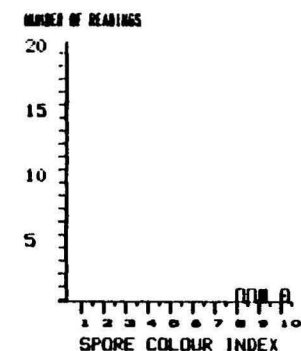


BREWSTER-1A

IN SITU POPULATION

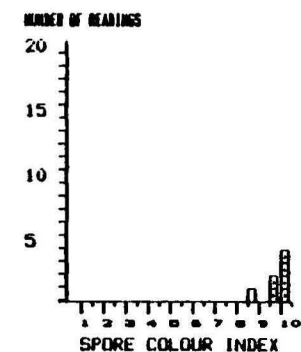
SAMPLE 4525-4540M
8.0 8.5 9.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.0-9.0	1
BLEACHED OR CAVED	8.0-8.5	2
STAINED OR REWORKED	10.0-10.0	1



SAMPLE 4635-4650M
8.5 9.5 9.5 10.0 10.0 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	8.5-8.5	1
STAINED OR REWORKED	9.5-10.0	6



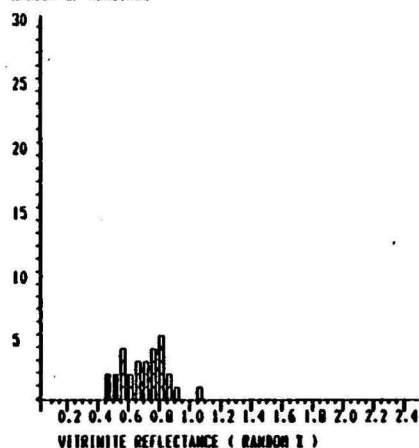
BREWSTER-1A

SAMPLE 2110-2120H

0.45 0.49 0.50 0.54 0.56 0.56 0.58 0.58 0.61 0.64
0.65 0.66 0.67 0.70 0.70 0.72 0.75 0.76 0.76 0.76
0.81 0.82 0.82 0.83 0.84 0.85 0.89 0.92 1.06

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.45-0.54	4	0.50	0.04
INERTINITE/REWORKED	0.56-1.06	25	0.74	0.12

NUMBER OF READINGS

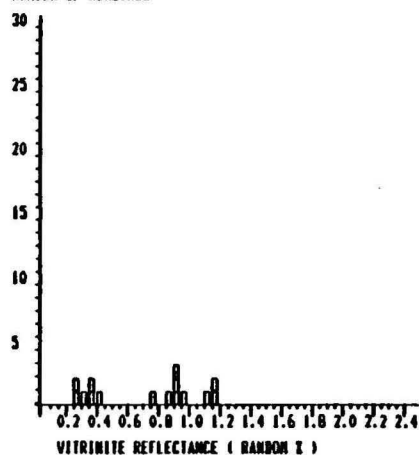


SAMPLE 2310-2320H

0.27 0.28 0.32 0.36 0.38 0.43 0.79 0.89 0.91 0.92
0.93 0.98 1.12 1.15 1.19

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
LIPITINITE/CAVINGS	0.27-0.43	6	0.34	0.06
INERTINITE/REWORKED	0.79-1.19	9	0.99	0.14

NUMBER OF READINGS



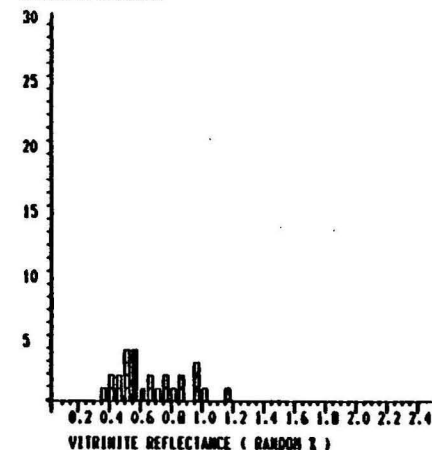
BREWSTER-1A

SAMPLE 2450-2460H

0.39 0.41 0.42 0.48 0.48 0.50 0.51 0.53 0.53 0.57
0.58 0.58 0.59 0.62 0.68 0.69 0.74 0.78 0.79 0.80
0.87 0.89 0.98 0.98 0.99 1.01 1.16

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.57-0.62	5	0.59	0.02
LIPITINITE/CAVINGS	0.39-0.53	9	0.47	0.05
INERTINITE/REWORKED	0.68-1.16	13	0.87	0.14

NUMBER OF READINGS

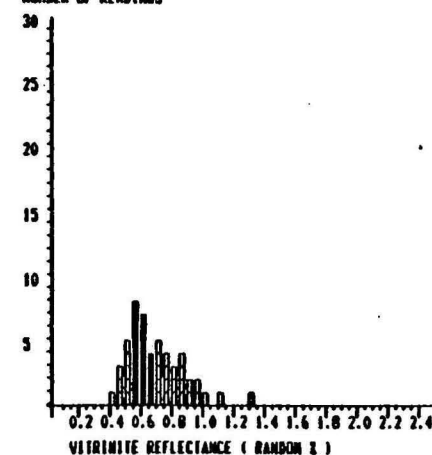


SAMPLE 2560-2570H

0.43 0.45 0.47 0.47 0.50 0.50 0.52 0.52 0.53 0.55
0.55 0.56 0.57 0.57 0.58 0.59 0.59 0.60 0.61 0.62
0.63 0.63 0.64 0.64 0.65 0.66 0.67 0.68 0.70 0.71
0.71 0.73 0.74 0.75 0.75 0.78 0.79 0.80 0.82 0.84
0.85 0.86 0.87 0.89 0.93 0.94 0.97 0.98 1.02 1.14
1.34

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.55-0.68	19	0.61	0.04
LIPITINITE/CAVINGS	0.43-0.53	9	0.49	0.03
INERTINITE/REWORKED	0.70-1.34	23	0.87	0.15

NUMBER OF READINGS



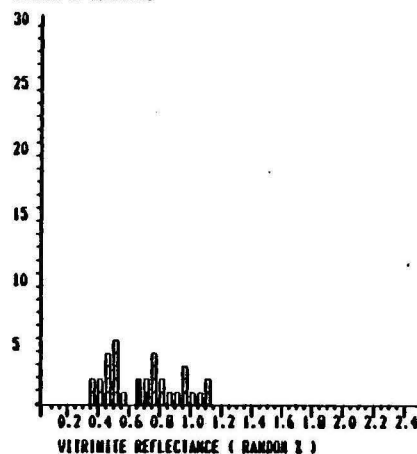
BREWSTER-1A

SAMPLE 2670-2680H

0.36 0.37 0.41 0.43 0.45 0.46 0.48 0.49 0.51 0.52
0.52 0.52 0.54 0.59 0.65 0.67 0.71 0.74 0.76 0.77
0.79 0.79 0.81 0.83 0.86 0.91 0.96 0.97 0.99 1.02
1.08 1.11 1.13

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.65-0.71	3	0.68	0.03
LIPTINITE/CAVINGS	0.36-0.59	14	0.48	0.07
INERTINITE/REWORKED	0.74-1.13	16	0.91	0.13

NUMBER OF READINGS

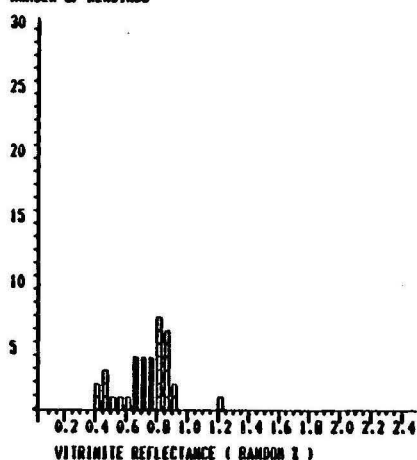


SAMPLE 2780-2790H

0.43 0.44 0.48 0.48 0.49 0.51 0.55 0.63 0.66 0.67
0.69 0.69 0.72 0.73 0.74 0.74 0.76 0.77 0.79 0.79
0.82 0.82 0.82 0.82 0.83 0.84 0.84 0.86 0.87 0.88
0.88 0.89 0.89 0.90 0.92 1.24

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.66-0.79	12	0.73	0.04
LIPTINITE/CAVINGS	0.43-0.63	8	0.50	0.06
INERTINITE/REWORKED	0.82-1.24	16	0.88	0.10

NUMBER OF READINGS



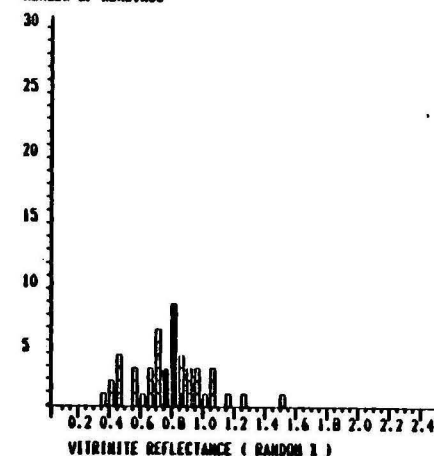
BREWSTER-1A

SAMPLE 2890-2900H

0.36 0.42 0.43 0.46 0.46 0.49 0.49 0.55 0.57 0.59
0.60 0.67 0.68 0.69 0.70 0.70 0.71 0.71 0.73 0.74
0.77 0.78 0.79 0.80 0.80 0.80 0.80 0.81 0.81 0.81
0.81 0.85 0.88 0.88 0.89 0.90 0.91 0.92 0.97 0.97
0.98 1.02 1.05 1.05 1.05 1.19 1.25 1.53

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.77-0.85	12	0.80	0.02
LIPTINITE/CAVINGS	0.36-0.74	20	0.59	0.12
INERTINITE/REWORKED	0.88-1.53	16	1.03	0.17

NUMBER OF READINGS

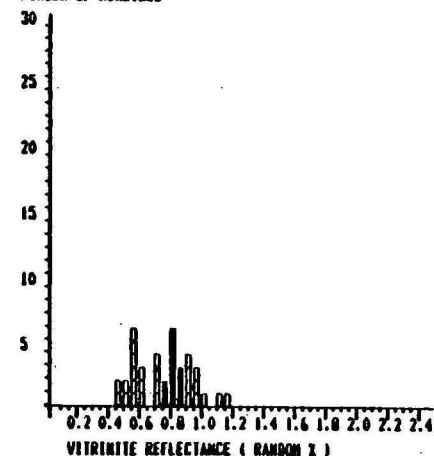


SAMPLE 3000-3010H

0.48 0.49 0.50 0.53 0.55 0.55 0.56 0.56 0.58 0.59
0.60 0.61 0.62 0.71 0.71 0.73 0.73 0.79 0.79 0.80
0.80 0.80 0.81 0.82 0.82 0.85 0.87 0.87 0.92 0.92
0.93 0.94 0.95 0.95 0.96 1.02 1.11 1.17

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.79-0.87	11	0.82	0.03
LIPTINITE/CAVINGS	0.48-0.73	17	0.59	0.08
INERTINITE/REWORKED	0.92-1.17	10	0.99	0.09

NUMBER OF READINGS



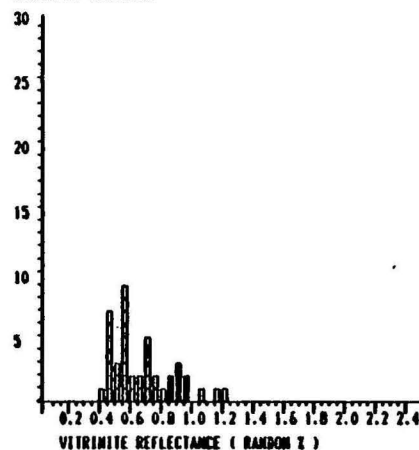
BREWSTER-1A

SAMPLE 3110-3120H

0.42 0.46 0.46 0.47 0.48 0.48 0.49 0.49 0.50 0.51
0.54 0.55 0.55 0.55 0.56 0.56 0.57 0.57 0.58 0.58
0.61 0.62 0.65 0.69 0.71 0.72 0.73 0.73 0.74 0.76
0.77 0.81 0.88 0.89 0.91 0.92 0.93 0.96 0.96 1.09
1.18 1.23

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.88-0.96	7	0.92	0.03
LIPITINITE/CAVINGS	0.42-0.81	32	0.59	0.11
INERTINITE/REWORKED	1.09-1.23	3	1.17	0.07

NUMBER OF READINGS

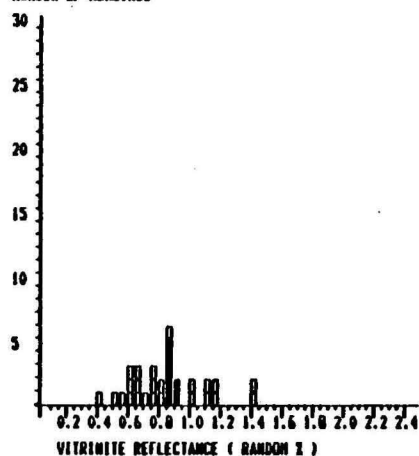


SAMPLE 3220-3230H

0.40 0.52 0.56 0.60 0.60 0.63 0.65 0.66 0.68 0.73
0.75 0.76 0.77 0.80 0.84 0.86 0.88 0.88 0.89 0.89
0.89 0.90 0.91 1.01 1.03 1.12 1.13 1.16 1.17 1.40
1.43

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.88-0.91	7	0.89	0.01
LIPITINITE/CAVINGS	0.40-0.86	16	0.68	0.12
INERTINITE/REWORKED	1.01-1.43	8	1.18	0.16

NUMBER OF READINGS



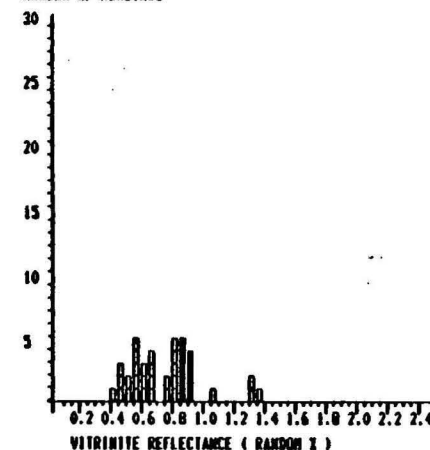
BREWSTER-1A

SAMPLE 3310-3320H

0.43 0.45 0.47 0.48 0.52 0.53 0.53 0.55 0.59 0.59
0.59 0.61 0.62 0.63 0.67 0.68 0.68 0.69 0.76 0.76
0.81 0.81 0.81 0.82 0.84 0.86 0.87 0.87 0.88 0.88
0.90 0.92 0.93 0.94 1.09 1.33 1.34 1.36

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.86-0.94	9	0.89	0.03
LIPITINITE/CAVINGS	0.43-0.84	25	0.64	0.13
INERTINITE/REWORKED	1.09-1.36	4	1.28	0.13

NUMBER OF READINGS

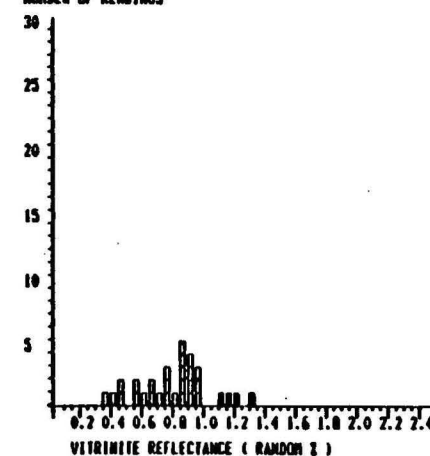


SAMPLE 3460-3470H

0.37 0.42 0.47 0.47 0.53 0.58 0.60 0.63 0.68 0.70
0.76 0.77 0.78 0.82 0.86 0.86 0.86 0.87 0.88 0.90
0.92 0.93 0.94 0.96 0.98 0.99 1.11 1.19 1.21 1.32

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.11-1.21	3	1.17	0.05
LIPITINITE/CAVINGS	0.37-0.99	26	0.75	0.19
INERTINITE/REWORKED	1.32-1.32	1	1.32	

NUMBER OF READINGS



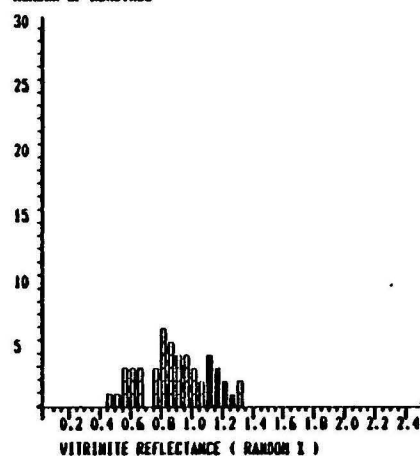
BREWSTER-1A

SAMPLE 3610-3620H

0.48 0.52 0.57 0.58 0.59 0.61 0.62 0.64 0.65 0.66
0.69 0.76 0.77 0.78 0.80 0.81 0.82 0.82 0.84 0.84
0.85 0.86 0.86 0.87 0.88 0.90 0.91 0.92 0.94 0.95
0.98 0.98 0.99 1.00 1.02 1.04 1.07 1.07 1.12 1.12
1.12 1.13 1.15 1.17 1.18 1.20 1.24 1.25 1.31 1.31

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	1.12-1.25	10	1.17	0.05
LIPTINITE/CAVINGS	0.48-1.07	38	0.81	0.16
INERTINITE/REWORKED	1.31-1.31	2	1.31	

NUMBER OF READINGS

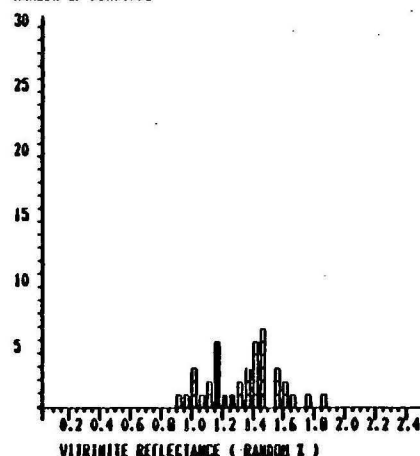


SAMPLE 3760-3770H

0.93 0.98 1.01 1.03 1.04 1.08 1.10 1.11 1.16 1.16
1.17 1.18 1.19 1.21 1.26 1.31 1.32 1.35 1.35 1.37
1.40 1.40 1.42 1.43 1.43 1.45 1.45 1.45 1.47 1.47
1.48 1.55 1.59 1.59 1.60 1.60 1.69 1.76 1.85

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	1.16-1.26	7	1.19	0.04
LIPTINITE/CAVINGS	0.93-1.11	8	1.04	0.06
INERTINITE/REWORKED	1.31-1.85	24	1.49	0.14

NUMBER OF READINGS



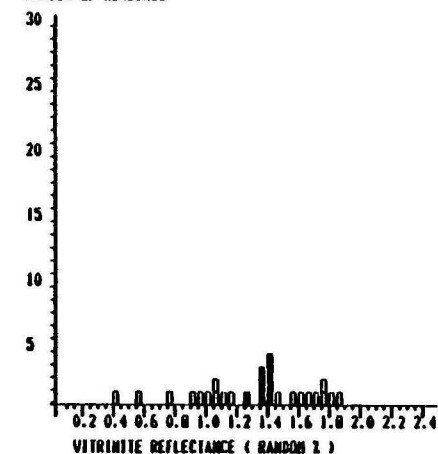
BREWSTER-1A

SAMPLE 3885-3895H

0.44 0.58 0.75 0.91 0.96 1.00 1.05 1.06 1.13 1.18
1.26 1.37 1.37 1.38 1.40 1.40 1.40 1.41 1.49 1.57
1.62 1.66 1.72 1.76 1.77 1.80 1.88

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	1.26-1.41	8	1.37	0.05
LIPTINITE/CAVINGS	0.44-1.18	10	0.91	0.24
INERTINITE/REWORKED	1.49-1.88	9	1.70	0.12

NUMBER OF READINGS

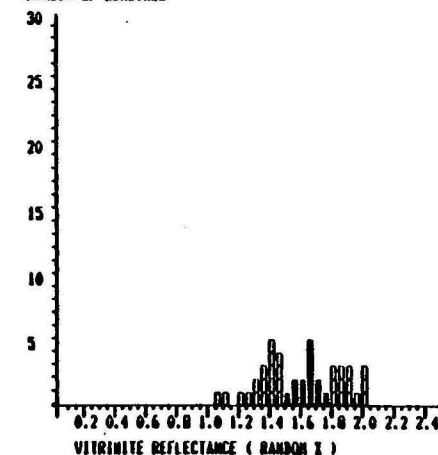


SAMPLE 4225-4240H

1.07 1.12 1.22 1.27 1.31 1.31 1.35 1.39 1.39 1.42
1.42 1.43 1.43 1.44 1.47 1.48 1.49 1.49 1.53 1.55
1.58 1.60 1.63 1.66 1.66 1.69 1.69 1.69 1.71 1.73
1.77 1.80 1.83 1.83 1.88 1.88 1.89 1.90 1.91 1.92
1.98 2.01 2.03 2.04

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	1.53-1.77	13	1.65	0.07
LIPTINITE/CAVINGS	1.07-1.49	18	1.36	0.12
INERTINITE/REWORKED	1.80-2.04	13	1.92	0.08

NUMBER OF READINGS



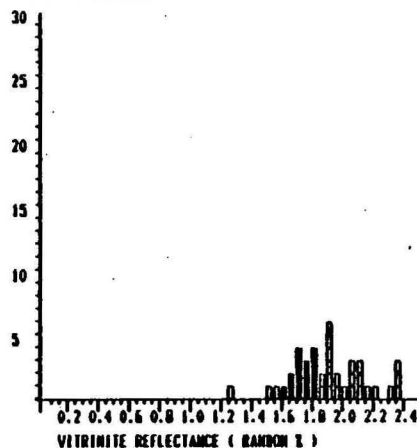
BREWSTER-1A

SAMPLE 4355-4370H

1.26 1.51 1.56 1.61 1.65 1.68 1.70 1.70 1.71 1.73
1.75 1.76 1.77 1.80 1.81 1.81 1.83 1.87 1.88 1.91
1.92 1.92 1.94 1.94 1.94 1.95 1.98 2.03 2.07 2.08
2.08 2.10 2.12 2.13 2.18 2.21 2.30 2.35 2.35 2.36
2.53 2.62

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	1.61-1.83	14	1.74	0.07
LIPTINITE/CAVINGS	1.26-1.56	3	1.44	0.16
INERTINITE/REWORKED	1.87-2.62	25	2.11	0.21

NUMBER OF READINGS

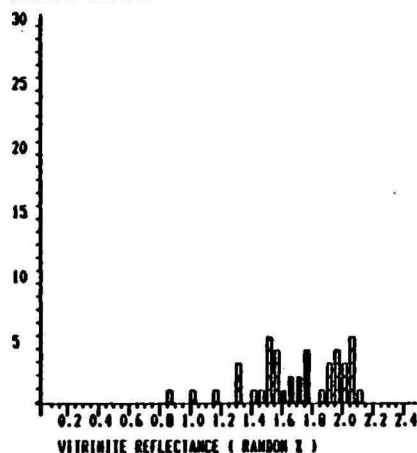


SAMPLE 4420-4435H

0.88 1.01 1.19 1.30 1.31 1.33 1.42 1.48 1.51 1.52
1.53 1.54 1.54 1.55 1.56 1.59 1.59 1.62 1.65 1.69
1.70 1.74 1.75 1.77 1.78 1.78 1.86 1.90 1.91 1.92
1.95 1.97 1.98 1.99 2.00 2.00 2.04 2.07 2.07 2.07
2.08 2.08 2.10 2.47

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	1.62-1.78	9	1.72	0.06
LIPTINITE/CAVINGS	0.88-1.59	17	1.40	0.21
INERTINITE/REWORKED	1.86-2.47	18	2.03	0.13

NUMBER OF READINGS



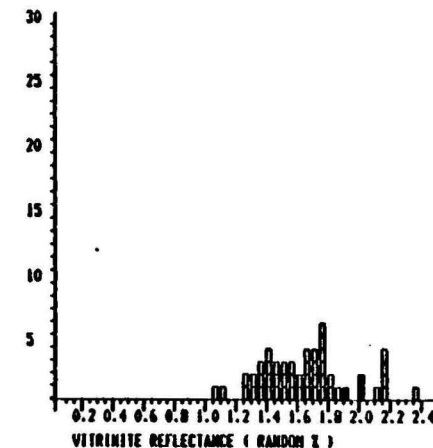
BREWSTER-1A

SAMPLE 4525-4540H

1.07 1.13 1.28 1.28 1.31 1.32 1.36 1.38 1.39 1.42
1.44 1.44 1.44 1.46 1.46 1.48 1.52 1.52 1.53 1.55
1.56 1.57 1.60 1.62 1.65 1.66 1.67 1.69 1.70 1.71
1.73 1.73 1.75 1.76 1.77 1.77 1.77 1.79 1.80 1.82
1.85 1.94 2.01 2.02 2.10 2.17 2.18 2.18 2.19 2.37
2.41

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	1.94-2.02	3	1.99	0.04
LIPTINITE/CAVINGS	1.07-1.85	41	1.55	0.19
INERTINITE/REWORKED	2.10-2.41	7	2.23	0.11

NUMBER OF READINGS

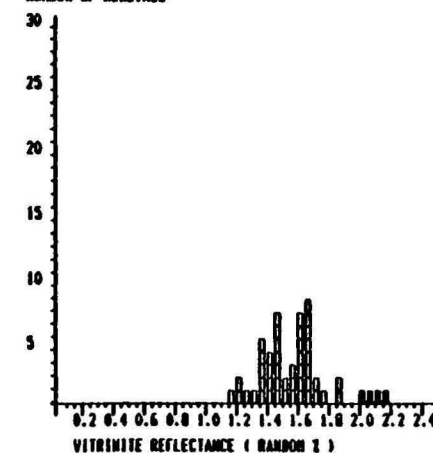


SAMPLE 4635-4650H

1.19 1.23 1.24 1.28 1.32 1.36 1.37 1.38 1.38 1.38
1.40 1.42 1.44 1.44 1.45 1.46 1.47 1.47 1.48 1.48
1.48 1.51 1.51 1.55 1.58 1.59 1.60 1.60 1.61 1.62
1.62 1.63 1.64 1.65 1.65 1.65 1.65 1.66 1.66 1.67
1.68 1.70 1.71 1.77 1.88 1.88 2.02 2.08 2.14 2.17

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	2.02-2.17	4	2.10	0.07
LIPTINITE/CAVINGS	1.19-1.88	46	1.53	0.16

NUMBER OF READINGS



BROWN GANNET-1

SUMMARY

Vitrinite reflectance and spore colour index analysis of samples from the interval 1387m to 2607m of the Brown Gannet-1 well show that the well section is immature to 1400m, early mature between 1400m and 2200m and middle mature between 2200m and 2743m TD. The maturity gradients show no evidence of any major erosional unconformities within the section analysed. Extrapolation of the gradients to seabed suggests that little Eocene to Recent section is missing above 1387m. The well section is at or near its maximum depth of burial.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 12° 06' 29"S, 123° 57' 22"E.

Operator and date of drilling: Arco Australia Ltd, 1972.

Well Status: Plugged and abandoned.

TD: 2743m.

Mud data: Seawater/gel system: Seabed to 1059m.

Seawater/spersene/XP20 system: 1059m to 2743m TD.

Casing data: 30" at 178m, 20" at 267m, 13³/₈" at 1060m.

BHT data: 36°C at 1081m, after 3 hours stopped circulation.

51°C at 2740m, after 7 hours stopped circulation.

Elevation: RT 34m ASL.

Water depth: 110m.

Interval analysed: 1387m to 2607m.

Age of interval analysed:

	<u>Depths (in metres)</u>
Eocene	1387-1768
Palaeocene	1768-1947
Late Cretaceous	1947-2167
Late Triassic	2167-2607

BROWN GANNET-1 WELL

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed yielded sufficient vitrinite for measurements. Results: Fair.
- b) Spore Colour Index: The samples analysed yielded sufficient sporomorphs for measurements but interpretation was made difficult by the abundant occurrence of caved and reworked sporomorphs. Results: Fair.

Source rock data quality: No analyses performed.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise steadily from interpreted values of 3.5 SCI units at 1387m to 6 SCI units at 2607m. Vitrinite reflectance results rise from 0.35% to 0.6% over the same interval. The maturity gradients show no evidence of any major erosional unconformities within the section analysed and extrapolation of the gradients to seabed indicates little Eocene to Recent sediments are missing above 1387m. The well section is currently at or near its maximum depth of burial.

The results show the well section is immature to 1400m, early mature between 1400m and 2200m and middle mature between 2200m and 2743m TD.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
905		Eocene									
1387-1405	Ctg	LST, wht	5.0-7.0rev								
1768		Palaeocene									
1768-1784	"	MDST, med lt gy, v calc + 20% LST, wht	4.0	0.43(4)							
1947		Late Cretaceous									
2167		Late Triassic									
2210-2226	"	MDST, v lt gy, v calc + 20% MDST, med gy	5.0	0.52(20)							
2591-2607	"	MDST, med gy + 20% SLTST, lt gy	6.0	0.60(25)							

Table 1 Maturity and Kerogen Composition Data

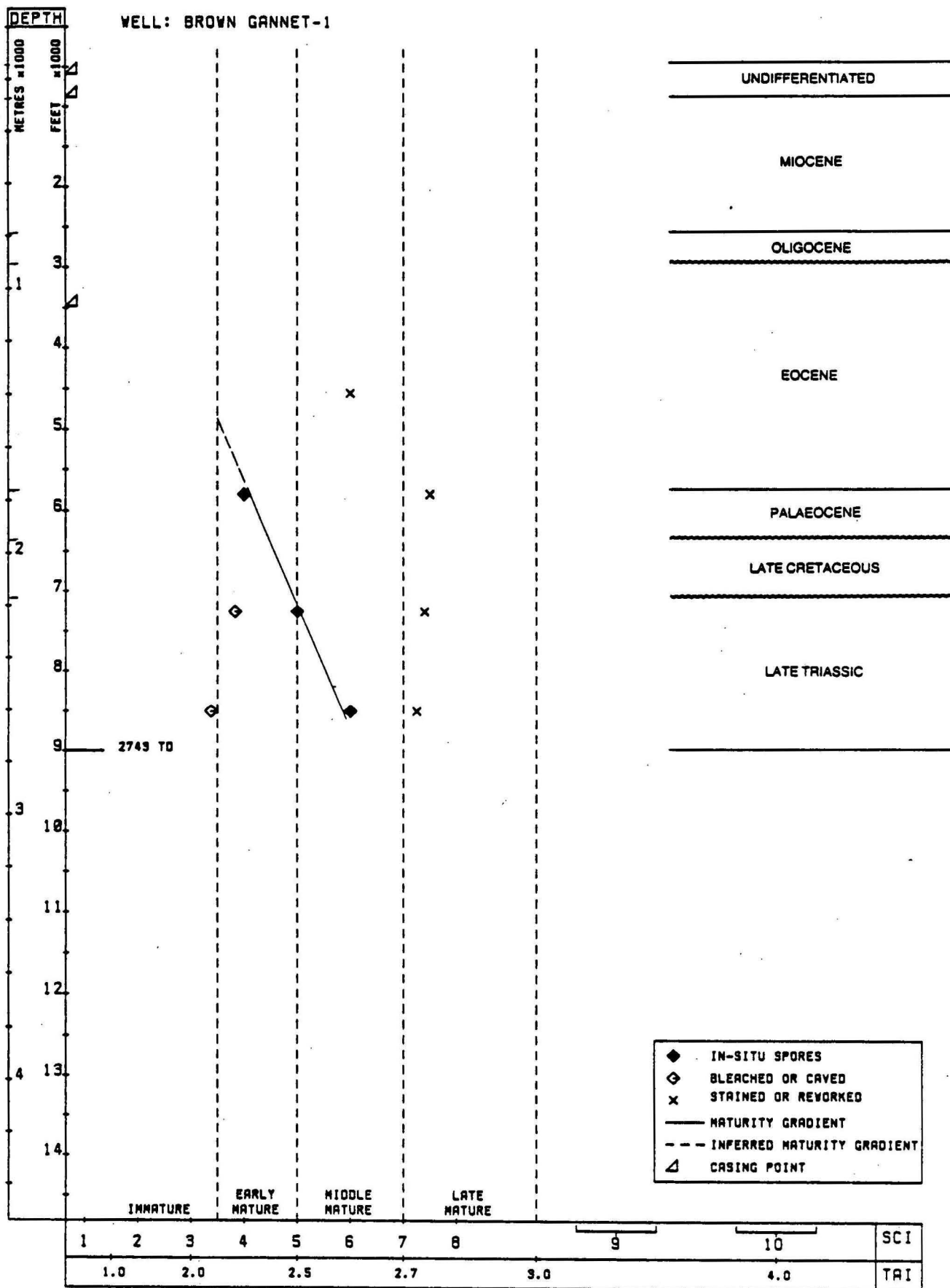


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

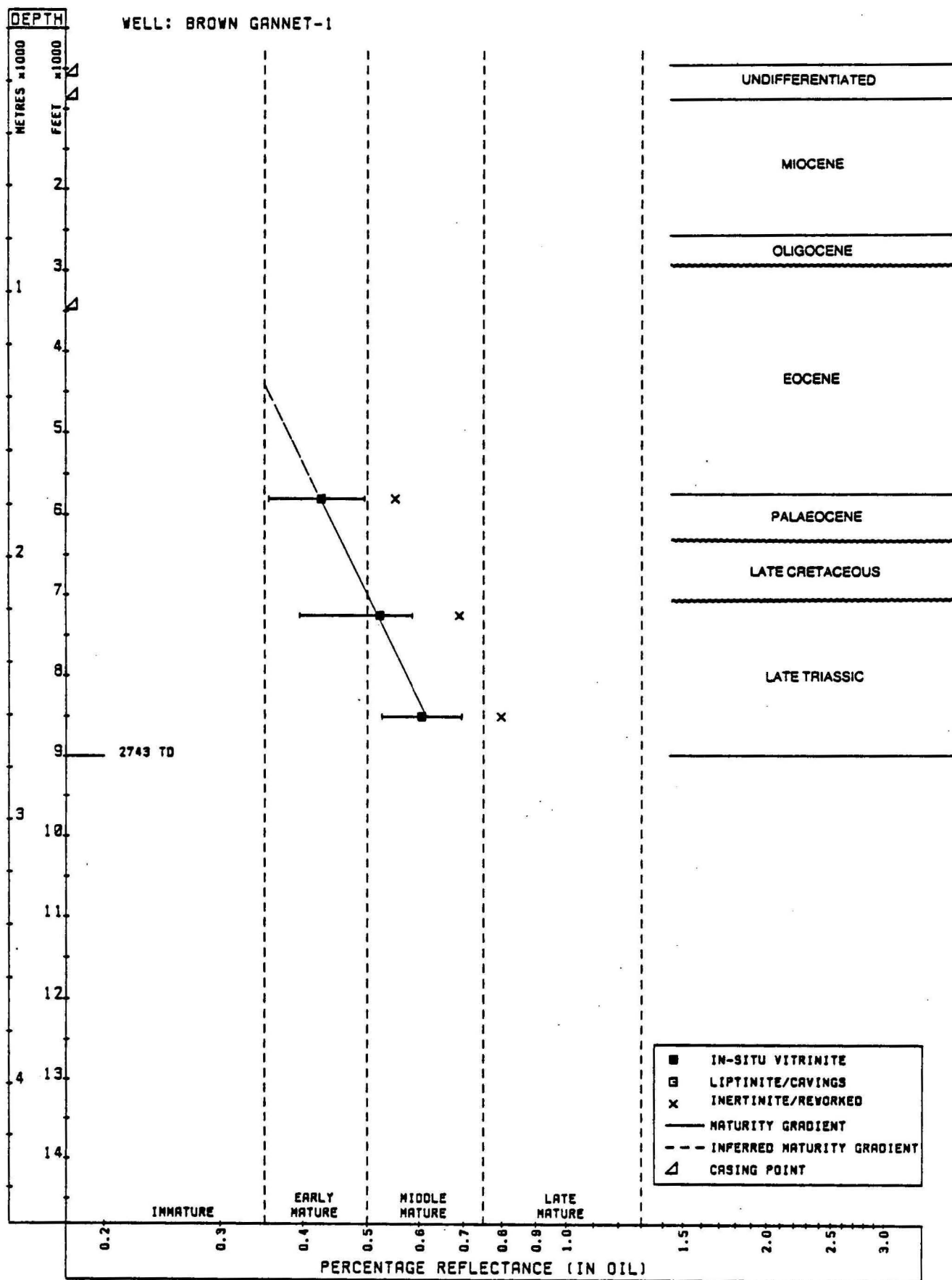


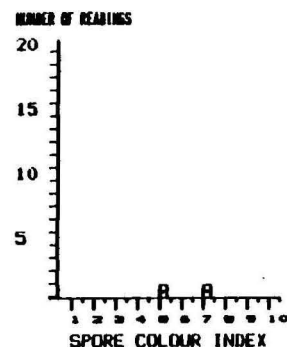
FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

BROWN GANNET-1

IN SITU POPULATION

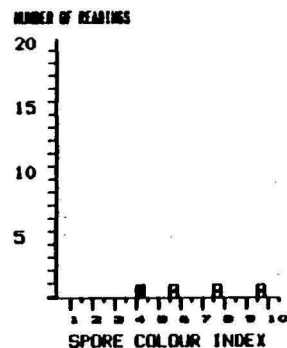
SAMPLE 1387-1405M
5.0 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	5.0-7.0	2



SAMPLE 1768-1784M
4.0 5.5 7.5 9.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.0-4.0	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	5.5-9.5	3

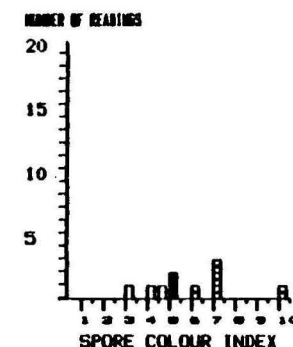


BROWN GANNET-1

IN SITU POPULATION

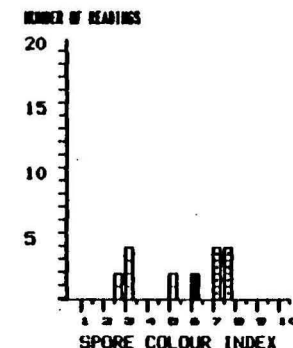
SAMPLE 2210-2226M
3.0 4.0 4.5 5.0 5.0 6.0 7.0 7.0 7.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.0	2
BLEACHED/CAVINGS	3.0-4.5	3
STAINED/REWORKED	6.0-10.0	5



SAMPLE 2591-2607M
2.5 2.5 3.0 3.0 3.0 3.0 5.0 5.0 6.0 6.0
7.0 7.0 7.0 7.0 7.5 7.5 7.5 7.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.0	2
BLEACHED/CAVINGS	2.5-5.0	8
STAINED/REWORKED	7.0-7.5	8



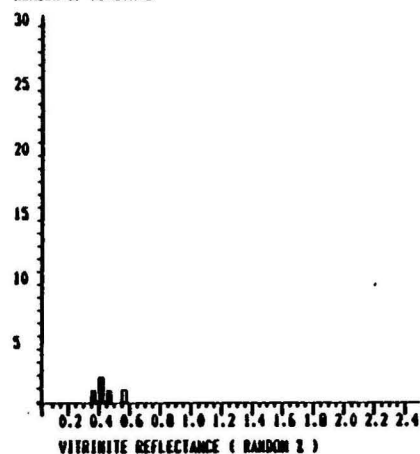
BROWN GAMNET-1

SAMPLE 1768-1784H

0.36 0.41 0.44 0.49 0.55

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.36-0.49	4	0.43	0.05
INERTINITE/REWORKED	0.55-0.55	1	0.55	

NUMBER OF READINGS

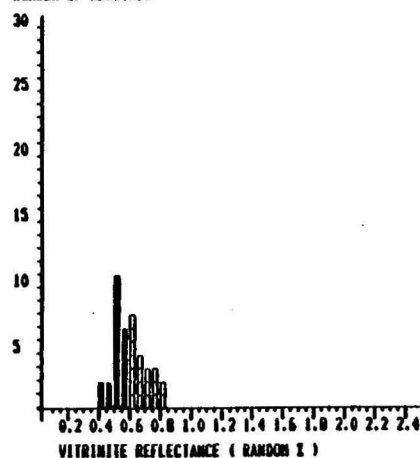


SAMPLE 2210-2226H

0.40 0.44 0.47 0.49 0.50 0.51 0.51 0.51 0.52 0.52
0.53 0.54 0.54 0.54 0.55 0.56 0.56 0.57 0.58 0.58
0.60 0.62 0.62 0.63 0.63 0.63 0.63 0.66 0.66 0.66
0.66 0.70 0.70 0.71 0.75 0.78 0.78 0.82 0.84

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.40-0.58	20	0.52	0.05
INERTINITE/REWORKED	0.60-0.84	19	0.69	0.07

NUMBER OF READINGS



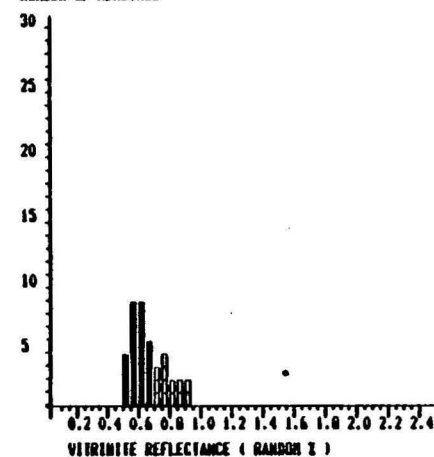
BROWN GAMNET-1

SAMPLE 2591-2607H

0.53 0.53 0.54 0.54 0.56 0.57 0.57 0.58 0.58 0.58
0.58 0.59 0.60 0.60 0.61 0.62 0.64 0.64 0.64 0.64
0.65 0.66 0.67 0.68 0.69 0.71 0.72 0.72 0.75 0.76
0.77 0.77 0.80 0.81 0.85 0.89 0.90 0.90

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.53-0.69	25	0.60	0.05
INERTINITE/REWORKED	0.71-0.90	13	0.80	0.07

NUMBER OF READINGS



BUFFON-1 WELL

SUMMARY

Geochemical analyses of samples from the interval 2355m to 4770m of the Buffon-1 well have shown that the interval analysed is early mature from 2355m to 2600m, middle mature between 2600m and 3300m and late mature to a depth of 4300m. Sediments below this depth are post mature for oil generation and mature for dry gas generation. The maturity gradients show no evidence of any missing section at unconformities within the section analysed and extrapolation of the gradients to seabed show that only a minor portion of the Early Cretaceous and younger section is missing above 3500m. The sediments analysed are currently at or near their maximum depths of burial.

The section analysed contains no oil or gas source rocks but is stained by a migrant oil. Samples at 2355m to 2375m and 3675m to 3690m possibly contain small quantities of a biodegraded oil mixed with indigenous n-alkanes.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 13° 23' 37.9"S, 122° 10' 59.6"E.

Operator and date of drilling: Woodside Petroleum Pty Ltd, 1980.

Well Status: Plugged and abandoned.

TD: 4787m.

Mud data: Seawater/gel system: Seabed to 2724m.

Brine polymer system: 2724m to 4787m TD.

Casing data: 30" at 572m, 20" at 830m, 13³/₈" at 1827m, 9⁵/₈" at 2727m, 7" at 3742m.

BHT data: 88°C at 2724m, after 9 hrs stopped circulation.

126°C at 4286m, after 14 hrs stopped circulation.

143°C at 4777m, after 12 hrs stopped circulation.

Elevation: RT 10m ASL.

Water depth: 533m.

Interval analysed: 2355m to 4770m.

BUFFON-1 WELL

Age of interval analysed:

Depths (in metres)

Miocene	2355-2725
Late Oligocene	2725-2865
Eocene	2865-3267
Palaeocene	3267-3478
Late Cretaceous	3478-3487
Early-Late Cretaceous	3487-3775
Middle Jurassic	3775-4500
Early Jurassic	4500-4770

Sample type and quality: Dried ditch cuttings samples of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed contained sufficient vitrinitic kerogen for analysis, but measurements were hindered by a large content of reworked and inertinitic material. Results: Fair.
- b) Spore Colour Index: The samples analysed contained sufficient in situ sporomorphs for analysis. Results: Good.

Source Rock data quality: Good.

Gas Chromatography run at: 2355m to 2375m, 3675m to 3690m and 4485m to 4500m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from values of around 7.5 SCI units at 3500m to values of 10 SCI units at 4770m. Vitrinite reflectance values rise from 0.8% to 1.6% over the same interval. The interpreted gradients show that the well section analysed is early mature from 2355m to 2600m, middle mature from 2600m to 3300m and late mature to around 4300m. Sediments below 4300m are post mature for oil generation but mature for dry gas generation. Extrapolation of the reflectance gradient to seabed suggests that little Early Cretaceous and younger section is missing above 3500m. Extrapolation of the spore colour gradient to seabed shows that the sediments analysed are presently at or near their maximum depths of burial.

BUFFON-1 WELL

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

No oil or gas source rocks have been identified in the section analysed although interpretation has been made difficult by the high maturity of the section.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

Samples analysed in the intervals 3500m to 3750m and 4485m to 4770m contain average to below average organic carbon contents of between 0.25% and 1.98%. Pyrolysis analysis of samples with greater than 1% TOC shows that the samples analysed have low hydrogen indices. The low Tmax values of between 427°C and 431°C suggest that these figures may represent results of pyrolysis of small quantities of contaminants. The remaining samples in the interval 3875m to 4445m contain very low organic carbon contents of between 0.03% and 0.06%.

Visual kerogen analysis shows that the samples contain only humic kerogen. Several samples contain a bitumen-like contaminant showing dull orange fluorescence.

The sample 3675m to 3690m contains moderately high organic carbon normalized extract and hydrocarbon yields of 146mg/g Corg and 124mg/g Corg respectively. These figures and the relatively high proportion of hydrocarbons in the extract suggest that the sample analysed is stained with migrant oil mixed with similar quantities of indigenous hydrocarbons derived from waxy kerogens. The napthenic hump present in the alkane distribution pattern indicates that this oil is biodegraded. Extraction, fractionation and gas chromatography analyses of samples at 2355m to 2375m and 4485m to 4500m shows that the sample at 2355m to 2375m contains migrant hydrocarbons. The large baseline hump suggests that this sample contains a biodegraded oil residue mixed with smaller quantities of indigenous n-alkanes. The sample at 4485m to 4500m contains a wide range of n-alkanes from n-C₁₃ to n-C₃₅ mixed with large amounts of unresolved napthenic compound. The hydrocarbon distribution seen in this sample is not typical of post mature sediments and may therefore represent small quantities of contamination.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
3487		Aptian-Early Cenomanian									
3530-3545	Crg	MDST, med gy + mnr LST	7.5	0.86(4)	50	50	cr				
3620-3635	"	MDST, med gy	8.0	0.85(12)	70	30	mar				
3705-3720	"	MDST, a/a	8.0-8.5	1.02(17)	55	40	5				
3775		Middle Jurassic (volcanics)									
3875-3890	"	MDST, med-lt-gy, calc + 30% LST, wht-pnk wht	8.0-8.5	1.15(5)	30	60	10				
3970-3985	"	MDST, med-dk gy	5.5cvd	1.16(1)	25	45	30				
4430-4445	"	LST, wht-yel gy	*	*	20	30	50				
4447		Aalenian-Bathonian									
4500		Early Jurassic									
4510-4525	"	LST, med gy + mnr LST	5.0-8.0cvd	1.43(18)	55	25	20				
4665-4680	"	SND, wht	9.0	1.44(2)	80	20	*				
4725-4740	"	MDST, med-dk gy + 10% LST, wht	9.0	1.65(2)	90	10	*				

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS	
843		Miocene														
2355-2375	Ctg	LST, off wht	0.77							1185	154	565	73	44	4	52
2725		Late Oligocene														
2865		Eocene														
3267		Palaeocene														
3478		Late Maastrichtian														
3484		Coniacian														
3487		Aptian-Early Cenomanian														
3500-3515	"	MDST, med-gy + 40% LST, wht	-													
	P	MDST, med-gy	0.94													
3530-3545	Ctg	MDST, a/a + mnr LST	1.58	428	72	120	0.07	1.22								
3560-3575	"	MDST, med-lt gy + mnr LST	0.71													
3590-3605	"	MDST, a/a	0.89													
3620-3635	"	MDST, med gy	1.71	429	47	67	0.09	0.88								
3645-3660	"	MDST, med gy + 30% LST, wht	-													
	P	MDST, med gy	0.98													
3675-3690	Ctg	MDST, med gy	1.03	431	114	129	0.09	1.29	1500	146	930	90	56	6	38	
3705-3720	"	MDST, med gy	1.45	431	56	90	0.10	0.90								
3735-3750	"	MDST, med gy	0.78													
3775		Middle Jurassic (volcanics)														
3875-3890	"	MDST, med-lt gy, calc + 30% LST, wht-pnk, wht	-													
	P	MDST, med-lt gy, calc	0.03													
3935-3950	Ctg	MDST, med gy + mnr LST, wht	0.06													
3970-3985	"	MDST, med-dk gy	0.06													
4430-4445	"	LST, wht-yel gy	0.06													
4447		Aalenian-Bathonian														
4485-4500	"	MDST, med gy + mnr LST, wht	1.98	427	29	55	0.16	0.69	995	50	535	27	37	17	46	
4500		Early Jurassic														
4510-4525	"	MDST, a/a + mnr LST, a/a	0.95													
4465-4680	"	SND, wht	-													
4695-4710	"	MDST, lt gy, v calc	0.25													
4725-4740	"	MDST, med-dk gy + 10% LST, wht	-													
	P	MDST, med-dk gy	0.39													
4755-4770	Ctg	MDST, lt-med gy, sl calc	0.61													

Table 2 Chemical Analysis Data

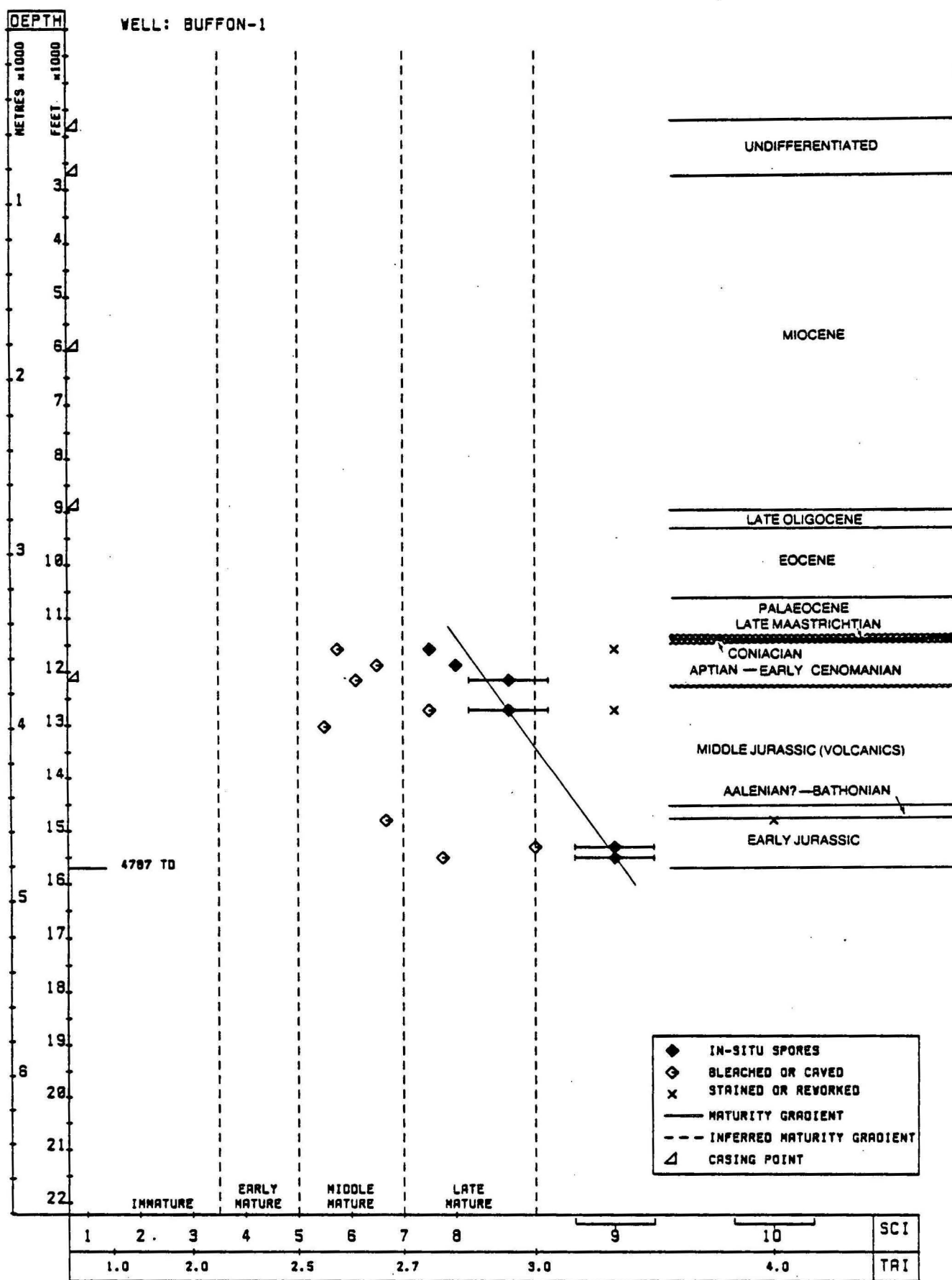


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

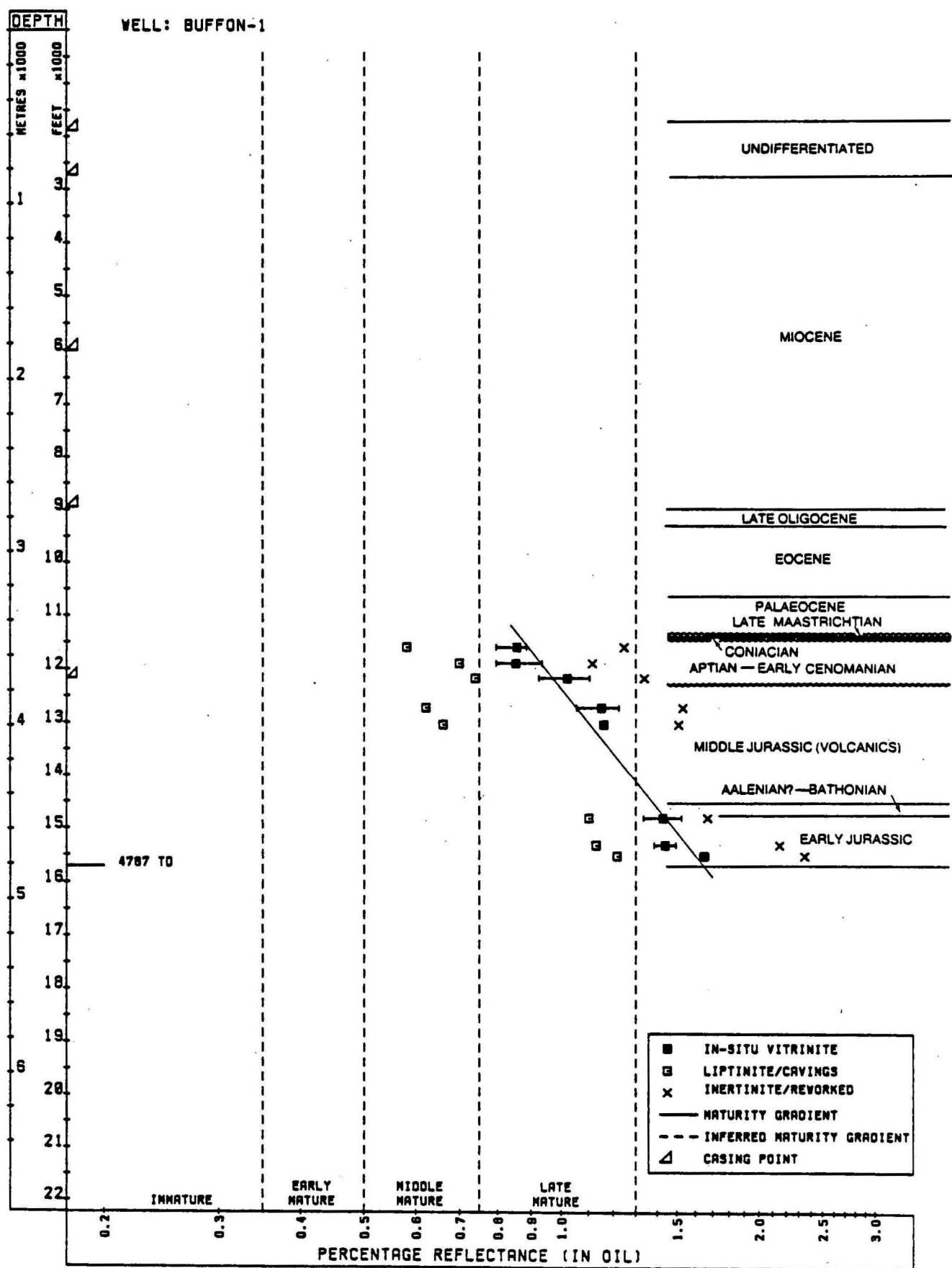
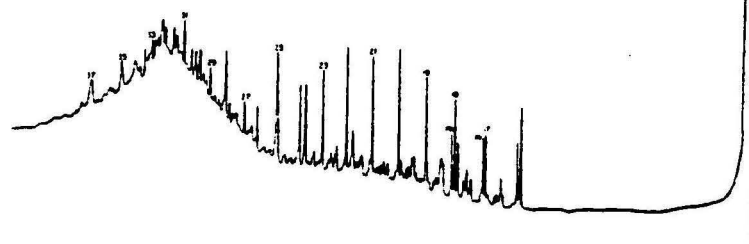


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

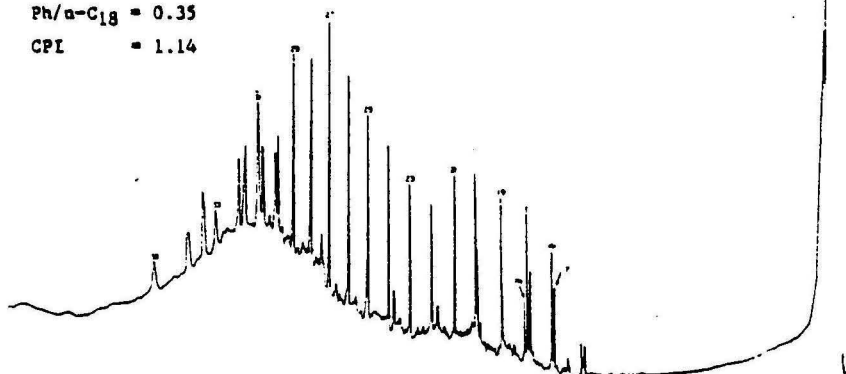
Buffon-1
2355-2375m
Miocene
SCI 5.25

Pr/Ph = 1.03
Pr/n-C₁₇ = 0.96
Ph/n-C₁₈ = 0.66
CPI = NDP



Buffon-1
3675-3690m
Aptian-E. Cenomanian
SCI 8.25

Pr/Ph = 2.26
Pr/n-C₁₇ = 1.46
Ph/n-C₁₈ = 0.35
CPI = 1.14



Buffon-1
4485-4500m
Aalenian-Bathonian
SCI 8.75

Pr/Ph = 1.70
Pr/n-C₁₇ = 0.59
Ph/n-C₁₈ = 0.41
CPI = 1.04

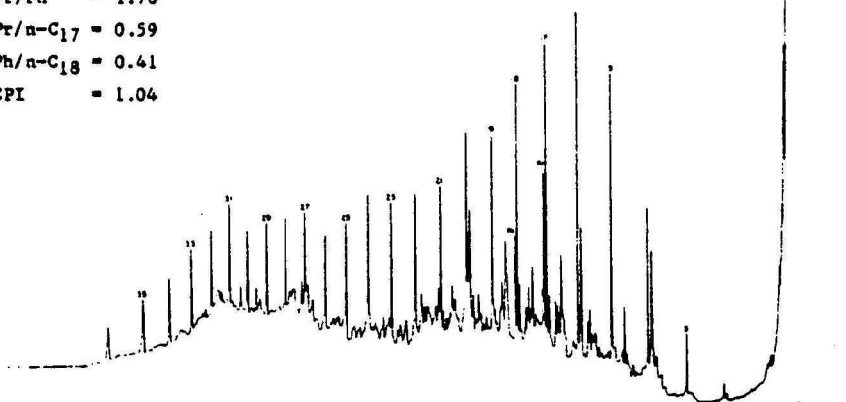


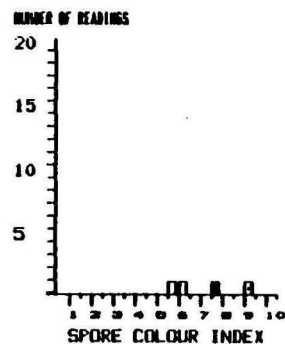
Figure 3

BUFFON-1

IN SITU POPULATION

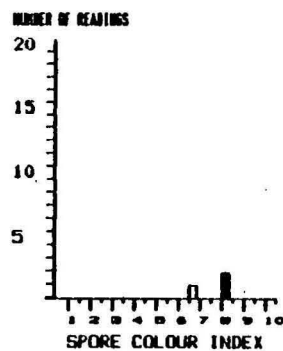
SAMPLE 3530-3545M
5.5 6.0 7.5 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.5-7.5	1
BLEACHED OR CAVED	5.5-6.0	2
STAINED OR REWORKED	9.0-9.0	1



SAMPLE 3620-3635M
6.5 8.0 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-8.0	2
BLEACHED OR CAVED	6.5-6.5	1
STAINED OR REWORKED	-	0

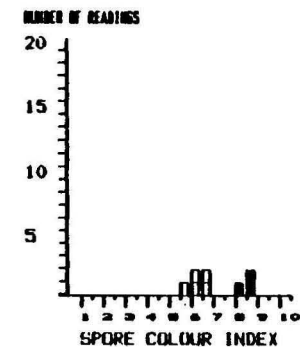


BUFFON-1

IN SITU POPULATION

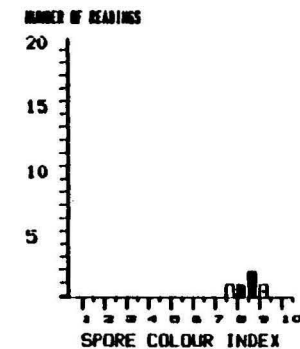
SAMPLE 3705-3720M
5.5 6.0 6.0 6.5 6.5 8.0 8.5 8.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-8.5	3
BLEACHED OR CAVED	5.5-6.5	5
STAINED OR REWORKED	-	0



SAMPLE 3875-3890
7.5 8.0 8.5 8.5 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-8.5	3
BLEACHED OR CAVED	7.5-7.5	1
STAINED OR REWORKED	9.0-9.0	1

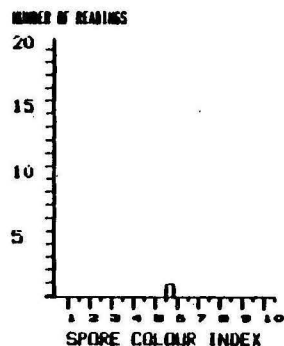


BUFFON-1

IN SITU POPULATION

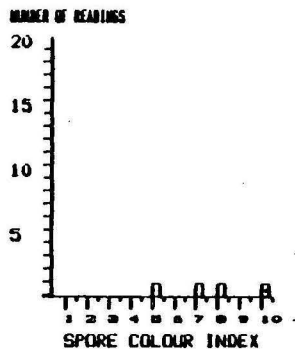
SAMPLE 3970-3985M
5.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	5.5-5.5	1
STAINED OR REWORKED	-	0



SAMPLE 4510-4525M
5.0 7.0 8.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	5.0-8.0	3
STAINED OR REWORKED	10.0-10.0	1

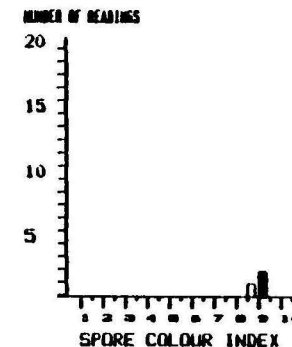


BUFFON-1

IN SITU POPULATION

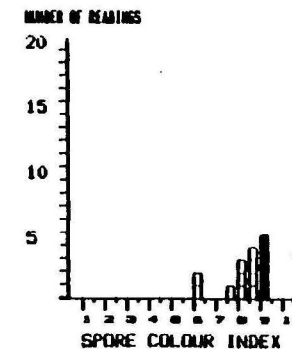
SAMPLE 4665-4680M
8.5 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.0-9.0	2
BLEACHED OR CAVED	8.5-8.5	1
STAINED OR REWORKED	-	0



SAMPLE 4725-4740M
6.0 6.0 7.5 8.0 8.0 8.0 8.5 8.5 8.5 8.5
9.0 9.0 9.0 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.0-9.0	5
BLEACHED OR CAVED	6.0-8.5	10
STAINED OR REWORKED	-	0



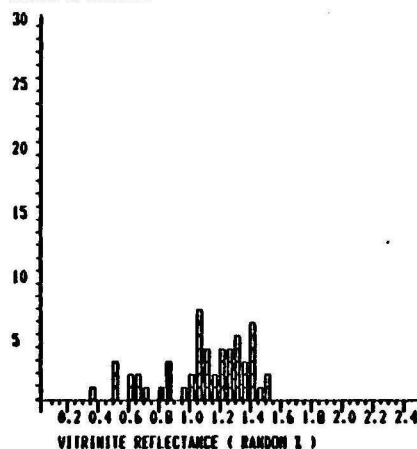
BUFFON-1

SAMPLE 3530-3543M

0.37 0.51 0.52 0.53 0.62 0.62 0.67 0.67 0.72 0.80
0.86 0.88 0.88 0.96 1.03 1.04 1.05 1.05 1.06 1.06
1.07 1.07 1.09 1.11 1.12 1.12 1.14 1.15 1.19 1.20
1.20 1.21 1.24 1.26 1.27 1.28 1.29 1.30 1.32 1.32
1.33 1.33 1.37 1.37 1.39 1.40 1.42 1.42 1.44 1.44
1.44 1.48 1.50 1.54

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.80-0.88	4	0.86	0.04
LIPITINITE/CAVINGS	0.37-0.72	9	0.58	0.11
INERTINITE/REWORKED	0.96-1.54	41	1.25	0.16

NUMBER OF READINGS

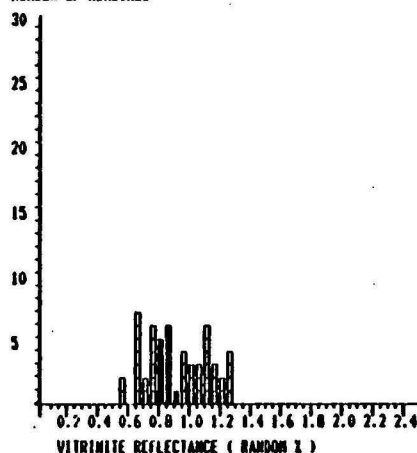


SAMPLE 3620-3625M

0.57 0.58 0.65 0.65 0.67 0.67 0.67 0.67 0.69 0.71
0.74 0.75 0.75 0.76 0.77 0.79 0.79 0.80 0.80 0.81
0.81 0.82 0.85 0.86 0.87 0.89 0.89 0.89 0.93 0.95
0.96 0.99 0.99 1.00 1.03 1.04 1.06 1.07 1.09 1.10
1.10 1.10 1.10 1.13 1.13 1.17 1.18 1.19 1.22 1.23
1.25 1.25 1.25 1.29

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.80-0.93	12	0.85	0.04
LIPITINITE/CAVINGS	0.57-0.79	17	0.70	0.07
INERTINITE/REWORKED	0.95-1.29	25	1.11	0.10

NUMBER OF READINGS



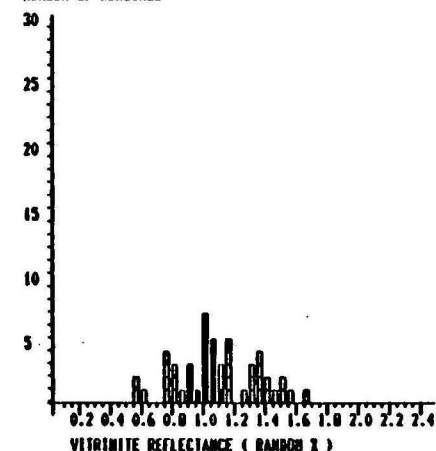
BUFFON-1

SAMPLE 3705-3720M

0.57 0.58 0.62 0.75 0.75 0.77 0.77 0.80 0.83 0.83
0.85 0.93 0.94 0.94 0.98 1.00 1.01 1.01 1.02 1.02
1.03 1.04 1.05 1.06 1.07 1.07 1.08 1.10 1.13 1.14
1.16 1.18 1.18 1.18 1.19 1.26 1.30 1.31 1.33 1.36
1.38 1.39 1.39 1.41 1.43 1.47 1.51 1.54 1.57 1.65

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.93-1.10	17	1.02	0.05
LIPITINITE/CAVINGS	0.57-0.85	11	0.74	0.10
INERTINITE/REWORKED	1.13-1.65	22	1.34	0.15

NUMBER OF READINGS

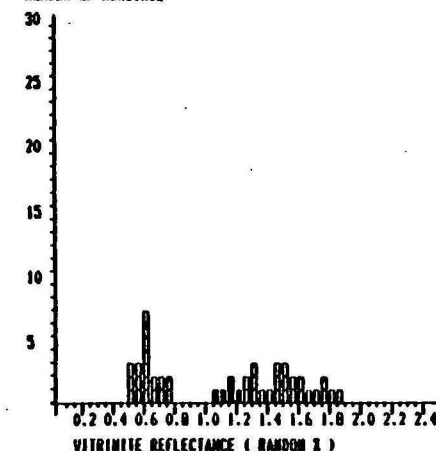


SAMPLE 3875-3890M

0.50 0.51 0.54 0.56 0.58 0.59 0.60 0.60 0.60 0.60
0.62 0.62 0.64 0.65 0.67 0.70 0.70 0.76 0.77 1.06
1.13 1.16 1.19 1.22 1.29 1.29 1.30 1.31 1.32 1.38
1.44 1.45 1.46 1.47 1.50 1.51 1.51 1.55 1.59 1.60
1.62 1.68 1.72 1.78 1.79 1.81 1.85

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	1.06-1.22	5	1.15	0.06
LIPITINITE/CAVINGS	0.50-0.77	19	0.62	0.07
INERTINITE/REWORKED	1.29-1.85	23	1.53	0.18

NUMBER OF READINGS



SAMPLE 4510-4525M

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	1.34-1.52	18	1.43	0.06
LIPIDINITE/CAVINGS	0.56-1.32	19	1.10	0.22
IMERTINITE/REWORKED	1.56-1.83	13	1.67	0.08

SAMPLE 4510-4525M

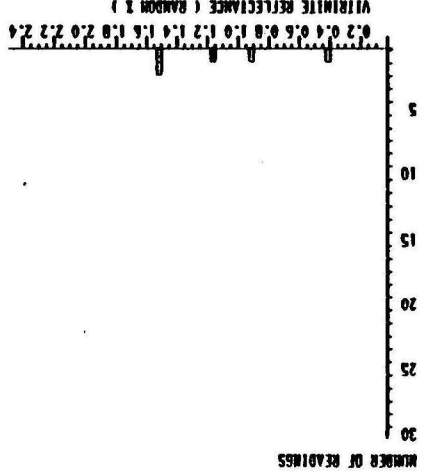
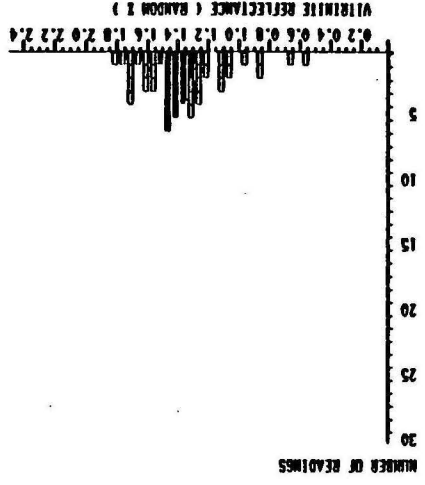
1.60	1.61	1.63	1.68	1.70	1.72	1.73	1.78	1.83
1.45	1.47	1.48	1.49	1.49	1.52	1.56	1.58	1.59
1.34	1.35	1.36	1.38	1.39	1.41	1.43	1.44	1.44
1.21	1.23	1.25	1.26	1.28	1.29	1.32	1.32	1.34
0.56	0.69	0.86	0.87	0.95	1.06	1.09	1.11	1.13

SAMPLE 3970-3985M

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	1.16-1.16	1	1.16	
LIPIDINITE/CAVINGS	0.40-0.92	2	0.66	0.37
IMERTINITE/REWORKED	1.50-1.52	2	1.51	0.01

SAMPLE 3970-3985M

0.40	0.92	1.16	1.50	1.52
------	------	------	------	------



SAMPLE 4725-4740M

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	1.63-1.67	2	1.65	0.03
LIPIDINITE/CAVINGS	1.12-1.31	3	1.22	0.10
IMERTINITE/REWORKED	2.00-2.72	35	2.35	0.22

SAMPLE 4725-4740M

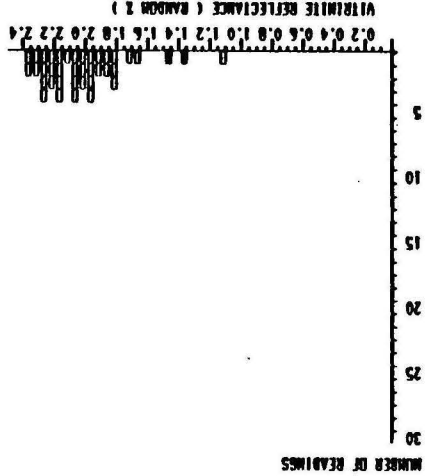
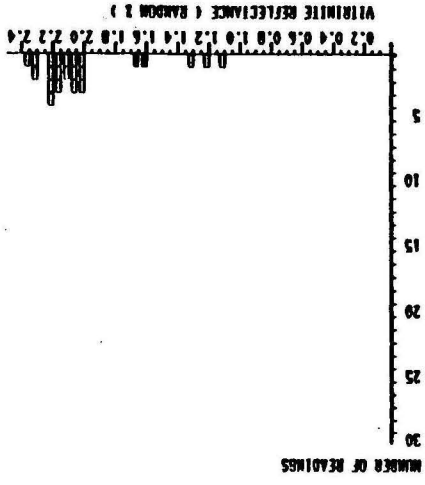
2.49	2.49	2.55	2.56	2.61	2.61	2.69	2.70	2.71	2.72
2.32	2.33	2.37	2.41	2.42	2.43	2.45	2.46	2.48	
2.09	2.10	2.14	2.16	2.17	2.19	2.22	2.23	2.23	
1.12	1.22	1.31	1.63	1.67	2.00	2.02	2.05	2.05	

SAMPLE 4665-4680M

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	1.39-1.49	2	1.44	0.07
LIPIDINITE/CAVINGS	1.13-1.13	1	1.13	
IMERTINITE/REWORKED	1.66-2.78	42	2.15	0.26

SAMPLE 4665-4680M

1.13	1.39	1.49	1.66	1.73	1.80	1.81	1.84	1.87	1.89
1.93	1.93	1.97	1.98	1.98	1.99	2.00	2.01	2.02	2.06
2.06	2.08	2.10	2.15	2.17	2.19	2.21	2.22		
2.23	2.26	2.27	2.28	2.31	2.32	2.39	2.39	2.42	
2.54	2.59	2.63	2.71	2.78					



CASWELL-1 WELL

SUMMARY

Geochemical analysis of selected samples from the interval 2600m to 4090m of the Caswell-1 well has shown that the well section becomes middle mature at around 2400m and late mature at around 3400m. The maturity gradients show no major erosional unconformities within the well section analysed or above 2600m. They also indicate that the sediments analysed are presently at or near their maximum depths of burial.

The interval 3020 to 4090m is stained by a migrant oil, derived from middle to late mature terrestrially sourced waxy kerogens. This oil is mixed with a biodegraded oil fraction in the deeper part of this interval.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 14° 14' 28.7"S, 122° 28' 3.0"E.

Operator and date of drilling: Woodside Petroleum Pty Ltd, 1978.

Well Status: Plugged and abandoned.

TD: 4097m.

Mud data: None available.

Casing data: 30" at 389m, 20" at 660m, 13³/₈" at 1807m, 9⁵/₈" at 3328m, 7" at 3515m.

BHT data: None available.

Elevation: RT 8m ASL.

Water Depth: 345m.

Interval analysed: 2600m to 4090m.

Age of interval analysed:

Depths (in metres)

Late Cretaceous	2600-3348
Early-Late Cretaceous	3348-4090

CASWELL-1 WELL

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed contained abundant reworked vitrinite which hampered analysis. Results: Poor.
- b) Spore Colour Index: The samples analysed yielded small quantities of in situ sporomorphs. Results: Fair.

Source Rock data quality: Fair to good.

Gas chromatography run at: 3620m to 3635m, 3815m to 3830m and 4010m to 4025m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from values of around 5.5 SCI units at 2600m to around 8 units at 4097m TD. Vitrinite reflectance values rise from around 0.57% to 1.05% over the same interval. The results show that the well section becomes middle mature at around 2400m and late mature at around 3400m.

The maturity gradients show no evidence of any major erosional unconformities within the interval analysed. Extrapolation of the interpreted gradients to seabed shows that there is little Late Cretaceous and younger section missing at the well location and that the sediments analysed are presently at or near their maximum depths of burial.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

The section analysed contains no significant oil or gas source rocks.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

Medium to dark grey mudstones analysed in the interval 3880m to 4090m (Neocomian-Cenomanian sediments) contain average organic

CASWELL-1 WELL

carbon contents of between 0.95% and 1.98% after solvent extraction to remove asphaltic material present in the samples.

Pyrolysis analysis shows hydrogen indices of between 76 and 131 on the extracted residues of the samples. These values are relatively high for the high level of maturity of this interval (SCI greater than 7.5 units) and are probably due to the presence of a small amount of biodegraded oil residue.

Extraction data for samples at 3815m to 3830m and 4010m to 4025m shows relatively high organic carbon normalized extract weights, high hydrocarbon yields and high proportion of hydrocarbons in the extracts (about 95%). This data suggests that these samples are contaminated with migrant oils. Alkane gas chromatograms of the samples show an oil-like distribution characteristic of hydrocarbons generated at a moderately high maturity level from kerogen containing abundant waxy kerogens. The napthenic hump observed in both chromatograms may indicate that these extracts also contain a biodegraded oil fraction.

Of the remaining mudstone samples analysed, those in the intervals 2730m to 2745m, 2990m to 3805m, 3620m to 3700m and 3815m to 3830m contain average organic carbon contents of between 1.1% and 2.28%. The rest contain below average organic carbon contents of between 0.40% and 0.97%. Samples in the interval 3620m to 3830m contained asphaltic material and were solvent extracted before analysis. Pyrolysis analysis of these samples shows that they contain only humic kerogens. Visual kerogen analysis shows that, with the exception of the sample at 2990m to 3005m, which contains non-indigenous cutinite, the samples analysed contain almost entirely humic kerogens. These sediments have no significant oil or gas source potential.

Extraction, fractionation and gas chromatography analysis of the sample at 3620m to 3635m shows that the sample contains migrant hydrocarbons derived from middle to late mature terrestrially sourced waxy kerogens.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
2595		Coniacian-Maastrichtian									
2600-2615	Ctg	MDST, lt ol gy, sl calc + mnr SND	5.0	0.54(2)	55	40	5				
2730-2745	"	MDST, lt ol gy	5.5-6.0	0.50(2)	50	50	tr	60	40	*	*
2860-2875	"	MDST, a/a	6.0	0.62(4)	40	55	5				
2990-3005	"	MDST, lt-med gy	6.0-6.5	0.69(5)	40	40	20	30	70	*	*
3348		Neocomian-Cenomanian									
3430-3445	"	MDST, lt gy, v calc	10.0rew	1.67(40)rew	70	30	*				
3530-3545	"	MDST, lt-med gy, sl sndy	7.0-7.5	0.82(6)	30	60	10				
3685-3700	"	MDST, lt gy-v lt gy + 30% SND	7.0-7.5	0.99(3)	40	60	mnr				
3750-3765	"	MDST, med gy + mnr SND						35	65	*	*
3815-3830	"	MDST, med-dk gy						35	65	*	*
3880-3895	"	MDST, med-dk gy	7.5-8.0	0.99(2)	45	55	tr				
4010-4025	"	MDST, a/a	8.0-8.5	1.03(2)	75	25	*				

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
2595		Coniacian-Maastrichtian														
2600-2615	Ctg	MDST, lt ol gy + sl calc + mnr SND	0.43													
2665-2680	"	MDST, lt ol gy	0.73													
2730-2745	"	MDST, a/a	1.11	418	70	178	0.09	0.86								
2795-2810	"	MDST, a/a	0.92													
2860-2875	"	MDST, a/a	0.76													
2925-2940	"	MDST, a/a	0.97													
2990-3005	"	MDST, lt-med gy	1.21	433	126	314	0.06	1.63								
3348		Neocomian-Cenomanian														
3430-3445	"	MDST, lt gy, v calc	0.40													
3480-3495	"	MDST, lt-med gy, v calc	0.46													
3530-3545	"	MDST, a/a, sl sandy	0.89													
3580-3595	"	MDST, a/a	0.50													
3620-3635	"	MDST, lt gy-v lt gy, v calc	1.37	430	156	166	0.43	3.78	2350	172	1850	135	66	13	21	
	"	After extraction	0.58													
3685-3700	Ctg	MDST, a/a + 30% SND	1.55	NDP	260	143	0.54	8.67								
	"	After extraction	0.79													
3750-3765	"	MDST, med gy + mnr SND	-													
	"	After extraction	0.56													
3815-3830	"	MDST, med-dk gy	2.28	NDP	57	89	0.45	2.36	3980	175	3080	135	69	9	22	
	"	After extraction	1.28	440	109	121	0.03	1.45								
3880-3895	"	MDST, a/a	-													
	"	After extraction	0.95	436	131	140	0.07	1.33								
3945-3960	"	MDST, a/a	-													
	"	After extraction	1.55	440	112	92	0.06	1.83								
4010-4025	"	MDST, a/a	2.57						4485	175	3670	143	73	9	18	
	"	After extraction	1.98	443	89	68	0.05	1.85								
4075-4090	"	MDST, a/a	2.59	442	105	54	0.38	4.37								
	"	After extraction	1.61	445	76	62	0.03	1.26								

Table 2 Chemical Analysis Data

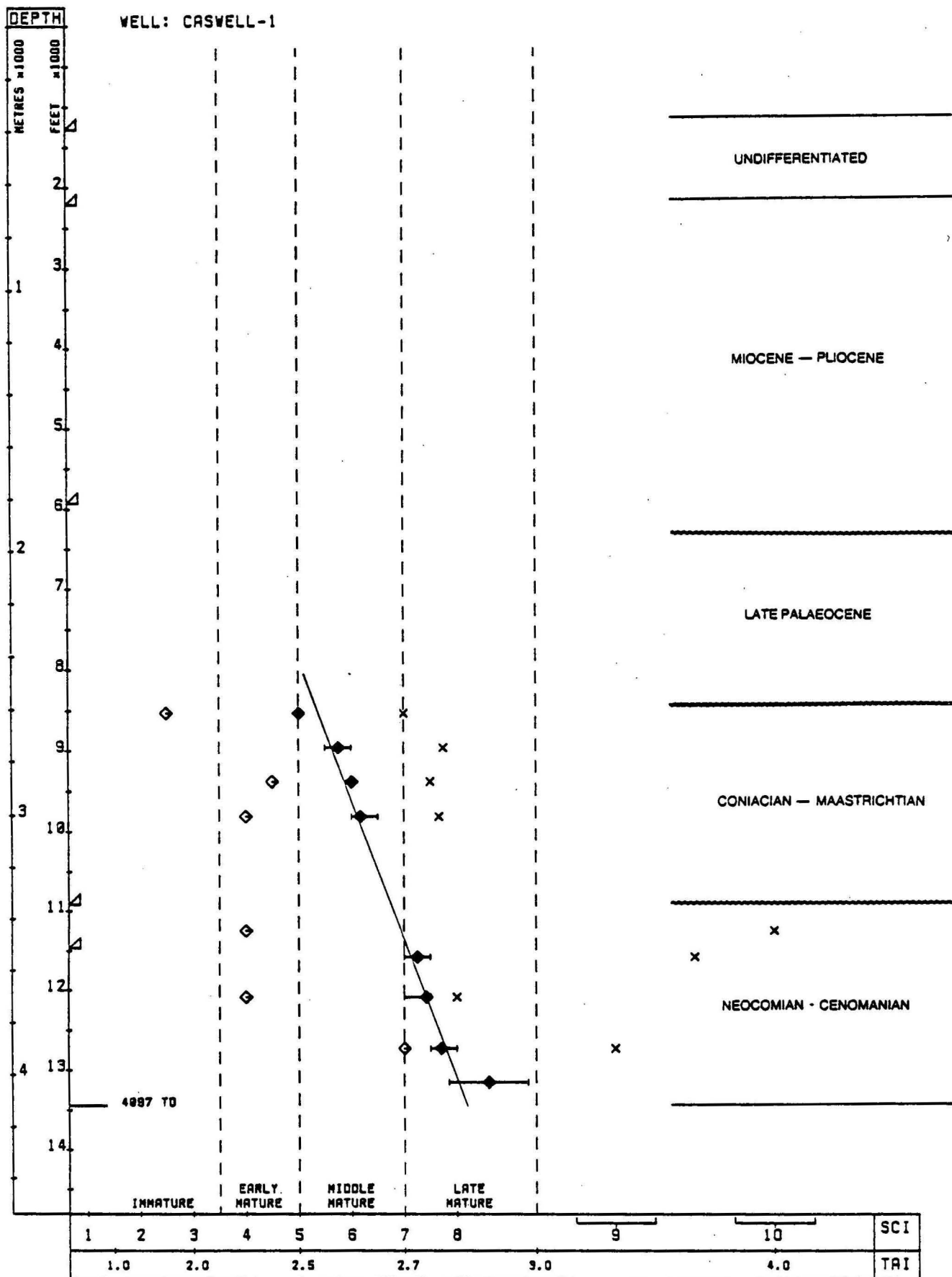
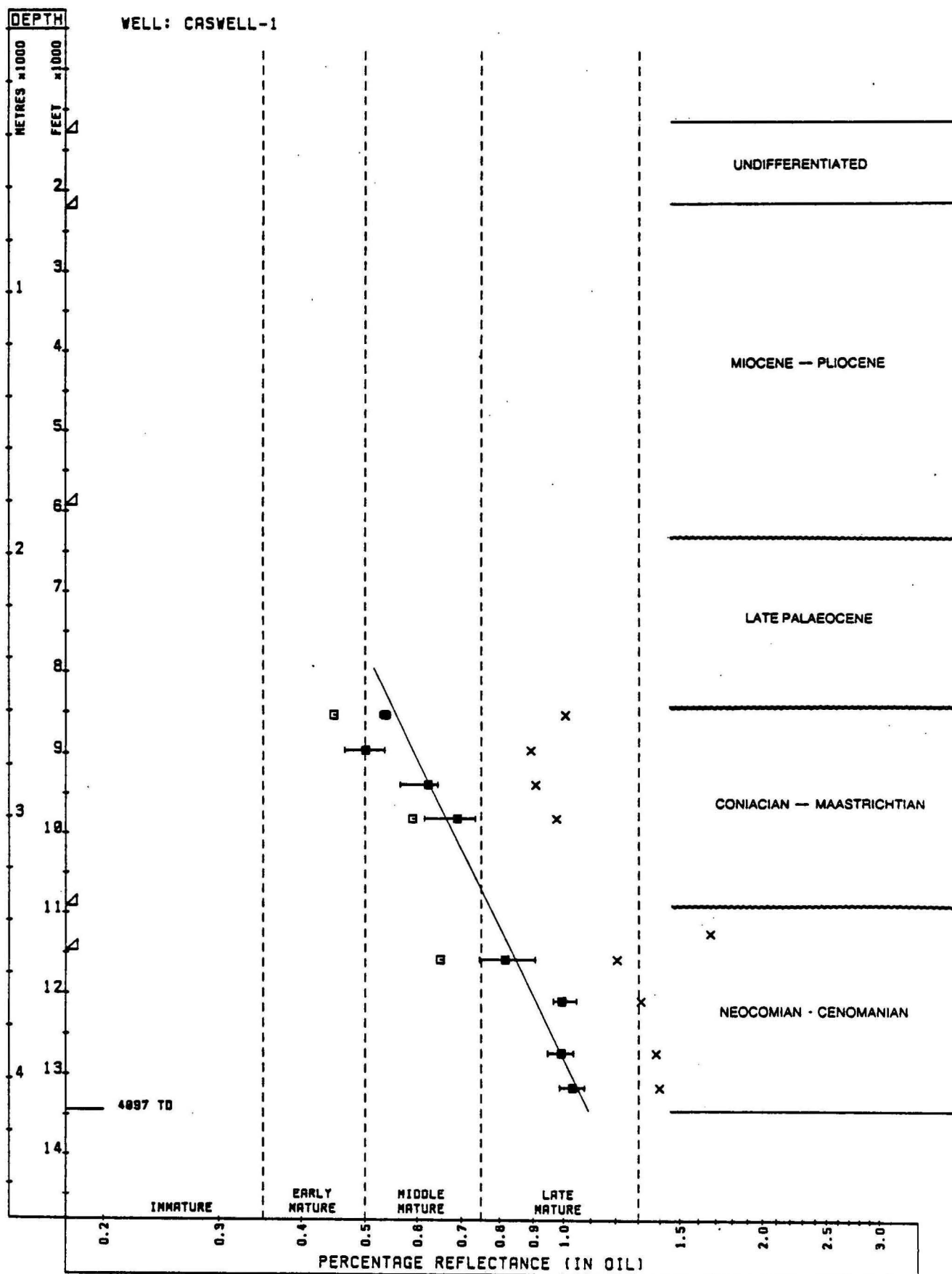
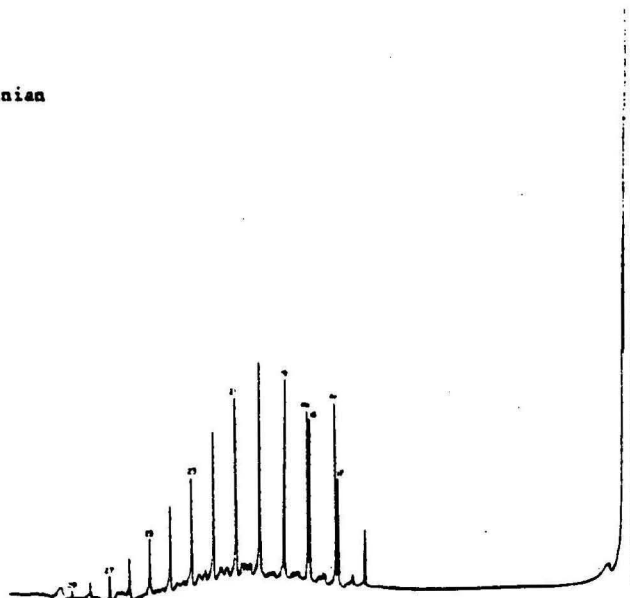


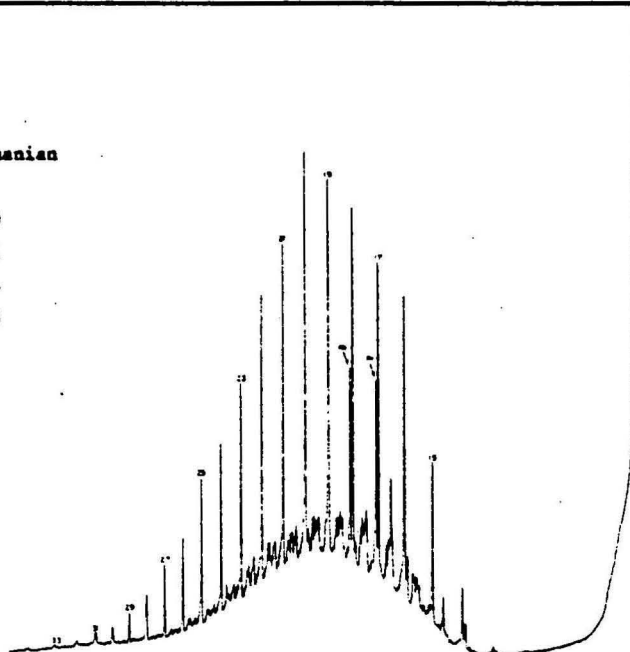
FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH



Caswell-1
3620-3635m
Neocomian-Cenomanian
SCI 7.25
Pr/Ph = 1.10
Pr/n-C₁₇ = 1.70
Ph/n-C₁₈ = 1.03
CPI = 1.05



Caswell-1
3815-3830m
Neocomian-Cenomanian
SCI 7.5
Pr/Ph = 1.00
Pr/n-C₁₇ = 0.61
Ph/n-C₁₈ = 0.54
CPI = 1.13



Caswell-1
4010-4025m
Neocomian-Cenomanian
SCI 8.0-8.5
Pr/Ph = 1.18
Pr/n-C₁₇ = 0.43
Ph/n-C₁₈ = 0.33
CPI = 0.97

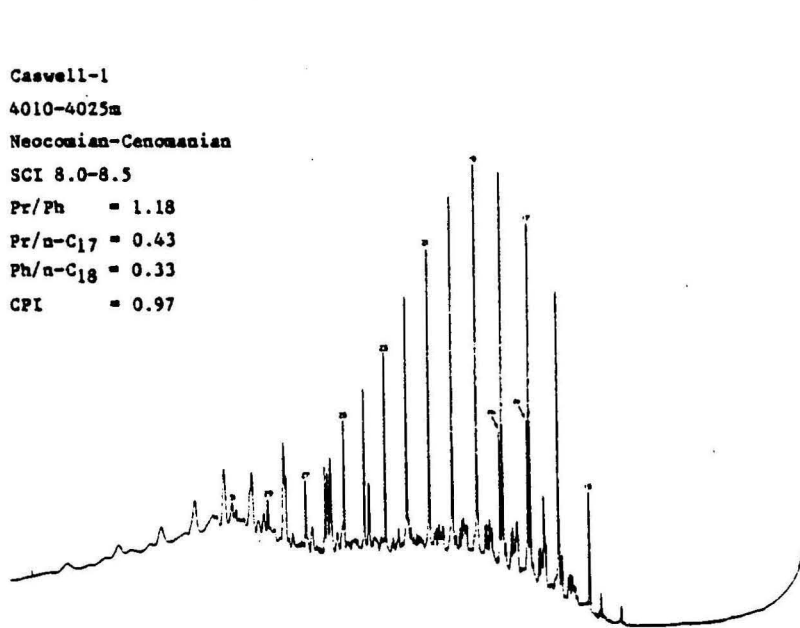


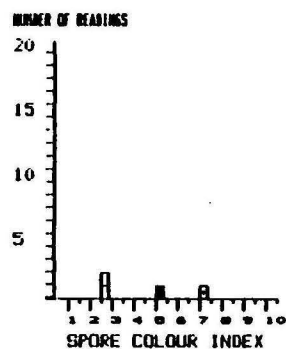
Figure 3

CASWELL-1

IN SITU POPULATION

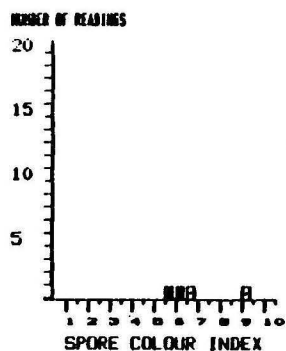
SAMPLE 2600-2615M
2.5 2.5 5.0 7.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.0-5.0	1
BLEACHED OR CAVED	2.5-2.5	2
STAINED OR REWORKED	7.0-7.0	1



SAMPLE 2730-2745M
5.5 6.0 6.5 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.5-6.0	2
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	6.5-9.0	2

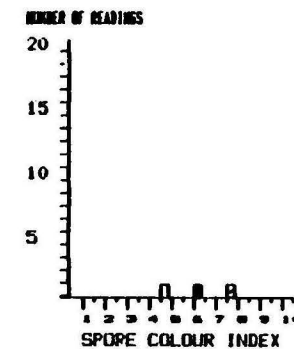


CASWELL-1

IN SITU POPULATION

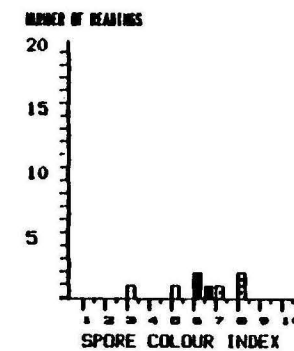
SAMPLE 2860-2875M
4.5 6.0 7.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.0-6.0	1
BLEACHED OR CAVED	4.5-4.5	1
STAINED OR REWORKED	7.5-7.5	1



SAMPLE 2990-3005M
3.0 5.0 6.0 6.0 6.5 7.0 8.0 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.0-6.5	3
BLEACHED OR CAVED	3.0-5.0	2
STAINED OR REWORKED	7.0-8.0	3

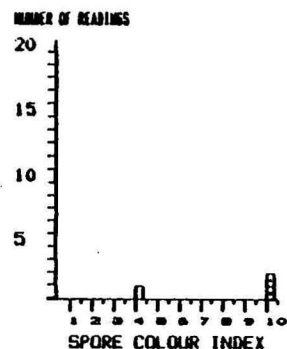


CASWELL-1

IN SITU POPULATION

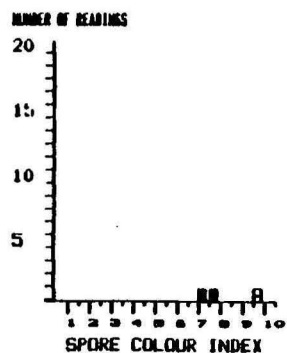
SAMPLE 3430-3445M
4.0 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	4.0-4.0	1
STAINED OR REWORKED	10.0-10.0	2



SAMPLE 3530-3545M
7.0 7.5 9.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.0-7.5	2
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	9.5-9.5	1

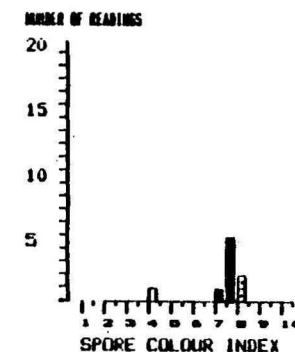


CASWELL-1

IN SITU POPULATION

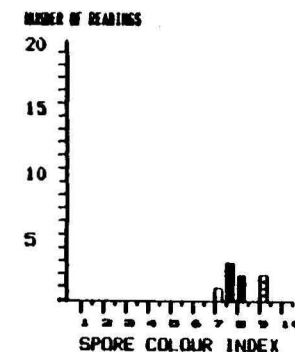
SAMPLE 3685-3700M
4.0 7.0 7.5 7.5 7.5 7.5 8.0 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.0-7.5	6
BLEACHED OR CAVED	4.0-4.0	1
STAINED OR REWORKED	8.0-8.0	2



SAMPLE 3880-3895M
7.0 7.5 7.5 7.5 8.0 8.0 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.5-8.0	5
BLEACHED OR CAVED	7.0-7.0	1
STAINED OR REWORKED	9.0-9.0	2

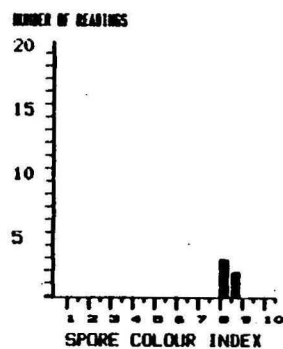


CASWELL-1

IN SITU POPULATION

SAMPLE 4010-4025M
8.0 8.0 8.0 8.5 8.5

<u>SELECTED CLASS</u>	<u>RANGE</u>	<u>COUNT</u>
IN-SITU SPORES	8.0-8.5	5
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	-	0



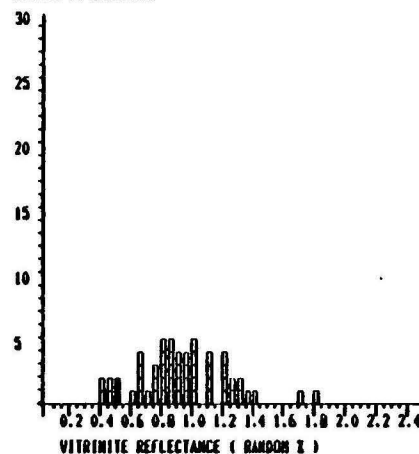
CASWELL-1

SAMPLE 2600-2615

0.41 0.44 0.46 0.48 0.53 0.54 0.60 0.65 0.67 0.68
0.68 0.70 0.75 0.78 0.79 0.80 0.80 0.81 0.82 0.84
0.85 0.86 0.87 0.88 0.89 0.90 0.90 0.92 0.93 0.96
0.96 0.99 0.99 1.00 1.00 1.01 1.03 1.04 1.10 1.12
1.12 1.14 1.21 1.21 1.21 1.24 1.27 1.28 1.31 1.34
1.35 1.40 1.74 1.82

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.53-0.54	2	0.54	0.01
LIPTINITE/CAVINGS	0.41-0.48	4	0.45	0.03
INERTINITE/REWORKED	0.60-1.82	48	1.00	0.26

NUMBER OF READINGS

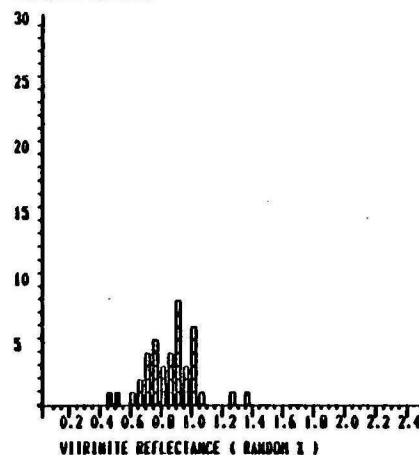


SAMPLE 2730-2745

0.47 0.53 0.63 0.66 0.67 0.70 0.70 0.70 0.73 0.76
0.77 0.78 0.78 0.79 0.81 0.81 0.83 0.86 0.87 0.87
0.88 0.90 0.91 0.92 0.92 0.92 0.94 0.94 0.94 0.97
0.98 0.99 1.01 1.01 1.02 1.03 1.03 1.04 1.09 1.25
1.35

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.47-0.53	2	0.50	0.04
INERTINITE/REWORKED	0.63-1.35	39	0.89	0.15

NUMBER OF READINGS



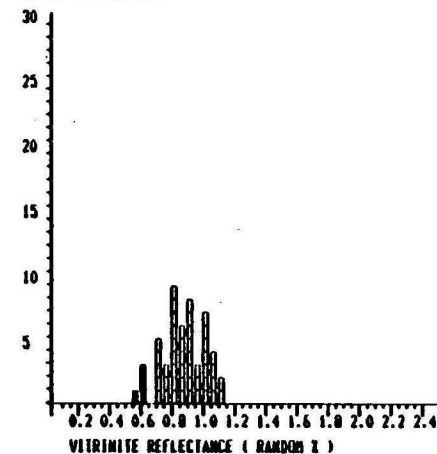
CASWELL-1

SAMPLE 2860-2875

0.57 0.64 0.64 0.64 0.73 0.73 0.73 0.74 0.74 0.77
0.78 0.79 0.81 0.81 0.81 0.81 0.82 0.82 0.82 0.83
0.84 0.86 0.87 0.87 0.88 0.89 0.89 0.90 0.90 0.90
0.92 0.93 0.93 0.93 0.94 0.96 0.97 0.98 1.00 1.00
1.01 1.02 1.03 1.03 1.04 1.06 1.06 1.07 1.09 1.13
1.14

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.57-0.64	4	0.62	0.03
INERTINITE/REWORKED	0.73-1.14	47	0.91	0.11

NUMBER OF READINGS

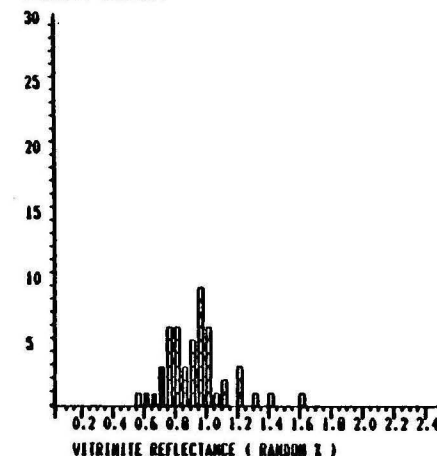


SAMPLE 2990-3005

0.59 0.62 0.66 0.71 0.73 0.73 0.75 0.76 0.76 0.77
0.77 0.79 0.80 0.80 0.83 0.84 0.84 0.84 0.86 0.88
0.89 0.90 0.91 0.92 0.93 0.93 0.95 0.95 0.95 0.95
0.96 0.97 0.97 0.98 0.98 1.00 1.01 1.01 1.03 1.03
1.04 1.09 1.10 1.11 1.20 1.23 1.24 1.33 1.44 1.62

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.62-0.73	5	0.69	0.05
LIPTINITE/CAVINGS	0.59-0.59	1	0.59	
INERTINITE/REWORKED	0.75-1.62	44	0.98	0.18

NUMBER OF READINGS



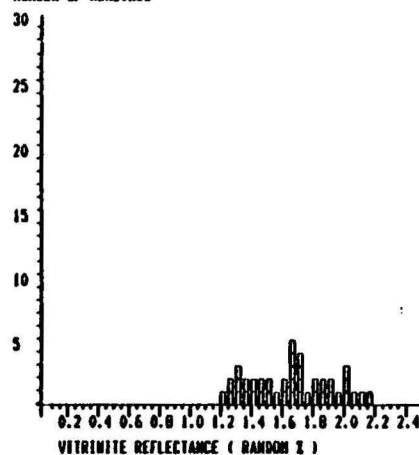
CASWELL-1

SAMPLE 3430-3445

1.20 1.28 1.29 1.32 1.33 1.33 1.35 1.37 1.40 1.43
1.48 1.49 1.51 1.54 1.55 1.60 1.64 1.65 1.65 1.67
1.68 1.68 1.71 1.71 1.73 1.74 1.77 1.80 1.82 1.86
1.88 1.90 1.91 1.99 2.00 2.00 2.04 2.06 2.10 2.19

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
INERTINITE/REWORKED	1.20-2.19	40	1.67	0.26

NUMBER OF READINGS

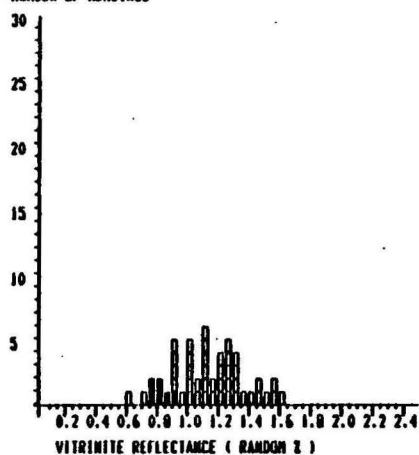


SAMPLE 3530-3545

0.60 0.70 0.75 0.75 0.80 0.82 0.87 0.90 0.91 0.91
0.91 0.94 0.98 1.00 1.00 1.01 1.02 1.03 1.05 1.07
1.10 1.11 1.12 1.13 1.13 1.14 1.15 1.16 1.20 1.22
1.23 1.24 1.25 1.28 1.28 1.29 1.29 1.30 1.30 1.32
1.33 1.37 1.42 1.45 1.49 1.53 1.55 1.58 1.61

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.75-0.90	6	0.82	0.06
LIPITINITE/CAVINGS	0.60-0.70	2	0.65	0.07
INERTINITE/REWORKED	0.91-1.61	41	1.20	0.19

NUMBER OF READINGS



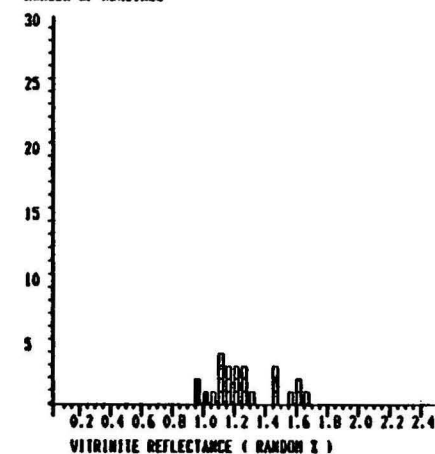
CASWELL-1

SAMPLE 3685-3700

0.97 0.97 1.04 1.07 1.10 1.12 1.12 1.14 1.17 1.18
1.19 1.20 1.24 1.24 1.28 1.28 1.29 1.31 1.45 1.45
1.48 1.57 1.61 1.64 1.67

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.97-1.04	3	0.99	0.04
INERTINITE/REWORKED	1.07-1.67	22	1.31	0.19

NUMBER OF READINGS

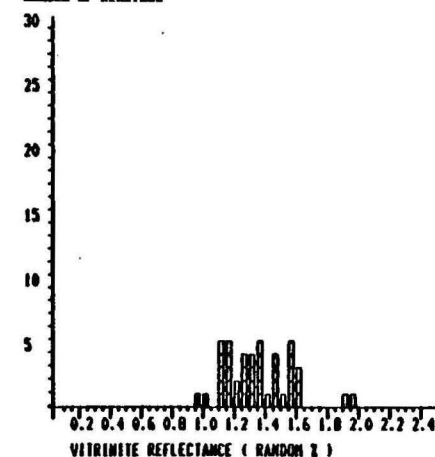


SAMPLE 3880-3895

0.95 1.03 1.11 1.12 1.13 1.14 1.14 1.15 1.16 1.17
1.18 1.19 1.20 1.23 1.25 1.27 1.27 1.29 1.32 1.32
1.32 1.34 1.36 1.37 1.37 1.38 1.39 1.40 1.45 1.45
1.46 1.47 1.52 1.57 1.58 1.58 1.59 1.59 1.61 1.62
1.62 1.94 1.95

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.95-1.03	2	0.99	0.06
INERTINITE/REWORKED	1.11-1.95	41	1.38	0.21

NUMBER OF READINGS



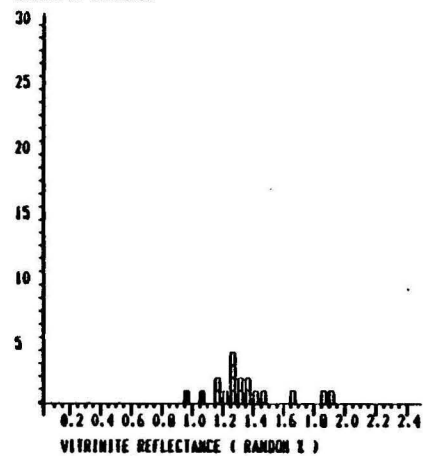
CASWELL-1

SAMPLE 4010-4025

0.99 1.07 1.15 1.17 1.23 1.25 1.26 1.26 1.28 1.34
1.34 1.35 1.36 1.42 1.46 1.65 1.88 1.94

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.99-1.07	2	1.03	0.06
INERTINITE/REWORKED	1.15-1.94	16	1.40	0.23

NUMBER OF READINGS



EAST SWAN-1 WELL

SUMMARY

Geochemical analysis of samples from the interval 713m to 3034m of the East Swan-1 well has shown that the well section is immature to 1650m, early mature between 1650m and 2300m and middle mature between 2300m and 3034m. There is only minor Tertiary to Recent section missing above 713m and the sediments analysed are currently at or near their maximum depths of burial. The vitrinite reflectance gradients show 200m of missing Late Jurassic to Cretaceous section at the unconformity at 2330m.

Mudstones in the interval 2683m to 3038m TD of the Petrel Formation have very good oil source potential and poor gas source potential. At their present level of maturity these source rocks will have already generated significant quantities of oil.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 12° 18' 07"S, 124° 34' 56"E.

Operator and date of drilling: Arco Australia Ltd, 1978.

Well Status: Plugged and abandoned.

TD: 3038m.

Mud data: Seawater and gel pills: Seabed to 151m.
Seawater with high viscosity pills: 151m to 268m.
Seawater/Spersene/gel system with LCM added
occasionally: 268m to 1948m.
Seawater/Spersene system: 1948m to 2206m.
Seawater/Spersene/Resinex system: 2206m to 3038m TD.

Casing data: 30" at 141m, 20" at 250m, 13³/₈" at 1224.5m, 9⁵/₈" at 2198m.

BHT data: 50.5°C at 1238m, stopped circulation time unknown.
69°C at 2206m, stopped circulation time unknown.
95°C at 2951m, stopped circulation time unknown.
99°C at 3034.5m, stopped circulation time unknown.

Elevation: RT 21m ASL.

Water depth: 103m.

EAST SWAN-1 WELL

Interval analysed: 713m to 3034m.

Age of interval analysed:

	<u>Depths (in metres)</u>
Miocene-Recent	713- 728
Eocene	728-1286
Palaeocene	1286-1824
Early-Late Cretaceous	1824-2330
Late Jurassic	2330-2694
Early-Middle Jurassic	2694-3034

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed contained sufficient vitrinite for measurements but measurements were complicated by abundant reworked material in the lower half of the well section. Results: Fair.
- b) Spore Colour Index: The samples analysed contained sufficient sporomorphs for measurements. Measurements in the lower half of the well were complicated by reworked material. Results: Fair.

Source rock data quality: Good.

Gas chromatography run at: 2732m to 2747m, 2790m to 2805m, 2854m to 2869m, 2982m to 3000m and 3018m to 3034m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Interpreted spore colour index values rise from 3 SCI units at 713m to around 6 SCI units at 3000m. Vitrinite reflectance values rise from 0.3% to around 0.6% over the same interval and show a marked discontinuity at 2330m consistent with uplift and erosion of around 200m of Late Jurassic-Cretaceous sediments. The marked non-linearity in the spore colour gradient between 2200m and 2300m is due to overpressuring which was noted in the well completion report between 2300m and 2800m. The gradients show that the well section is immature to 1650m, early mature between 1650m and 2300m and middle mature between 2300m and 3034m.

EAST SWAN-1 WELL

Extrapolation of the gradients to surface suggests that the sediments analysed are currently at or near their maximum depths of burial and that little Tertiary to Recent section is missing above 713m.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

Medium to dark grey mudstones of the Petrel Formation in the interval 2683m to 3034m generally contain above average organic carbon contents of between 1.99% and 3.53%. Pyrolysis and visual kerogen analysis of these mudstones suggests that they contain between 10% to 30% oil-prone kerogen, most of which is waxy kerogen. These mudstones have a cumulative thickness of around 66m between 2683m and 3034m and have good to very good oil source potential and poor gas source potential. At their present level of maturity much of this oil potential will have already been generated.

Extraction, fractionation and gas chromatography analyses of samples at 2732m to 2747m, 2854m to 2869m, 2982m to 3000m and 3018m to 3033m shows that these samples contain hydrocarbons derived from mature terrestrially derived waxy kerogens.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

Tertiary and Cretaceous sediments and sediments of the upper part of the Petrel Formation: Member "B" are assumed to have no significant source potential.

Extraction of potentially oil stained samples at 723m to 732m and 851m to 860m yielded only small quantities of extract and no further analyses were therefore performed.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
124		Miocene-Recent									
713-723	Ctg	LST, wht	3.5rew	0.35(6)rew	30	60	10				
728		Eocene									
1265-1268	"	SST, lt gy gn, arg + 20% LST, wht	3.0	0.28(2)	70	25	5				
1286		Palaeocene									
1824		Cretaceous									
1997-2012	"	LST, lt gy-wht, sndy	4.0	0.43(3)	80	20	*				
2302-2317	"	MDST, med dk gy + 20% MDST, med lt gy	5.0	0.53(11)	70	30	*				
2330		Petrel Fm Mbr "B" Eqv									
2683-2698	"	MDST, dk gy	5.5-6.0	0.44(4)cvd	40	30	30	50	30	5	15
2694		Petrel Fm Mbr "C" Eqv									
2732-2747	"	MDST, med dk gy-dk gy						30	40	10	20
2790-2805	"	MDST, a/a						35	40	10	15
2838-2854	"	MDST, med dk gy-dk gy	6.0	0.54(2)	45	30	25	35	40	10	15
2854-2869	"	MDST, a/a + mnr LST, lt gy						30	40	10	20
2869-2875	"	MDST, dk gy						35	40	10	15
2896-2912	P	MDST, med dk gy						30	50	5	15
	P	MDST, dk gy						45	40	5	10
2939-2948	Ctg	MDST, dk gy, carb + walnut shell, mica contam	5.5-6.5	0.58(8)	30	50	20				
	P	MDST, dk gy, carb						30	45	5	20
2982-3000	P	MDST, gy blk, carb						25	45	*	30
3003-3018	P	MDST, med-med dk gy						40	50	*	10
	P	MDST, gy blk, carb						30	45	*	25
3018-3034	Ctg	SST, wht-lt gy + 30% MDST, med-med dk gy + 30% MDST, dk gy, carb	6.0	0.61(7)	50	40	10				
	P	MDST, med-med dk gy						70	30	*	*
	P	MDST, dk gy, carb						30	50	*	20

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS	
214		Miocene-Recent														
713-723	Ctg	LST, wht	-													
728		Eocene														
723-732	"	LST, lt gy, arg	0.28							190	68					
851-860	"	LST, wht	0.13							305	235					
1286		Palaeocene														
1824		Cretaceous														
2330		Petrel Fm Mbr "B" Eqv														
2683-2698	"	MDST, dk gy	2.21	436	176	74	0.04	4.05								
2728		Petrel Fm Mbr "C" Eqv														
2732-2747	"	MDST, med-dk gy-dk gy	1.99	429	224	85	0.05	4.66	1030	52	320	16	24	7	69	
2790-2805	"	MDST, a/a	2.53	434	203	64	0.05	5.40	825	33	325	13	31	9	60	
2838-2854	"	MDST, a/a	2.81	432	196	77	0.04	5.74								
2854-2869	"	MDST, a/a + unr LST, lt gy	2.13	434	238	72	0.04	5.29	1930	91	500	23	17	9	74	
2869-2875	"	MDST, dk gy	2.46	433	207	76	0.05	5.38								
2896-2912	"	MDST, dk gy, carb + 20% MDST, med-dk gy	-													
	P	MDST, dk gy	3.53	431	151	42	0.05	5.57								
	P	MDST, med-dk gy	3.42	432	206	34	0.04	7.34								
2939-2948	Ctg	MDST, dk gy, carb + walnut shell, mica contam	-													
	P	MDST, dk gy, carb	2.79	436	206	35	0.05	6.07								
2982-3000	Ctg	SST, wht-lt gy + 30% MDST, gy blk, carb	3.56						1045	29	260	7	19	6	75	
	P	MDST, gy blk, carb	3.05	432	242	34	0.04	7.72								
3003-3018	Ctg	SST, a/a + 30% MDST, med-med dk gy + 30% MDST, gy blk, carb	-													
	P	MDST, med-med dk gy	2.55	432	118	34	0.05	3.19								
	P	MDST, gy blk, carb	3.27	432	206	20	0.03	6.94								
3018-3034	Ctg	SST, a/a + 30% MDST, med-med dk gy + 30% MDST, dk gy, carb	3.03						705	23	105	3	13	2	85	
	P	MDST, med-med dk gy	3.19	425	25	20	0.08	0.87								
	P	MDST, dk gy, carb	2.77	429	186	27	0.04	5.35								

Table 2 Chemical Analysis Data

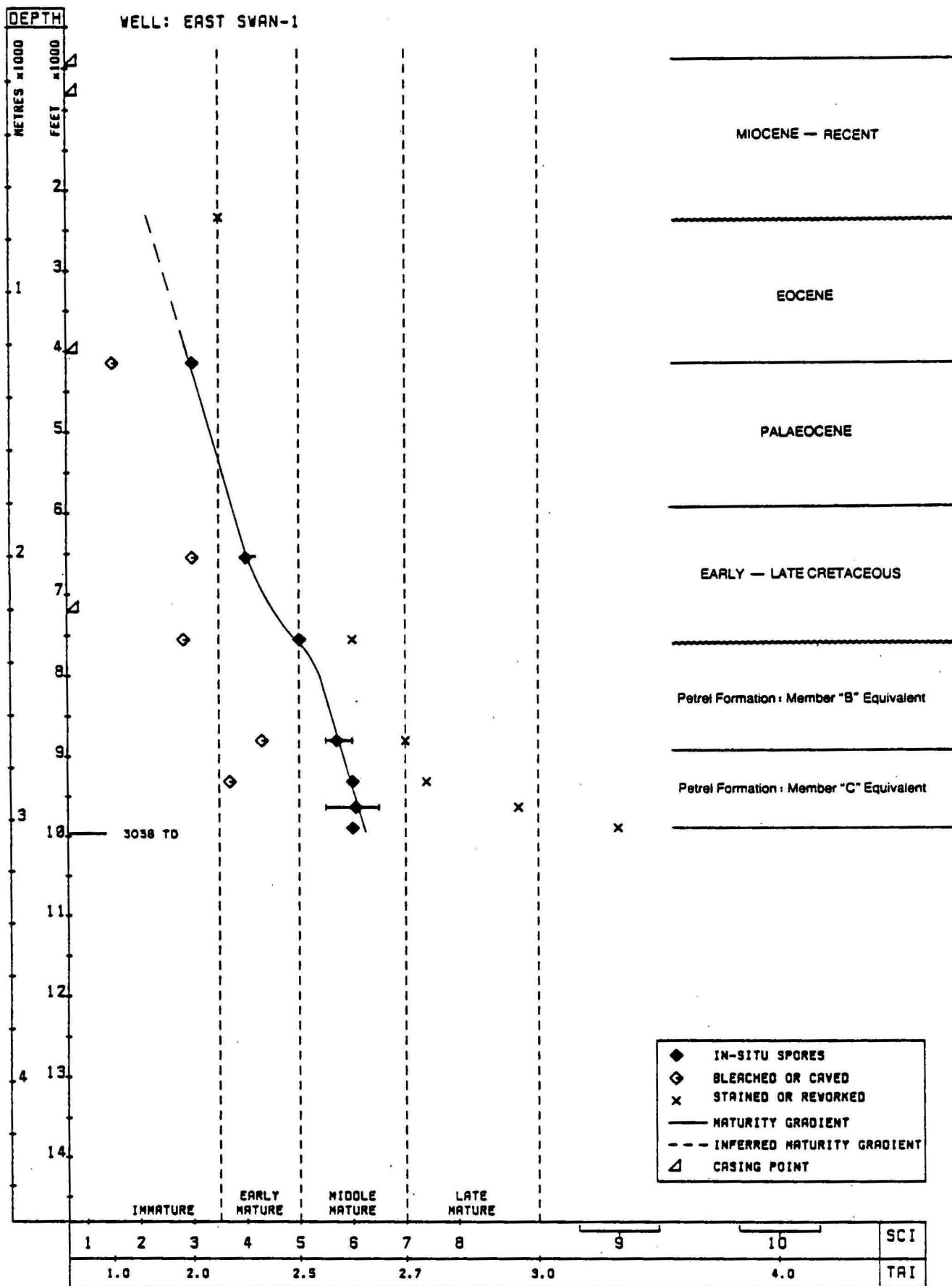


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

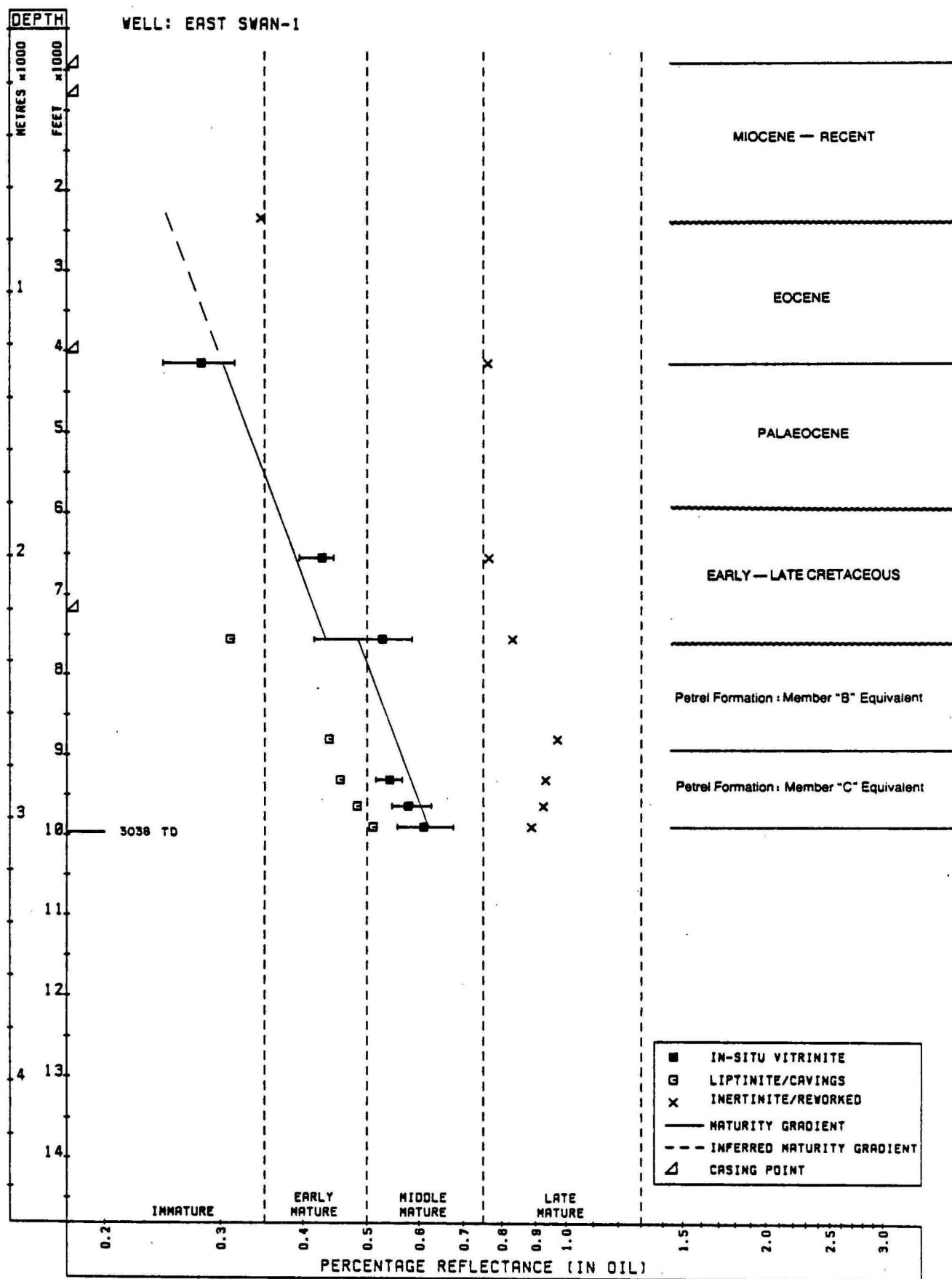
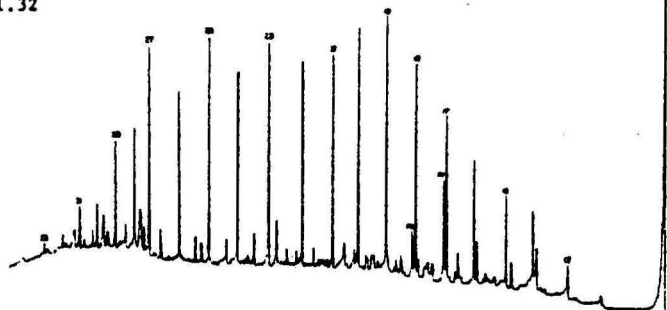
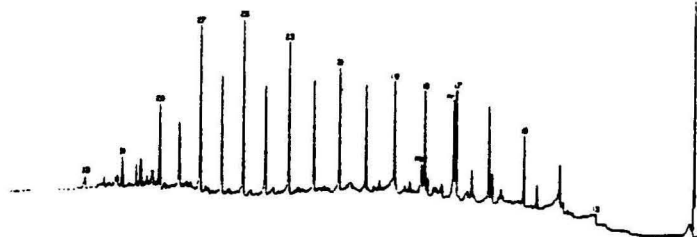


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

East Swan-1
2732-2747m
Petrel Fan Mbr "C" Eqv
SCI 5.5
Pr/Ph = 2.22
Pr/n-C₁₇ = 0.61
Ph/n-C₁₈ = 0.21
CPI = 1.32



East Swan-1
2790-2805m
Petrel Fan Mbr "C" Eqv
SCI 5.75
Pr/Ph = 3.11
Pr/n-C₁₇ = 0.90
Ph/n-C₁₈ = 0.29
CPI = 1.63



East Swan-1
2854-2869m
Petrel Fan Mbr "C" Eqv
SCI 6.0
Pr/Ph = 2.99
Pr/n-C₁₇ = 0.91
Ph/n-C₁₈ = 0.30
CPI = 0.92

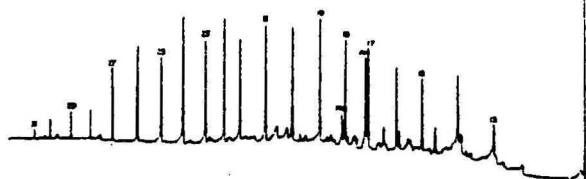
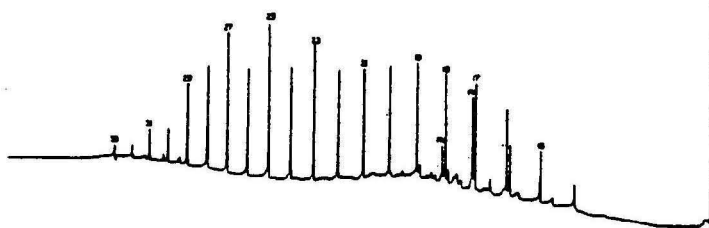


Figure 3a

East Swan-1
2982-3000m
Petrel Fan Mbr "C" Eqv
SCI 6.0
Pr/Ph = 2.43
Pr/n-C₁₇ = 0.86
Ph/n-C₁₈ = 0.34
CPI = 1.31



East Swan-1
3018-3034m
Petrel Fan Mbr "C" Eqv
SCI 6.0
Pr/Ph = 1.39
Pr/n-C₁₇ = 0.70
Ph/n-C₁₈ = 0.38
CPI = 1.25

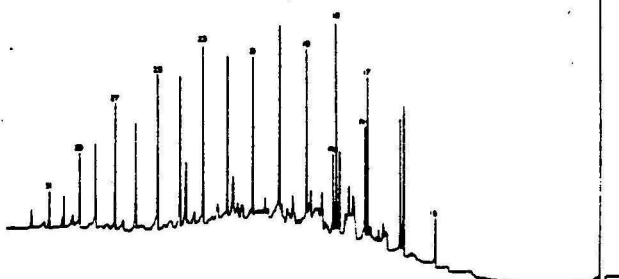


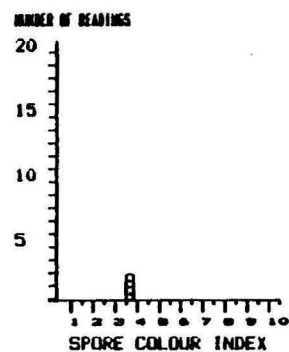
Figure 3b

EAST SWAN-1

IN SITU POPULATION

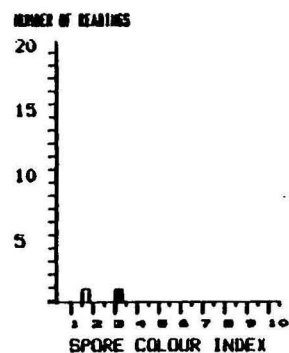
SAMPLE 713-723M
3.5 3.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	3.5-3.5	2



SAMPLE 1265-1268M
1.5 3.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	1
BLEACHED/CAVINGS	1.5-1.5	1
STAINED/REWORKED	-	0

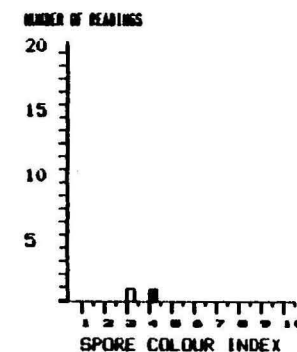


EAST SWAN-1

IN SITU POPULATION

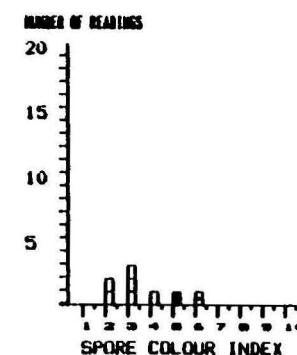
SAMPLE 1997-2012M
3.0 4.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.0-4.0	1
BLEACHED/CAVINGS	3.0-3.0	1
STAINED/REWORKED	-	0



SAMPLE 2302-2317M
2.0 2.0 3.0 3.0 3.0 4.0 5.0 6.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.0	1
BLEACHED/CAVINGS	2.0-4.0	6
STAINED/REWORKED	6.0-6.0	1



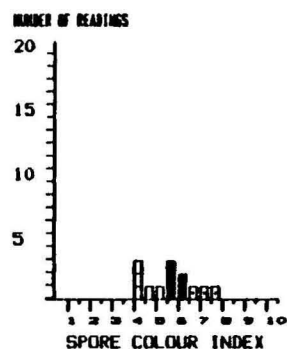
EAST SHAN-1

IN SITU POPULATION

SAMPLE 2683-2698M

4.0 4.0 4.0 4.5 5.0 5.5 5.5 5.5 6.0 6.0
6.5 7.0 7.5

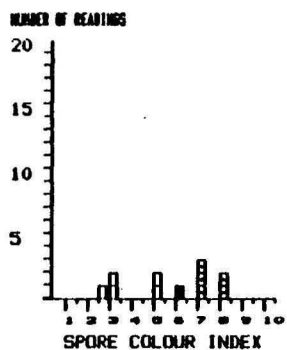
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-6.0	5
BLEACHED/CAVINGS	4.0-5.0	5
STAINED/REWORKED	6.5-7.5	3



SAMPLE 2838-2854M

2.5 3.0 3.0 5.0 5.0 6.0 7.0 7.0 7.0 8.0
8.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.0	1
BLEACHED/CAVINGS	2.5-5.0	5
STAINED/REWORKED	7.0-8.0	5



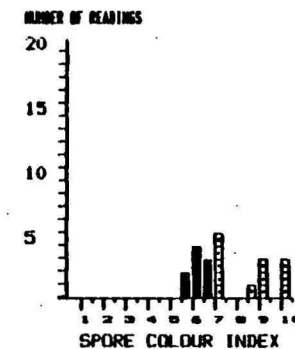
EAST SHAN-1

IN SITU POPULATION

SAMPLE 2939-2948M

5.5 5.5 6.0 6.0 6.0 6.0 6.5 6.5 6.5 7.0
7.0 7.0 7.0 7.0 8.5 9.0 9.0 9.0 10.0 10.0
10.0

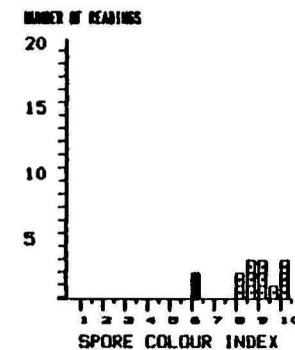
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-6.5	9
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.0-10.0	12



SAMPLE 3018-3034M

6.0 6.0 8.0 8.0 8.5 8.5 8.5 9.0 9.0 9.0
9.5 10.0 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.0	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.0-10.0	12



EAST SWAN-1

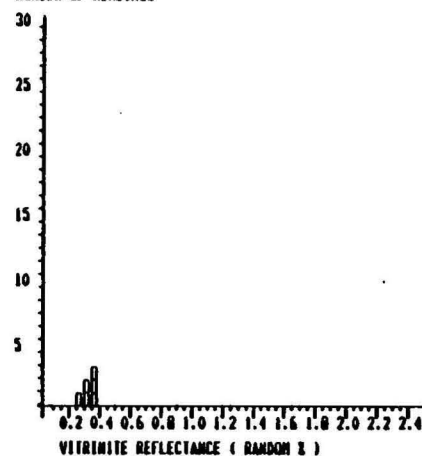
SAMPLE 713-723H

0.28 0.33 0.34 0.36 0.38 0.38

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
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INERTINITE/REWORKED	0.28-0.38	6	0.35	0.04
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NUMBER OF READINGS



SAMPLE 1265-1268H

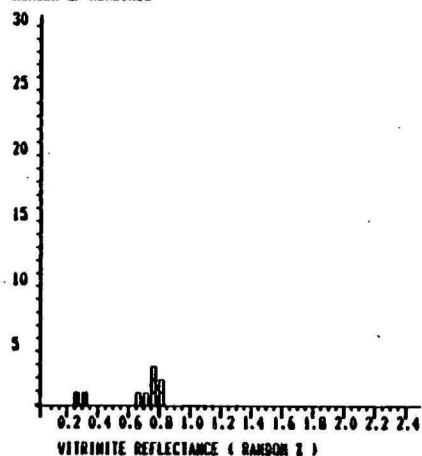
0.25 0.31 0.69 0.70 0.77 0.78 0.79 0.80 0.80

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
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IN SITU VITRINITE	0.25-0.31	2	0.28	0.04
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INERTINITE/REWORKED	0.69-0.80	7	0.76	0.05
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NUMBER OF READINGS



EAST SWAN-1

SAMPLE 1997-2012H

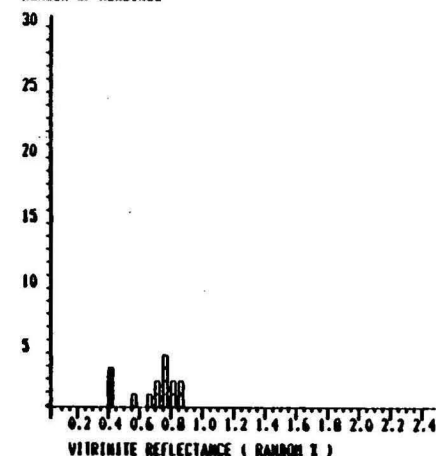
0.40 0.44 0.44 0.59 0.68 0.71 0.73 0.76 0.77 0.78
0.79 0.80 0.82 0.85 0.89

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
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IN SITU VITRINITE	0.40-0.44	3	0.43	0.02
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INERTINITE/REWORKED	0.59-0.89	12	0.76	0.08
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NUMBER OF READINGS



SAMPLE 2302-2317H

0.31 0.42 0.43 0.48 0.53 0.54 0.55 0.55 0.56 0.57
0.58 0.58 0.62 0.64 0.68 0.68 0.70 0.71 0.76 0.78
0.79 0.81 0.83 0.84 0.84 0.85 0.85 0.87 0.87 0.89
0.89 0.91 0.93 0.94 0.94 0.98 0.99 0.99

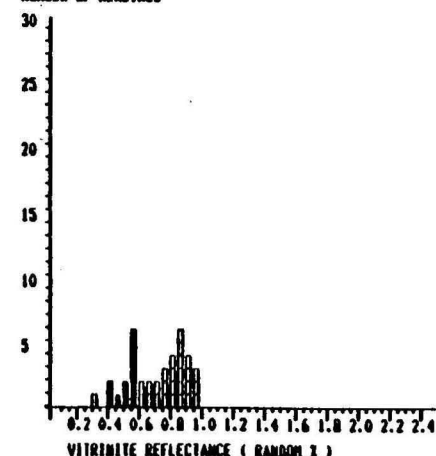
SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
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IN SITU VITRINITE	0.42-0.58	11	0.53	0.06
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LIPTINITE/CAVINGS	0.31-0.31	1	0.31	
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INERTINITE/REWORKED	0.62-0.99	26	0.83	0.11
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NUMBER OF READINGS



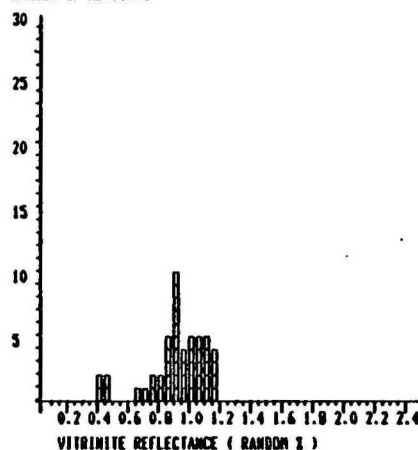
EAST SWAN-1

SAMPLE 2683-2698M

0.40 0.43 0.45 0.47 0.68 0.70 0.76 0.79 0.81 0.84
0.85 0.86 0.88 0.88 0.89 0.90 0.90 0.91 0.92 0.92
0.92 0.93 0.94 0.94 0.94 0.95 0.96 0.98 0.98 1.00
1.00 1.02 1.02 1.02 1.05 1.05 1.06 1.08 1.09 1.10
1.10 1.10 1.13 1.14 1.15 1.15 1.17 1.19

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
LIPTINITE/CAVINGS	0.40-0.47	4	0.44	0.03
INERTINITE/REWORKED	0.68-1.19	44	0.97	0.12

NUMBER OF READINGS

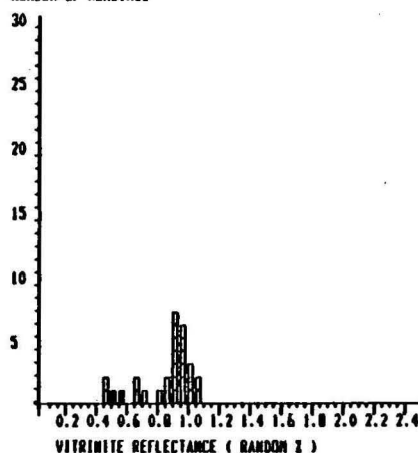


SAMPLE 2838-2854M

0.45 0.46 0.52 0.56 0.66 0.68 0.70 0.81 0.85 0.85
0.91 0.91 0.93 0.93 0.94 0.94 0.94 0.95 0.96 0.97
0.98 0.98 0.98 1.01 1.02 1.03 1.06 1.09

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.52-0.56	2	0.54	0.03
LIPTINITE/CAVINGS	0.45-0.46	2	0.46	0.01
INERTINITE/REWORKED	0.68-1.09	23	0.93	0.10

NUMBER OF READINGS



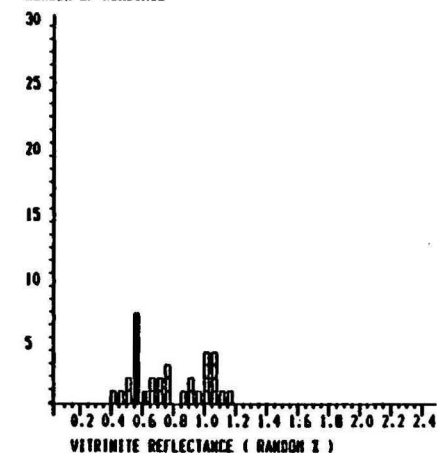
EAST SWAN-1

SAMPLE 2939-2948M

0.43 0.47 0.51 0.52 0.55 0.56 0.56 0.57 0.57 0.59
0.59 0.62 0.63 0.68 0.71 0.74 0.75 0.76 0.79 0.88
0.92 0.94 0.96 1.00 1.00 1.01 1.02 1.05 1.06 1.08
1.09 1.13 1.18

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.55-0.62	8	0.58	0.02
LIPTINITE/CAVINGS	0.43-0.52	4	0.48	0.04
INERTINITE/REWORKED	0.65-1.18	21	0.92	0.16

NUMBER OF READINGS

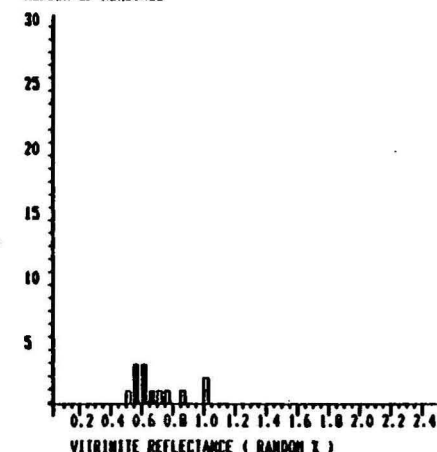


SAMPLE 3018-3034M

0.51 0.56 0.58 0.59 0.60 0.62 0.64 0.67 0.74 0.78
0.89 1.01 1.01

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.56-0.67	7	0.61	0.04
LIPTINITE/CAVINGS	0.51-0.51	1	0.51	
INERTINITE/REWORKED	0.74-1.01	5	0.89	0.13

NUMBER OF READINGS



LEVEQUE-1 WELL

SUMMARY

Vitrinite reflectance and spore colour index analysis of samples from the interval 274m to 869m of the Leveque-1 well shows that the well section is immature to 600m and early mature between 600m and 896m. The maturity gradients show no evidence of any major erosional unconformities within the interval analysed but extrapolation of the gradients to seabed suggests that around 450m of Late Cretaceous and younger section is missing above 274m. The sediments analysed are not presently at their maximum depths of burial which was about 300m greater than present day burial depths. Maximum burial of the well section was sometime during the Late Cretaceous to Recent.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 15° 45' 11.9"S, 122° 00' 17.7"E.

Operator and date of drilling: Bocal, 1970.

Well Status: Plugged and abandoned.

TD: 899m.

Mud data: Seawater with gel slugs: Seabed to 485m.
Seawater/Q mix/Dextrid low solids, low ph system: 485m to 899m TD.

Casing data: 30" at 92m, 20" at 120m, 13³/₈" at 456m.

BHT data: 36°C at 473m, after 2 hours stopped circulation.
45°C at 888m, after 2 hours stopped circulation.

Elevation: RT 9.5m ASL.

Water depth: 77.5m.

Interval analysed: 274m to 869m.

Age of interval analysed:

Miocene-Pliocene
Late Cretaceous

Depths (in metres)

274-334
334-415

LEVEQUE-1 WELL

	<u>Depths (in metres)</u>
Early-Late Cretaceous	415-814
Late Jurassic	814-869

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite reflectance: The samples analysed yielded sufficient quantities of vitrinite for measurements. Results: Fair.
- b) Spore Colour Index. The samples analysed yielded only small amounts of sporomorphs. Results: Fair.

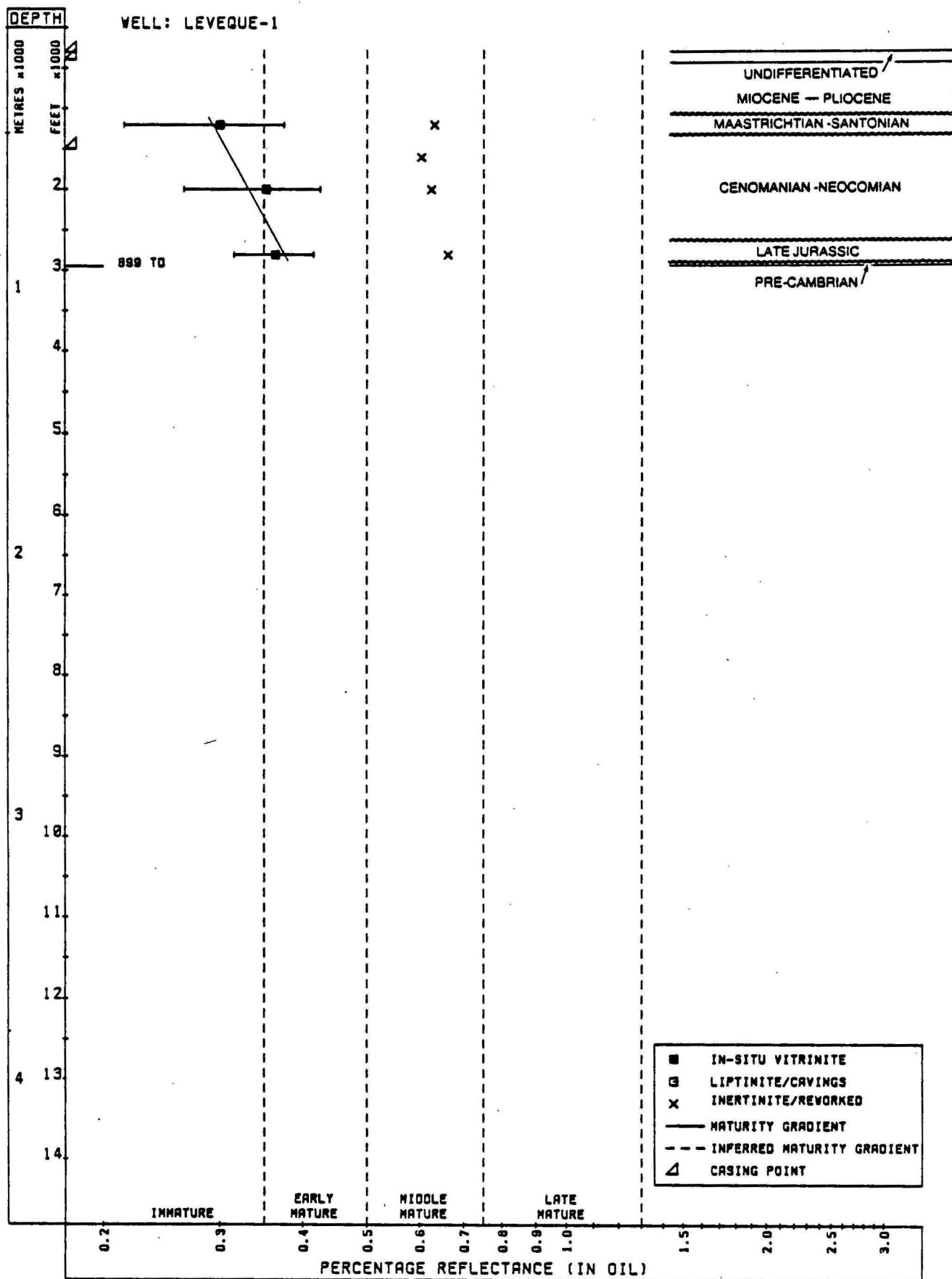
Source rock data quality: No analyses performed.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values increase from around 2 to 2.5 SCI units at 274m to around 4 SCI units at 869m. Vitrinite reflectance readings increase from 0.3% to 0.37% over the same interval. The results show that the well section is immature to around 600m and early mature between 600m and 896m where Pre Cambrian rocks were encountered. The maturity gradients show no evidence of any major erosional unconformities within the interval analysed. Extrapolation of the maturity gradients to seabed shows that around 450m of Late Cretaceous to Recent section is missing above 274m. The maximum depth of burial of the sediments analysed was approximately 300m greater than present day burial depths and was reached sometime during the Late Cretaceous to Recent.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
137		Miocene-Pliocene									
274-290	Ctg	LST, off wht	4.5-5.5rew	*							
334		Santonian- Maastrichtian									
366-381	"	LST, wht-lt gy	2.5-3.0	0.30(3)							
415		Neocomian-Cenomanian									
488-503	"	MDST, med dk gy	3.0-3.5	0.60(3)rew							
610-625	"	MDST, med gy	3.5	0.35(10)							
814		Late Jurassic									
854-869	"	MDST, gy-org	4.0	0.36(12)							

Table 1 Maturity and Kerogen Composition Data

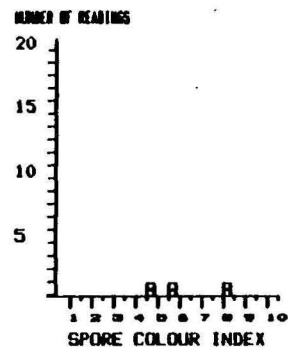


LEVEQUE-1

IN SITU POPULATION

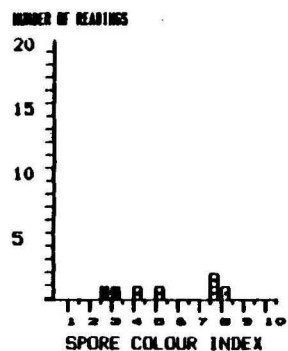
SAMPLE 274-290M
4.5 5.5 8.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	4.5-8.0	3



SAMPLE 366-381M
2.5 3.0 4.0 5.0 7.5 7.5 8.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.5-3.0	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	4.0-8.0	5

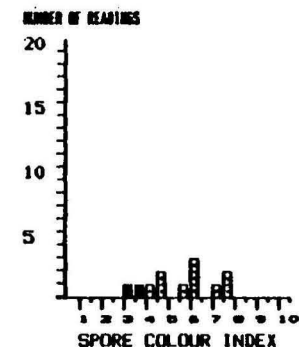


LEVEQUE-1

IN SITU POPULATION

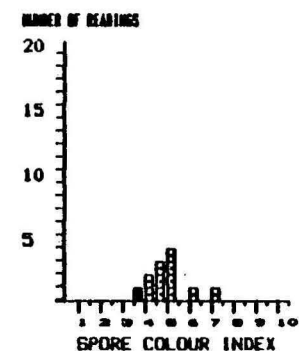
SAMPLE 488-503M
3.0 3.5 4.0 4.5 4.5 5.5 6.0 6.0 6.0 7.0
7.5 7.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.5	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	4.0-7.5	10



SAMPLE 610-625M
3.5 4.0 4.0 4.5 4.5 4.5 5.0 5.0 5.0 5.0
6.0 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.5-3.5	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	4.0-7.0	11



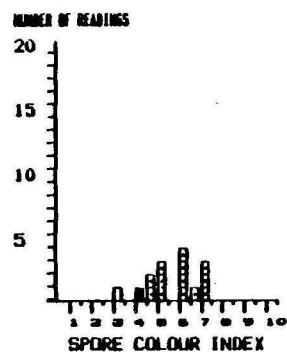
LEVEQUE-1

■ IN SITU POPULATION

SAMPLE 854-869M

3.0 4.0 4.5 4.5 5.0 5.0 5.0 6.0 6.0 6.0
6.0 6.5 7.0 7.0 7.0

<u>SELECTED CLASS</u>	<u>RANGE</u>	<u>COUNT</u>
IN SITU SPORES	4.0-4.0	1
BLEACHED/CAVINGS	3.0-3.0	1
STAINED/REWORKED	4.5-7.0	13



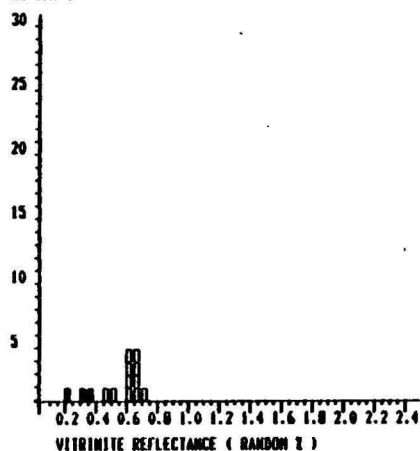
LEVEQUE-1

SAMPLE 366-381H

0.22 0.31 0.37 0.48 0.52 0.62 0.63 0.64 0.64 0.65
0.66 0.68 0.68 0.74

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.22-0.37	3	0.30	0.08
INERTINITE/REWORKED	0.48-0.74	11	0.63	0.07

NUMBER OF READINGS

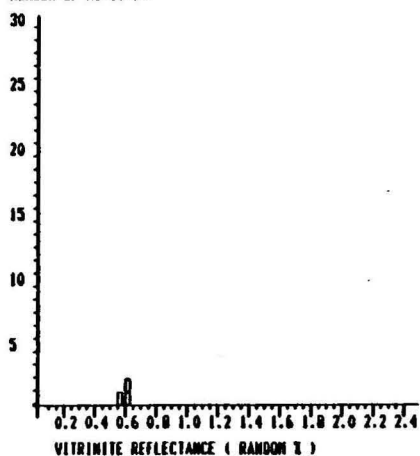


SAMPLE 488-503H

0.57 0.62 0.62

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
INERTINITE/REWORKED	0.57-0.62	3	0.60	0.03

NUMBER OF READINGS



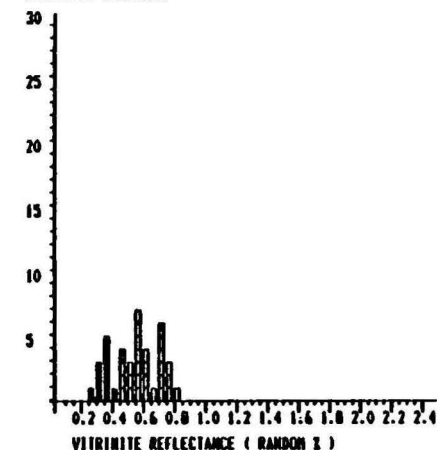
LEVEQUE-1

SAMPLE 610-625H

0.27 0.31 0.32 0.32 0.36 0.37 0.37 0.39 0.39 0.42
0.45 0.47 0.48 0.49 0.52 0.52 0.54 0.56 0.57 0.57
0.57 0.59 0.59 0.59 0.60 0.60 0.61 0.63 0.65 0.72
0.72 0.73 0.73 0.73 0.73 0.77 0.77 0.78 0.83

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.27-0.42	10	0.35	0.05
INERTINITE/REWORKED	0.45-0.83	29	0.62	0.11

NUMBER OF READINGS

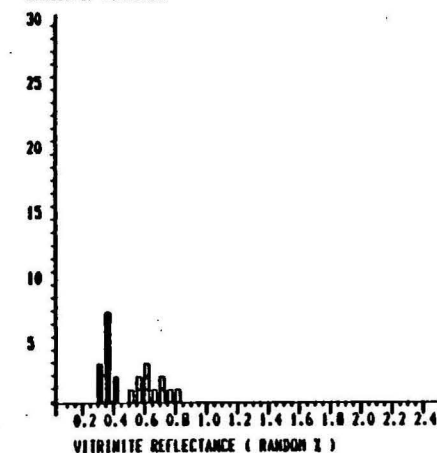


SAMPLE 854-869H

0.32 0.33 0.33 0.35 0.35 0.36 0.36 0.37 0.39 0.39
0.40 0.41 0.50 0.56 0.58 0.62 0.63 0.64 0.66 0.73
0.74 0.79 0.83

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.32-0.41	12	0.36	0.03
INERTINITE/REWORKED	0.50-0.83	11	0.66	0.10

NUMBER OF READINGS



LOMBARDINA-1 WELL

SUMMARY

Geochemical analysis of samples from the interval 965m to 2855m TD of the Lombardina-1 well has shown that the well section is immature to 2100m, early mature between 2100m and 2500m, middle mature between 2500m and 2750m and late mature between 2750m and 2800m. The well section is post mature below 2800m.

The maturity gradients indicate that a sill like igneous body around 50m to 100m thick is present close to the base of the well section.

Extrapolation of the maturity gradients to the surface indicates that the sediments penetrated are currently at or near their maximum depths of burial and that a cumulative total of around 900m of Cretaceous and younger section is missing above 1500m.

Early Cretaceous mudstones in the interval 2085m to 2205m have fair to good oil source potential at optimum maturity. The well section is extensively stained by a mature oil derived from a source rich in terrestrially derived waxy kerogen.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 15° 17' 20.2"S, 121° 32' 14.3"E.

Operator and date of drilling: Bocal, 1974.

Well Status: Plugged and abandoned.

TD: 2855m.

Mud Data: Seawater with high viscosity plugs: Seabed to 530m.
Seawater gel system with CMC and Qmix: 530m to 1960m.
Controlled salinity Dexrid/Drispac mud system: 1960m to 2855m TD.

Casing data: 30" at 228m, 20" at 519m, 13³/₈" at 1494m, 9⁵/₈" at 1938m.

BHT data: None available.

Elevation: RT 30m ASL.

LOMBARDINA-1 WELL

Water depth: 175m

Interval analysed: 965m to 2855m TD.

Age of interval analysed:

	<u>Depths (in metres)</u>
Palaeocene	965- 976
Late Cretaceous	976-1276
Early Cretaceous	1276-2308
Late Jurassic-Early Cretaceous	2308-2432
Middle-Late Jurassic	2432-2572
Early-Middle Jurassic	2572-2701
Early Jurassic	2701-2855 TD

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed yielded sufficient vitrinite for measurements but contained abundant reworked kerogen. Results: Poor.
- b) Spore Colour Index: The samples analysed yielded sufficient sporomorphs for measurements but contained abundant reworked material. Results: Fair.

Source rock data quality: Generally good, but possibly affected by oil staining.

Gas chromatography run at: 1470m to 1485m, 1845m to 1855m, 2085m to 2095m, 2325m to 2335m, 2425m to 2435m and 2845m to 2855m TD.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values are interpreted as rising steadily from values of around 2.5 units at 965m to about 4 units at 2400m. Below this depth, the interpreted gradient shows a non-linear increase, rising rapidly to values in excess of 8 units at 2800m. The vitrinite reflectance gradient shows similar profile values which rise steadily to around 2400m and then continue in a non-linear manner to 2855m TD. These results indicate the presence of a sill-like igneous intrusion near to the base of the

LOMBARDINA-1 WELL

well section. The gradient suggests that this body may be around 50m to 100m thick.

Extrapolation of the maturity gradients to surface suggests that the sediments penetrated in the well section are presently at or near their maximum depths of burial. The reflectance gradient suggests that a cumulative total of around 900m of Cretaceous and younger section is missing at unconformities above 1500m.

The results show that the well section is immature to 2100m, early mature between 2100m and 2500m, middle mature between 2500m and 2750m and late mature between 2750m and 2800m. Below 2800m the section is post mature.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

Dark yellow brown mudstones in the interval 2085m to 2205m (Early Cretaceous) contain slightly above average organic carbon contents of between 1.87% and 2.85% and have relatively high hydrogen indices of between 194 and 207 showing that they contain between 15% to 20% waxy sapropel.

These samples may have fair to good oil source potential at optimum maturity.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

The remaining mudstones contain below average to average organic carbon contents of between 0.2% and 2.40% and contain mostly humic kerogen. These samples have no oil or gas source potential.

Extraction of samples at 1470m to 1485m, 1845m to 1855m, 2085m to 2095m, 2325m to 2335m, 2425m to 2435m and 2845m to 2855m TD shows that these samples contain small quantities of migrant oil stain. This oil staining has been derived from a mature source rich in terrestrially derived waxy sapropel. The large napthenic hump present in the gas chromatograms is thought to be due to the presence of a significant quantity of napthenic components in the oil and not to biodegradation.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
927		Palaeocene									
976		Turonian-Maastrichtian									
965-980	Ctg	MDST, lt ol gy	2.5	0.74(1)rew	70	30	mnr				
1260-1275	"	MDST, a/a + 20% LST, wht-yel gy, v arg	2.5-3.0	0.55(2)rew	90	10	mnr				
	P	MDST, a/a									
	P	After extraction						45	50	*	5
1276		Late Neocomian-Albian									
1405-1420	Ctg	MDST, lt ol gy-ol gy	3.0	0.64(3)rew	65	35	mnr				
1535-1545	"	MDST, med gy	3.0	0.47(6)	65	20	15				
1725-1735	"	MDST, med gy	3.0	0.50(3)	55	45	*				
	"	After extraction						50	50	*	*
1845-1855	"	MDST, lt ol gy-ol gy	3.0-3.5	0.47(2)	55	40	5				
	"	After extraction						35	65	*	*
1905-1915	"	MDST, a/a									
	"	After extraction						50	50	*	*
1960-1970	"	MDST, dk gy	3.5	0.72(2)rew	50	50	*				
	"	After extraction						40	55	*	5
2025-2035	"	MDST, med dk gy									
	"	After extraction						45	55	*	*
2085-2095	"	MDST, dk yel brn	3.5	0.71(3)rew	50	50	*				
	"	After extraction						50	35	*	15
2145-2155	"	MDST, a/a									
	"	After extraction						40	40	*	20
2205-2215	"	MDST, med-dk gy	5.0-8.0rew	1.17(24)rew	45	55	*				
	"	After extraction						40	60	*	*
2308		Tithonian-Berriasian									
2325-2335	"	MDST, a/a	7.5-8.0rew	1.22(20)rew	40	60	*				
	"	After extraction						25	70	*	5
2385-2395	"	MDST, a/a									
	"	After extraction						50	45	*	5
2432		Bathonian-Oxfordian									
2425-2435	"	MDST, a/a	4.5-5.0	1.28(47)rew	60	30	10				
	"	After extraction						35	60	*	5

Table 1a Maturity and Kerogen Composition Data

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
2572		Middle Jurassic (Volcanics)									
2701		Early Jurassic									
2730-2740	Ctg	SND + SST, wht-lt gy + 40% SLTST, lt gy + 10% MDST, med gy	8.0-9.0	0.78(9)	65	30	5				
2810-2820	"	MDST, lt-med gy + 40% SLTST, lt rd + 10% SND	8.0-9.0	1.20(6)	75	25	*				

Table 1b Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
														SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
976		Turonian-Maastrichtian														
965-980	Ctg	MDST, lt ol gy, v calc	0.21													
	"	After extraction	0.20													
1260-1275	"	MDST, lt ol gy + 20% LST, wht-yel, gy-v arg	-													
	P	MDST, a/a	-													
	"	After extraction	1.16	429	159	126	0.04	1.92								
1276		Late Neocomian-Albian														
1275-1290	Ctg	MDST, lt med gy + 10% LST, wht	-													
	P	MDST, a/a	-													
	"	After extraction	0.80													
1340-1355	Ctg	MDST, ol gy, calc + mn LST	-													
	"	After extraction	0.66													
1405-1420	"	MDST, lt ol gy-ol gy, calc	-													
	"	After extraction	0.73													
1470-1485	"	MDST, lt ol gy, calc	1.09	NDP	217	130	0.35	3.65	2410	221	2015	185	76	8	16	
	"	After extraction	0.60													
1535-1545	"	MDST, med gy	-													
	"	After extraction	0.60													
1590-1600	"	MDST, med-lt gy	-													
	"	After extraction	0.87													
1725-1735	"	MDST, med gy	-													
	"	After extraction	1.57	425	57	65	0.07	0.97								
1785-1795	"	MDST, a/a	-													
	"	After extraction	0.72													
1845-1855	"	MDST, lt ol gy-ol-gy	2.09	432	237	77	0.23	6.44	2370	113	1850	89	71	7	22	
	"	After extraction	1.71	434	117	115	0.07	2.16								
1905-1915	"	MDST, a/a	-													
	"	After extraction	2.32	434	105	111	0.10	2.72								
1960-1970	"	MDST, dk gy	-													
	"	After extraction	1.46	438	133	205	0.06	2.07								
2025-2035	"	MDST, med dk gy	-													
	"	After extraction	2.40	435	118	78	0.06	3.01								
2085-2095	"	MDST, dk yel brn	2.83	431	192	75	0.21	6.87	3120	110	2060	73	54	12	34	
	"	After extraction	2.85	434	194	77	0.08	4.29								

Table 2a Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg g T O C)	HYDROCARBONS (ppm)	HYDROCARBONS (mg g T O C)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
2145-2155	Ctg	MDST, dk yel brn	-												
	"	After extraction	1.87	435	207	146	0.04	4.02							
2205-2215	Ctg	MDST, med dk gy	-												
	"	After extraction	2.64	438	90	109	0.05	2.50							
2265-2275	"	MDST, a/a	2.47	434	113	83	0.31	4.03							
	"	After extraction	2.65	437	96	98	0.07	2.79							
2308		Tithonian-Berriasian													
2325-2335	"	MDST, med-dk gy	2.42						2400	99	1475	61	51	10	39
	"	After extraction	1.87	439	136	42	0.05	2.66							
2385-2395	"	MDST, med-dk gy	-												
	"	After extraction	2.36	441	108	26	0.06	2.72							
2432		Bathonian-Oxfordian													
2425-2435	"	MDST, a/a	2.00						2365	118	1870	94	72	7	21
	"	After extraction	1.43	440	143	34	0.05	2.55							
2572		Middle Jurassic (Volcanic)													
2701		Early Jurassic													
2730-2740	"	SND + SST, wht-lt gy + 40% SLTST, lt gy + 10% MDST, med gy	-												
	P	MDST, med gy	-												
	"	After extraction	1.64												
2760-2770	Ctg	MDST, med gy + 20% LST, wht-v lt gy	-												
	P	MDST, med gy	-												
	"	After extraction	0.77												
2810-2820	Ctg	MDST, lt-med gy + 40% SLTST, lt rd + 10% SND	-												
	P	MDST, a/a	-												
	"	After extraction	1.33	440	72	58	0.07	1.03							
2845-2855	Ctg	SND + SST, wht-v lt gy + 10% MDST, med gy + tr MDST, blk	-												
	P	MDST, med gy	-												
	"	After extraction	0.22												
	"	MDST, blk	1.81						1030	57	630	35	50	11	39
	"	After extraction	1.08	441	138	57	0.04	1.55							

Table 2b Chemical Analysis Data

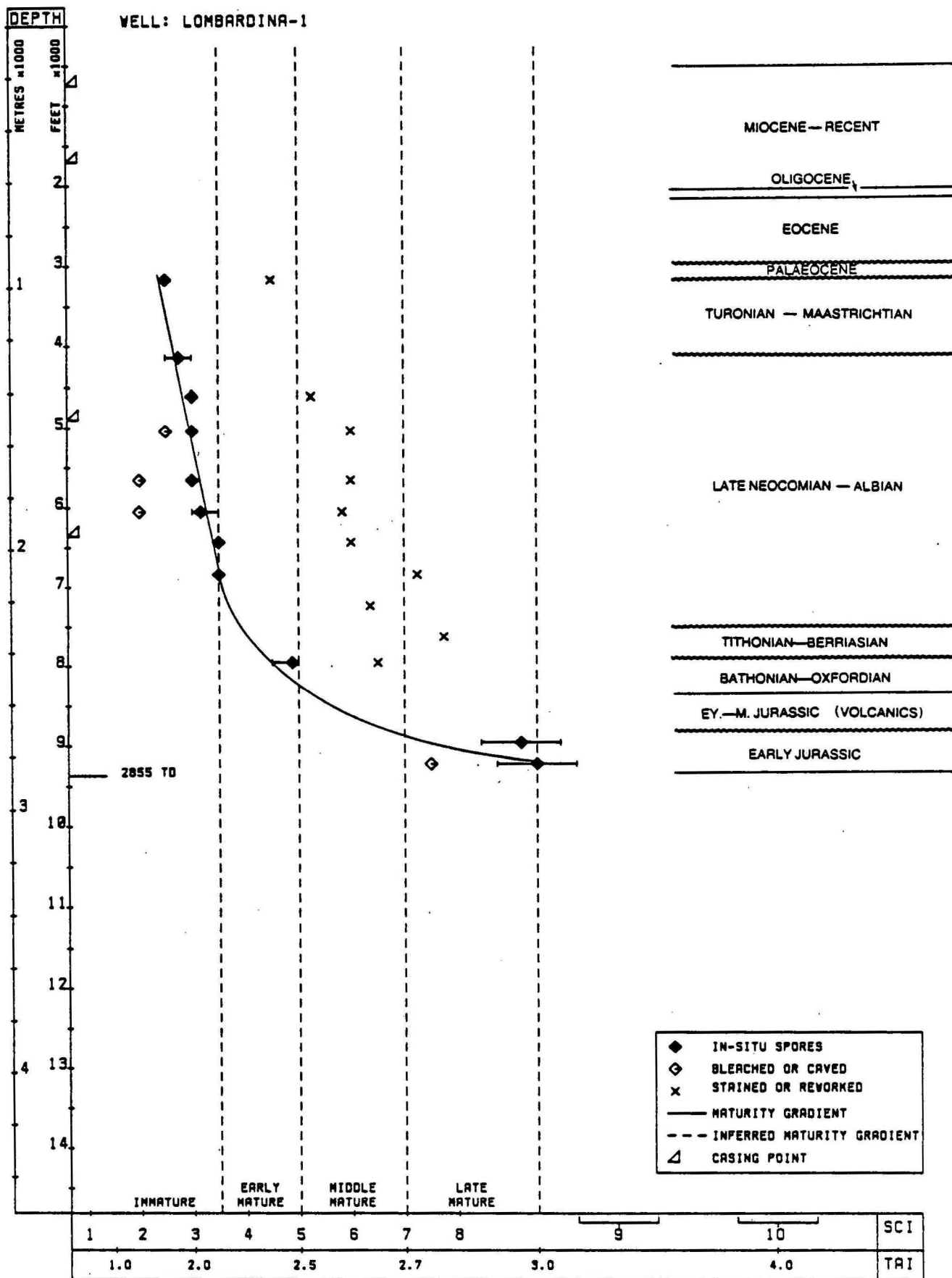


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

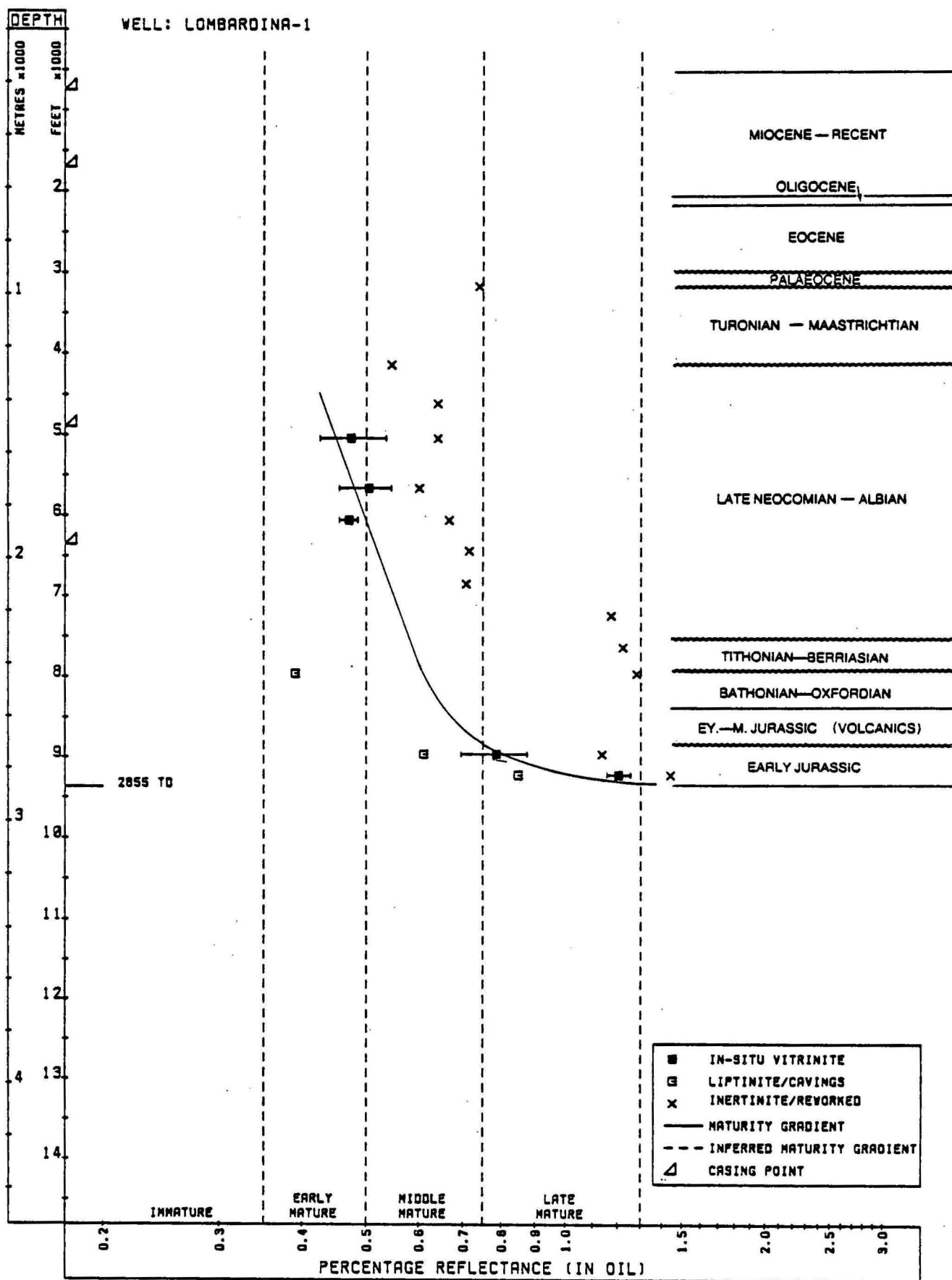
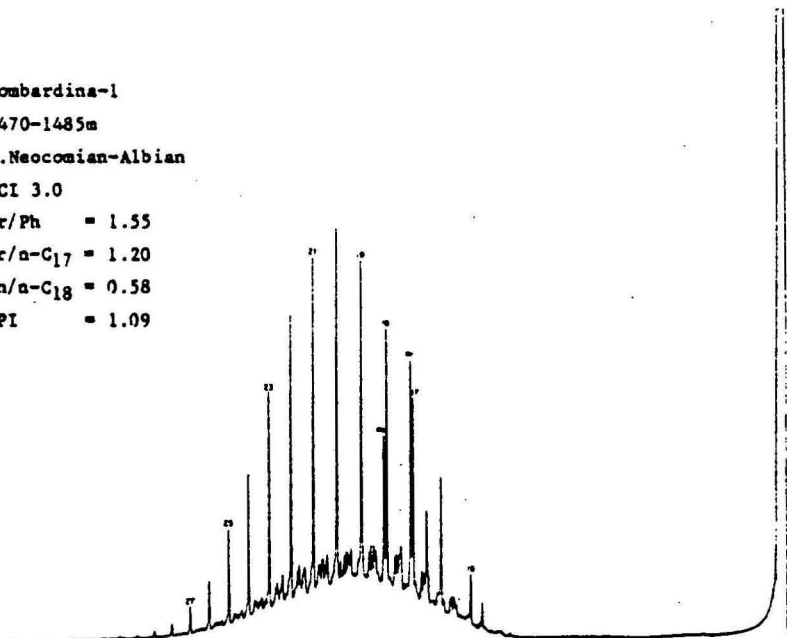
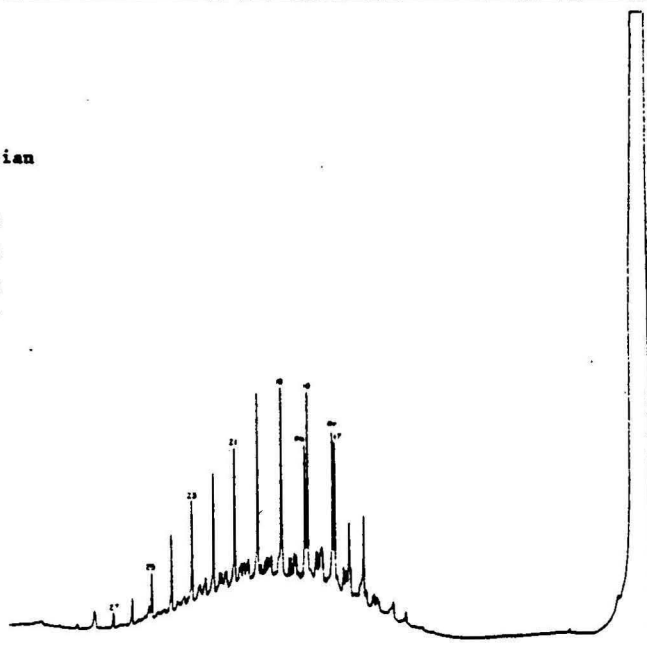


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Lombardina-1
 1470-1485m
 L. Neocomian-Albian
 SCI 3.0
 Pr/Ph = 1.55
 Pr/n-C₁₇ = 1.20
 Ph/n-C₁₈ = 0.58
 CPI = 1.09



Lombardina-1
 1845-1855m
 L. Neocomian-Albian
 SCI 3.0-3.25
 Pr/Ph = 1.10
 Pr/n-C₁₇ = 1.08
 Ph/n-C₁₈ = 0.72
 CPI = 0.97



Lombardina-1
 2085-2095m
 L. Neocomian-Albian
 SCI 3.5
 Pr/Ph = 1.62
 Pr/n-C₁₇ = 0.70
 Ph/n-C₁₈ = 0.46
 CPI = 1.21

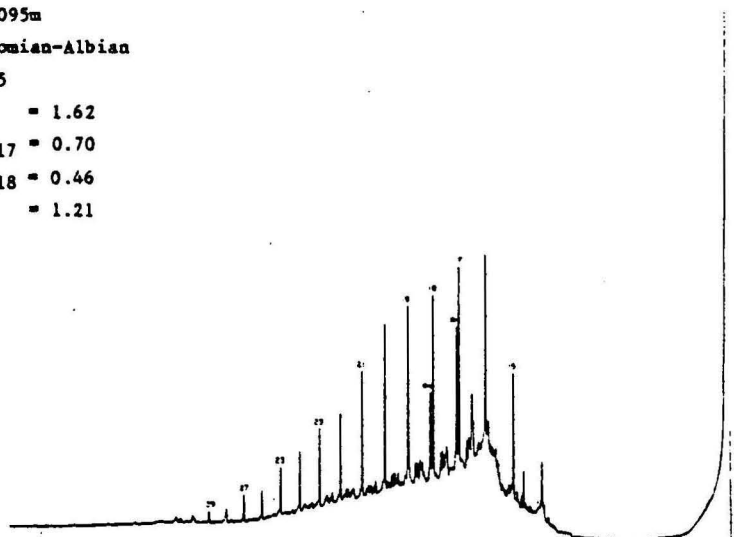
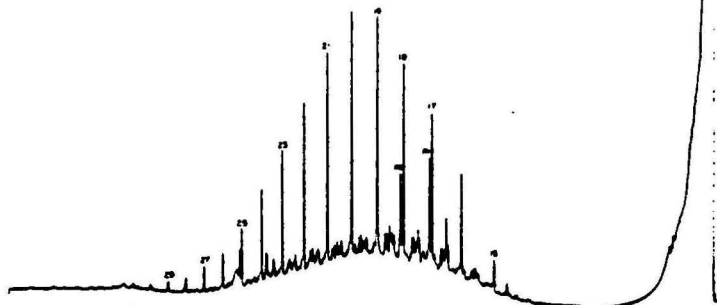
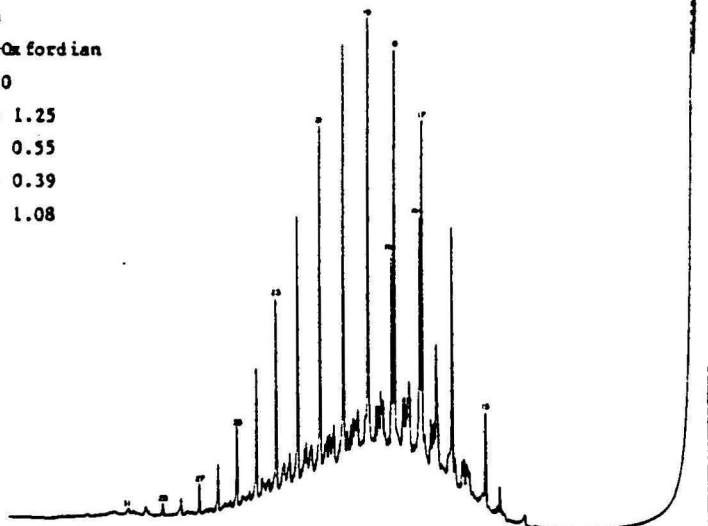


Figure 3a

Lombardina-1
 2325-2335m
 Tichonian-Berriasian
 SCI 4.0
 Pr/Ph = 1.26
 Pr/n-C₁₇ = 0.70
 Ph/n-C₁₈ = 0.43
 CPI = 1.05



Lombardina-1
 2425-2435m
 Bathonian-Oxfordian
 SCI 4.5-5.0
 Pr/Ph = 1.25
 Pr/n-C₁₇ = 0.55
 Ph/n-C₁₈ = 0.39
 CPI = 1.08



Lombardina-1
 2845-2855m (P)
 Early Jurassic
 SCI 9.0
 Pr/Ph = 1.04
 Pr/n-C₁₇ = 0.88
 Ph/n-C₁₈ = 0.51
 CPI = 1.14

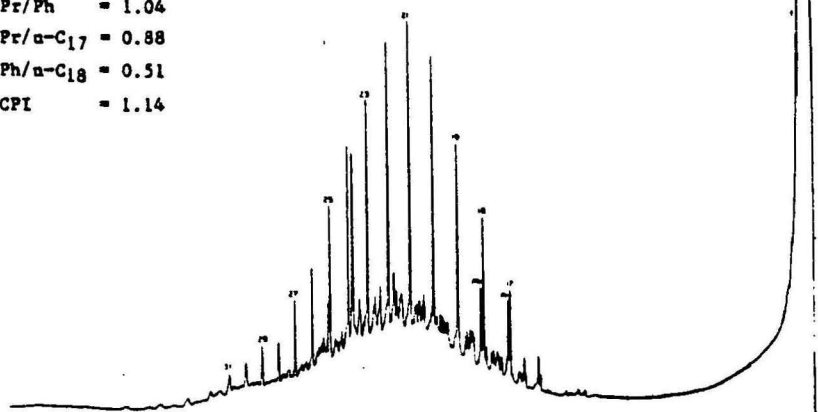


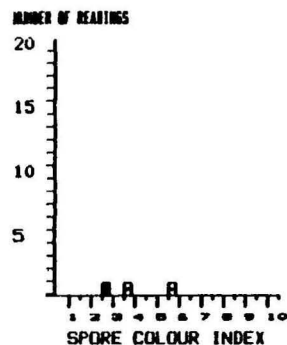
Figure 3b

LOMBARDINA-1

IN SITU POPULATION

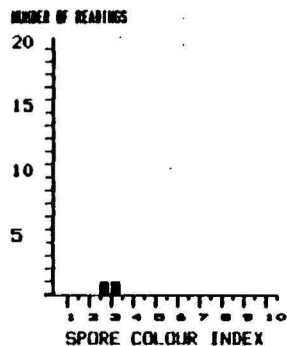
SAMPLE 965-980M
2.5 3.5 5.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	2.5-2.5	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	3.5-5.5	2



SAMPLE 1260-1275M
2.5 3.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	2.5-3.0	2
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	-	0

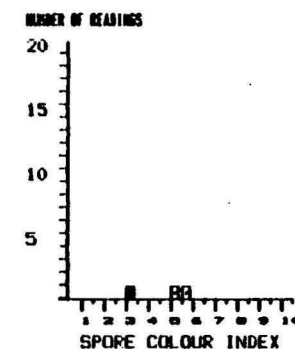


LOMBARDINA-1

IN SITU POPULATION

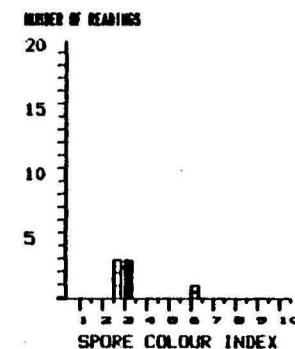
SAMPLE 1405-1420M
3.0 5.0 5.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.0-3.0	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	5.0-5.5	2



SAMPLE 1535-1545M
2.5 2.5 2.5 3.0 3.0 3.0 6.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.0-3.0	3
BLEACHED OR CAVED	2.5-2.5	3
STAINED OR REWORKED	6.0-6.0	1



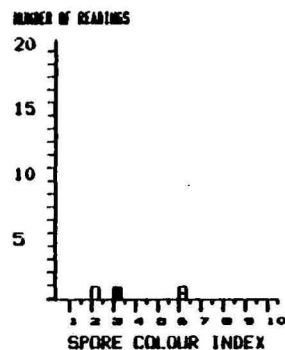
LOMBARDINA-1

IN SITU POPULATION

SAMPLE 1725-1735M

2.0 3.0 6.0

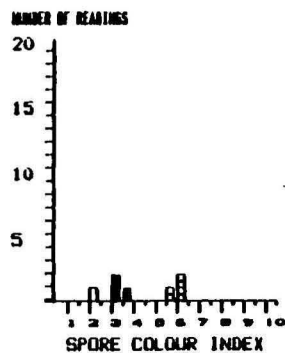
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.0-3.0	1
BLEACHED OR CAVED	2.0-2.0	1
STAINED OR REWORKED	6.0-6.0	1



SAMPLE 1845-1855M

2.0 3.0 3.0 3.5 5.5 6.0 6.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.0-3.5	3
BLEACHED OR CAVED	2.0-2.0	1
STAINED OR REWORKED	5.5-6.0	3



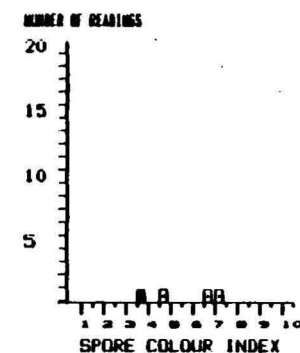
LOMBARDINA-1

IN SITU POPULATION

SAMPLE 1960-1970M

3.5 4.5 6.5 7.0

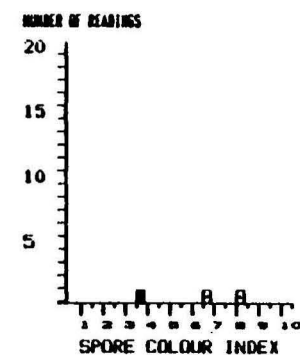
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.5-3.5	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	4.5-7.0	3



SAMPLE 2085-2095M

3.5 6.5 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.5-3.5	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	6.5-8.0	2



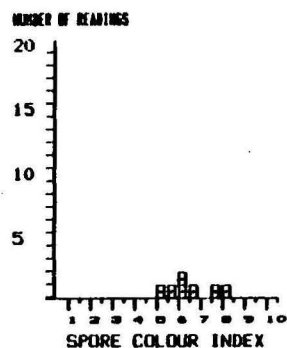
LOMBARDINA-1

IN SITU POPULATION

SAMPLE 2205-2215M

5.0 5.5 6.0 6.0 6.5 7.5 8.0

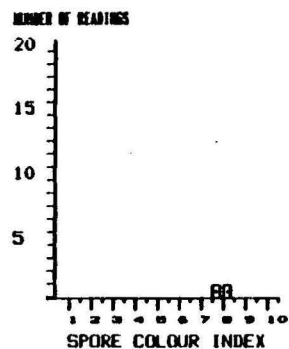
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	5.0-8.0	7



SAMPLE 2325-2335M

7.5 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	7.5-8.0	2



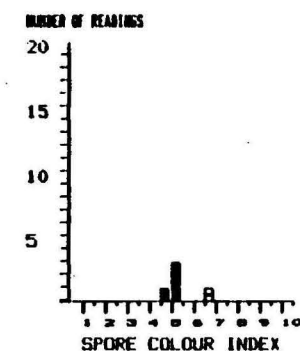
LOMBARDINA-1

IN SITU POPULATION

SAMPLE 2425-2435M

4.5 5.0 5.0 5.0 6.5

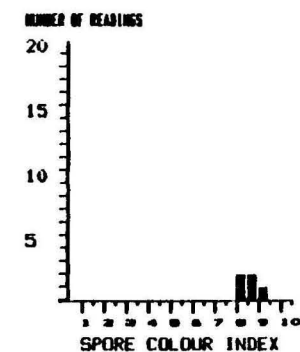
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	4.5-5.0	4
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	6.5-6.5	1



SAMPLE 2730-2740M

8.0 8.0 8.5 8.5 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-9.0	5
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	-	0

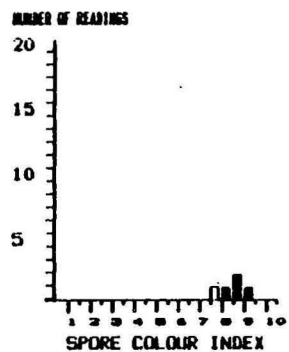


LOMBARDINA-1

IN SITU POPULATION

SAMPLE 2810-2820M
7.5 8.0 8.5 8.5 9.0

<u>SELECTED CLASS</u>	<u>RANGE</u>	<u>COUNT</u>
IN-SITU SPORES	8.0-9.0	4
BLEACHED OR CAVED	7.5-7.5	1
STAINED OR REWORKED	-	0



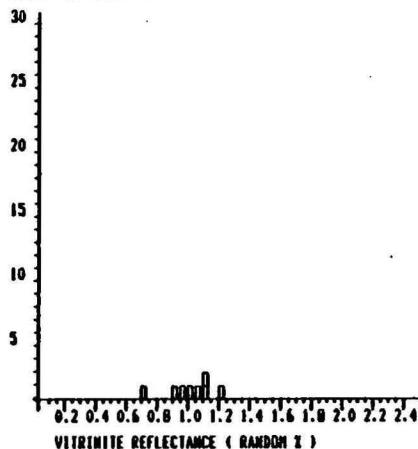
SAMPLE 965-980M

0.74 0.94 0.96 1.03 1.06 1.12 1.14 1.24

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
----------------	-----------	-------	-------	--------

REWORKED	0.74-0.74	1	0.74	
REWORKED	0.94-1.06	4	1.00	0.06

NUMBER OF READINGS



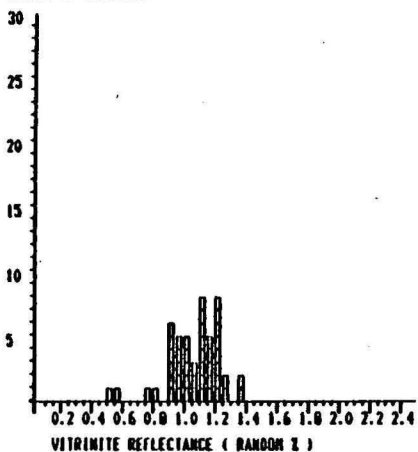
SAMPLE 1260-1275M

0.51 0.58 0.75 0.81 0.90 0.90 0.92 0.94 0.94 0.94
0.95 0.97 0.98 0.99 0.99 1.01 1.01 1.02 1.03 1.04
1.05 1.07 1.07 1.10 1.11 1.12 1.12 1.12 1.13 1.14
1.14 1.15 1.15 1.15 1.17 1.18 1.20 1.20 1.21 1.21
1.21 1.21 1.23 1.24 1.27 1.28 1.35 1.37

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
----------------	-----------	-------	-------	--------

REWORKED	0.51-0.58	2	0.55	0.05
REWORKED	0.75-1.10	22	0.97	0.08

NUMBER OF READINGS



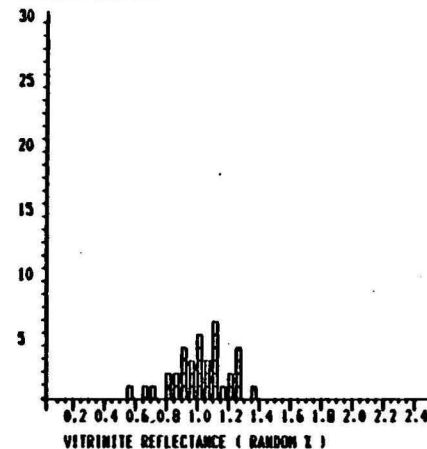
SAMPLE 1405-1420M

0.57 0.65 0.70 0.82 0.83 0.86 0.89 0.92 0.93 0.94
0.94 0.96 0.97 0.99 1.01 1.02 1.02 1.02 1.03 1.05
1.05 1.06 1.10 1.12 1.12 1.14 1.14 1.14 1.18 1.20
1.23 1.27 1.27 1.28 1.29 1.38

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
----------------	-----------	-------	-------	--------

REWORKED	0.57-0.70	3	0.64	0.07
REWORKED	0.82-0.99	11	0.91	0.06

NUMBER OF READINGS



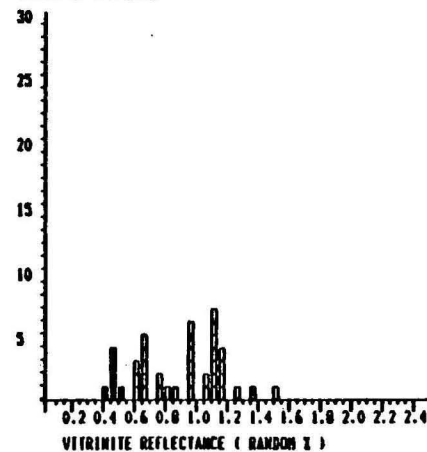
SAMPLE 1535-1545M

0.43 0.46 0.47 0.47 0.48 0.53 0.60 0.61 0.61 0.65
0.66 0.66 0.66 0.67 0.78 0.78 0.83 0.89 0.95 0.95
0.96 0.99 0.99 0.99 1.09 1.09 1.10 1.11 1.11 1.11
1.12 1.13 1.14 1.15 1.17 1.18 1.19 1.28 1.37 1.51

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
----------------	-----------	-------	-------	--------

IN SITU VITRINITE	0.43-0.53	6	0.47	0.03
REWORKED	0.60-0.67	8	0.64	0.03
REWORKED	0.78-0.89	4	0.82	0.05

NUMBER OF READINGS

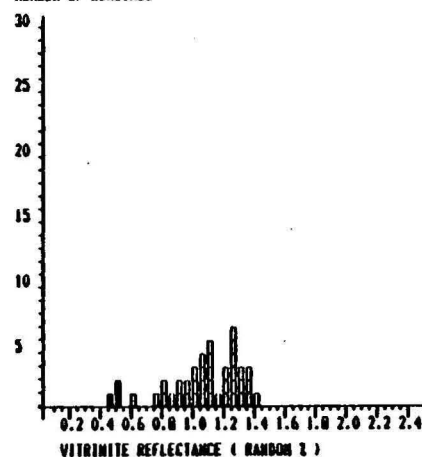


SAMPLE 1725-1735H

0.46 0.51 0.54 0.60 0.70 0.80 0.83 0.88 0.92 0.93
0.99 0.99 1.03 1.04 1.04 1.05 1.07 1.08 1.09 1.10
1.10 1.12 1.12 1.14 1.18 1.22 1.23 1.24 1.25 1.25
1.26 1.26 1.28 1.28 1.32 1.33 1.34 1.35 1.36 1.39
1.40

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRIMITE	0.46-0.54	3	0.50	0.04
REWORKED	0.60-0.60	1	0.60	
REWORKED	0.70-1.18	21	1.01	0.12

NUMBER OF READINGS

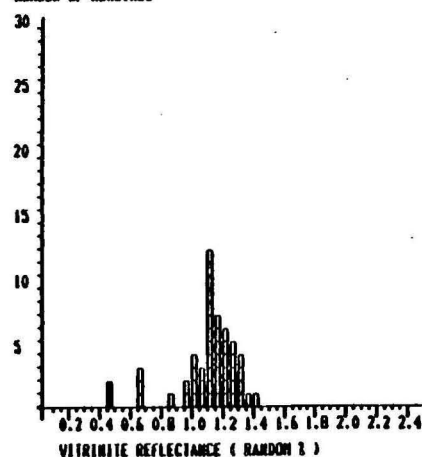


SAMPLE 1845-1855H

0.46 0.48 0.66 0.67 0.67 0.85 0.95 0.96 1.01 1.02
1.03 1.04 1.05 1.05 1.09 1.10 1.10 1.11 1.11 1.11
1.12 1.12 1.12 1.12 1.13 1.14 1.14 1.15 1.15 1.16
1.16 1.17 1.17 1.19 1.20 1.20 1.22 1.24 1.24 1.24
1.25 1.25 1.27 1.27 1.28 1.30 1.30 1.31 1.31 1.35
1.40

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRIMITE	0.46-0.48	2	0.47	0.01
REWORKED	0.66-0.67	3	0.67	0.01
REWORKED	0.95-1.40	45	1.16	0.10

NUMBER OF READINGS

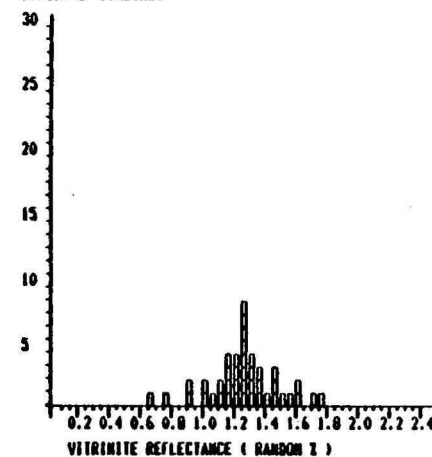


SAMPLE 1960-1970H

0.65 0.78 0.91 0.94 1.02 1.04 1.09 1.12 1.12 1.15
1.15 1.16 1.16 1.21 1.23 1.23 1.24 1.25 1.25 1.26
1.26 1.27 1.27 1.28 1.29 1.30 1.31 1.31 1.34 1.35
1.35 1.39 1.43 1.45 1.45 1.47 1.52 1.57 1.62 1.63
1.71 1.75

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
REWORKED	0.65-0.78	2	0.72	0.09
REWORKED	0.91-1.39	30	1.21	0.12

NUMBER OF READINGS

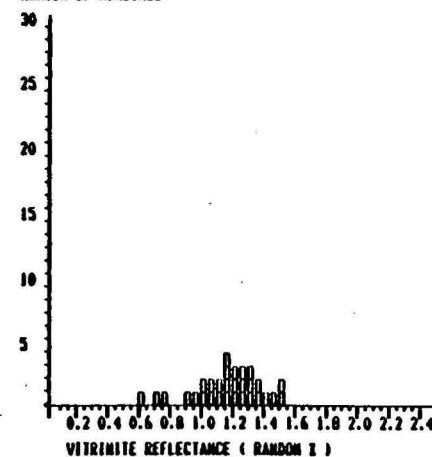


SAMPLE 2085-2095H

0.63 0.72 0.77 0.94 0.99 1.01 1.02 1.08 1.09 1.10
1.13 1.15 1.16 1.19 1.19 1.20 1.23 1.23 1.25 1.27
1.28 1.30 1.30 1.33 1.35 1.37 1.40 1.45 1.53 1.53

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
REWORKED	0.63-0.77	3	0.71	0.07
REWORKED	0.94-1.40	24	1.19	0.13

NUMBER OF READINGS



LOWARDINA-1

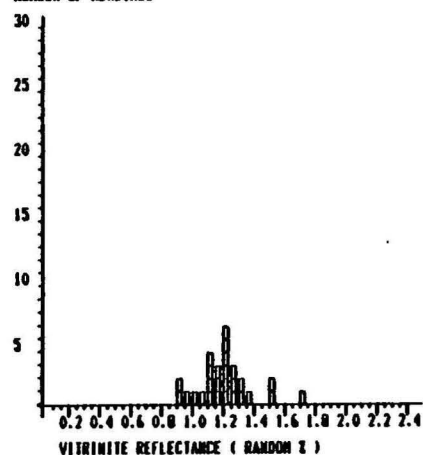
SAMPLE 2205-2215H

0.92 0.93 0.97 1.03 1.07 1.11 1.12 1.12 1.14 1.15
1.16 1.18 1.21 1.21 1.22 1.22 1.24 1.24 1.27 1.29
1.29 1.30 1.34 1.37 1.51 1.53 1.71

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
----------------	-----------	-------	-------	--------

REWORKED	0.92-1.37	24	1.17	0.12
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NUMBER OF READINGS



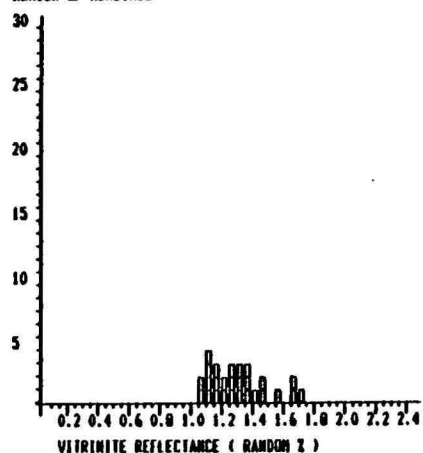
SAMPLE 2375-2395H

1.05 1.08 1.10 1.11 1.11 1.13 1.16 1.17 1.17 1.22
1.24 1.25 1.26 1.28 1.34 1.34 1.34 1.35 1.36 1.36
1.40 1.47 1.48 1.56 1.68 1.69 1.71

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
----------------	-----------	-------	-------	--------

INERTINITE/REWORKED	1.05-1.36	20	1.22	0.11
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NUMBER OF READINGS



LOWARDINA-1

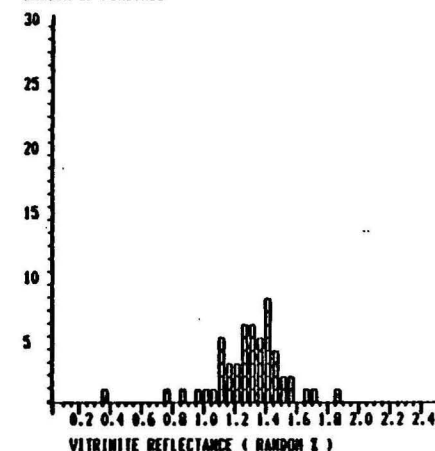
SAMPLE 2425-2435H

0.39 0.77 0.89 0.99 1.03 1.06 1.11 1.12 1.12 1.13
1.14 1.16 1.18 1.19 1.22 1.22 1.24 1.26 1.26 1.26
1.26 1.27 1.28 1.30 1.30 1.32 1.32 1.33 1.33 1.36
1.37 1.37 1.38 1.39 1.40 1.40 1.40 1.41 1.42 1.43
1.44 1.44 1.45 1.46 1.48 1.48 1.50 1.52 1.57 1.59
1.68 1.72 1.87

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
----------------	-----------	-------	-------	--------

LIPITINITE/CAVINGS	0.39-0.39	1	0.39	
REWORKED	0.77-1.52	47	1.28	0.16

NUMBER OF READINGS



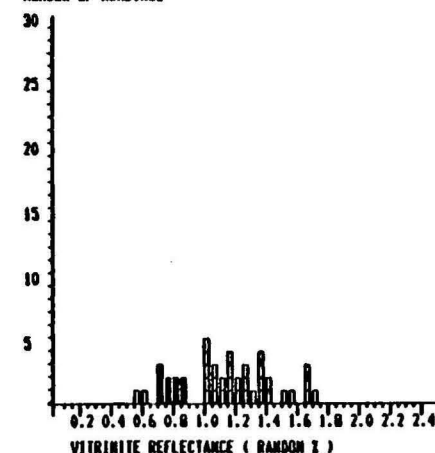
SAMPLE 2730-2740H

0.58 0.64 0.70 0.71 0.71 0.77 0.78 0.83 0.84 0.85
0.87 1.00 1.00 1.00 1.01 1.03 1.05 1.07 1.08 1.10
1.13 1.15 1.15 1.17 1.17 1.22 1.23 1.27 1.28 1.29
1.30 1.35 1.37 1.38 1.38 1.40 1.41 1.53 1.59 1.65
1.66 1.68 1.74

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
----------------	-----------	-------	-------	--------

IN SITU VITRINITE	0.70-0.87	9	0.78	0.07
LIPITINITE/CAVINGS	0.58-0.64	2	0.61	0.04
INERTINITE/REWORKED	1.00-1.30	20	1.14	0.10

NUMBER OF READINGS



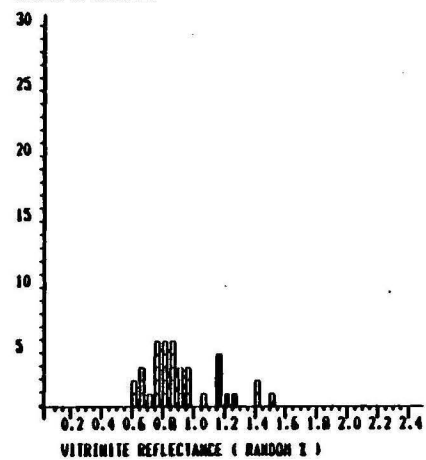
LONBARDINA-1

SAMPLE 2810-2820M

0.62 0.64 0.65 0.65 0.67 0.72 0.75 0.76 0.77 0.77
0.77 0.80 0.80 0.81 0.83 0.84 0.85 0.85 0.87 0.88
0.89 0.90 0.92 0.94 0.96 0.98 0.98 1.09 1.16 1.18
1.19 1.19 1.24 1.25 1.40 1.42 1.50

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	1.16-1.25	6	1.20	0.04
LIPTINITE/CAVINGS	0.72-0.98	22	0.85	0.08
INERTINITE/REWORKED	1.40-1.50	3	1.44	0.05

NUMBER OF READINGS



LYNHER-1 WELL

SUMMARY

Geochemical analysis of samples from the interval 427m to 2698m of the Lynher-1 well has shown that the well section is immature to around 900m, early mature between 900m and 2000m and middle mature below this depth to 2725m TD.

Extrapolation of the gradients to seabed suggests a cumulative total of around 1000m of Late Palaeocene and younger section is missing above 427m. Maximum depths of burial of the sediments analysed were some 600m greater than those of the present day and were reached sometime during the Late Palaeocene to Recent.

Middle Jurassic mudstones in the interval 1457m to 1495m and mudstones and coals in the interval 1543m to 1598m have fair and good oil source potential respectively. The lower interval may already have generated significant quantities of oil. These intervals have only poor gas source potential.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 15° 56' 24"S, 121° 04' 59"E.

Operator and date of drilling: Bocal, 1971.

Well Status: Plugged and abandoned.

TD: 2725m.

Mud data: Seawater with gel slugs: Seabed to 987m.
Seawater/Qmix mud: 987m to 1128m.
Low solids Dextrid mud 1 to 6%: 1128m to 2725m TD.
Diesel added below 1317m.

Casing data: 20" at 282m, 13³/₈" at 1114.5m.

BHT data: 57.5°C at 1125m, stopped circulation time unknown.
90°C at 2199m, stopped circulation time unknown.

Elevation: RT 9.5m ASL.

Water depth: 58m.

Interval analysed: 427m to 2698m.

LYNHER-1 WELL

Age of interval analysed:

	<u>Depths (in metres)</u>
Late Palaeocene	427- 489
Late Cretaceous	489- 731
Early-Late Cretaceous	731-1310
Late Jurassic-Early Cretaceous	1310-1338
Late Jurassic	1338-1455
Middle Jurassic	1455-1722
Early Jurassic	1722-2426
Late Triassic	2426-2639
Permian	2639-2698

Sample type and quality: Dried ditch cuttings and 1 core piece of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed yielded sufficient vitrinite for measurements. Results: Good.
- b) Spore Colour Index: The samples analysed yielded sufficient sporomorphs for measurements. Results: Good.

Source rock data quality: The data from phase II analyses is good. Quality of phase I analyses unknown.

Gas chromatography run at: 1460m to 1470m, 1540m to 1555m, 1570m to 1585m, 1982m to 1997m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from around 3 SCI units at 427m to 5.5 to 6 SCI units at 2607m. Vitrinite reflectance values rise steadily from around 0.4% at 1037m to 0.6% at 2607m. The results show that the well section is immature to around 900m, early mature between 900m and 2000m and middle mature below this depth to 2725m TD.

Extrapolation of the maturity gradients to seabed suggests that a cumulative total of around 1000m of Late Palaeocene and younger section is missing above 427m. The sediments analysed are not

LYNHER-1 WELL

currently at their maximum depths of burial. Maximum depths of burial were around 600m greater than those of the present day and were reached sometime during the Late Palaeocene to Recent.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

The mudstones in the intervals 1457m to 1495m and 1543m to 1598m of the Middle Jurassic section generally contain above average organic carbon contents of between 1.79% and 6.72%. Pyrolysis analysis of these mudstones shows that they contain mostly humic kerogen mixed with between 15 to 35% oil-prone kerogen. In the lower interval thin interbedded coals also contain around 20% of oil-prone kerogen. Analysis of electric logs suggests that 18m of mudstones are present in the interval 1457m to 1495m and 20m of mudstones and 3m of coal are present in the interval 1543m to 1598m. These intervals have fair and good oil source potential respectively. These organically rich sediments are not sufficiently thick to be good potential gas sources and the two intervals combined have only poor gas source potential. The lower interval may have generated significant quantities of oil in reaching its present level of maturity.

Extraction, fractionation and gas chromatography analysis of samples at 1460m to 1470m, 1540m to 1555m and 1570m to 1585m shows that these samples contain relatively large quantities of extractable bitumen, which in the intervals 1540m to 1555m and 1570m to 1585m are mostly heteroatomic compounds. The presence of these is consistent with the relatively low maturity of the samples. The alkane gas chromatograms of these samples show that they contain hydrocarbons derived from a mixture of predominantly early mature terrestrially derived waxy kerogen and lesser amounts of algal kerogen. The sample at 1460m to 1470m contains anomalously large amounts of saturated hydrocarbons and probably contains small quantities of a migrant oil derived from a mature source rich in waxy kerogens.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

The remaining mudstones and siltstones analysed in the intervals 1246m to 1460m, 1509m to 1524m and 1738m to 2698m contain variable amounts of organic carbon, with TOC values of between 0.29% and 0.77% in siltstone lithologies and 1.33% and 5.43% in mudstone lithologies. Pyrolysis analysis of the samples indicates that they contain mostly humic kerogen with at most around 5% of

LYNHER-1 WELL

oil-prone kerogen content. These mudstones and siltstones have no oil source potential and organically rich intervals are insufficiently thickly developed for the more organically rich mudstones to be significant gas sources.

Extraction, fractionation and gas chromatography analysis of the sample at 1982m to 1997m shows that it contains very small quantities of indigenous hydrocarbons derived from predominantly early mature terrestrially sourced waxy kerogens.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
413		Late Palaeocene									
427-442	Ctg	LST, lt ol-gy	3.5-4.5rew	*	70	25	5				
489		Santonian-Maastrichtian									
518-534	"	MDST, lt ol-gy, v calc	3.0	*	70	30	mnr				
731		Neocomian-Turonian									
1037-1052	"	MDST, med lt gy to med-gy	3.5-4.0	0.59(10)rew	60	25	15				
1204-1220	"	MDST, brn-gy + 30% MDST, lt ol gy-ol gy	3.5-4.0	0.39(11)	40	50	10				
1246	Core	SST/SLTST, gn gy, glauc						90	10	*	*
1310		Tithonian-Early Neocomian									
1311-1326	Ctg	MDST, med lt gy-lt ol gy + 50% MDST, med dk gy	4.0	0.42(9)	60	20	20				
	P	MDST, med lt gy-lt ol gy						55	45	*	*
	P	MDST, med dk gy						60	40	*	*
1326-1341	P	MDST, dk gy						70	30	*	*
1338		Oxfordian-Kimmeridgian									
1448-1460	Ctg	MDST, dk gy	4.0-4.5	0.45(13)	50	40	10	60	40	*	*
1455		Calloviaian									
1460-1470	"	MDST, dk gy						60	25	5	10
1463-1479	"	MDST, a/a						70	30	*	*
1509-1524	P	MDST, dk gy-gy blk, v carb						45	50	*	5
	P	MDST, med gy, slty						60	40	*	*
1540-1555	P	MDST, dk gy						50	30	10	10
	P	MDST, med dk gy						70	30	*	*
	P	COAL, blk						45	35	5	15
1555-1570	P	MDST, med gy/dk gy						20	30	20	30
1570-1585	Ctg	SST, wht-lt gy + 30% MDST, med dk gy-dk gy + 30% COAL, blk	4.5	0.49(32)	35	60	5				
	P	MDST, a/a						60	40	*	*
	P	COAL, blk						55	25	5	15
1722		Early Jurassic									
1738-1753	Ctg	SST, wht-pnk gy-lt gy + 80% SLTST, pal brn-pnk gy	2.5-4.0cvd	0.50(11)	40	60	*				

Table 1a Maturity and Kerogen Composition Data

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
1768-1784	P	SLTST, pal brn, sandy						55	45	*	*
	P	MDST, brn gy						55	40	*	5
1829-1845	Ctg	MDST, brn gy, slty						55	40	*	5
1860-1875	P	MDST, brn gy						50	45	*	5
	P	MDST, med-med dk gy						45	50	*	5
1875-1890	P	MDST, med dk gy, slty						80	20	*	*
1890-1905	Ctg	MDST, med dk gy + mnr SND	4.5	0.54(24)	30	55	15	60	40	*	*
1982-1997	P	MDST, med dk gy						45	50	*	5
	P	MDST, med lt gy						55	45	*	*
2180-2195	Ctg	SST, wht-lt gy + 20% MDST, med dk gy	5.0-5.5	0.58(20)	40	40	20				
	P	MDST, a/a						60	40	*	*
2210-2226	P	MDST, med dk gy, slty						55	45	*	*
2241-2256	P	MDST, med gy, slty						50	45	*	5
2287-2302	P	MDST, med dk gy, slty						40	60	*	*
2393-2409	Ctg	MDST, dk gy + 30% MDST, med gy, slty + 40% SST, wht	5.5-6.0	0.58(13)	30	60	10				
	P	MDST, dk gy						55	45	*	*
2426		Late Triassic									
2591-2607	Ctg	SST, wht-pal yel + 40% MDST, med gy	5.5-6.0	0.62(18)	30	55	15				
	P	MDST, a/a						40	60	*	*
2622-2637	P	MDST, med dk gy						50	50	*	*
2639		Permian (undiff)									
2668-2683	P	MDST, med dk gy						55	45	*	*
2683-2698	P	MDST, med dk gy						60	40	*	*

Table 1b Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
413		Late Palaeocene														
427-442	Ctg	LST, lt ol gy	-													
489		Santonian-Maastrichtian														
518-534	"	MDST, lt ol gy, v calc	-													
731		Neocomian-Turonian														
1037-1052	"	MDST, med lt gy to med gy	-													
1204-1220	"	MDST, brn-gy + 30% MDST, lt ol gy ol gy	-													
1246	"	SST/SLTST, gn-gy, glauc	1.39	431	7	32	0.00	0.10								
1310		Tithonian-?Early Neocomian														
1311-1326	"	MDST, med lt gy-lt ol gy + 50% MDST, med-dk gy	-													
	P	MDST, med lt gy-lt ol gy	1.48	430	92	38	0.05	1.43								
	P	MDST, med-dk gy	2.06	428	80	28	0.06	1.76								
1338		Oxfordian-Kimmeridgian														
1326-1341	Ctg	MDST, dk gy + 35% MDST, med-dk gy + 30% MDST, med-gy/ol-gy	-													
	P	MDST, dk gy	2.57	424	62	31	0.00	1.60								
1455		Callovian														
1448-1460	Ctg	MDST, dk gy	5.43	425	128	26	0.11	7.78								
1460-1470	"	MDST, a/a	6.72	429	163	17	0.11	12.28	3280	49	2065	31	53	10	37	
1463-1479	"	MDST, dk gy + 30% MDST, med gy + 5% COAL	-													
	P	MDST, dk gy	2.85	234	74	18	0.00	2.10								
1509-1524	Ctg	MDST, dk gy-gy blk, v carb + 30% MDST, med gy, slty + 10% SST, wht-lt gy	-													
	P	MDST, dk gy-gy blk, v carb	3.36	432	140	27	0.05	4.91								
	P	MDST, med gy, slty	1.61	429	103	58	0.08	1.81								
1540-1555	Ctg	MDST, dk gy + 30% MDST, med-dk gy + 40% SST, wht lt gy, tr COAL, blk	5.13						3010	59	720	14	13	11	76	
	P	MDST, dk gy	4.76	424	179	17	0.03	8.79								
	P	MDST, med-dk gy	1.29	426	73	48	0.08	1.02								
	P	COAL, blk	29.80	431	216	20	0.03	66.50								
1555-1570	Ctg	MDST, med gy/dk gy + 5% COAL	-													
	P	MDST, a/a	1.79	427	408	40	0.00	7.30								
1570-1585	Ctg	SST, wht-lt gy + 30% MDST, med-dk-dk gy + 30% COAL, blk	5.55						2185	39	590	11	15	12	73	

Table 2a Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T O C)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T O C)	EXTRACT COMPOSITION (%)			
														SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
1570-1585	P	MDST, med-dk gy-dk gy	2.52	431	93	35	0.06	2.49								
"	"	COAL, blk	40.73	433	180	18	0.06	78.05								
1722		Early Jurassic														
1738-1753	Ctg	SST, wht-pnk gy-lt gy + 80% SLTST, pal brn-pnk gy	-													
	P	SLTST, pal brn-pnk gy	0.72													
1768-1784	Ctg	SLTST, pal brn, sndy + 20% MDST, brn gy	-													
	P	SLTST, pal brn sndy	1.38	430	101	245	0.09	1.53								
	P	MDST, brn gy	1.85	435	103	87	0.08	2.07								
1829-1845	Ctg	MDST, brn gy, slty	3.02	431	112	64	0.05	3.56								
1860-1875	"	MDST, brn gy + 40% MDST, med-med dk gy	-													
	P	MDST, brn gy	1.39	437	129	137	0.07	1.93								
	P	MDST, med-med dk gy	1.71	438	114	67	0.06	2.07								
1875-1890	Ctg	MDST, med-dk gy, slty + mnr MDST, gy-rd, slty + mnr COAL	-													
	P	MDST, med-dk gy, slty	2.29	430	31	79	0.00	0.70								
1890-1905	Ctg	MDST, med-dk gy + mnr SND	2.01	433	75	56	0.06	1.60								
1982-1997	"	MDST, med-dk gy + 30% MDST, med lt gy, slty + 20% SST, wht-lt brn	2.56						680	27	160	6	15	8	77	
	P	MDST, med-dk gy	2.81	435	125	33	0.06	3.74								
	P	MDST, med lt gy	1.20	433	83	67	0.08	1.09								
2180-2195	Ctg	SST, wht-lt gy + 20% MDST, med-dk gy	-													
	P	MDST, med-dk gy	1.60	434	64	56	0.08	1.12								
2088-2104	Ctg	SST, lt ol-gy + mnr MDST, med-dk gy + tr COAL	-													
2210-2226	"	MDST, med-dk gy, slty + 30% SST, a/a + tr COAL	-													
	P	MDST, a/a	1.57	431	70	45	0.30	1.57								
2241-2256	Ctg	SST + 50% MDST, med gy, slty	-													
	P	MDST, med gy, slty	1.98	434	98	42	0.03	2.02								
2287-2302	Ctg	MDST, med-dk gy, slty + 30% SST, a/a + tr COAL	-													
	P	MDST, a/a	1.91	432	110	52	0.40	3.50								
2393-2409	Ctg	MDST, dk gy + 30% MDST, med gy, slty + 40% SST, wht	-													

Table 2b Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA																
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION										
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)						
2393-2409	P	MDST, dk gy	1.34	431	92	57	0.07	1.32											
	P	MDST, med gy, slty	0.77																
2426		Late Triassic																	
2500-2515	Ctg	SST, lt ol-gy + 15% MDST, med-dk gy, slty + 15% MDST, gy-rd, slty + mnr COAL	1.70																
2591-2607	"	SST, wht-pal yel + 40% MDST, med gy	-																
	P	MDST, med gy	1.46	430	74	29	0.07	1.16											
2622-2637	Ctg	MDST, med-dk gy + 30% SST, wht + tr MDST, rd brn	-																
	P	MDST, med-dk gy	1.33	430	76	41	0.06	1.07											
	P	MDST, rd brn	0.29																
2639		Permian (undiff)																	
2668-2683	Ctg	SST, wht-rd brn + 20% MDST, med-dk gy	-																
	P	MDST, med-dk gy	2.00	431	55	35	0.08	1.20											
2683-2698	Ctg	SST, varicol + 30% MDST, med-dk gy	-																
	P	MDST, a/a	2.72	432	85	11	0.60	5.80											

Table 2c Chemical Analysis Data

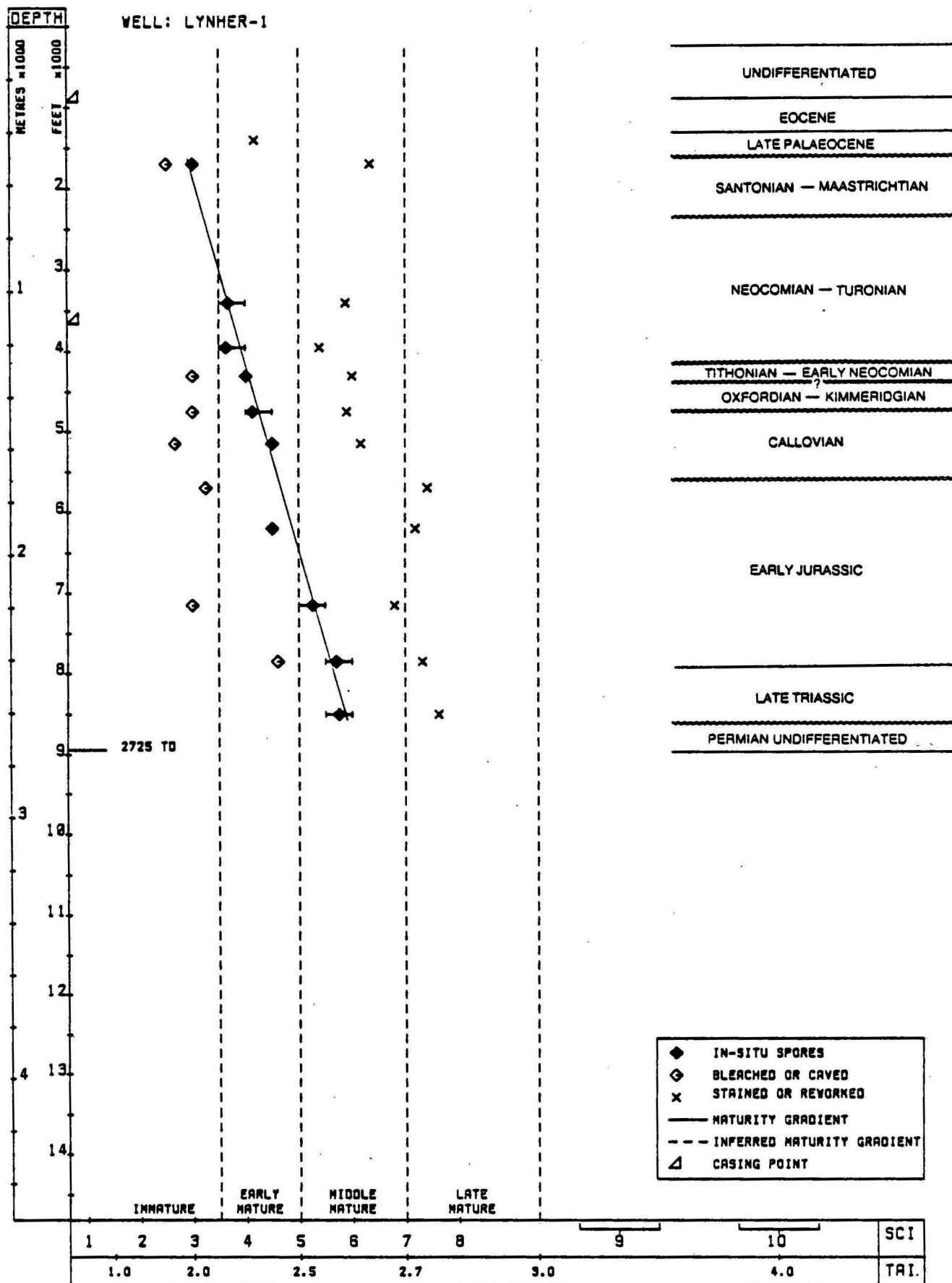


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

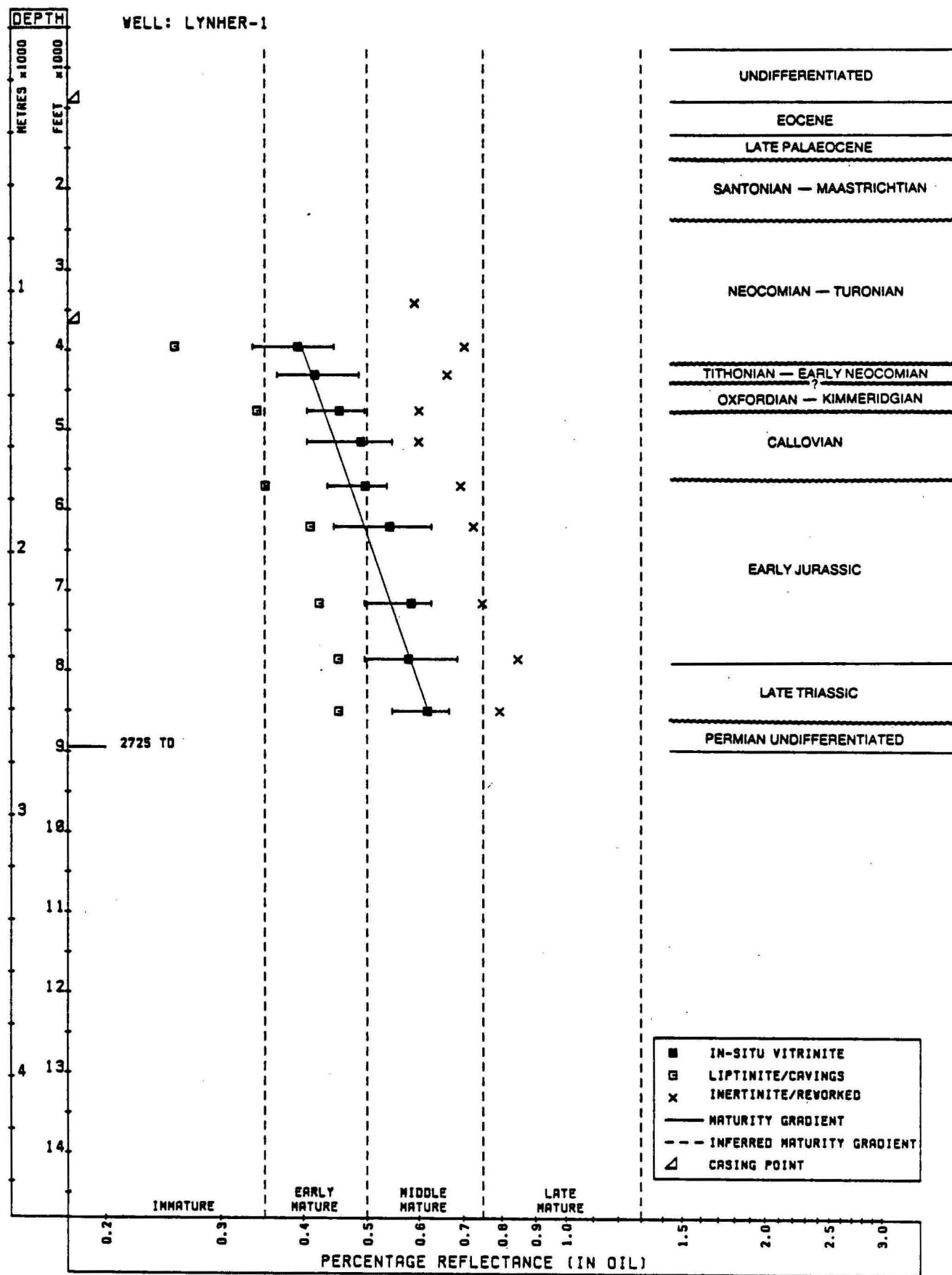
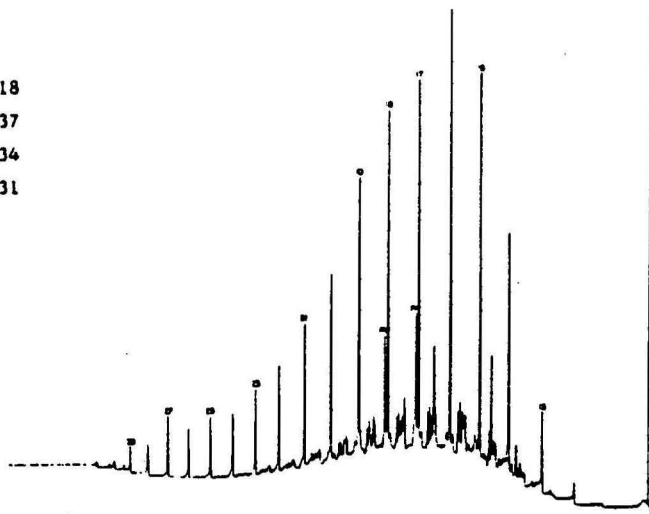
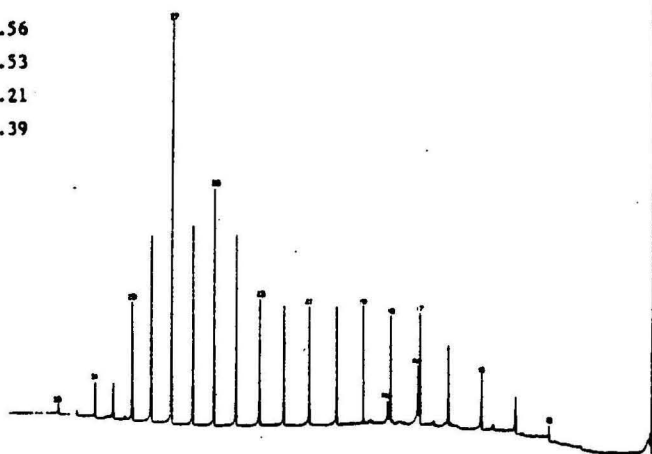


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Lynher-1
1460-1470m
Callovian
SCI 4.25
Pr/Ph = 1.18
Pr/n-C₁₇ = 0.37
Ph/n-C₁₈ = 0.34
CPI = 1.31



Lynher-1
1540-1555m
Callovian
SCI 4.5
Pr/Ph = 2.56
Pr/n-C₁₇ = 0.53
Ph/n-C₁₈ = 0.21
CPI = 1.39



Lynher-1
1570-1585m
Callovian
SCI 4.5
Pr/Ph = 2.26
Pr/n-C₁₇ = 0.57
Ph/n-C₁₈ = 0.27
CPI = 1.29

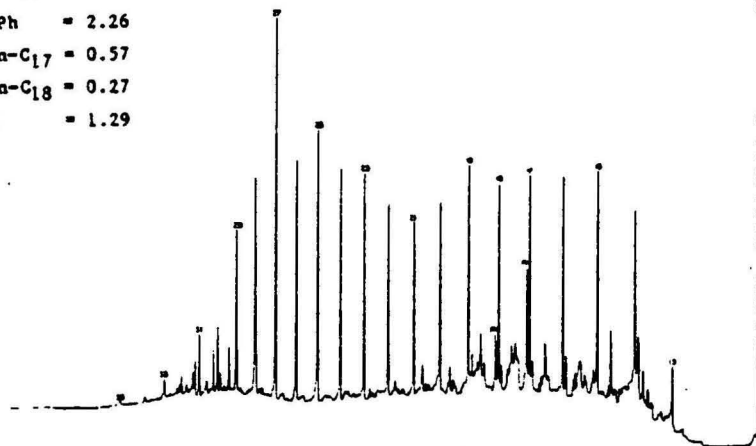


Figure 3a

Lynher-1
1982-1997m
Early Jurassic
SCI 5.0
Pr/Ph = 2.31
Pr/n-C₁₇ = 0.63
Ph/n-C₁₈ = 0.34
CPI = 1.53

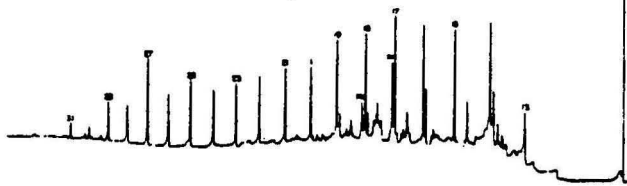


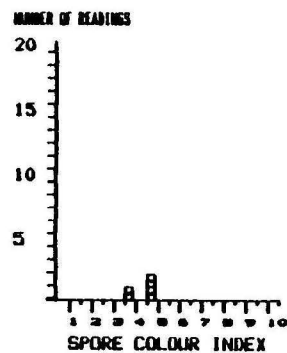
Figure 3b

LYNHER-1

IN SITU POPULATION

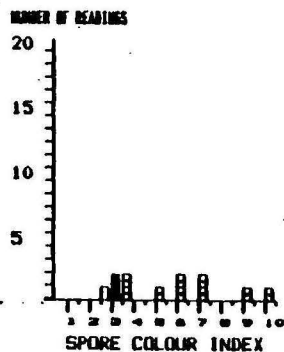
SAMPLE 427-442M
3.5 4.5 4.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	3.5-4.5	3



SAMPLE 518-534M
2.5 3.0 3.0 3.5 3.5 5.0 6.0 6.0 7.0 7.0
9.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	2
BLEACHED/CAVINGS	2.5-2.5	1
STAINED/REWORKED	3.5-10.0	9

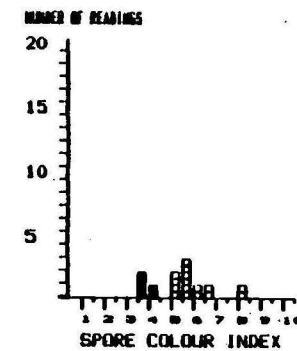


LYNHER-1

IN SITU POPULATION

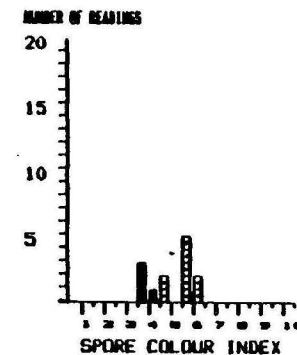
SAMPLE 1037-1052M
3.5 3.5 4.0 5.0 5.0 5.5 5.5 5.5 6.0 6.5
8.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.5-4.0	3
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	5.0-8.0	8



SAMPLE 1204-1220M
3.5 3.5 3.5 4.0 4.5 4.5 5.5 5.5 5.5 5.5
5.5 6.0 6.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.5-4.0	4
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	4.5-6.0	9



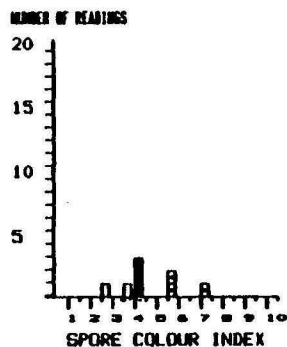
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IN SITU POPULATION

SAMPLE 1311-1326M

2.5 3.5 4.0 4.0 4.0 5.5 5.5 7.0

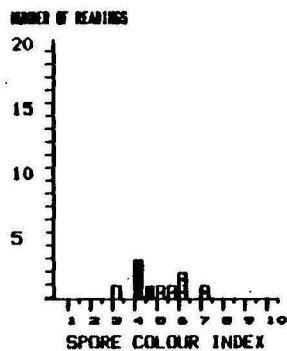
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.0-4.0	3
BLEACHED/CAVINGS	2.5-3.5	2
STAINED/REWORKED	5.5-7.0	3



SAMPLE 1448-1460M

3.0 4.0 4.0 4.0 4.5 5.0 5.5 6.0 6.0 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.0-4.5	4
BLEACHED/CAVINGS	3.0-3.0	1
STAINED/REWORKED	5.0-7.0	5



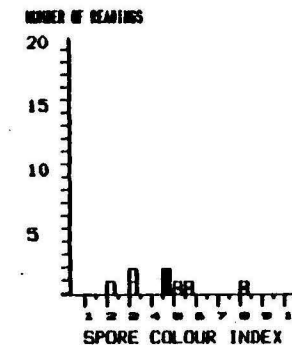
LYNER-1

IN SITU POPULATION

SAMPLE 1570-1585M

2.0 3.0 3.0 4.5 4.5 5.0 5.5 8.0

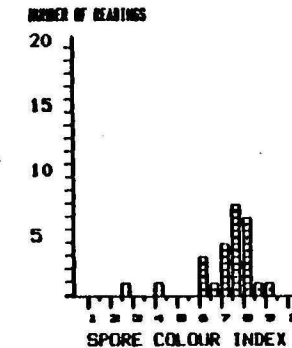
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.5-4.5	2
BLEACHED/CAVINGS	2.0-3.0	3
STAINED/REWORKED	5.0-8.0	3



SAMPLE 1738-1753M

2.5 4.0 6.0 6.0 6.0 6.5 7.0 7.0 7.0 7.0
7.5 7.5 7.5 7.5 7.5 7.5 7.5 8.0 8.0 8.0
8.0 8.0 8.0 8.5 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	2.5-4.0	2
STAINED/REWORKED	6.0-9.0	23



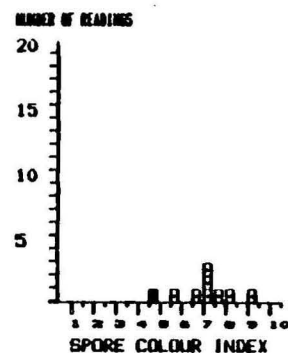
LYNHER-1

IN SITU POPULATION

SAMPLE 1890-1905M

4.5 5.5 6.5 7.0 7.0 7.0 7.5 8.0 9.0

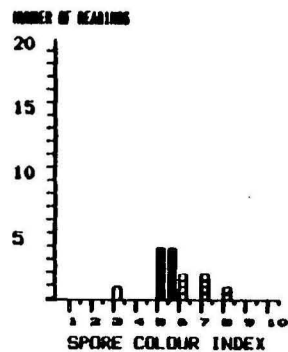
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.5-4.5	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	5.5-9.0	8



SAMPLE 2180-2195M

3.0 5.0 5.0 5.0 5.0 5.5 5.5 5.5 5.5 5.5 6.0
6.0 7.0 7.0 8.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.5	8
BLEACHED/CAVINGS	3.0-3.0	1
STAINED/REWORKED	6.0-8.0	5



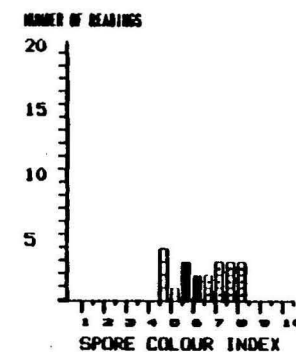
LYNHER-1

IN SITU POPULATION

SAMPLE 2393-2409M

4.5 4.5 4.5 4.5 5.0 5.5 5.5 5.5 6.0 6.0
6.5 6.5 7.0 7.0 7.0 7.5 7.5 7.5 8.0 8.0
8.0

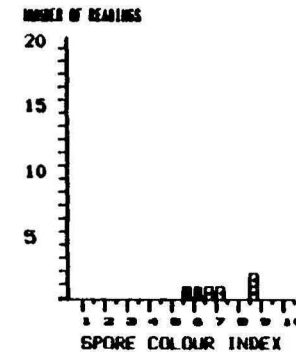
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-6.0	5
BLEACHED/CAVINGS	4.5-5.0	5
STAINED/REWORKED	6.5-8.0	11



SAMPLE 2591-2607M

5.5 6.0 6.5 7.0 8.5 8.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-6.0	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	6.5-8.5	4



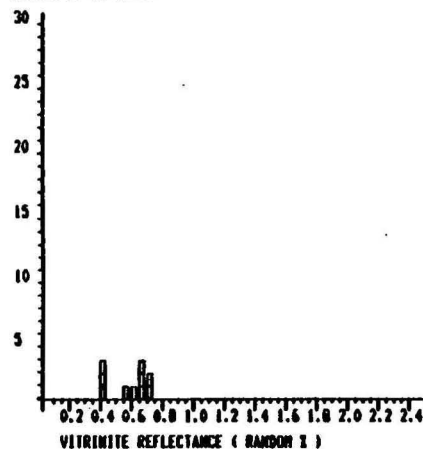
LYNHER-1

SAMPLE 1037-1052H

0.41 0.44 0.44 0.53 0.63 0.65 0.66 0.68 0.70 0.73

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
INERTINITE/REWORKED	0.41-0.73	10	0.59	0.12

NUMBER OF READINGS

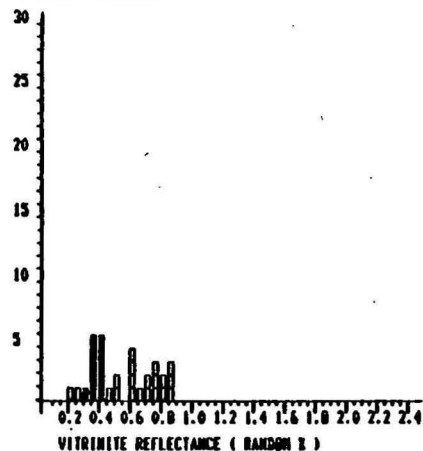


SAMPLE 1204-1220H

0.24 0.27 0.34 0.36 0.36 0.36 0.37 0.38 0.40 0.43
0.43 0.44 0.44 0.49 0.50 0.54 0.60 0.61 0.61 0.64
0.65 0.72 0.72 0.77 0.77 0.79 0.81 0.82 0.86 0.86
0.87

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.34-0.44	11	0.39	0.04
LIPITINITE/CAVINGS	0.24-0.27	2	0.26	0.02
INERTINITE/REWORKED	0.49-0.87	18	0.70	0.13

NUMBER OF READINGS



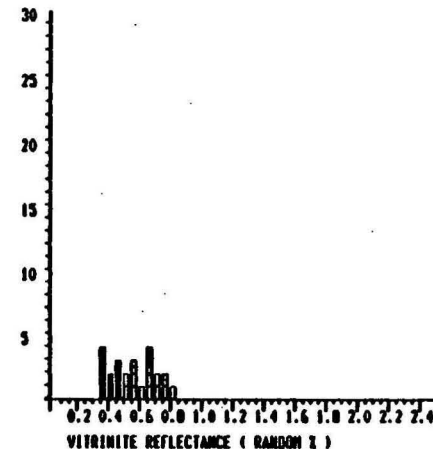
LYNHER-1

SAMPLE 1311-1326H

0.37 0.37 0.38 0.39 0.40 0.41 0.46 0.48 0.48 0.50
0.53 0.57 0.59 0.59 0.63 0.65 0.67 0.69 0.69 0.74
0.74 0.75 0.76 0.80

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.37-0.48	9	0.42	0.05
INERTINITE/REWORKED	0.50-0.80	15	0.66	0.09

NUMBER OF READINGS

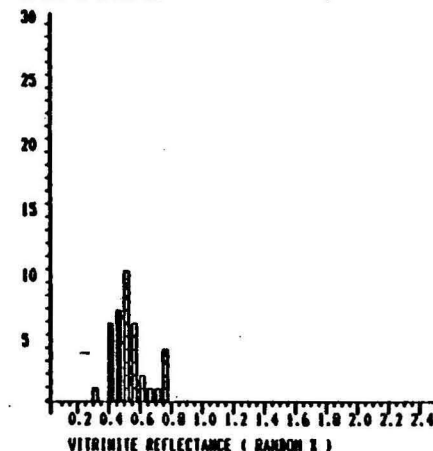


SAMPLE 1448-1460H

0.34 0.41 0.42 0.43 0.44 0.44 0.44 0.45 0.46 0.47
0.48 0.48 0.48 0.49 0.51 0.52 0.52 0.52 0.52 0.53
0.53 0.54 0.54 0.54 0.55 0.55 0.55 0.58 0.59 0.59
0.61 0.64 0.67 0.70 0.75 0.75 0.77 0.79

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.41-0.49	13	0.45	0.03
LIPITINITE/CAVINGS	0.34-0.34	1	0.34	
INERTINITE/REWORKED	0.51-0.79	24	0.60	0.09

NUMBER OF READINGS



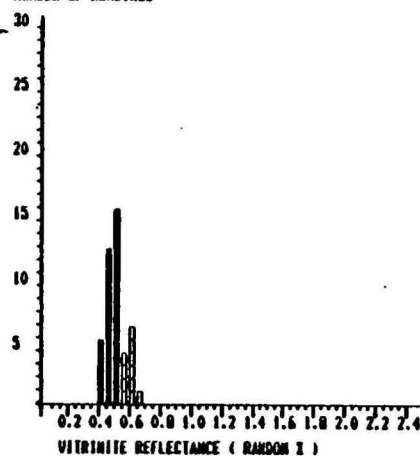
LYNHER-1

SAMPLE 1570-1585M

0.41 0.42 0.44 0.44 0.44 0.45 0.45 0.46 0.46 0.47
0.47 0.48 0.48 0.49 0.49 0.49 0.49 0.50 0.51 0.51
0.51 0.51 0.52 0.52 0.52 0.53 0.53 0.53 0.53
0.54 0.54 0.55 0.56 0.57 0.58 0.60 0.60 0.61 0.61
0.61 0.64 0.65

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.41-0.54	32	0.49	0.04
INERTINITE/REWORKED	0.55-0.65	11	0.60	0.03

NUMBER OF READINGS

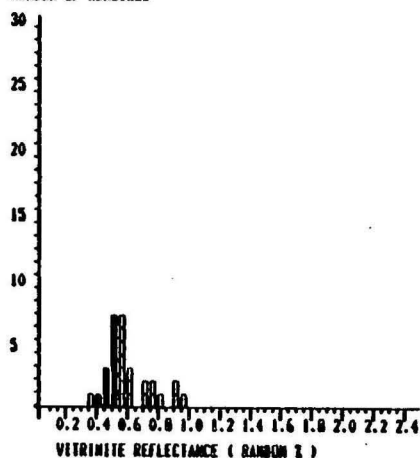


SAMPLE 1738-1753M

0.35 0.44 0.45 0.47 0.48 0.50 0.51 0.51 0.51 0.53
0.53 0.53 0.55 0.55 0.56 0.57 0.57 0.59 0.59 0.60
0.63 0.63 0.71 0.73 0.76 0.79 0.80 0.92 0.93 0.98

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.44-0.53	11	0.50	0.03
LIPITINITE/CAVINGS	0.35-0.35	1	0.35	
INERTINITE/REWORKED	0.55-0.98	18	0.69	0.14

NUMBER OF READINGS



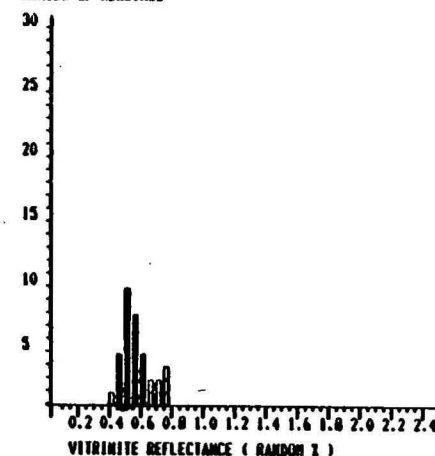
LYNHER-1

SAMPLE 1890-1905M

0.41 0.45 0.47 0.48 0.48 0.50 0.50 0.50 0.52 0.52
0.52 0.54 0.54 0.54 0.55 0.56 0.56 0.56 0.57 0.57
0.59 0.60 0.61 0.61 0.62 0.66 0.69 0.70 0.74 0.75
0.76 0.77

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.45-0.62	24	0.54	0.05
LIPITINITE/CAVINGS	0.41-0.41	1	0.41	
INERTINITE/REWORKED	0.66-0.77	7	0.72	0.04

NUMBER OF READINGS

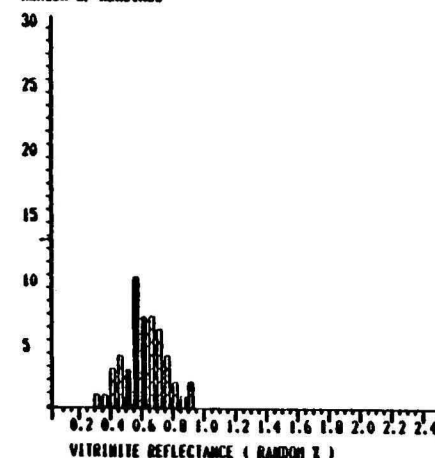


SAMPLE 2180-2195M

0.34 0.39 0.40 0.41 0.44 0.45 0.45 0.46 0.46 0.50
0.54 0.54 0.55 0.55 0.57 0.57 0.58 0.59 0.59 0.59
0.59 0.59 0.61 0.61 0.61 0.61 0.61 0.62 0.62 0.65
0.66 0.66 0.66 0.67 0.68 0.68 0.70 0.71 0.71 0.72
0.73 0.74 0.75 0.76 0.76 0.79 0.84 0.84 0.87 0.91
0.93

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.50-0.62	20	0.58	0.03
LIPITINITE/CAVINGS	0.34-0.46	9	0.42	0.04
INERTINITE/REWORKED	0.65-0.93	22	0.75	0.08

NUMBER OF READINGS



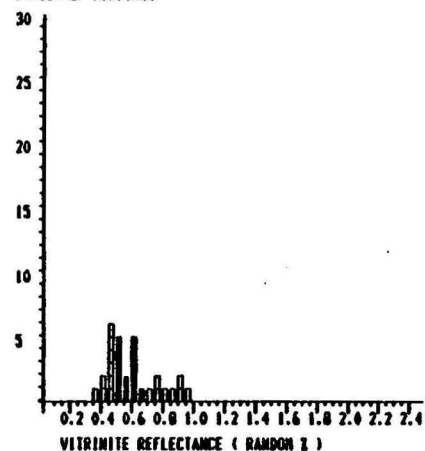
LYNCH-1

SAMPLE 2393-2409H

0.38 0.42 0.42 0.46 0.47 0.47 0.48 0.48 0.48 0.50
0.52 0.52 0.54 0.54 0.55 0.55 0.60 0.61 0.62 0.63
0.64 0.68 0.71 0.75 0.78 0.81 0.89 0.92 0.93 0.97

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST. DEV
IN SITU VITRINITE	0.50-0.60	13	0.58	0.06
LIPITINITE/CAVINGS	0.38-0.48	9	0.45	0.04
INERTINITE/REWORKED	0.71-0.97	8	0.85	0.10

NUMBER OF READINGS

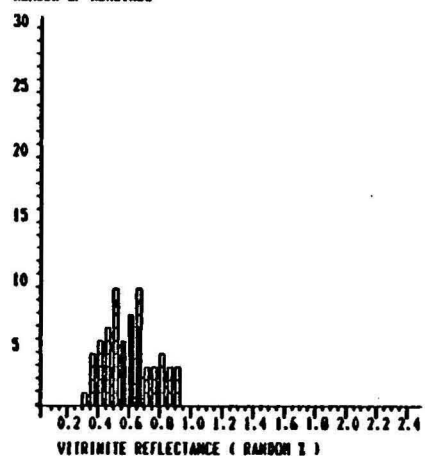


SAMPLE 2591-2607H

0.33 0.36 0.38 0.38 0.38 0.40 0.40 0.40 0.40 0.43
0.46 0.46 0.46 0.47 0.48 0.49 0.50 0.50 0.50 0.51
0.51 0.51 0.52 0.53 0.54 0.55 0.55 0.57 0.57 0.59
0.60 0.60 0.62 0.62 0.62 0.64 0.64 0.65 0.65 0.65
0.66 0.66 0.66 0.68 0.68 0.69 0.70 0.70 0.74 0.75
0.76 0.77 0.80 0.80 0.84 0.84 0.85 0.86 0.89 0.90
0.91 0.92

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST. DEV
IN SITU VITRINITE	0.55-0.66	10	0.62	0.04
LIPITINITE/CAVINGS	0.33-0.54	25	0.45	0.06
INERTINITE/REWORKED	0.68-0.92	19	0.79	0.08

NUMBER OF READINGS



NORTH HIBERNIA-1

SUMMARY

Geochemical analyses of samples in the interval 1145m to 4000m TD of the North Hibernia-1 well shows that the section analysed is early mature to 1400m, middle mature between 1400m and 2700m and late mature between 2700m and 3600m. The section below 3600m is post mature for oil generation but mature for gas generation. There is a marked increase in the maturity gradients at around 3200m to 4000m TD indicating high paleoheatflow in this interval. The marked non-linear increase in vitrinite reflectance between 3200m and 4000m TD probably indicates an igneous intrusive near to the base of the well section. Extrapolation of the maturity gradients to surface indicates a cumulative total of around 1400m of Eocene to Recent uplift and erosion at unconformities above 1145m. The sediments analysed are not currently at their maximum depths of burial which were some 1000m greater than those of the present day and were reached during the Eocene to Recent.

Medium to medium dark grey carbonaceous mudstones in the interval 2177m to 2350m (Late Triassic), have good to very good oil and poor gas source potential.

Samples at 2805m to 2820m and 2910 to 2925m contain a migrant oil derived from early to middle mature terrestrially sourced 'waxy' kerogen and a biodegraded oil residue respectively.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 11° 40.3'S, 123° 19.5'E.

Operator and date of drilling: Bocal, 1974.

Well Status: Plugged and abandoned.

TD: 4000m.

Mud data: Seawater/Bentonite system used over the interval analysed.

Casing data: 30" at 72m, 20" at 309m, 13³/₈" at 1039m, 9⁵/₈" at 2180m.

NORTH HIBERNIA-1 WELL

BHT data: 70°C at 2190m, after 14 hours stopped circulation.
105°C at 3500m, after 6 hours stopped circulation.
120°C at 3998m, after 8 hours stopped circulation.

Elevation: RT 13m ASL.

Water depth: 33m.

Interval analysed: 1145m to 4000m TD.

Age of interval analysed:

	<u>Depths (in metres)</u>
Oligocene	1145-1382
Eocene	1382-1610
Palaeocene	1610-1663
Early-Late Cretaceous	1663-1958
Early Cretaceous	1958-1983
Triassic	1983-4000 TD

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed yielded sufficient vitrinite for measurements but measurements were complicated by abundant reworked kerogen in many samples. Results: Fair.
- b) Spore Colour Index: The samples analysed yielded sufficient sporomorphs for analysis. Results: Good.

Source rock data quality: Fair.

Gas chromatography run at: 2205m to 2210m, 2315m to 2330m, 2350m to 2360m, 2805m to 2820m and 2910m to 2925m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from values of around 6 SCI units at 1955m to around 7.5 SCI units at 3200m. There is an interpreted rapid increase in SCI values from 7.5 units at 3200m to around 9.5 to 10 units at 4000m. Vitrinite reflectance values show a similar shallow gradient between 1155m and 3200m

NORTH HIBERNIA-1 WELL

(increasing from 0.4% to 0.88%) followed by a marked increase from 0.88% to interpreted values of around 2.6% at 4000m TD.

The results show that the well section is early mature to 1400m, middle mature between 1400m and 2700m and late mature between 2700m and 3600m. Below 3600m sediments are post mature for oil generation but mature for gas generation.

The marked increase in the maturity gradients below 3200m indicates high paleoheatflow in this interval, probably due to an igneous intrusive near to the base of the well section. Extrapolation of the reflectance gradient to seabed indicates a cumulative thickness of around 1400m of missing Eocene to Recent section at unconformities above 1145m. The sediments analysed are not currently at their maximum depths of burial which was some 1000m greater than that of the present day and was reached sometime during the Eocene to Recent.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

Medium to medium dark grey mudstones in the interval 2205m to 2330m contain high organic carbon contents of between 6.40% and 10.79%. Both visual kerogen data and pyrolysis data indicate the presence of a 10% content of oil-prone kerogen in these samples. Analysis of electric logs suggests that around 65m of mudstones are present between 2177m and 2350m.

Extraction of the picked carbonaceous mudstone lithologies at 2205m to 2210m, 2315m to 2330m and 2350m to 2360m yielded abundant bitumen extract. Fractionation of the extracts shows them to have little hydrocarbon content. The alkane gas chromatograms of these samples show abundant n -C₁₅ to n -C₃₀ alkanes. Pristane is dominant over phytane. This distribution of hydrocarbons is consistent with derivation from a terrestrially derived 'waxy' kerogen at middle to late maturity. The abundance of polar compounds in the extracts is most probably due to the high content of type III vitrinitic kerogen in the samples.

Although the content of oil-prone kerogen in these sediments is low, the relatively high maturity coupled with the high organic carbon content of mudstones in the interval 2177m to 2350m suggests that they have good to very good oil and poor gas source potential. Much of the oil potential of these mudstones will have already been generated.

NORTH HIBERNIA-1 WELL

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

The remaining limestone and mudstones analysed contain generally below average organic carbon contents of between 0.01% and 0.84%. Samples with high organic carbon contents in the intervals 2025m to 2160m and 2360m to 2460m have low hydrogen indices (2 to 83) suggesting mostly humic kerogen content. The high hydrogen index of the picked limestone at 2910m to 2925m is due to content of heavy oil or asphaltic material.

Extraction of the mudstone pick at 2805m to 2820m shows that this lithology contains a migrant oil. The alkane gas chromatogram of the sample shows a migrant oil derived from terrestrially sourced waxy kerogen at early to middle maturity. Extraction of the limestone pick at 2910m to 2925m shows that this sample contains a small quantity of solvent soluble material. The alkane gas chromatogram of the sample suggests that it represents the soluble fraction of a biodegraded oil residue which was also noted during pyrolysis analysis of the sample.

These samples have no oil or gas source potential.

WELL: NORTH HIBERNIA-1

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
1076		Oligocene									
1145-1155	Ctg	MDST, lt gy-lt gn gy, calc + 30% LST, wht	3.5cvd	0.44(7)	40	45	15				
1382		Eocene									
1610		Paleocene									
1663		Albian-Maastrichtian									
1958		Late Neocomian-Aptian									
1955-1965	"	MDST, lt ol-gy	6.0	*	30	65	5				
1955-1970	"	LST, lt-med-lt gy + 20% LST, wht		0.65(2)	70	30	mnr				
1975-1985	"	SST, lt gy, v calc, arg	6.0-6.5	0.58(4)	25	50	25				
1983		Late Triassic									
2025-2040	P	MDST, med-dk-gy						35	60	*	5
2145-2160	Ctg	SND + 40% MDST, med-lt gy + 10% LST, wht	6.5	0.90(35)rew	50	40	10				
	P	MDST, med-lt gy						20	80	*	*
2205-2210	P	MDST, med-dk gy, carb						35	55	*	10
2245-2260	Ctg	SST + SND, wht-lt gy + 10% MDST, med-med dk gy, carb	6.5-7.0	0.69(12)	60	35	5				
2315-2330	P	MDST, med-med dk gy, carb						40	50	*	10
2360-2375	P	MDST, med-med dk gy						95	5	*	*
2400-2405	Ctg	MDST, med dk gy + 70% SST, wht, lt gy	6.5-7.0	0.69(10)	40	50	10				
	P	MDST, med dk gy						50	50	*	*
2450-2460	P	MDST, med dk gy						40	60	*	*
2675-2690	Ctg	LST, med gy + LST, wht, v sandy	7.0	0.77(37)	65	35	mnr				
	P	LST, med gy						35	65	*	*
2805-2820	P	MDST, dk gy-gy blk, v calc						40	55	*	5
2855-2870	Ctg	LST, lt-med gy + mnr MDST, med-dk gy	7.0-7.5	0.81(17)	60	40	*				
2910-2925	P	LST, med-med dk gy									
	P	After extraction						15	85	*	*
3125-3140	Ctg	LST, wht-med gy + mnr MDST, med-dk gy	7.0-8.0	0.87(6)	40	60	tr				
3305-3380	"	LST, a/a + 20% LST, med-dk gy	8.0-8.5	1.01(19)	50	50	tr				
3495-3510	"	LST, wht-lt gy + 30% LST, med-dk gy	8.5-9.0	1.27(2)	50	50	*				

Table 1a Maturity and Kerogen Composition Data

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
3530-3545	Ctg	LST, wht-med gy + 20% MDST, med-dk gy	8.5-9.0	1.30(20)	55	40	5				
3680-3695	"	MDST, med gy-med dk gy + 40% LST, wht-med lt gy	8.5-9.5	1.51(18)	60	40	*				
3770-3785	"	MDST, med dk gy-dk gy + 40% LST, lt gy-med lt gy	9.0	1.56(15)	55	45	*				
3880-3895	"	MDST, dk gy + 20% LST, lt gy-med gy	9.0-10.0	1.92(4)	60	40	*				
3990-4000	"	LST, wht-med gy + 30% LST, med-dk gy-dk gy	9.5-10.0	1.59(53)cvd	70	30	*				

Table 1b Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
														SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
1076		Oligocene														
1145-1155	Ctg	MDST, lt gy-lt gn gy calc + 30% LST, wht	-													
1382		Eocene														
1610		Paleocene														
1663		Albian-Maastrichtian														
1958		Late Neocomian-Aptian														
1955-1965	"	MDST, lt ol gy	-													
1955-1970	"	LST, lt-med-lt gy + 20% LST, wht	-													
	P	LST, lt-med-lt gy	0.02													
1983		Late Triassic														
1975-1985	Ctg	SST, lt gy, v calc, glauc, arg	-													
2025-2040	"	MDST, med-dk-gy + 40% SST, v lt gy-lt gy	-													
	P	MDST, med-dk-gy	2.98	434	74	44	0.16	2.65								
2065-2075	Ctg	SST, lt gy + 20% MDST, lt-med gy, slty, occ sndy	1.23						300	24						
2145-2160	"	SND + 40% MDST, med-lt gy + 10% LST, wht	-													
	P	MDST, med-lt gy	1.56	433	32	154	0.07	0.54								
2205-2210	"	SND + SST, wht, lt-gy + mnr MDST, med-dk gy, carb	-													
	P	MDST, med-dk gy, carb	6.40						2675	42	960	15	28	8	64	
2245-2260	Ctg	SST + SND, wht-lt gy + 10% MDST, med-med dk gy, carb	-													
	P	MDST, med-med dk gy, carb	0.63													
2315-2330	Ctg	MDST, a/a + 50% SST, a/a + fibre contam	-													
	P	MDST, a/a	10.79	429	110	20	0.04	12.36	5455	51	870	8	11	5	84	
2350-2360	Ctg	SST, wht-lt gy + 30% MDST, dk gy carb + mnr COAL, blk	1.21						600	50	195	16	26	7	67	
2360-2375	Ctg	MDST, med-med dk gy + 70% SST, wht, lt-gy	-													
	P	MDST, a/a	2.76	440	2	9	0.60	0.15								
2400-2405	Ctg	MDST, med dk gy + 70% SST, a/a	-													
	P	MDST, med dk gy	1.40	430	80	119	0.20	1.40								
2450-2460	Ctg	SST, a/a + 20% MDST, med dk gy	-													
	P	MDST, a/a	1.57	434	68	75	0.10	1.19								

Table 2a Chemical Analysis Data

WELL: NORTH HIBERNIA-1

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
														SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
2675-2690	Ctg	LST, med gy + LST, wht, v sndy	-													
	P	LST, med gy	0.93	436	53	119	0.14	0.57								
2805-2820	Ctg	LST, med gy + 30% MDST, dk gy-gy blk, v calc + 20% LST, wht	-													
	P	LST, med gy	0.06													
	"	MDST, a/a	0.70	433	83	151	0.12	0.66	1275	182	865	124	68	0	32	
2855-2870	Ctg	LST, lt-med gy + mnr MDST, med-dk gy	-													
	P	LST, lt-med gy	0.02													
	"	MDST, med-dk gy	0.26													
2910-2925	Ctg	LST, med-med-dk gy + 50% LST, wht-lt-gy	-													
	P	LST, med-med-dk gy	0.84	402	788	219	0.14	7.70	265	32	50	6	11	8	81	
	P	After extraction	1.43	431	22	41	0.09	0.35								
3125-3140	Ctg	LST, wht-med gy + mnr MDST, med-dk gy	-													
	P	LST, wht-med gy	0.01													
3200-3215	Ctg	LST, a/a + 30% MDST, med-dk gy	-													
	P	MDST, a/a	0.36													
3305-3380	Ctg	LST, wht-med gy + 20% LST, med-dk gy	-													
	P	LST, wht-med gy	0.12													
	P	LST, med-dk gy	0.04													
3495-3510	Ctg	LST, wht-lt-gy + 30% LST, med-dk gy	-													
	P	LST, med-dk gy	0.07													
3515-3530	Ctg	LST, wht-lt gy + 30% MDST, med-dk gy	-													
	P	LST, a/a	0.01													
	"	MDST, a/a	0.30													
3530-3545	Ctg	LST, wht-med gy + 20% MDST, med-dk gy	-													
	P	MDST, med-dk gy	0.05													
3655-3670	Ctg	LST, lt-med gy + 40% LST, med-dk gy	-													
	P	LST, med-dk gy	0.07													
	P	LST, lt-med gy	0.17													

Table 2b Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA										
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION				
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION %
													SATURATED HYDROCARBONS AROMATIC HYDROCARBONS POLAR COMPOUNDS
3680-3695	Ctg	MDST, med gy-med dk gy + 40% LST, wht-med-lt gy	-										
	P	MDST, a/a	0.20										
3710-3725	Ctg	MDST, med dk-dk gy + 50% LST, wht-med gy	-										
	P	MDST, med dk-dk gy	0.53										
	P	LST, wht-med gy	0.02										
3740-3755	Ctg	MDST, med-dk gy + 40% LST, wht-med gy	-										
	P	MDST, med-dk gy	0.42										
3770-3785	Ctg	MDST, med dk gy-dk gy + 40% LST, lt gy-med lt gy	0.35						125	36			
	P	MDST, med dk gy-dk gy	0.72	413	26	174	0.27	0.26					
	P	LST, lt gy-med lt gy	0.12										
3835-3850	Ctg	MDST, dk gy, carb + 20% LST, lt gy-med lt gy	-										
	P	MDST, a/a	0.02										
3880-3895	Ctg	MDST, dk gy + 20% LST, lt gy-med gy	-										
	P	MDST, a/a	0.32										
3940-3955	Ctg	MDST, med dk gy-dk gy + 40% LST, lt gy-med gy	-										
	P	MDST, a/a	0.13										
	P	LST, a/a	0.02										
3990-4000	Ctg	LST, wht-med gy + 30% LST, med-dk gy-dk gy	-										
	P	LST, med-dk gy-dk gy	0.11										

Table 2c Chemical Analysis Data

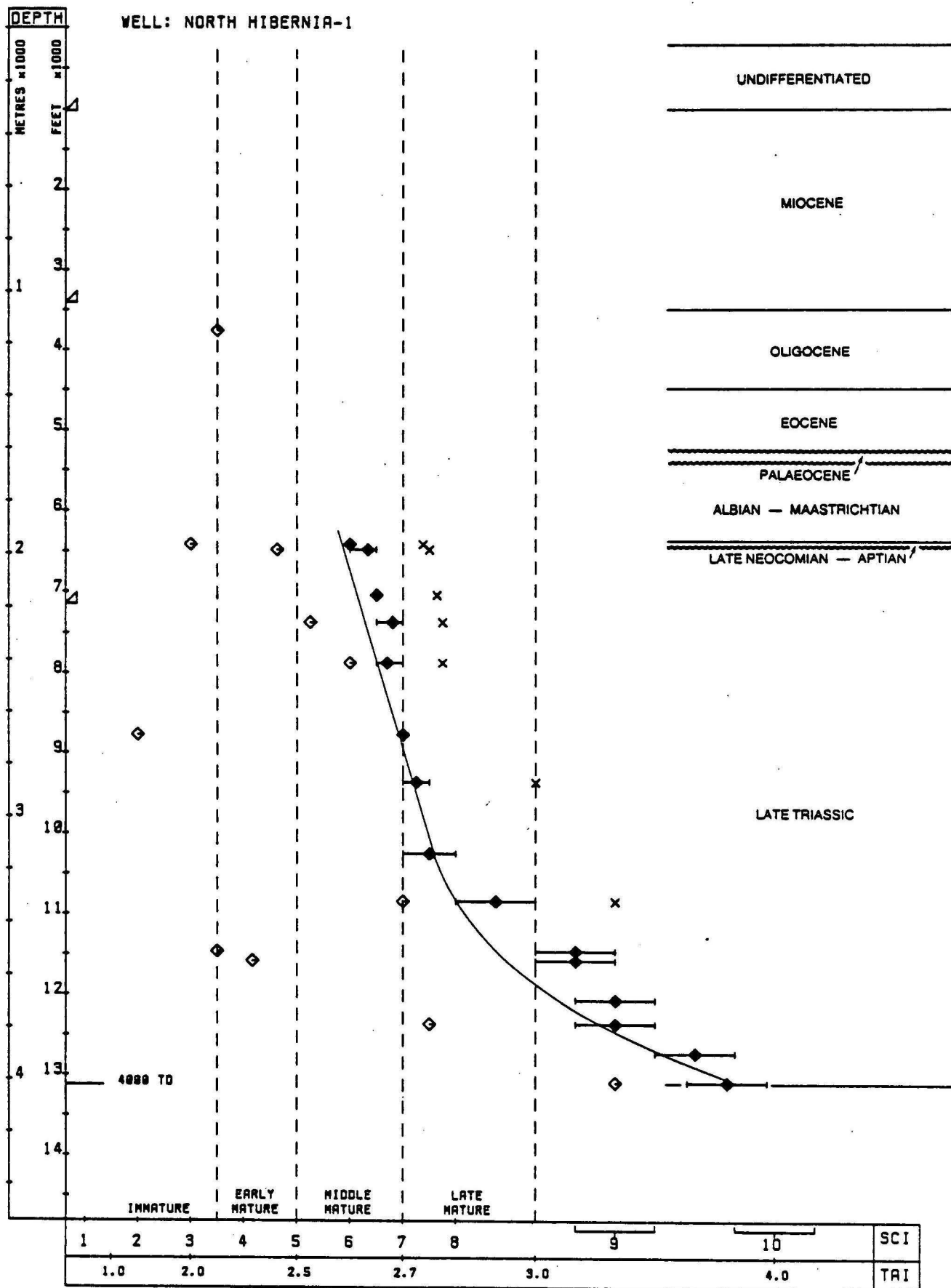


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

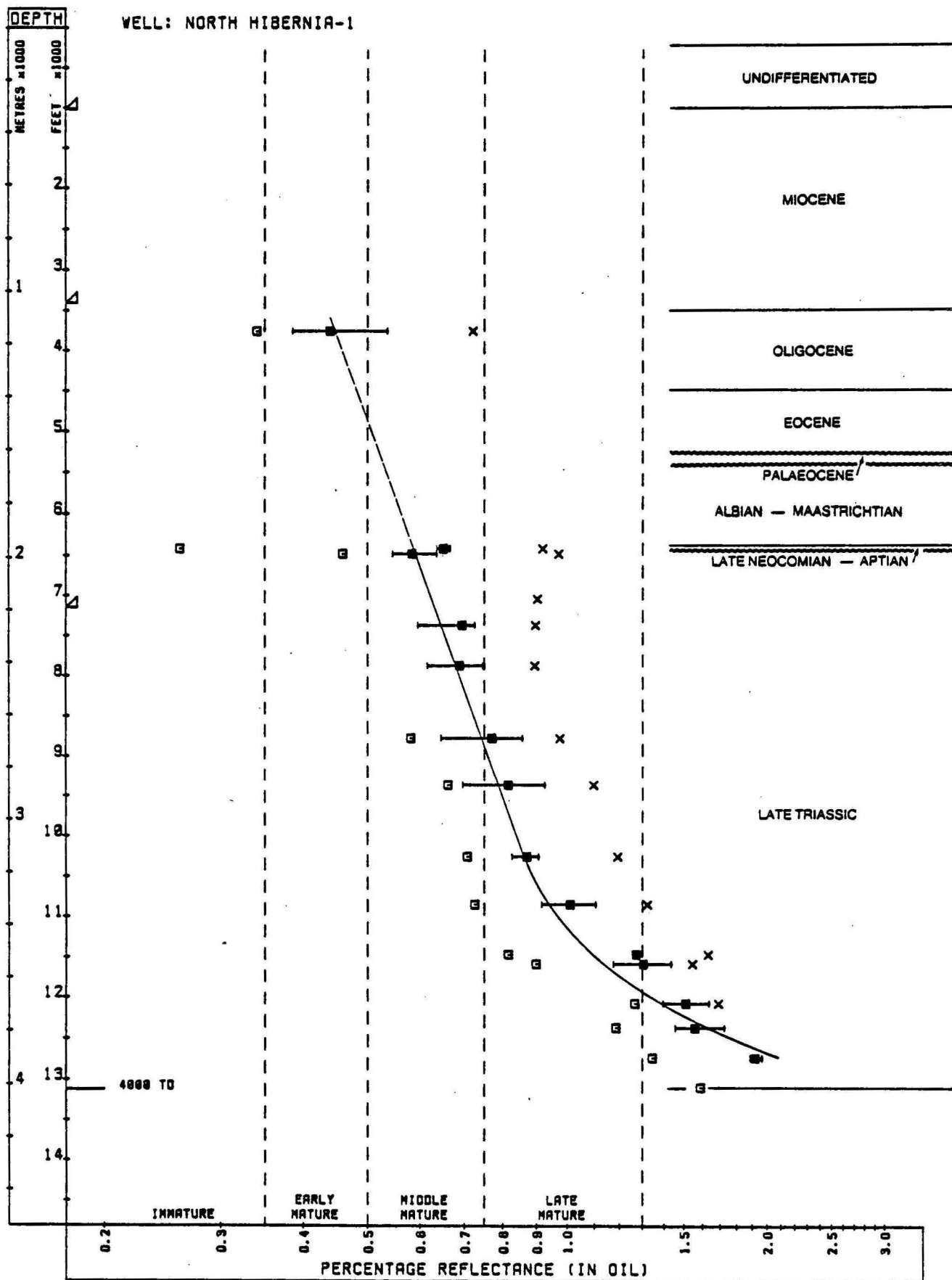
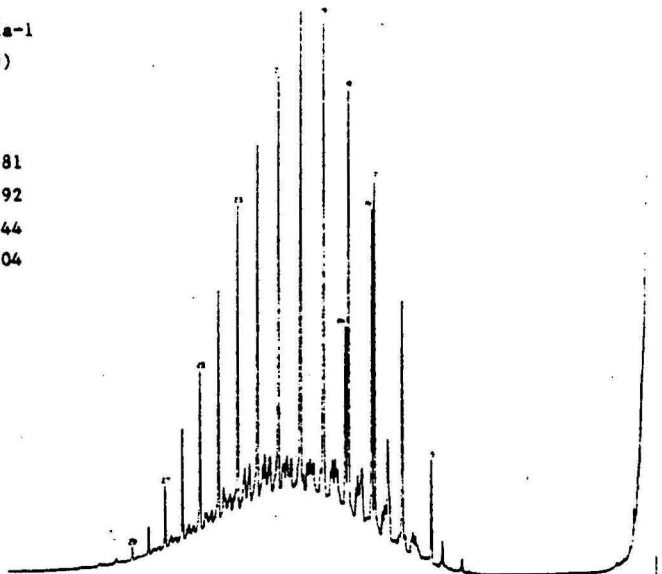
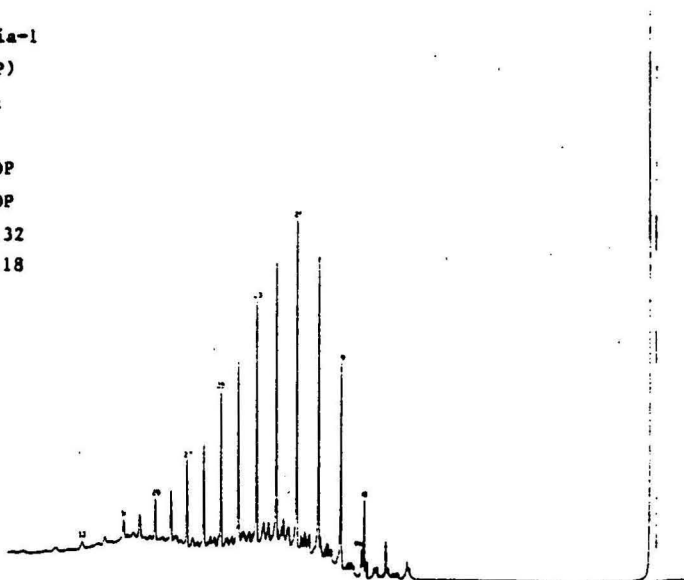


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

North Hibernia-1
2205-2210m (P)
Late Triassic
SCI 6.25
Pr/Ph = 1.81
Pr/n-C₁₇ = 0.92
Ph/n-C₁₈ = 0.44
CPI = 1.04



North Hibernia-1
2315-2330m (P)
Late Triassic
SCI 6.25
Pr/Ph = NDP
Pr/n-C₁₇ = NDP
Ph/n-C₁₈ = 0.32
CPI = 1.18



North Hibernia-1
2350-2360m
Late Triassic
SCI 6.5
Pr/Ph = 2.21
Pr/n-C₁₇ = 0.77
Ph/n-C₁₈ = 0.30
CPI = 1.06

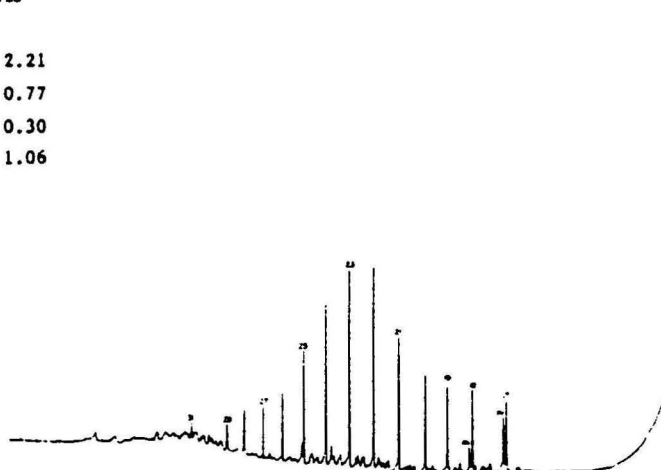
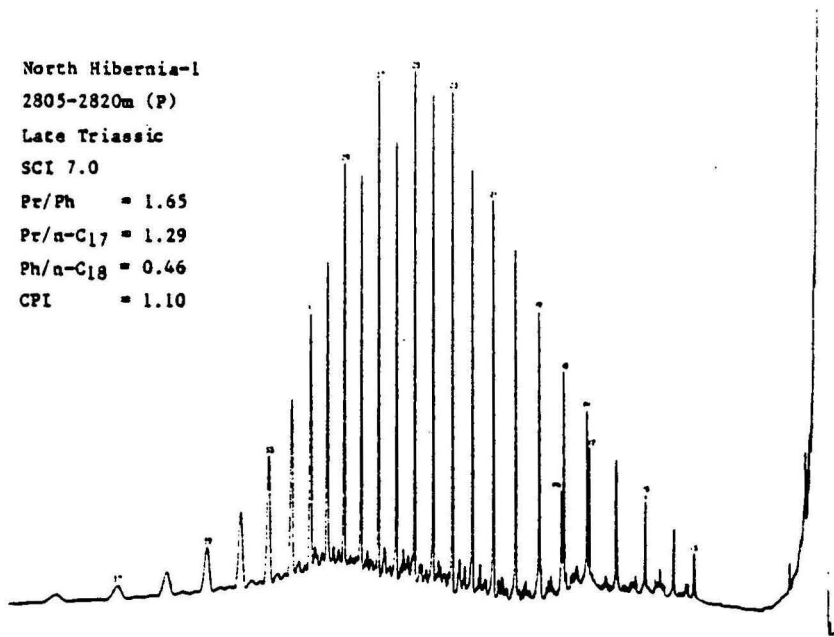


Figure 3a

North Hibernia-1
2805-2820m (P)
Late Triassic
SCI 7.0
Pr/Ph = 1.65
Pr/n-C₁₇ = 1.29
Ph/n-C₁₈ = 0.46
CPI = 1.10



North Hibernia-1
2910-2925m (P)
Late Triassic
SCI 7.25
Pr/Ph = 0.74
Pr/n-C₁₇ = 1.13
Ph/n-C₁₈ = 0.98
CPI = 1.35

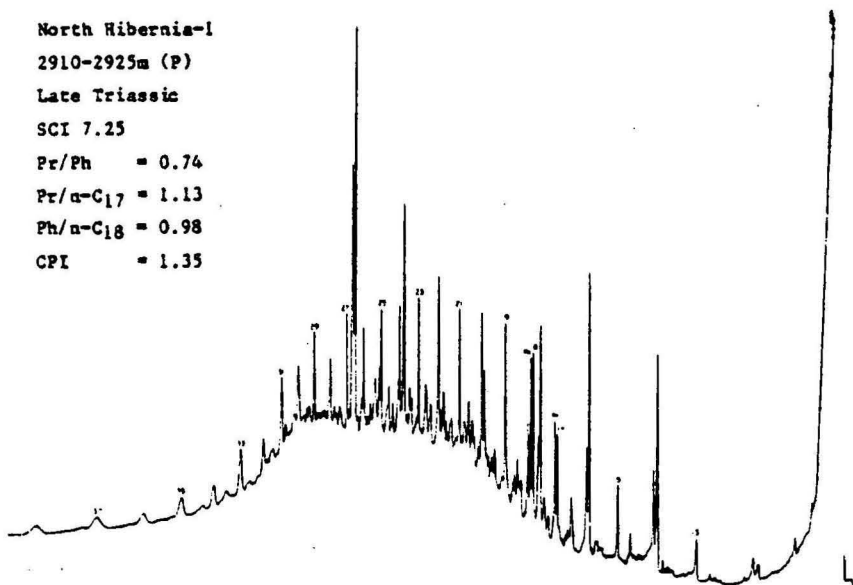


Figure 3b

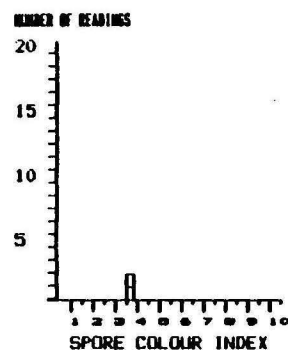
NORTH HIBERNIA-1

IN SITU POPULATION

SAMPLE 1145-1155M

3.5 3.5

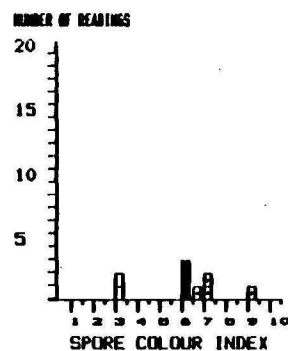
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	3.5-3.5	2
STAINED/REWORKED	-	0



SAMPLE 1955-1965M

3.0 3.0 6.0 6.0 6.0 6.5 7.0 7.0 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.0	3
BLEACHED/CAVINGS	3.0-3.0	2
STAINED/REWORKED	6.5-9.0	4



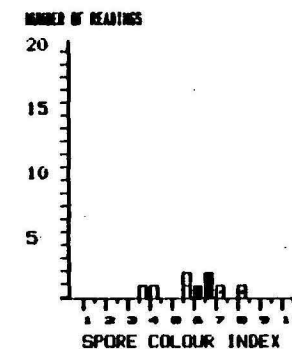
NORTH HIBERNIA-1

IN SITU POPULATION

SAMPLE 1975-1985M

3.5 4.0 5.5 5.5 6.0 6.5 6.5 7.0 8.0

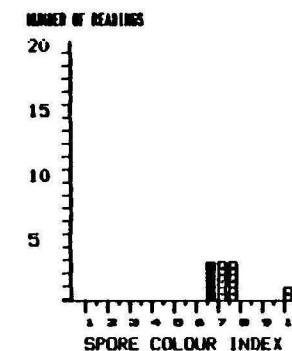
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.5	3
BLEACHED/CAVINGS	3.5-5.5	4
STAINED/REWORKED	7.0-8.0	2



SAMPLE 2145-2160M

6.5 6.5 6.5 7.0 7.0 7.0 7.5 7.5 7.5 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-6.5	3
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	7.0-10.0	7



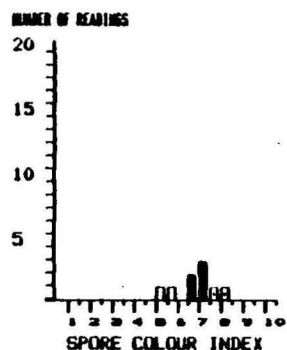
NORTH HIBERNIA-1

IN SITU POPULATION

SAMPLE 2245-2260M

5.0 5.5 6.5 6.5 7.0 7.0 7.0 7.5 8.0

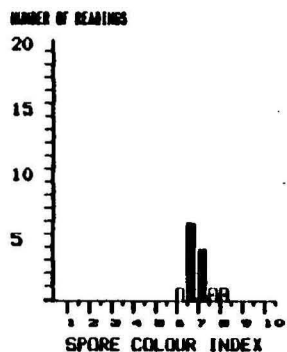
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-7.0	5
BLEACHED OR CAVED	5.0-5.5	2
STAINED OR REMORKED	7.5-8.0	2



SAMPLE 2400-2405M

6.0 6.5 6.5 6.5 6.5 6.5 6.5 7.0 7.0 7.0
7.0 7.5 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-7.0	10
BLEACHED OR CAVED	6.0-6.0	1
STAINED OR REMORKED	7.5-8.0	2



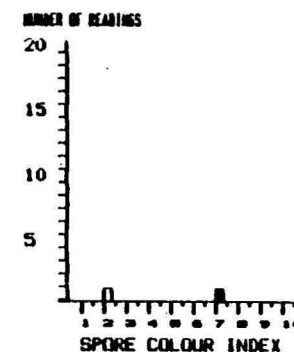
NORTH HIBERNIA-1

IN SITU POPULATION

SAMPLE 2675-2690M

2.0 7.0

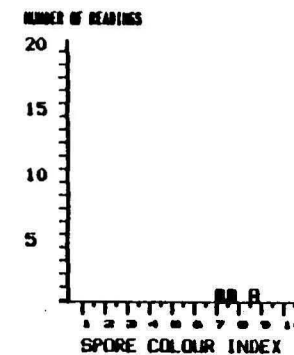
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.0-7.0	1
BLEACHED OR CAVED	2.0-2.0	1
STAINED OR REMORKED	-	0



SAMPLE 2855-2870M

7.0 7.5 8.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.0-7.5	2
BLEACHED OR CAVED	-	0
STAINED OR REMORKED	8.5-8.5	1

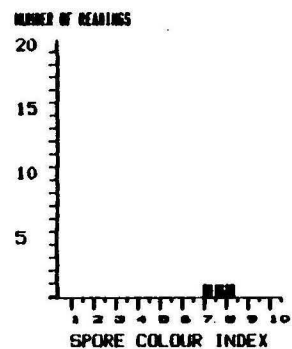


NORTH HIBERNIA-1

IN SITU POPULATION

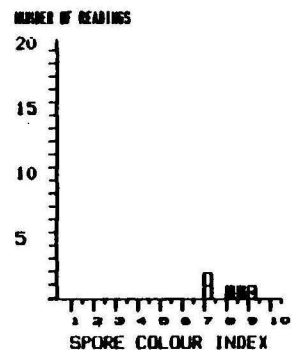
SAMPLE 3125-3140M
7.0 7.5 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.0-8.0	3
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	-	0



SAMPLE 3305-3380M
7.0 7.0 8.0 8.5 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-8.5	2
BLEACHED OR CAVED	7.0-7.0	2
STAINED OR REWORKED	9.0-9.0	1

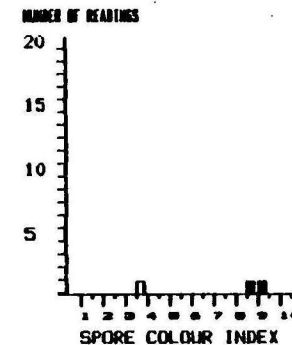


NORTH HIBERNIA-1

IN SITU POPULATION

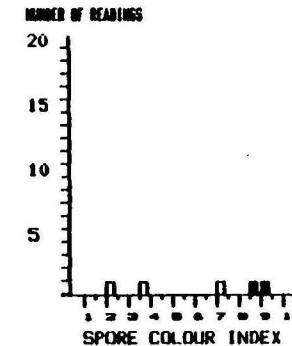
SAMPLE 3495-3510M
3.5 8.5 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	8.5-9.0	2
BLEACHED/CAVINGS	3.5-3.5	1
STAINED/REWORKED	-	0



SAMPLE 3530-3545M
2.0 3.5 7.0 8.5 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.5-9.0	2
BLEACHED OR CAVED	2.0-7.0	3
STAINED OR REWORKED	-	0

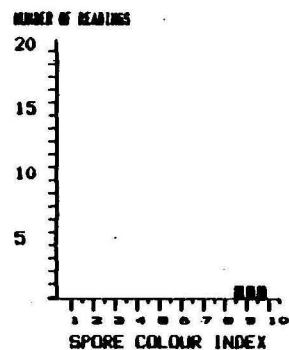


NORTH HIBERNIA-1

IN SITU POPULATION

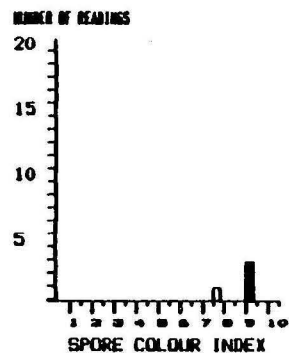
SAMPLE 3680-3695M
8.5 9.0 9.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.5-9.5	3
BLEACHED OR CAVED	-	0
STAINED OR REMORKED	-	0



SAMPLE 3770-3785M
7.5 9.0 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.0-9.0	3
BLEACHED OR CAVED	7.5-7.5	1
STAINED OR REMORKED	-	0

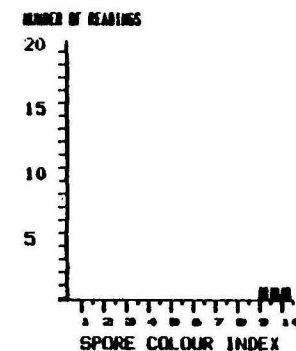


NORTH HIBERNIA-1

IN SITU POPULATION

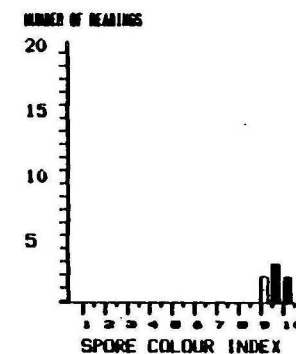
SAMPLE 3880-3895M
9.0 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.0-10.0	3
BLEACHED OR CAVED	-	0
STAINED OR REMORKED	-	0



SAMPLE 3990-4000M
9.0 9.0 9.5 9.5 9.5 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	9.5-10.0	5
BLEACHED OR CAVED	9.0-9.0	2
STAINED OR REMORKED	-	0

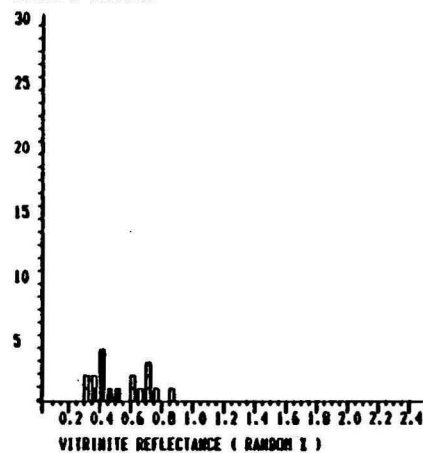


SAMPLE 1145-1155H

0.33 0.34 0.35 0.39 0.40 0.42 0.44 0.44 0.45 0.53
0.60 0.64 0.69 0.71 0.72 0.74 0.79 0.87

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.39-0.53	7	0.44	0.05
LIPTINITE/CAVINGS	0.33-0.35	3	0.34	0.01
INERTINITE/REWORKED	0.60-0.87	8	0.72	0.08

NUMBER OF READINGS

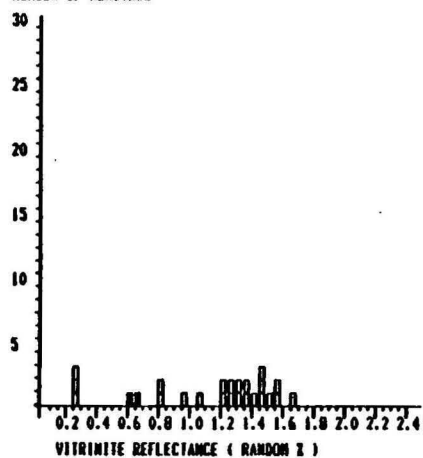


SAMPLE 1955-1970H

0.25 0.26 0.27 0.64 0.66 0.81 0.84 0.97 1.05 1.23
1.23 1.26 1.29 1.30 1.33 1.37 1.38 1.40 1.47 1.48
1.49 1.52 1.56 1.58 1.65

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.64-0.66	2	0.65	0.01
LIPTINITE/CAVINGS	0.25-0.27	3	0.26	0.01
INERTINITE/REWORKED	0.81-1.05	4	0.92	0.11
REWORKED	1.23-1.65	16	1.41	0.13

NUMBER OF READINGS



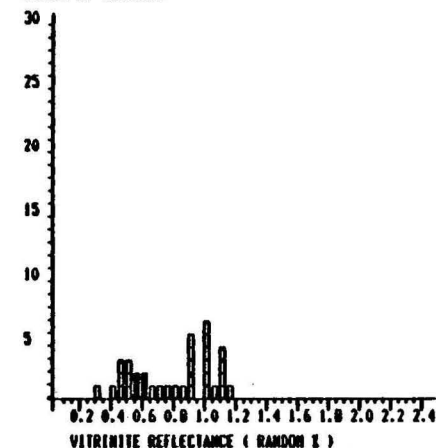
NORTH HIBERNIA-1

SAMPLE 1975-1985H

0.30 0.41 0.46 0.46 0.48 0.51 0.52 0.53 0.55 0.55
0.60 0.63 0.69 0.71 0.77 0.82 0.89 0.90 0.91 0.93
0.94 0.94 1.00 1.01 1.03 1.03 1.04 1.04 1.07 1.10
1.10 1.12 1.14 1.16

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.55-0.63	4	0.58	0.04
LIPTINITE/CAVINGS	0.30-0.53	8	0.46	0.08
INERTINITE/REWORKED	0.69-1.16	22	0.97	0.13

NUMBER OF READINGS

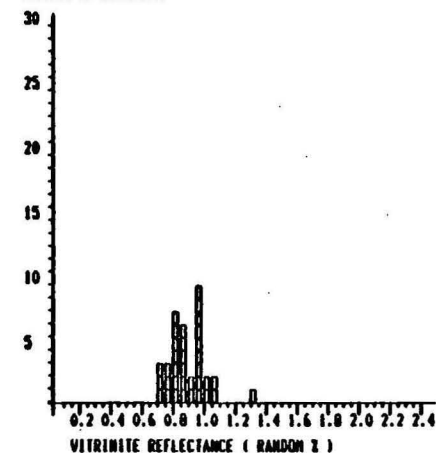


SAMPLE 2145-2160H

0.71 0.72 0.72 0.77 0.78 0.78 0.81 0.81 0.82 0.83
0.83 0.84 0.84 0.86 0.86 0.88 0.88 0.88 0.89 0.91
0.94 0.95 0.95 0.95 0.96 0.96 0.96 0.96 0.97 0.97
1.00 1.04 1.08 1.09 1.32

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
INERTINITE/REWORKED	0.71-1.32	35	0.90	0.12

NUMBER OF READINGS



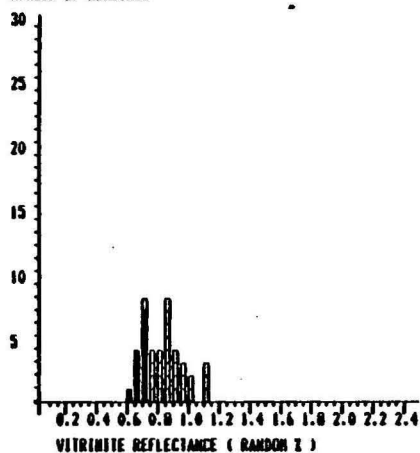
NORTH NIGERIA-1

SAMPLE 2245-2260M

0.60 0.67 0.68 0.68 0.69 0.70 0.71 0.71 0.72 0.72
0.72 0.72 0.74 0.75 0.75 0.76 0.79 0.81 0.81 0.82
0.82 0.85 0.85 0.86 0.86 0.86 0.87 0.89 0.89 0.90
0.91 0.92 0.93 0.95 0.95 0.99 1.01 1.02 1.11 1.12
1.14

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.60-0.72	12	0.69	0.03
INERTINITE/REWORKED	0.74-1.14	29	0.89	0.11

NUMBER OF READINGS

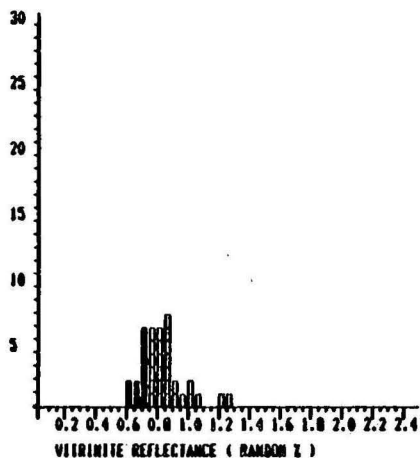


SAMPLE 2400-2405M

0.62 0.63 0.65 0.69 0.70 0.70 0.71 0.71 0.72 0.74
0.76 0.76 0.77 0.78 0.79 0.79 0.81 0.82 0.83 0.84
0.84 0.84 0.85 0.86 0.86 0.88 0.88 0.88 0.89 0.91
0.93 0.97 1.00 1.01 1.09 1.20 1.25

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.62-0.74	10	0.69	0.04
INERTINITE/REWORKED	0.76-1.25	27	0.89	0.13

NUMBER OF READINGS



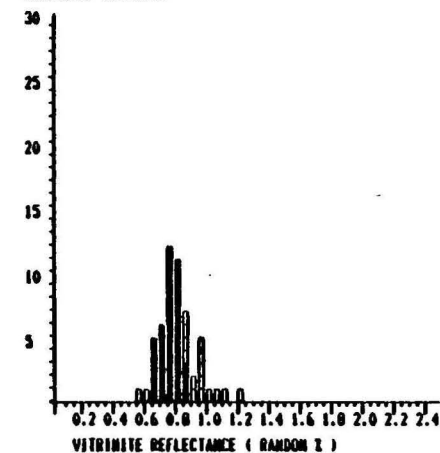
NORTH NIGERIA-1

SAMPLE 2675-2690M

0.55 0.61 0.65 0.66 0.66 0.67 0.68 0.71 0.71 0.71
0.72 0.74 0.74 0.75 0.76 0.76 0.76 0.76 0.77 0.77
0.77 0.78 0.78 0.78 0.79 0.80 0.80 0.81 0.81 0.81
0.82 0.82 0.82 0.83 0.83 0.84 0.85 0.85 0.85 0.87
0.87 0.88 0.89 0.90 0.93 0.95 0.96 0.98 0.98 0.98
1.04 1.06 1.11 1.21

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.65-0.85	37	0.77	0.06
LIPTINITE/CAVINGS	0.55-0.61	2	0.58	0.04
INERTINITE/REWORKED	0.87-1.21	15	0.97	0.10

NUMBER OF READINGS

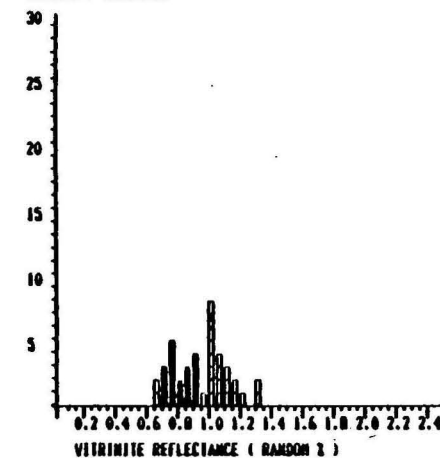


SAMPLE 2855-2870M

0.65 0.67 0.70 0.71 0.72 0.76 0.77 0.77 0.77 0.79
0.80 0.83 0.85 0.86 0.86 0.90 0.90 0.91 0.92 0.99
1.01 1.01 1.01 1.02 1.02 1.03 1.03 1.03 1.05 1.06
1.08 1.09 1.11 1.13 1.14 1.16 1.18 1.21 1.31 1.33

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.70-0.92	17	0.81	0.07
LIPTINITE/CAVINGS	0.65-0.67	2	0.66	0.01
INERTINITE/REWORKED	0.99-1.33	21	1.10	0.10

NUMBER OF READINGS

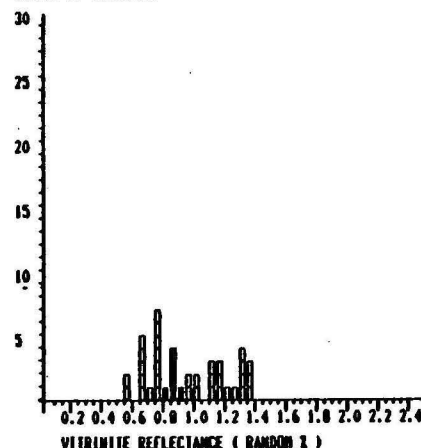


SAMPLE 3125-3140M

0.56 0.58 0.65 0.66 0.66 0.67 0.67 0.74 0.76 0.76
0.77 0.77 0.78 0.78 0.78 0.83 0.85 0.86 0.88 0.89
0.90 0.97 0.97 1.03 1.03 1.10 1.11 1.12 1.16 1.17
1.18 1.23 1.26 1.30 1.30 1.31 1.34 1.35 1.35 1.36

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.83-0.90	6	0.87	0.03
LIPITINITE/CAVINGS	0.56-0.78	15	0.71	0.08
INERTINITE/REWORKED	0.97-1.36	19	1.19	0.13

NUMBER OF READINGS

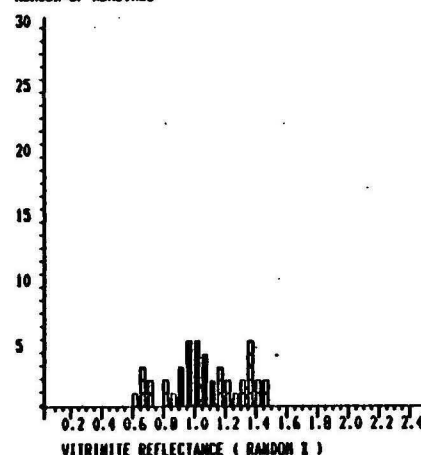


SAMPLE 3305-3380M

0.60 0.65 0.69 0.69 0.71 0.73 0.80 0.81 0.85 0.92
0.93 0.94 0.95 0.96 0.98 0.99 0.99 1.00 1.00 1.02
1.02 1.03 1.05 1.05 1.06 1.09 1.10 1.10 1.16 1.16
1.18 1.21 1.22 1.29 1.30 1.32 1.36 1.36 1.37 1.38
1.39 1.40 1.43 1.45 1.47

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.92-1.10	19	1.01	0.06
LIPITINITE/CAVINGS	0.60-0.85	9	0.73	0.08
INERTINITE/REWORKED	1.16-1.47	17	1.32	0.10

NUMBER OF READINGS

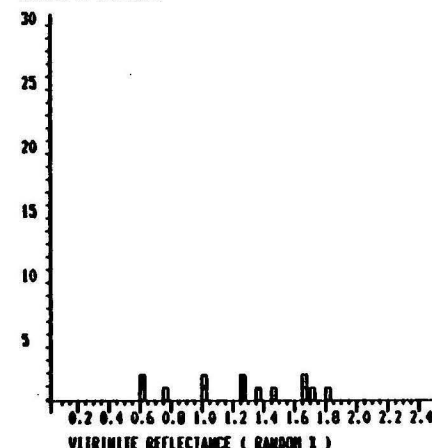


SAMPLE 3495-3510M

0.60 0.63 0.77 1.03 1.04 1.26 1.28 1.38 1.49 1.67
1.67 1.74 1.83

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.26-1.28	2	1.27	0.01
LIPITINITE/CAVINGS	0.60-1.04	5	0.81	0.21
INERTINITE/REWORKED	1.38-1.83	6	1.63	0.17

NUMBER OF READINGS

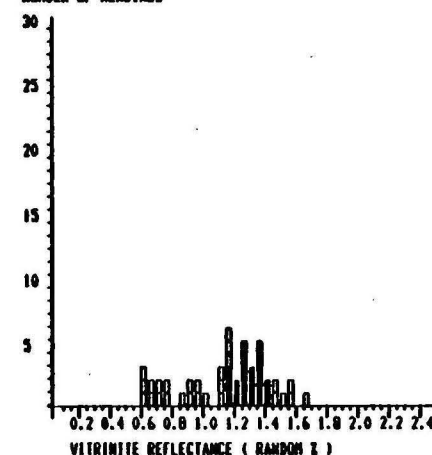


SAMPLE 3530-3545M

0.62 0.64 0.64 0.68 0.69 0.71 0.72 0.77 0.79 0.89
0.92 0.94 0.96 0.99 1.04 1.11 1.12 1.13 1.15 1.16
1.16 1.18 1.18 1.19 1.20 1.22 1.28 1.28 1.28 1.29
1.29 1.30 1.33 1.34 1.35 1.35 1.36 1.39 1.39 1.41
1.43 1.46 1.48 1.52 1.55 1.57 1.68

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.18-1.43	20	1.30	0.08
LIPITINITE/CAVINGS	0.62-1.16	21	0.90	0.20
INERTINITE/REWORKED	1.46-1.68	6	1.54	0.08

NUMBER OF READINGS



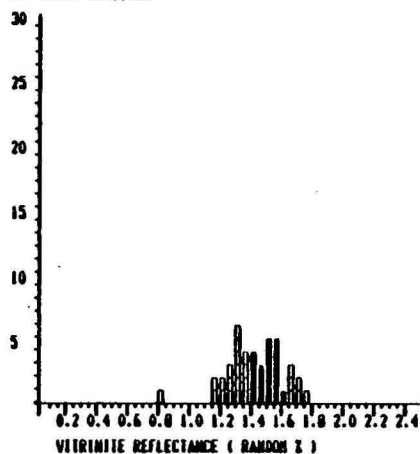
NORTH HIBERNIA-1

SAMPLE 3680-3695M

0.82 1.15 1.16 1.22 1.22 1.25 1.28 1.29 1.30 1.30
1.32 1.33 1.34 1.34 1.35 1.35 1.36 1.37 1.40 1.41
1.42 1.42 1.45 1.47 1.48 1.52 1.52 1.53 1.53 1.54
1.55 1.56 1.56 1.57 1.58 1.63 1.65 1.66 1.66 1.70
1.71 1.75

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.40-1.63	18	1.51	0.07
LIPTINITE/CAVINGS	0.82-1.37	18	1.26	0.13
INERTINITE/REMARKED	1.65-1.75	6	1.69	0.04

NUMBER OF READINGS

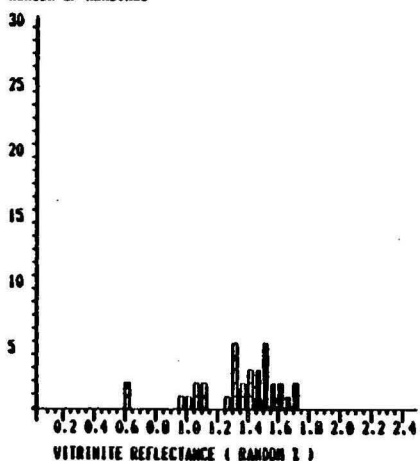


SAMPLE 3770-3785M

0.63 0.64 0.96 1.04 1.05 1.07 1.10 1.10 1.29 1.30
1.31 1.31 1.31 1.34 1.37 1.39 1.41 1.43 1.43 1.46
1.46 1.46 1.50 1.50 1.51 1.51 1.52 1.55 1.56 1.62
1.62 1.65 1.70 1.72

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.46-1.72	15	1.56	0.09
LIPTINITE/CAVINGS	0.63-1.43	19	1.10	0.24

NUMBER OF READINGS



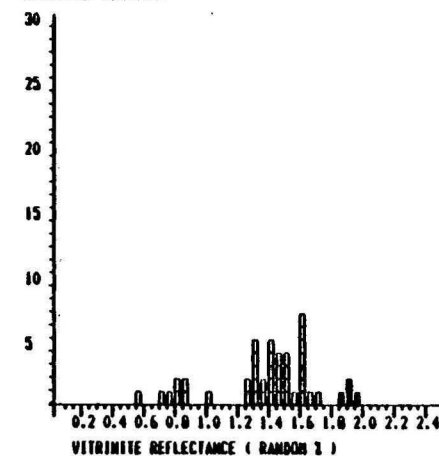
NORTH HIBERNIA-1

SAMPLE 3880-3895M

0.59 0.71 0.77 0.81 0.83 0.86 0.87 1.00 1.29 1.29
1.30 1.32 1.32 1.33 1.33 1.35 1.39 1.40 1.42 1.43
1.44 1.44 1.46 1.46 1.48 1.49 1.50 1.50 1.52 1.53
1.58 1.61 1.61 1.61 1.62 1.62 1.62 1.63 1.67 1.73
1.89 1.91 1.91 1.96

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.89-1.96	4	1.92	0.03
LIPTINITE/CAVINGS	0.59-1.73	40	1.34	0.30

NUMBER OF READINGS

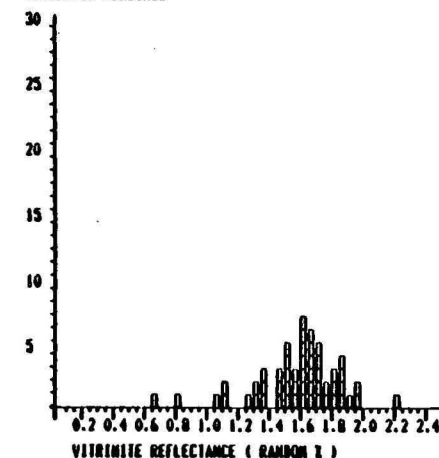


SAMPLE 3990-4000M

0.67 0.83 1.05 1.12 1.14 1.27 1.30 1.34 1.35 1.39
1.39 1.46 1.47 1.48 1.50 1.52 1.52 1.53 1.54 1.57
1.58 1.59 1.61 1.61 1.62 1.63 1.63 1.64 1.64 1.65
1.66 1.67 1.67 1.67 1.68 1.72 1.72 1.73 1.73 1.73
1.75 1.75 1.81 1.82 1.83 1.86 1.87 1.88 1.89 1.92
1.97 1.98 2.20

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
LIPTINITE/CAVINGS	0.67-2.20	53	1.59	0.28

NUMBER OF READINGS



PRUDHOE-1 WELL

SUMMARY

Geochemical analyses of samples from the interval 735m to 3315m of the Prudhoe-1 well have shown that the well section is immature to 800m, early mature between 800m and 1500m, middle mature between 1500m and 2650m, and late mature between 2650m and 3322m TD. The reflectance gradient shows that around 600m of Eocene to Recent section is missing above 735m, 300m of Miocene section is missing at the unconformity at 817m, and possibly 300m of missing Early Permian to Late Jurassic sediments at the unconformity at 2888m. Sediments in the Early Permian section have experienced higher thermal gradients than the remaining sediments of the well section, perhaps reflecting a deep heat source. The sediments analysed are not currently at their maximum depths of burial which was some 500m greater than that of the present day and was reached sometime during the Eocene to Recent.

No oil or gas source rock have been identified in the section analysed.

Samples at 2620m to 2630m and 3075m to 3090m contain migrant "live" oil derived from mature terrestrially sourced waxy kerogens and a biodegraded oil.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 13° 44' 55.75"S, 123° 51' 51.13"E.

Operator and date of drilling: Bocal, 1974.

Well Status: Plugged and abandoned.

TD: 3322m.

Mud data: Seawater/Polymer/CMC/Qmix mud system used over the interval analysed.

Casing data: 30" at 228m, 20" at 505m, 13³/₈" at 1314m.

BHT data: 57°C at 1328m, after 10 hours stopped circulation.
104°C at 3221m, after 16 hours stopped circulation.

Elevation: RT 30m ASL.

PRUDHOE-1 WELL

Water depth: 175m.

Interval analysed: 735m to 3315m.

Age of interval analysed:

	<u>Depths (in metres)</u>
Pliocene-Miocene	735- 817
Eocene	817-1209
Palaeocene	1209-1330
Late Cretaceous	1330-1797
Early-Late Cretaceous	1797-2135
Early Cretaceous	2135-2759
Late Jurassic	2759-2888
Early Permian	2888-3315

Sample type and quality: Dried ditch cuttings samples of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: Most samples yielded sufficient vitrinite for measurements. Measurement was complicated by reworked and caved material in the interval 1550m to 2780m. Results: Fair to good.
- b) Spore Colour Index: The samples analysed yielded sufficient in situ sporomorphs for measurements. Results: Good.

Source Rock data quality: Good, but complicated by the high maturity of the Early Permian section.

Gas chromatography run at: 2510m to 2520m, 2620m to 2630m and 3075m to 3090m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from values of around 3 SCI units at 735m to values of around 8 SCI units at 3322m. Vitrinite reflectance results rise from values of around 0.32% at 735m to around 0.4% at the unconformity at 817m and from 0.4% to 0.8% at the unconformity at 2888m. These unconformities are marked by discontinuities in the reflectance gradient indicating possibly 300m of missing Miocene section at 817m and possibly 300m of

PRUDHOE-1 WELL

missing Early Permian to Late Jurassic section at 2888m. Below 2888m the reflectance gradient is steeper, increasing from values of around 0.95% at 2888m to 1.3% at 3316m.

The results show that the well section is immature to 800m, early mature between 800m and 1500m, middle mature between 1500m and 2650m, and late mature between 2650m and 3322m TD. Extrapolation of the maturity gradients to seabed indicates a cumulative total of around 600m of missing Eocene to Recent section at unconformities above 817m. The sediments analysed are not currently at their maximum depths of burial which were some 500m greater than those of the present day and were reached sometime between the Eocene and Recent. The higher vitrinite reflectance gradient seen towards the base of the well section may be due to higher heat flow reflecting a deep heat source below the base of the well.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

No oil and gas source rocks have been identified within the interval analysed.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

With the exception of samples at 2080m to 2090m and 2510m to 2520m in the Early-Late Cretaceous and Early Cretaceous intervals respectively, mudstone and siltstone lithologies analysed in the interval 1550m to 2960m contain below average organic carbon contents of between 0.02% and 0.79%. The samples at 2080m to 2090m and 2510m to 2520m contain average organic carbon contents of between 1.24% and 1.27%. Pyrolysis analysis of these samples show low hydrogen indices of between 135 to 156 indicating only humic kerogen content. This is confirmed by visual kerogen analysis.

Samples in the interval 3045m to 3315m in the Early Permian generally contain average to above average organic carbon contents of between 1.13% and 2.24%. Both pyrolysis analysis and visual kerogen typing data show that these samples contain mostly inertinitic kerogen.

Extraction, fractionation and gas chromatography analysis of samples at 2510m to 2520m, 2620m to 2630m and 3075m to 3090m shows that the samples at 2620m to 2630m and 3075m to 3090m both contain

PRUDHOE-1 WELL

small quantities of a migrant "live" oil derived from mature terrestrially sourced waxy kerogens and a biodegraded oil. The sample at 2510m to 2520m contains small quantities of hydrocarbons derived from mature waxy kerogens.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
512		Miocene-Pliocene									
735-740	Ctg	LST, wht-off wht	3.0	0.27(3)cvd	20	60	20				
790-795	"	LST, a/a	3.5	0.31(3)	40	50	10				
810-815	"	LST, yel gy + 10% MDST, blk	8.0-10.0rew	0.37(6)	60	40	*				
817		Eocene									
920-925	"	SND + mnr MDST, a/a	5.0rew	0.35(37)	50	50	*				
1209		Palaeocene									
1220-1225	"	SND + 50% COAL	6.5rew		10	85	5				
	P	COAL		0.38(24)							
1330		Santonian-Maastrichtian									
1375-1380	Ctg	SND + mnr SLTST, wht	*	70.46(1)	60	40	mnr				
1550-1560	"	SLTST, dsk yel gn	4.5-5.0	0.53(17)	50	40	10				
1755-1765	"	SLTST, yel gy, v calc	*	0.55(3)	95	5	*				
1797		Late Albian-Cenomanian									
1860-1870	"	MDST, ol gy + 20% MDST, lt ol gy	5.0-5.5	0.59(15)	55	30	15				
1970-1980	"	MDST, ol gy	5.5-6.0	0.62(11)	65	30	5				
2080-2090	"	MDST, med gy	3.0cvd	0.67(7)	80	15	5	40	50	5	5
2135		Neocomian-basal Aptian									
2190-2200	"	MDST, med gy, slty	6.0	0.69(7)	75	25	mnr				
2300-2310	"	MDST, med-lt-gy	7.5rew	0.68(8)	90	10	mnr				
2410-2420	"	MDST, gn-gy	6.5	0.76(2)	80	10	10				
2510-2520	"	MDST, lt ol gy-ol gy	6.5-7.0	0.73(17)	60	35	5	45	50	5	*
2620-2630	"	MDST, med gy + 30% SLTST, mod ol brn	6.0-6.5	0.71(19)	70	20	10				
2759		Tithonian									
2770-2780	"	SLTST, v lt gy-lt gy	7.0	0.81(8)	45	45	10				
2888		Early Permian									
2900-2910	"	MDST, lt brn-gy + 30% MDST, yel gy	7.0-7.5	1.06(18)	90	mnr	10bit				
3045-3060	"	MDST, dk gy, slty	8.0	1.13(13)	80	20	*				
3130-3145	"	SLTST, med gy, arg	8.5-10.0rew	1.25(16)	70	30	*				
3300-3315	"	MDST, med-dk gy, slty	9.0-9.5rew	1.41(21)	60	40	*				
		bit : bitumen									

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS	
1330		Santonian-Maastrichtian														
1550-1560	Ctg	SLTST, dsk yel gn	0.06													
1650-1660	"	SLTST, lt ol gy, calc	0.21													
1755-1765	"	SLTST, yel gy, v calc	0.02													
1797		Late Albian-Cenomanian														
1860-1870	"	MDST, ol gy + 20% MDST, lt ol-gy	-													
	P	MDST, ol gy	0.68													
	P	MDST, lt ol-gy	0.67													
1970-1980	Ctg	MDST, ol gy	1.04													
2080-2090	"	MDST, med gy	1.27	429	135	90	0.07	1.83								
2135		Neocomian-Basal Aptian														
2190-2220	"	MDST, med gy, slty	0.79													
2300-2310	"	MDST, med-lt gy	0.75													
2410-2420	"	MDST, gn-gy	0.04													
2510-2520	"	MDST, lt ol gy-ol gy	1.24	433	156	133	0.08	2.11	1070	86	655	53	51	10	39	
2620-2630	"	MDST, med gy + 30% SLTST, mod ol brn	0.91						1140	125	455	50	33	7	60	
	P	MDST, med gy	0.75													
	"	SLTST, mod ol brn	0.71													
2735-2745	Ctg	SLTST, wht-v lt gy, arg	0.03													
2759		Tithonian														
2770-2780	"	SLTST, v lt gy-lt gy	0.43													
2835-2845	"	SLTST, v lt gy-lt gn	0.30													
2888		Early Permian														
2900-2910	"	MDST, lt brn gy + 30% MDST, yel gy	-													
	P	MDST, lt brn gy	0.15													
	"	MDST, yel gy	0.04													
2950-2960	Ctg	SLTST, v lt gy	0.04													
3045-3060	"	MDST, dk gy, slty	1.13	NDP	30	118	0.29	0.48								
3075-3090	"	MDST, a/a	1.43	NDP	31	83	0.17	0.54	635	44	355	25	45	11	44	
3105-3120	"	MDST, med-dk, slty	1.55	NDP	31	98	0.24	0.63								
3130-3145	"	SLTST, med gy, arg	0.46													
3235-3250	"	MDST, med-dk gy, slty	2.24	430	20	25	0.10	0.49								
3300-3315	"	MDST, med-dk gy, slty	1.25	NDP	21	92	0.24	0.34								

Table 2 Chemical Analysis Data

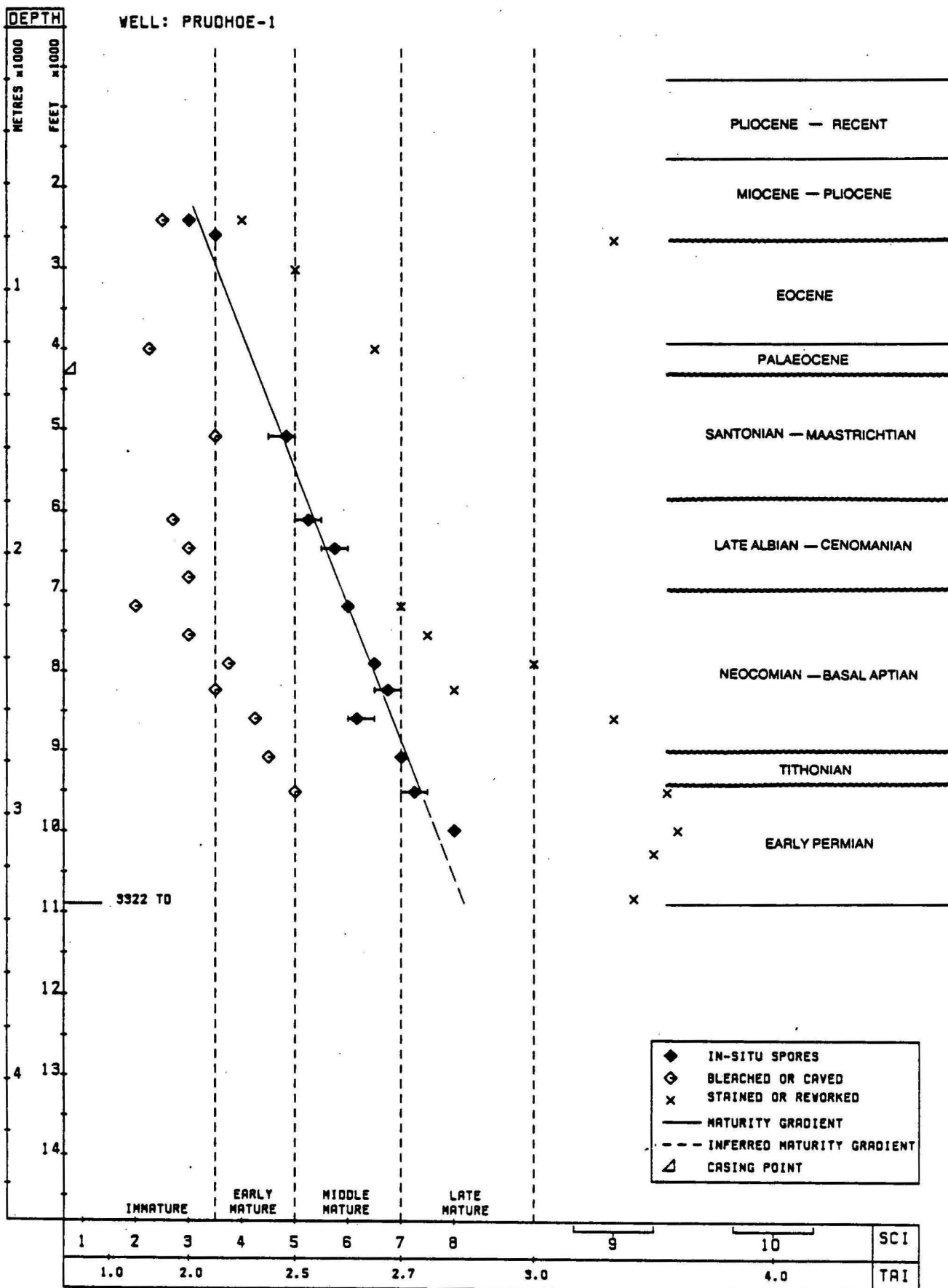


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

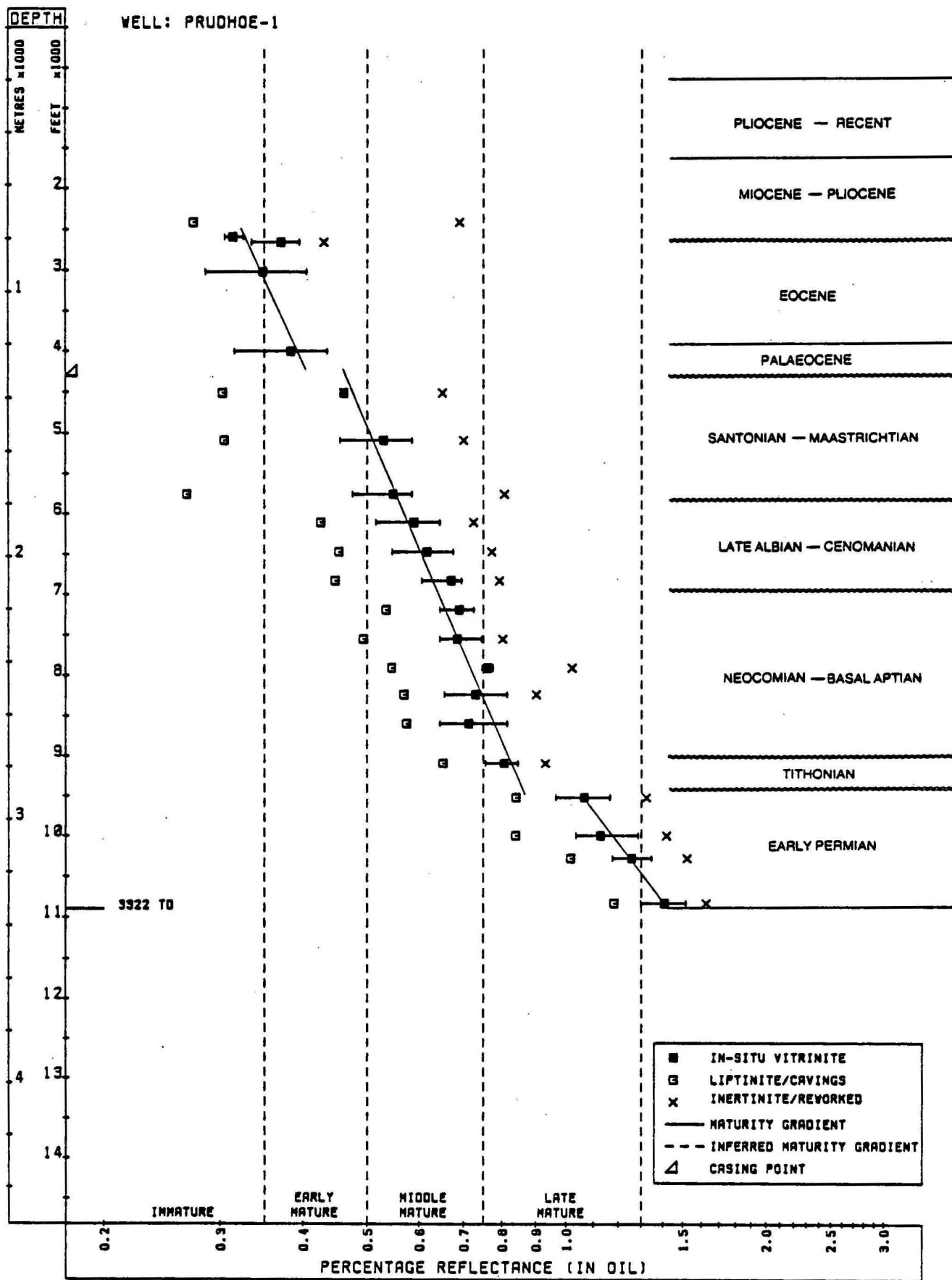
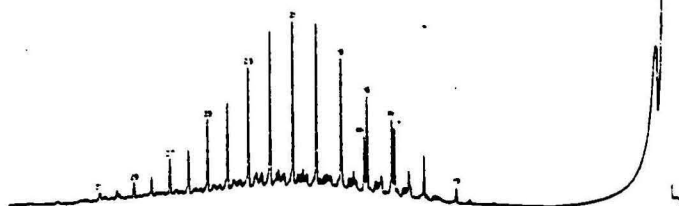
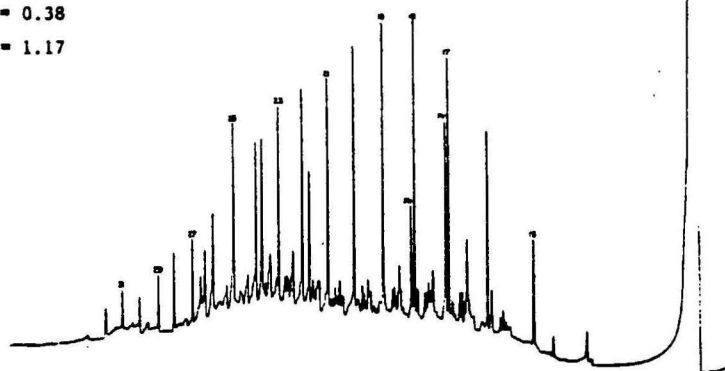


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Prudhoe-1
 2510-2520m
 Neocomian-Basal Aptian
 SCI 6.5-7.0
 Pr/Ph = 1.37
 Pr/n-C₁₇ = 1.13
 Ph/n-C₁₈ = 0.57
 CPI = 1.22



Prudhoe-1
 2620-2630m
 Neocomian-Basal Aptian
 SCI 6.0-6.5
 Pr/Ph = 1.73
 Pr/n-C₁₇ = 0.76
 Ph/n-C₁₈ = 0.38
 CPI = 1.17



Prudhoe-1
 3075-3090m
 Early Permian
 SCI 8.0
 Pr/Ph = 1.74
 Pr/n-C₁₇ = 0.99
 Ph/n-C₁₈ = 0.53
 CPI = 0.94

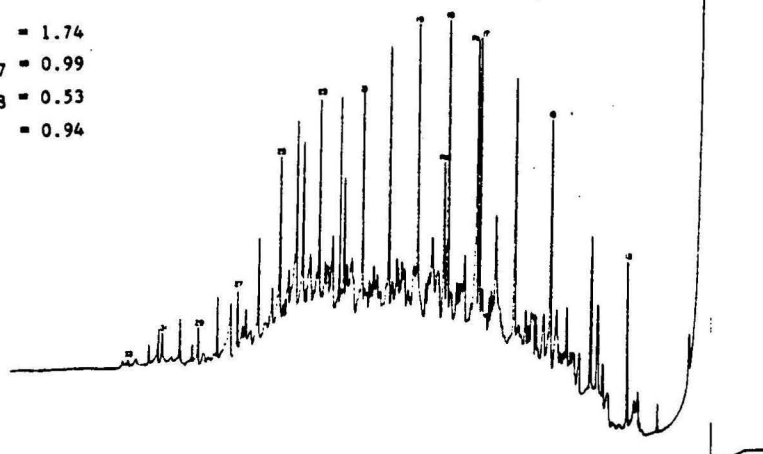


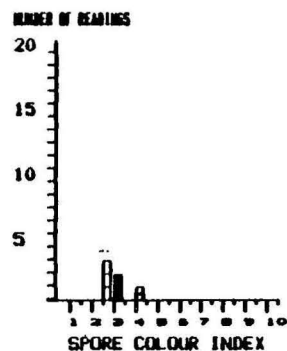
Figure 3

PRUDHOE-1

IN SITU POPULATION

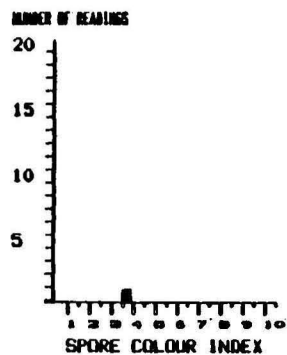
SAMPLE 735-740M
2.5 2.5 2.5 3.0 3.0 4.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	2
BLEACHED/CAVINGS	2.5-2.5	3
STAINED/REWORKED	4.0-4.0	1



SAMPLE 790-795M
3.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.5-3.5	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0

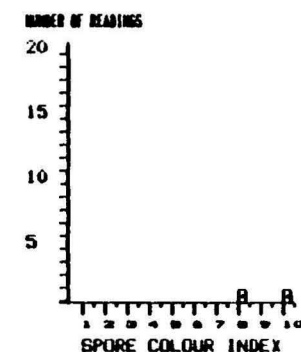


PRUDHOE-1

IN SITU POPULATION

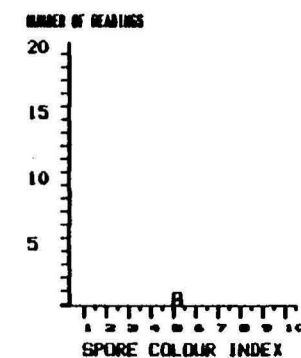
SAMPLE 810-815M
8.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.0-10.0	2



SAMPLE 920-925M
5.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	5.0-5.0	1

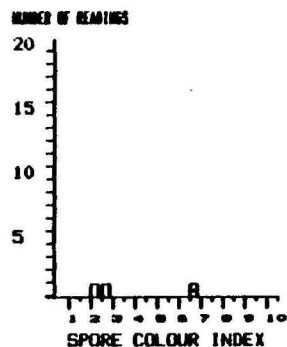


PRUDHOE-1

IN SITU POPULATION

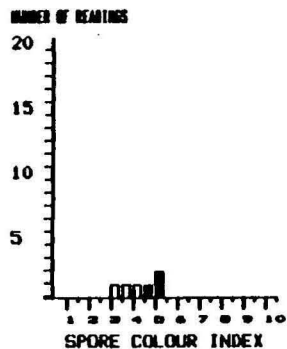
SAMPLE 1220-1225M
2.0 2.5 6.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	2.0-2.5	2
STAINED/REWORKED	6.5-6.5	1



SAMPLE 1550-1560M
3.0 3.5 4.0 4.5 5.0 5.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	4.5-5.0	3
BLEACHED OR CAVED	3.0-4.0	3
STAINED OR REWORKED	-	0

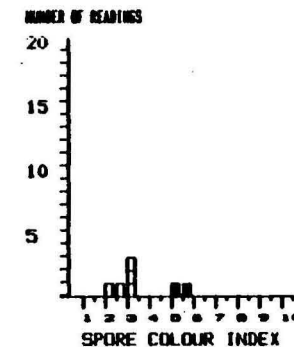


PRUDHOE-1

IN SITU POPULATION

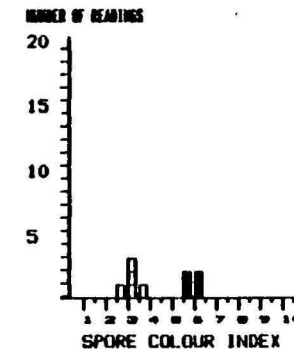
SAMPLE 1860-1870M
2.0 2.5 3.0 3.0 3.0 5.0 5.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.0-5.5	2
BLEACHED OR CAVED	2.0-3.0	5
STAINED OR REWORKED	-	0



SAMPLE 1970-1980M
2.5 3.0 3.0 3.0 3.5 5.5 5.5 6.0 6.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.5-6.0	4
BLEACHED OR CAVED	2.5-3.5	5
STAINED OR REWORKED	-	0

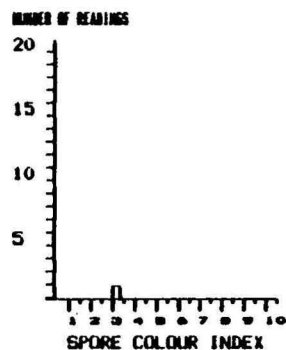


PRUDHOE-1

IN SITU POPULATION

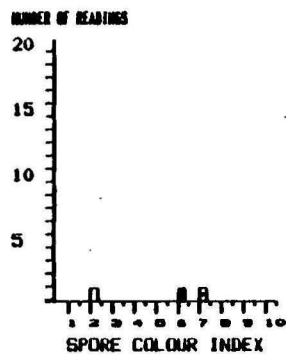
SAMPLE 2080-2090M
3.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	3.0-3.0	1
STAINED OR REWORKED	-	0



SAMPLE 2190-2200M
2.0 6.0 7.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.0-6.0	1
BLEACHED OR CAVED	2.0-2.0	1
STAINED OR REWORKED	7.0-7.0	1

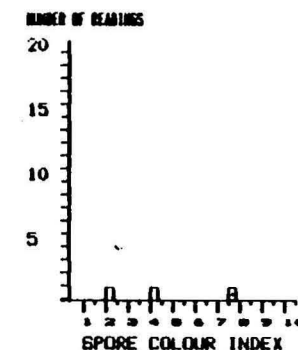


PRUDHOE-1

IN SITU POPULATION

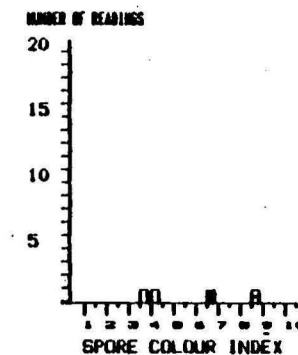
SAMPLE 2300-2310M
2.0 4.0 7.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	2.0-4.0	2
STAINED OR REWORKED	7.5-7.5	1



SAMPLE 2410-2420M
3.5 4.0 6.5 8.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-6.5	1
BLEACHED OR CAVED	3.5-4.0	2
STAINED OR REWORKED	8.5-8.5	1

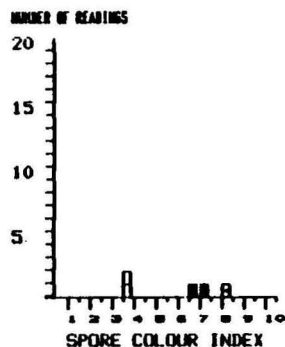


PRUDHOE-1

IN SITU POPULATION

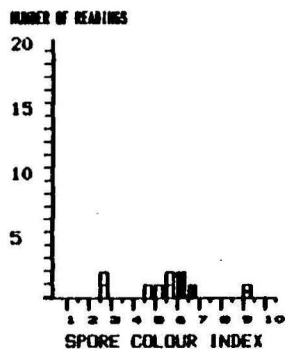
SAMPLE 2510-2520M
3.5 3.5 6.5 7.0 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.5-7.0	2
BLEACHED OR CAVED	3.5-3.5	2
STAINED OR REMORKED	8.0-8.0	1



SAMPLE 2620-2630M
2.5 2.5 4.5 5.0 5.5 5.5 6.0 6.0 6.5 9.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	6.0-6.5	3
BLEACHED OR CAVED	2.5-5.5	6
STAINED OR REMORKED	9.0-9.0	1

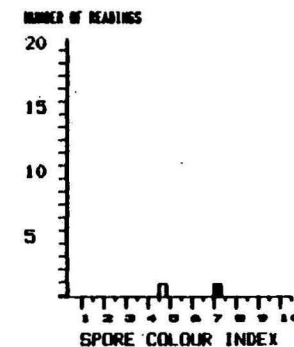


PRUDHOE-1

IN SITU POPULATION

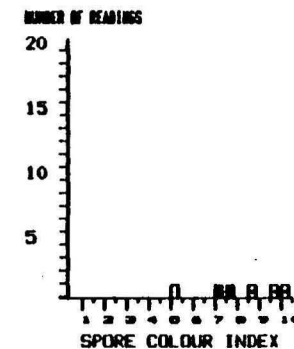
SAMPLE 2770-2780M
4.5 7.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.0-7.0	1
BLEACHED OR CAVED	4.5-4.5	1
STAINED OR REMORKED	-	0



SAMPLE 2900-2910M
5.0 7.0 7.5 8.5 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.0-7.5	2
BLEACHED OR CAVED	5.0-5.0	1
STAINED OR REMORKED	8.5-10.0	3



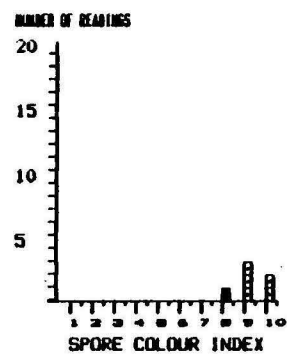
PRUDHOE-1

IN SITU POPULATION

SAMPLE 3045-3060M

8.0 9.0 9.0 9.0 10.0 10.0

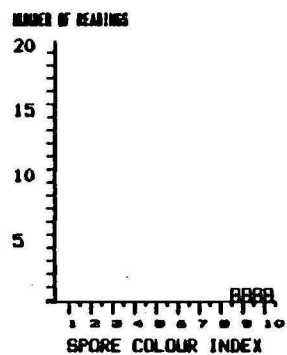
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	8.0-8.0	1
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	9.0-10.0	5



SAMPLE 3130-3145M

8.5 9.0 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	8.5-10.0	4



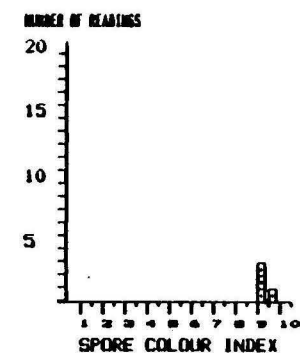
PRUDHOE-1

IN SITU POPULATION

SAMPLE 3300-3315M

9.0 9.0 9.0 9.5

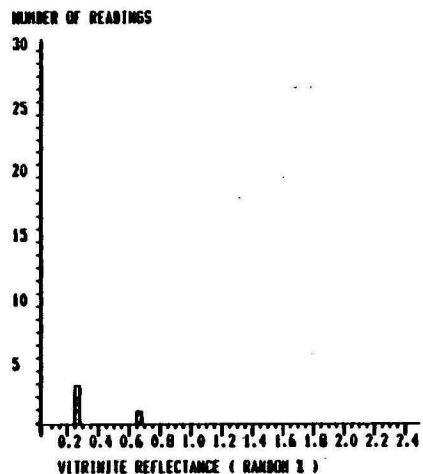
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	9.0-9.5	4



PRUDHOE-1

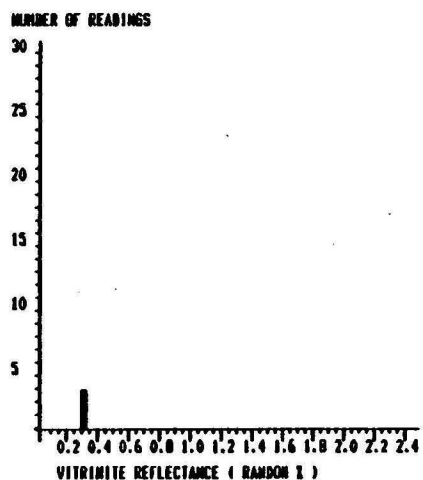
SAMPLE 735-740M
0.27 0.27 0.28 0.69

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
LIPITINITE/CAVINGS	0.27-0.28	3	0.27	0.01
INERTINITE/REWORKED	0.69-0.69	1	0.69	



SAMPLE 790-795M
0.31 0.31 0.32

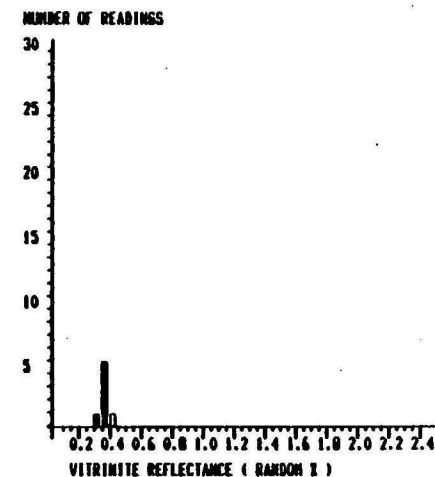
SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.31-0.32	3	0.31	0.01



PRUDHOE-1

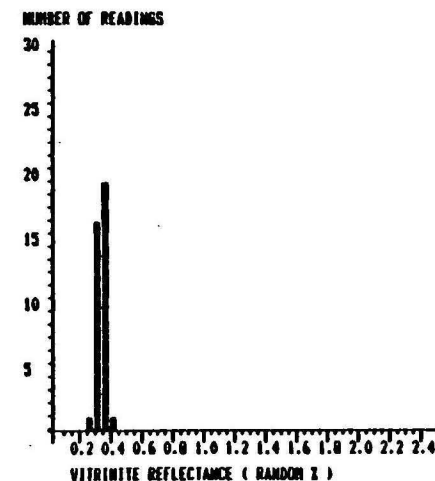
SAMPLE 810-815M
0.34 0.36 0.37 0.38 0.38 0.39 0.43

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.34-0.39	6	0.37	0.02
INERTINITE/REWORKED	0.43-0.43	1	0.43	



SAMPLE 920-925M
0.29 0.30 0.30 0.30 0.31 0.32 0.32 0.32 0.33 0.33
0.33 0.34 0.34 0.34 0.34 0.34 0.34 0.35 0.35 0.35
0.35 0.35 0.36 0.36 0.36 0.37 0.37 0.37 0.37 0.37
0.37 0.37 0.38 0.39 0.39 0.39 0.40

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.29-0.40	37	0.35	0.03



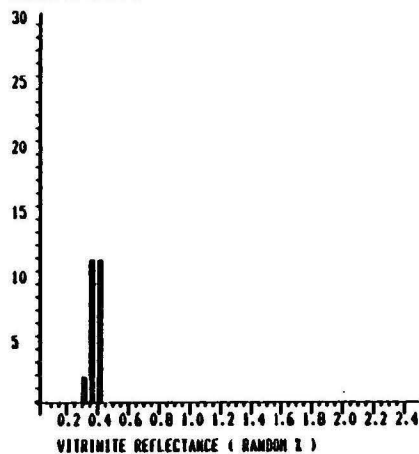
PRUDHDE-1

SAMPLE 1220-1225M

0.32 0.34 0.35 0.35 0.35 0.36 0.36 0.36 0.37 0.37
0.38 0.39 0.39 0.40 0.40 0.40 0.40 0.40 0.41 0.41
0.41 0.42 0.43 0.43

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.32-0.43	24	0.38	0.03

NUMBER OF READINGS

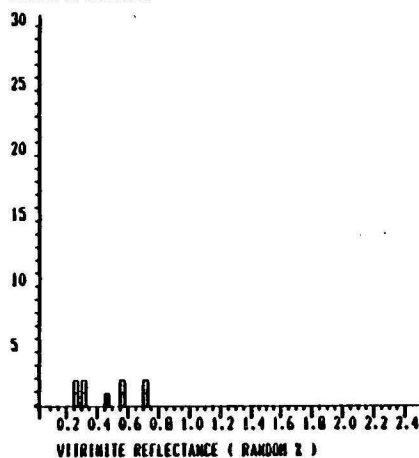


SAMPLE 1375-1380M

0.28 0.29 0.32 0.32 0.46 0.56 0.59 0.72 0.73

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.46-0.46	1	0.46	
LIPTINITE/CAVINGS	0.28-0.32	4	0.30	0.02
INERTINITE/REWORKED	0.56-0.73	4	0.65	0.09

NUMBER OF READINGS



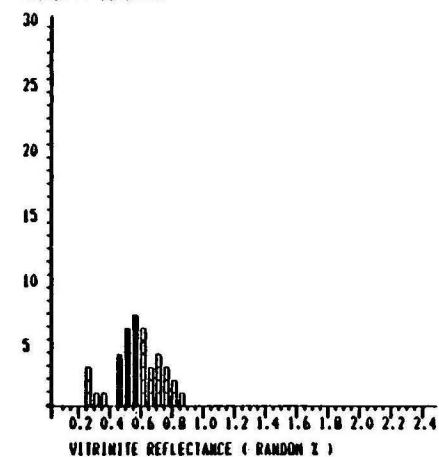
PRUDHDE-1

SAMPLE 1550-1560M

0.25 0.27 0.29 0.34 0.37 0.46 0.47 0.48 0.49 0.50
0.50 0.51 0.53 0.54 0.54 0.55 0.56 0.56 0.56 0.57
0.58 0.58 0.60 0.60 0.62 0.62 0.63 0.64 0.65 0.67
0.69 0.70 0.70 0.71 0.71 0.75 0.75 0.76 0.82 0.82
0.86

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.46-0.58	17	0.53	0.04
LIPTINITE/CAVINGS	0.25-0.37	5	0.30	0.05
INERTINITE/REWORKED	0.60-0.86	19	0.70	0.08

NUMBER OF READINGS

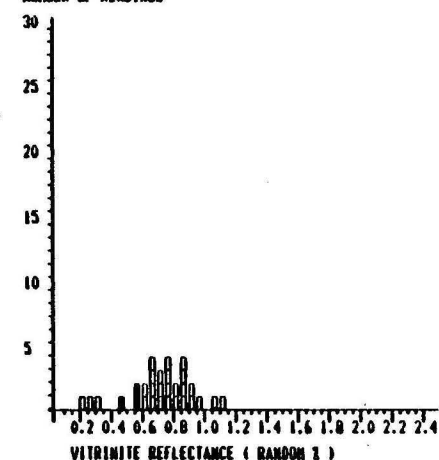


SAMPLE 1755-1765M

0.24 0.26 0.30 0.48 0.58 0.58 0.62 0.63 0.65 0.67
0.69 0.69 0.73 0.73 0.74 0.75 0.75 0.77 0.79 0.81
0.81 0.85 0.85 0.89 0.89 0.94 0.94 0.95 1.08 1.13

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.48-0.58	3	0.55	0.06
LIPTINITE/CAVINGS	0.24-0.30	3	0.27	0.03
INERTINITE/REWORKED	0.62-1.13	24	0.81	0.13

NUMBER OF READINGS



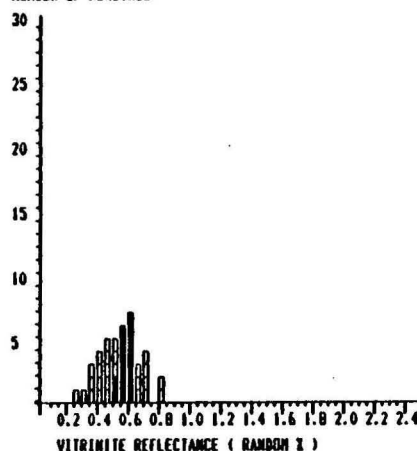
PRUDHOE-1

SAMPLE 1860-1870M

0.26 0.32 0.36 0.37 0.39 0.41 0.42 0.43 0.43 0.45
0.45 0.47 0.48 0.49 0.50 0.50 0.50 0.52 0.53 0.55
0.56 0.57 0.57 0.58 0.59 0.60 0.61 0.62 0.62 0.63
0.64 0.64 0.67 0.68 0.69 0.70 0.71 0.72 0.73 0.81
0.81

SELECTED CLASS	RANGE (R)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.52-0.64	15	0.59	0.04
LIPITINITE/CAVINGS	0.26-0.50	17	0.43	0.07
INERTINITE/REWORKED	0.67-0.81	9	0.72	0.05

NUMBER OF READINGS

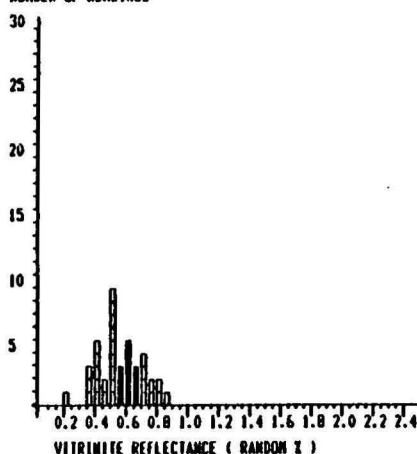


SAMPLE 1970-1980M

0.21 0.37 0.37 0.39 0.41 0.42 0.42 0.42 0.43 0.45
0.46 0.50 0.52 0.52 0.52 0.52 0.53 0.54 0.54
0.55 0.57 0.59 0.60 0.61 0.62 0.62 0.63 0.65 0.66
0.67 0.71 0.72 0.73 0.73 0.76 0.77 0.81 0.83 0.88

SELECTED CLASS	RANGE (R)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.55-0.67	11	0.62	0.04
LIPITINITE/CAVINGS	0.21-0.54	20	0.45	0.08
INERTINITE/REWORKED	0.71-0.88	9	0.77	0.06

NUMBER OF READINGS



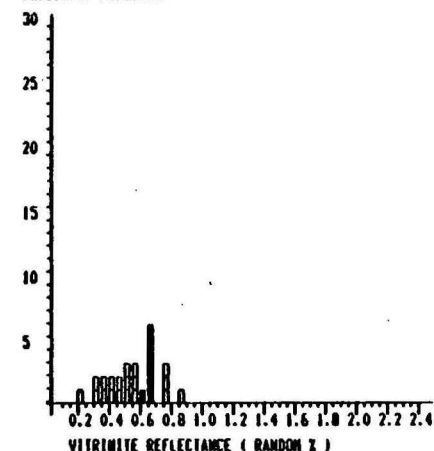
PRUDHOE-1

SAMPLE 2080-2090M

0.21 0.33 0.34 0.36 0.38 0.40 0.42 0.46 0.47 0.50
0.54 0.54 0.58 0.59 0.59 0.61 0.66 0.66 0.69 0.69
0.69 0.69 0.75 0.76 0.77 0.89

SELECTED CLASS	RANGE (R)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.61-0.69	7	0.67	0.03
LIPITINITE/CAVINGS	0.21-0.59	15	0.45	0.11
INERTINITE/REWORKED	0.75-0.89	4	0.79	0.07

NUMBER OF READINGS

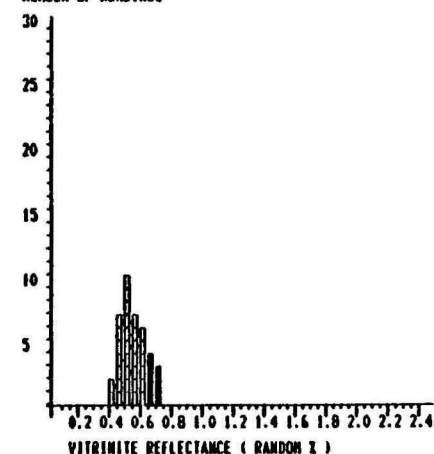


SAMPLE 2190-2200M

0.43 0.44 0.45 0.46 0.46 0.46 0.46 0.48 0.49 0.50
0.51 0.51 0.51 0.52 0.52 0.52 0.53 0.54 0.54 0.55
0.56 0.57 0.57 0.58 0.59 0.59 0.60 0.61 0.62 0.63
0.63 0.64 0.65 0.67 0.68 0.69 0.70 0.71 0.72

SELECTED CLASS	RANGE (R)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.65-0.72	7	0.69	0.02
LIPITINITE/CAVINGS	0.43-0.64	32	0.53	0.06

NUMBER OF READINGS



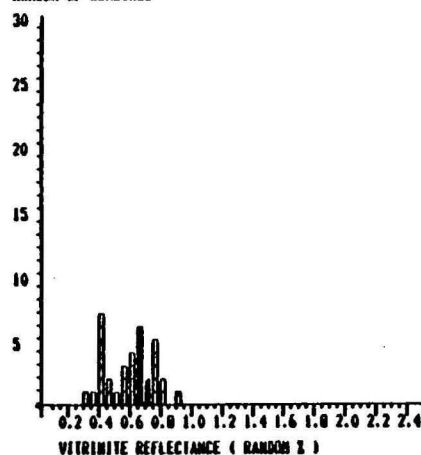
PRUDHOE-1

SAMPLE 2300-2310M

0.33 0.39 0.40 0.41 0.41 0.44 0.44 0.44 0.44 0.46
0.48 0.53 0.55 0.58 0.58 0.61 0.62 0.63 0.63 0.65
0.66 0.67 0.67 0.69 0.69 0.70 0.74 0.75 0.76 0.76
0.77 0.79 0.83 0.84 0.91

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.65-0.74	8	0.68	0.03
LIPTINITE/CAVINGS	0.33-0.63	19	0.49	0.09
INERTINITE/REWORKED	0.75-0.91	8	0.80	0.06

NUMBER OF READINGS

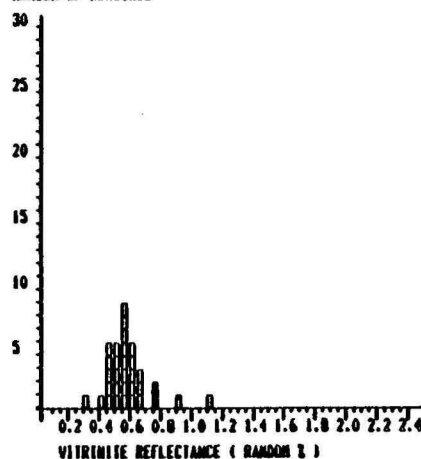


SAMPLE 2410-2420M

0.30 0.44 0.45 0.46 0.46 0.46 0.49 0.50 0.50 0.52
0.53 0.53 0.55 0.56 0.56 0.56 0.58 0.58 0.58 0.59
0.60 0.61 0.62 0.62 0.63 0.65 0.66 0.66 0.75 0.77
0.91 1.13

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.75-0.77	2	0.76	0.01
LIPTINITE/CAVINGS	0.30-0.66	28	0.54	0.08
INERTINITE/REWORKED	0.91-1.13	2	1.02	0.16

NUMBER OF READINGS



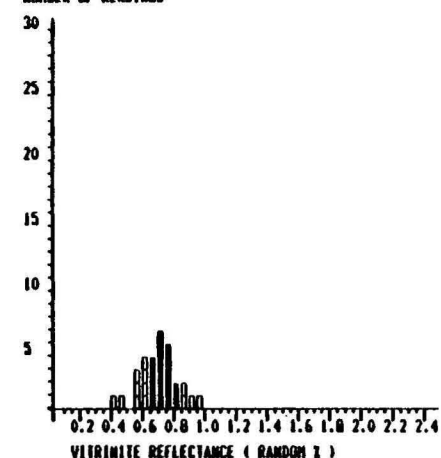
PRUDHOE-1

SAMPLE 2510-2520M

0.43 0.49 0.56 0.57 0.59 0.60 0.62 0.63 0.63 0.66
0.67 0.68 0.69 0.70 0.70 0.70 0.71 0.73 0.74 0.75
0.76 0.76 0.76 0.77 0.80 0.81 0.86 0.87 0.90 0.97

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.66-0.81	17	0.73	0.04
LIPTINITE/CAVINGS	0.43-0.63	9	0.57	0.07
INERTINITE/REWORKED	0.86-0.97	4	0.90	0.05

NUMBER OF READINGS

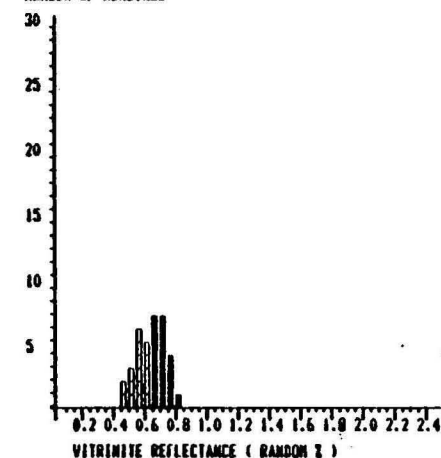


SAMPLE 2620-2630M

0.48 0.49 0.52 0.53 0.54 0.57 0.58 0.59 0.59 0.59
0.59 0.61 0.62 0.62 0.63 0.63 0.65 0.66 0.67 0.67
0.67 0.68 0.68 0.70 0.71 0.71 0.71 0.72 0.73 0.74
0.75 0.75 0.76 0.76 0.81

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.65-0.81	19	0.71	0.04
LIPTINITE/CAVINGS	0.48-0.63	16	0.57	0.05

NUMBER OF READINGS



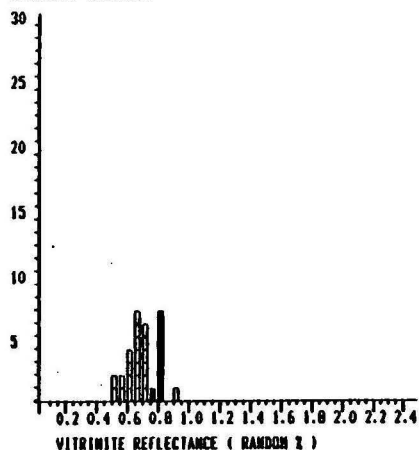
PRUDHOE-1

SAMPLE 2770-2780M

0.50 0.52 0.55 0.56 0.61 0.62 0.64 0.64 0.66 0.66
0.68 0.69 0.69 0.69 0.69 0.70 0.70 0.71 0.71 0.73
0.73 0.76 0.80 0.80 0.81 0.81 0.81 0.81 0.84 0.93

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.76-0.84	8	0.81	0.02
LIPTINITE/CAVINGS	0.50-0.73	21	0.65	0.07
INERTINITE/REWORKED	0.93-0.93	1	0.93	

NUMBER OF READINGS

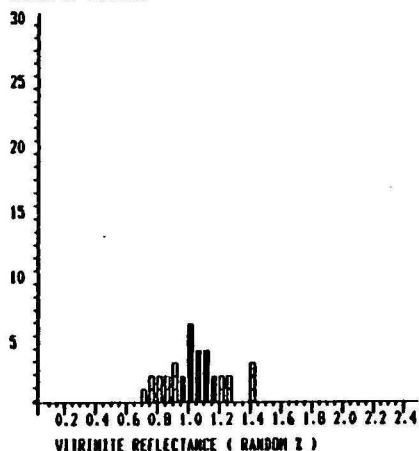


SAMPLE 2900-2910M

0.73 0.75 0.77 0.80 0.82 0.86 0.88 0.92 0.93 0.94
0.97 0.99 1.00 1.00 1.01 1.03 1.04 1.04 1.05 1.07
1.08 1.09 1.10 1.11 1.13 1.13 1.15 1.16 1.20 1.22
1.26 1.27 1.42 1.43 1.44

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.97-1.16	18	1.06	0.06
LIPTINITE/CAVINGS	0.73-0.94	10	0.84	0.08
INERTINITE/REWORKED	1.20-1.44	7	1.32	0.11

NUMBER OF READINGS



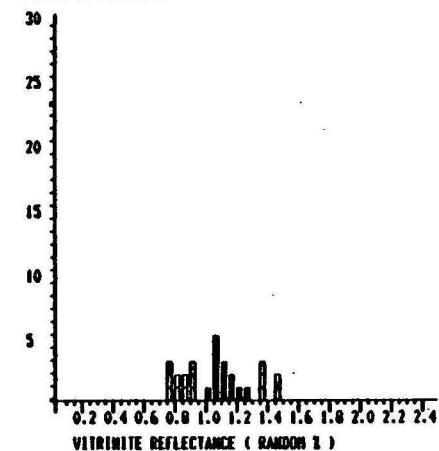
PRUDHOE-1

SAMPLE 3045-3060M

0.75 0.75 0.78 0.80 0.84 0.86 0.89 0.90 0.91 0.91
1.04 1.05 1.08 1.08 1.09 1.09 1.11 1.12 1.14 1.15
1.18 1.23 1.28 1.39 1.39 1.39 1.45 1.46

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.04-1.28	13	1.13	0.07
LIPTINITE/CAVINGS	0.75-0.91	10	0.84	0.06
INERTINITE/REWORKED	1.39-1.46	5	1.42	0.04

NUMBER OF READINGS

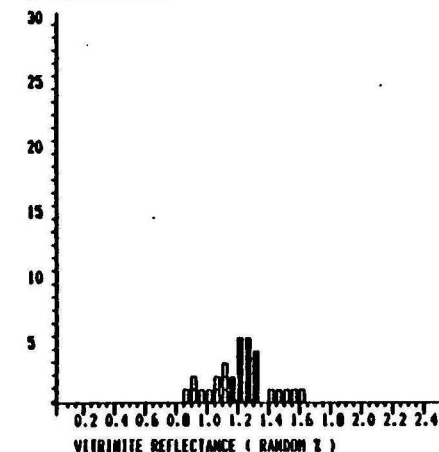


SAMPLE 3130-3145M

0.86 0.91 0.91 0.96 1.00 1.08 1.09 1.10 1.12 1.13
1.18 1.18 1.20 1.20 1.21 1.22 1.24 1.25 1.26 1.27
1.28 1.29 1.30 1.32 1.33 1.34 1.42 1.48 1.51 1.57
1.63

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.18-1.34	16	1.25	0.05
LIPTINITE/CAVINGS	0.86-1.13	10	1.02	0.10
INERTINITE/REWORKED	1.42-1.63	5	1.52	0.08

NUMBER OF READINGS



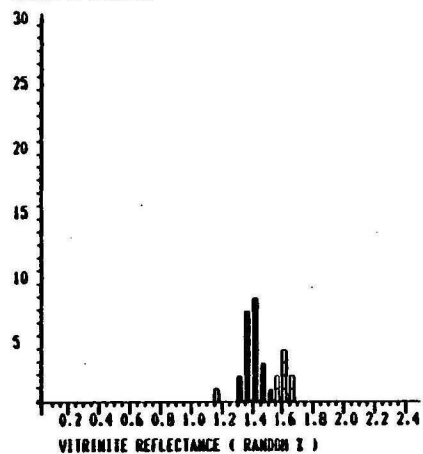
PRUDHOE-1

SAMPLE 3300-3315M

1.10 1.30 1.34 1.35 1.35 1.36 1.37 1.38 1.39 1.39
1.40 1.41 1.41 1.43 1.43 1.44 1.44 1.44 1.45 1.46
1.48 1.51 1.57 1.57 1.60 1.63 1.64 1.64 1.67 1.68

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST. DEV
IN SITU VITRIMITE	1.30-1.51	21	1.41	0.05
LIPITIMITE/CAVINGS	1.10-1.18	1	1.10	
INERTIMITE/REWORKED	1.57-1.68	8	1.63	0.04

NUMBER OF READINGS



PUFFIN-1 WELL

SUMMARY

Vitrinite reflectance and spore colour index analysis of samples from the interval 1646m to 2912m of the Puffin-1 well shows that the well section is early mature between 1646m and 2450m, middle mature between 2450m and 2800m and late mature between 2800m and 2961m TD. The maturity gradients show no evidence of any major uplift and erosion at unconformities within the section analysed. Extrapolation of the gradients to seabed shows 550m of missing Late Cretaceous and younger section above 2119m. The well section is currently at or near its maximum depth of burial.

The non-linearity seen in the maturity gradients between 2332m and 2912m is probably due to an igneous intrusive near the base of the well section.

Extraction of a core piece at 1023m shows that this sample contains a migrant biodegraded oil.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 12° 18' 30"S, 124° 20' 01"E.

Operator and date of drilling: Arco Australia Ltd, 1972.

Well Status: Plugged and abandoned with oil and gas shows.

TD: 2961m.

Mud data: Seawater/high viscosity gel: Seabed to 1091m.
Seawater/gel/Spersene/XP20 system: 1091m to 2961m TD.

Casing data: 30" at 169m, 20" at 272m, 13³/₈" at 1091m, 9⁵/₈" at 2099m.

BHT data: 39.5°C at 1232m, after 3 hours stopped circulation time.
50.5°C at 2114m, after 4 hours stopped circulation time.
89°C at 2956m, after 6 hours stopped circulation time.

Elevation: RT 34m ASL.

Water depth: 102m.

Interval analysed: 1023m to 2912m.

PUFFIN-1 WELL

Age of interval analysed:

	<u>Depths</u> (in metres)
Eocene	1023-1743
Palaeocene	1743-1999
Late Cretaceous	1999-2347
Middle-Late Triassic	2347-2912

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed yielded sufficient vitrinite for measurements. Results: Good.
- b) Spore Colour Index: The samples analysed yielded sufficient sporomorphs for analysis. Results: Good.

Source rock data quality: No analyses performed.

Gas chromatography run at: 1023m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values are interpreted as rising steadily from around 4 SCI units at 1646m to around 5 SCI units at 2332m. Below this depth values increase in a non-linear manner rising from 5 SCI units at 2332m to 7 to 7.5 SCI units at 2912m. Vitrinite reflectance results show a similar linear increase with depth from 0.44% at 1646m to 0.56% at 2332m, followed by a non-linear increase from 0.56% to 0.89% over the interval 2332m to 2912m. The maturity gradients show no evidence of any major erosional unconformities within the section analysed. Extrapolation of the maturity gradients to seabed suggests that 550m of Late Cretaceous and younger section is missing above 2119m. The sediments analysed are currently at or near their maximum depths of burial.

The non-linear maturity gradients seen between 2332m and 2912m is probable due to an igneous intrusive towards the base of the well section.

The results show that the well section is early mature between 1646m and 2450m, middle mature between 2450m and 2800m and late mature between 2800m and 2961m TD.

PUFFIN-1 WELL

MIGRANT HYDROCARBONS (Table 2, Figure 3)

Extraction of the core piece at 1023m shows that the sample contains a biodegraded oil.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
1021		Eocene									
1646-1665	Ctg	LST, off wht-lt gy	3.0cvd	0.64(5)rev							
1743		Palaeocene									
1999		Late Cretaceous									
2119-2134	"	MDST, med-med dk gy + 20% SLTST, yel gy	4.5-5.0	0.56(8)							
2317-2332	"	MDST, a/a + 10% SST, wht	5.0-5.5	0.61(18)							
2347		Middle-Late Triassic									
2500-2515	"	MDST, a/a + 40% SST, yel gy, slty	5.5-6.0	0.62(19)							
2622-2637	"	MDST, a/a + 50% SST, wht-yel gy, v slty, calc	6.0-6.5	0.68(31)							
2820-2835	"	MDST, a/a + 50% LST, wht, off wht + 10% SST, wht, v calc	7.0	0.52(6)cvd							
2896-2912	"	MDST, a/a + 70% LST, a/a	7.5-8.0	0.90(9)							

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T O C)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T O C)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
1023	Core	Lst, oil stained	0.38						2895	762	1515	399	37	15	48

Table 2 Chemical Analysis Data

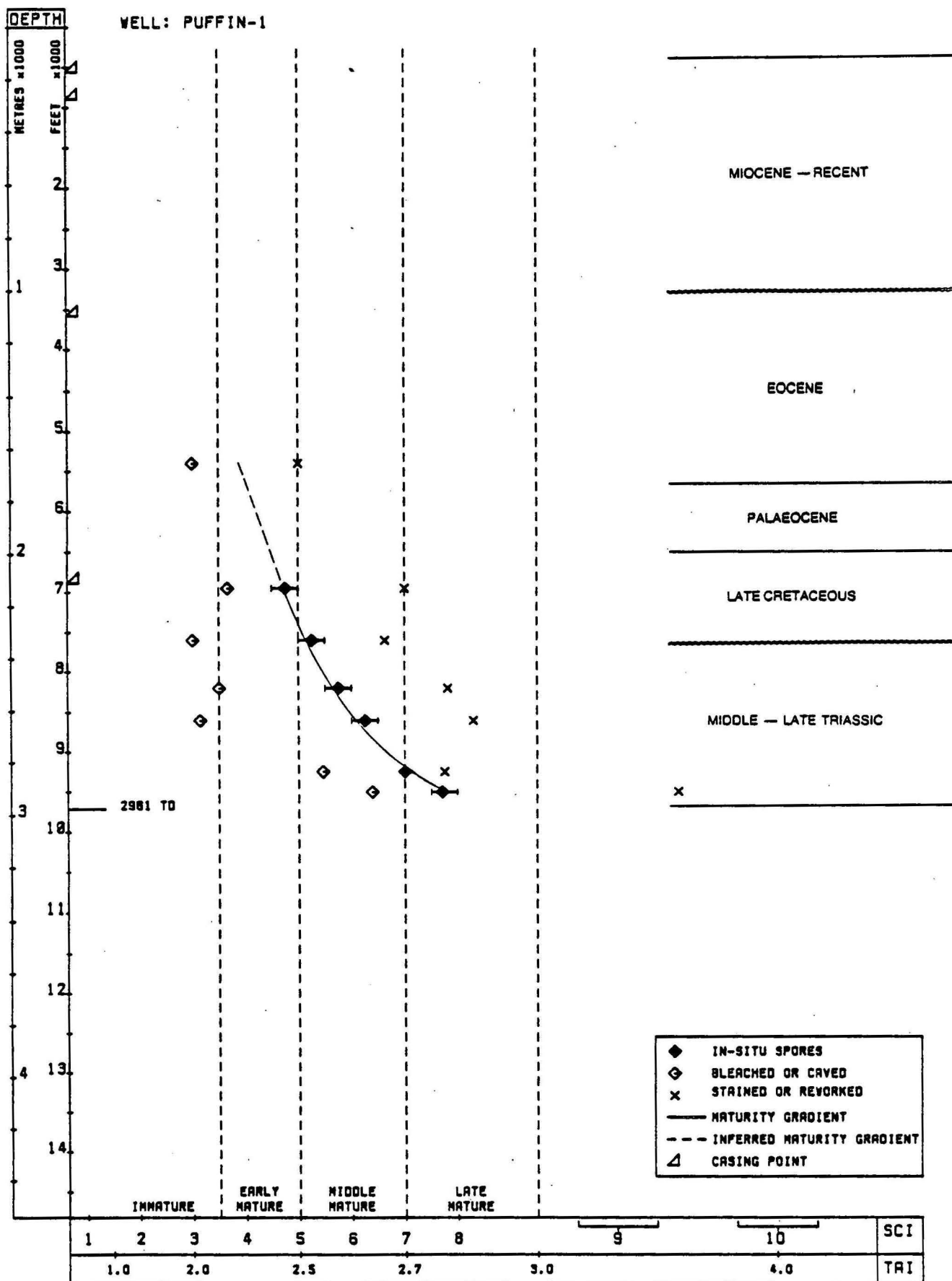


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

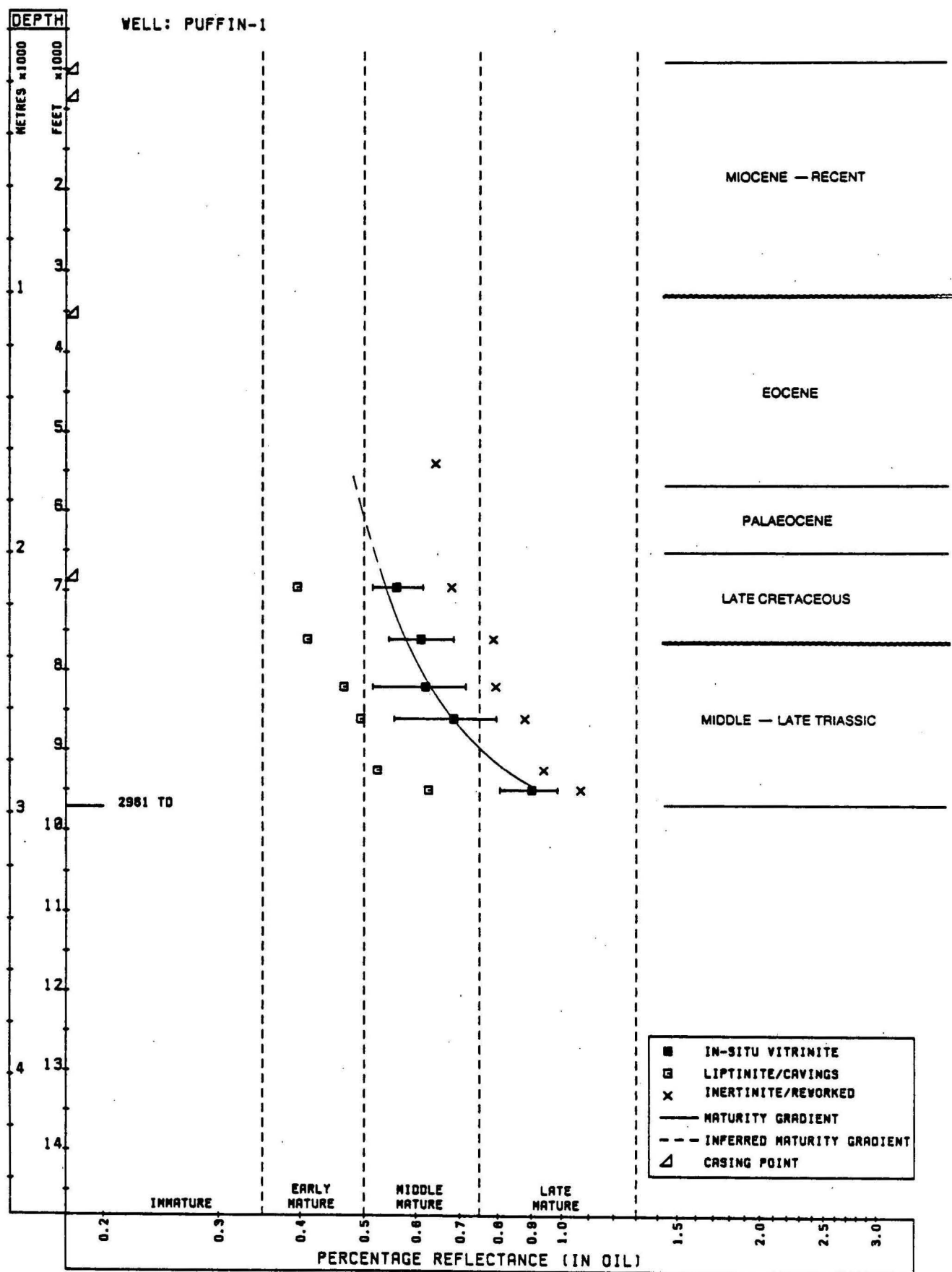


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Puffin-1

1023m

Eocene

Pr/Ph = NDP

Pr/n-C₁₇ = NDP

Ph/n-C₁₈ = NDP

CPI = NDP

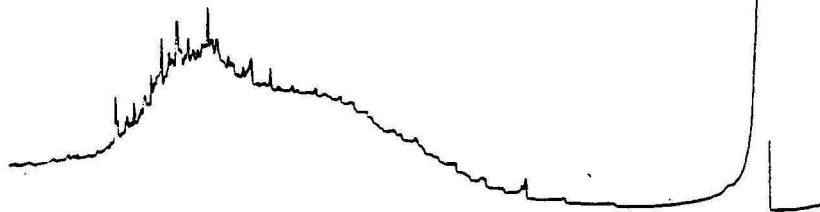


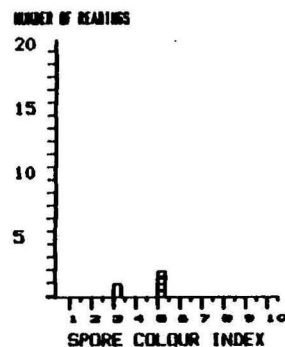
Figure 3

PUFFIN-1

IN SITU POPULATION

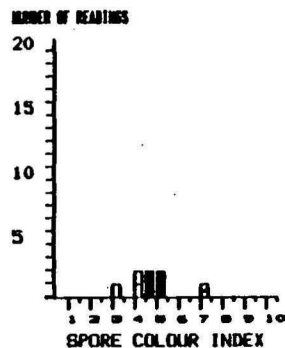
SAMPLE 1646-1665M
3.0 5.0 5.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	3.0-3.0	1
STAINED/REWORKED	5.0-5.0	2



SAMPLE 2119-2134M
3.0 4.0 4.0 4.5 4.5 5.0 5.0 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.5-5.0	4
BLEACHED/CAVINGS	3.0-4.0	3
STAINED/REWORKED	7.0-7.0	1

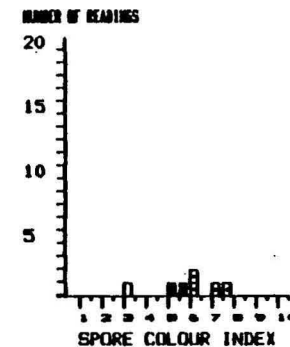


PUFFIN-1

IN SITU POPULATION

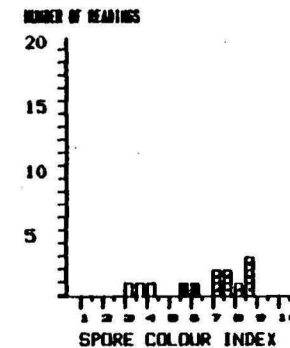
SAMPLE 2317-2332M
3.0 5.0 5.5 6.0 6.0 7.0 7.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.5	2
BLEACHED/CAVINGS	3.0-3.0	1
STAINED/REWORKED	6.0-7.5	4



SAMPLE 2500-2515M
3.0 3.5 4.0 5.5 6.0 7.0 7.0 7.5 7.5 8.0
8.5 8.5 8.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-6.0	2
BLEACHED/CAVINGS	3.0-4.0	3
STAINED/REWORKED	7.0-8.5	8



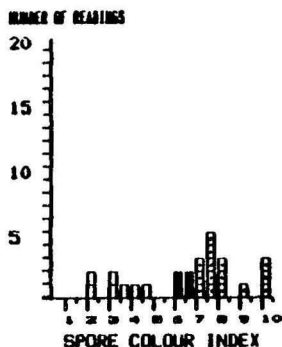
PUFFIN-1

IN SITU POPULATION

SAMPLE 2622-2637M

2.0 2.0 3.0 3.0 3.5 4.0 4.5 6.0 6.0 6.5
6.5 7.0 7.0 7.0 7.5 7.5 7.5 7.5 7.5 8.0
8.0 8.0 9.0 10.0 10.0 10.0

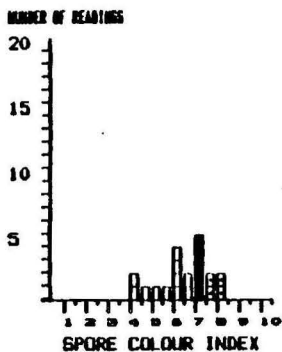
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.5	4
BLEACHED/CAVINGS	2.0-4.5	7
STAINED/REWORKED	7.0-10.0	15



SAMPLE 2820-2835M

4.0 4.0 4.5 5.0 5.5 6.0 6.0 6.0 6.0 6.5
6.5 7.0 7.0 7.0 7.0 7.0 7.5 7.5 8.0 8.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.0-7.0	5
BLEACHED/CAVINGS	4.0-6.5	11
STAINED/REWORKED	7.5-8.0	4



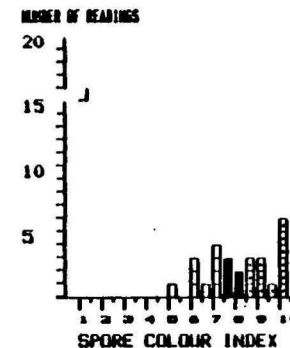
PUFFIN-1

IN SITU POPULATION

SAMPLE 2896-2912M

5.0 6.0 6.0 6.0 6.5 7.0 7.0 7.0 7.0 7.5
7.5 7.5 8.0 8.0 8.5 8.5 8.5 9.0 9.0 9.0
9.5 10.0 10.0 10.0 10.0 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.5-8.0	5
BLEACHED/CAVINGS	5.0-7.0	9
STAINED/REWORKED	8.5-10.0	13



SAMPLE 1646-1665H

0.61 0.62 0.64 0.66 0.68 0.76 0.76 0.78 0.80 0.80
0.82 0.88 0.91 0.95 0.96 0.99 1.01 1.03 1.06 1.09

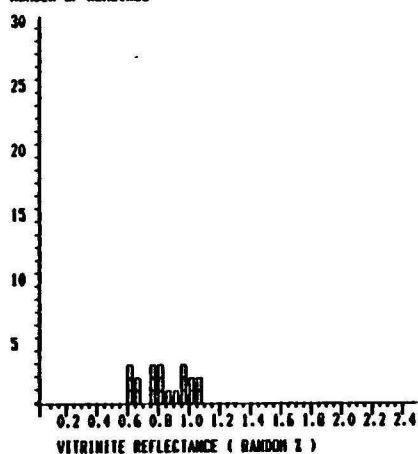
SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
INERTINITE/REWORKED	0.61-0.68	5	0.64	0.03
REWORKED	0.76-1.09	15	0.91	0.11

SAMPLE 2119-2134H

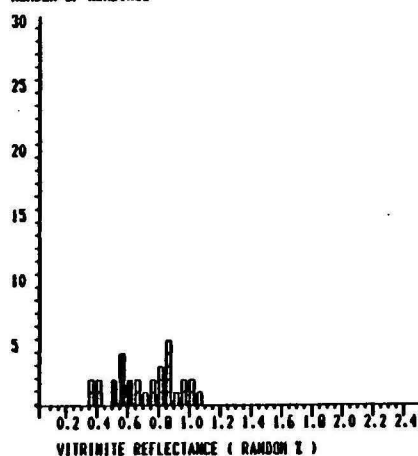
0.36 0.36 0.42 0.44 0.52 0.52 0.53 0.53 0.53 0.58
0.60 0.61 0.65 0.68 0.70 0.78 0.78 0.82 0.84 0.84
0.85 0.86 0.87 0.88 0.88 0.92 0.97 0.98 1.01 1.02
1.09

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.52-0.61	8	0.56	0.03
LIPITINITE/CAVINGS	0.36-0.44	4	0.40	0.04
INERTINITE/REWORKED	0.66-0.70	3	0.68	0.02
REWORKED	0.78-1.09	16	0.90	0.09

NUMBER OF READINGS



NUMBER OF READINGS



PUFFIN-1

SAMPLE 2317-2332H

0.35 0.36 0.38 0.38 0.38 0.39 0.39 0.39 0.40 0.42
0.42 0.42 0.43 0.47 0.47 0.50 0.55 0.55 0.56 0.56
0.56 0.57 0.58 0.61 0.62 0.62 0.63 0.64 0.64 0.65
0.65 0.65 0.66 0.68 0.70 0.70 0.71 0.77 0.77 0.79
0.79 0.80 0.82 0.85 0.87 0.87

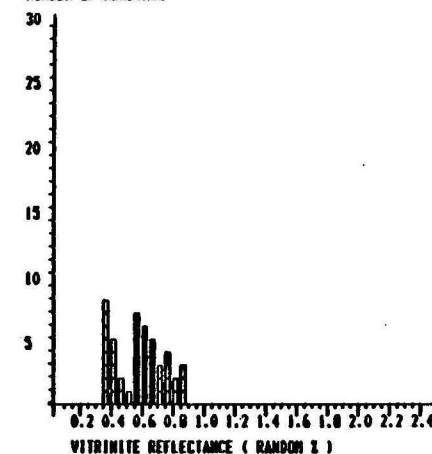
SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.55-0.68	18	0.61	0.04
LIPITINITE/CAVINGS	0.35-0.50	16	0.41	0.04
INERTINITE/REWORKED	0.70-0.87	12	0.79	0.06

SAMPLE 2500-2515H

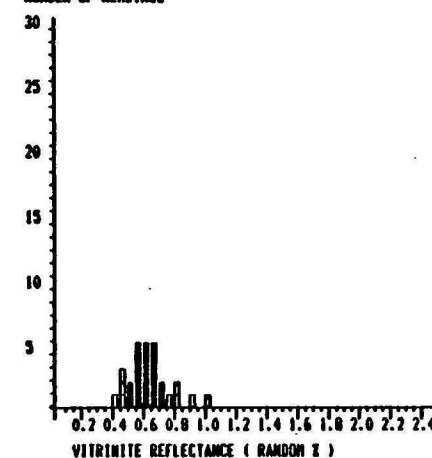
0.43 0.47 0.48 0.48 0.52 0.54 0.56 0.57 0.57 0.58
0.58 0.60 0.61 0.62 0.63 0.63 0.66 0.66 0.67 0.68
0.69 0.70 0.71 0.76 0.80 0.82 0.90 1.02

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.52-0.71	19	0.62	0.06
LIPITINITE/CAVINGS	0.43-0.48	4	0.47	0.02
INERTINITE/REWORKED	0.76-0.82	3	0.79	0.03
REWORKED	0.90-1.02	2	0.96	0.08

NUMBER OF READINGS



NUMBER OF READINGS

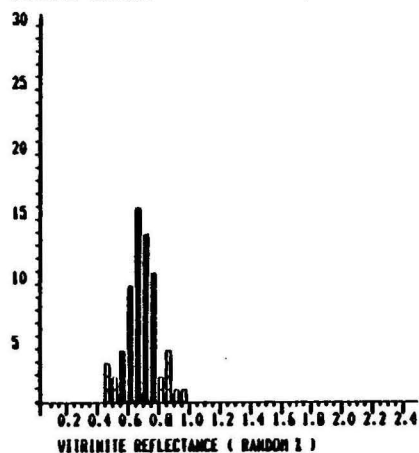


SAMPLE 2622-2637H

0.45 0.48 0.49 0.51 0.54 0.56 0.58 0.58 0.58 0.60
0.60 0.60 0.60 0.60 0.61 0.61 0.64 0.64 0.65 0.65
0.65 0.66 0.66 0.66 0.66 0.67 0.67 0.67 0.68 0.68
0.69 0.69 0.69 0.70 0.70 0.70 0.70 0.72 0.72 0.72
0.73 0.73 0.74 0.74 0.74 0.74 0.75 0.75 0.75 0.76
0.76 0.76 0.77 0.78 0.79 0.79 0.82 0.84 0.85 0.86
0.87 0.89 0.94 0.95

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST. DEV
IN SITU VITRINITE	0.56-0.79	51	0.68	0.06
LIPTINITE/CAVINGS	0.45-0.54	5	0.49	0.03
INERTINITE/REWORKED	0.82-0.95	8	0.88	0.05

NUMBER OF READINGS

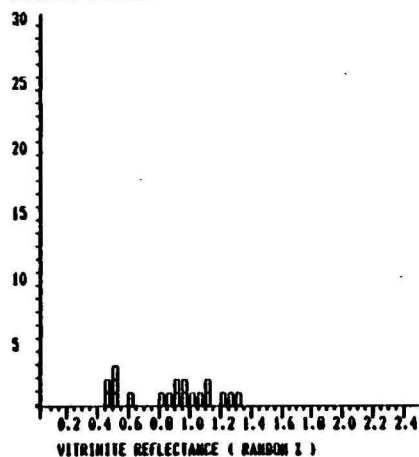


SAMPLE 2820-2835H

0.47 0.49 0.51 0.51 0.53 0.63 0.84 0.88 0.94 0.94
0.96 0.98 1.03 1.07 1.10 1.13 1.22 1.26 1.30

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST. DEV
LIPTINITE/CAVINGS	0.47-0.63	6	0.52	0.06
INERTINITE/REWORKED	0.84-1.03	7	0.94	0.06
REWORKED	1.07-1.30	6	1.18	0.09

NUMBER OF READINGS

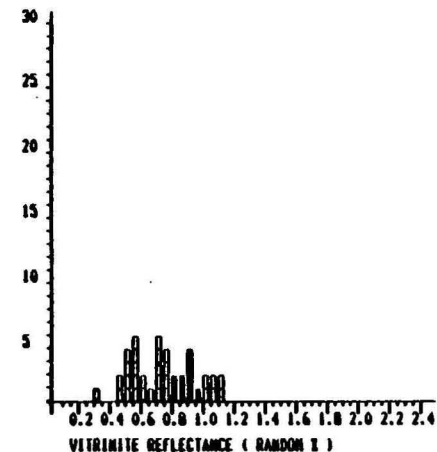


SAMPLE 2896-2912H

0.34 0.45 0.45 0.50 0.50 0.53 0.54 0.56 0.57 0.59
0.59 0.59 0.60 0.63 0.65 0.71 0.71 0.71 0.71 0.74
0.75 0.75 0.78 0.79 0.81 0.84 0.87 0.89 0.91 0.92
0.93 0.94 0.98 1.02 1.02 1.06 1.06 1.12 1.13

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST. DEV
IN SITU VITRINITE	0.81-0.98	9	0.90	0.05
LIPTINITE/CAVINGS	0.45-0.79	23	0.63	0.11
INERTINITE/REWORKED	1.02-1.13	6	1.07	0.05

NUMBER OF READINGS



RAINBOW-1 WELL

SUMMARY

Geochemical analysis of the interval 2066m to 2669m of the Rainbow-1 well has shown that the interval analysed is immature to 2300m, early mature between 2300m and 2392m, middle mature between 2392m and 2500m and late mature between 2500m and 2699m TD. The high maturity gradients below 2392m are best interpreted as being due to high heat flow associated with an igneous intrusive emplaced during the Triassic-Cretaceous. The gradients also indicate 1100m of missing Triassic to Cretaceous sediments at the unconformity at 2392m.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 11° 56' 16.7"S, 124° 19' 54.9"E.

Operator and date of drilling: BHP, 1985.

Well Status: Plugged and abandoned.

TD: 2700m.

Mud data: Seawater and high viscosity pills: Seabed to 1685m.
Lost circulation material added over the interval
297m to 1685m.
Seawater gel/Polymer mud system: 1685m to 2700m TD.

Casing data: 30" at 179m, 20" at 291m, 13³/₈" at 1675m.

BHT data: 79°C at 2697m, circulation time unknown.

Elevation: RT 8m ASL.

Water depth: 135m.

Interval analysed: 2066m to 2669m.

Age of interval analysed:

Palaeocene
Late Cretaceous
Triassic

Depths (in metres)

2066-2194
2194-2392
2392-2699 TD

RAINBOW-1 WELL

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

a) Vitrinite Reflectance: The samples analysed yielded sufficient in situ vitrinite for measurements. Results: Good.

b) Spore Colour Index: The samples analysed yielded sufficient in situ sporomorphs for measurements. Results: Good.

Source rock data quality: Good.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from around 3 to 3.5 SCI units to 3.5 SCI units over the interval 2066m to 2392m. There is a marked discontinuity at this depth. Below 2392m the spore colour index values rise steadily from 6.5 to 7.5 SCI units over the interval 2392m to 2669m. Vitrinite reflectance values rise from interpreted values of around 0.90% to 1.20% over the same interval. The results show that the section is immature to 2300m, early mature between 2300m and 2392m, middle mature between 2392m and 2500m and late mature between 2500m and 2699m TD.

The high maturity gradients below 2392m are best interpreted as being due to an igneous intrusive near the base of the well section emplaced during the Triassic to Cretaceous. The gradients also indicate at least 1100m of missing Triassic to Cretaceous section at 2392m.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2)

No oil or gas source rocks have been identified in the interval analysed.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2)

Analysis of limestone and mudstone lithologies within the analysed interval shows them to contain only minor amounts of organic carbon (TOC values between 0.05% and 0.35%). These sediments have no oil or gas source potential.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
1885		Paleocene									
2066-2078	Ctg	LST, lt gy, arg	3.0	70.27(3)	30	60	10				
2194		Cretaceous									
2234-2246	"	SND, lt gy	3.0-4.0	0.32(24)	30	60	10				
2354-2366	"	LST, lt gy, arg	4.0	0.36(40)	25	60	15				
2392		Triassic (undiff)									
2396-2402	"	MDST, lt-med gy, v calc + 40% LST, wht -pnk gy	6.5-7.0	0.95(8)	65	35	nmr				
2501-2513	"	LST, a/a + 20% LST, med-dk gy	7.0	1.09(14)	70	30	tr				
2597-2618	"	SST, lt gy, arg + 20% MDST, med gy	7.5-8.0	1.12(5)	50	40	10				
2606-2618	"	MDST, lt med gy + 20% SND/SST, wht	4.5-5.0cvd	0.36(29)cvd	40	50	10				
2651-2669	"	SND, lt gy	4.0-4.5cvd	1.08(4)	40	60	nmr				

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
2392		Triassic (undiff)													
2396-2402	Ctg	MDST, lt-med gy, v calc + 40% LST, wht-pnk gy	-												
	P	MDST, lt-med gy, v calc	0.15												
2417-2429	Ctg	LST, wht-pnk gy + 30% MDST, med gy-lt gy, calc	-												
	P	LST, wht-pnk gy	0.07												
	P	MDST, med gy-lt gy, calc	0.05												
2438-2450	Ctg	LST, wht-pnk gy + 40% MDST, med-lt gy	-												
	P	MDST, med-lt gy	0.15												
2459-2474	Ctg	LST, lt gy, arg	0.08												
2480-2495	"	LST, yel gy, arg	0.10												
2501-2513	"	LST, yel gy + 20% LST, med-dk gy	-												
	P	LST, med-dk gy	0.09												
2519-2534	Ctg	LST, wht-lt gy + 10% MDST, med gy lt gy	-												
	P	LST, wht-lt gy	0.05												
	P	MDST, med gy lt gy	0.13												
2534-2549	Ctg	LST, wht-lt gy + 40% MDST, med-med dk gy	-												
	P	MDST, med-med dk gy	0.25												
2558-2573	Ctg	LST, wht + 50% MDST, med -med dk gy	-												
	P	LST, wht	0.04												
2597-2618	Ctg	SST, lt gy, arg + 20% MDST, med gy	-												
	P	MDST, med gy	0.35												

Table 2 Chemical Analysis Data

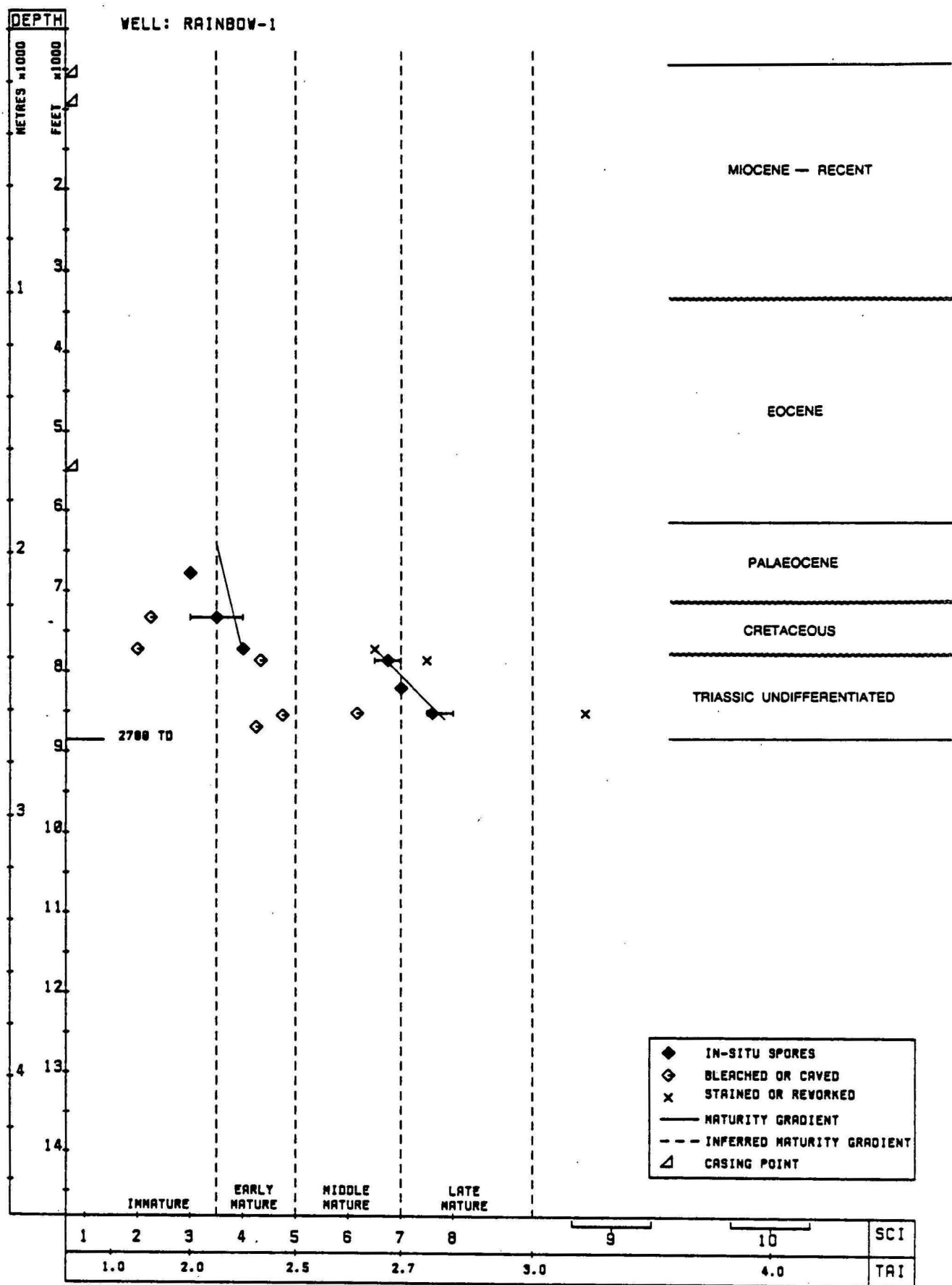


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

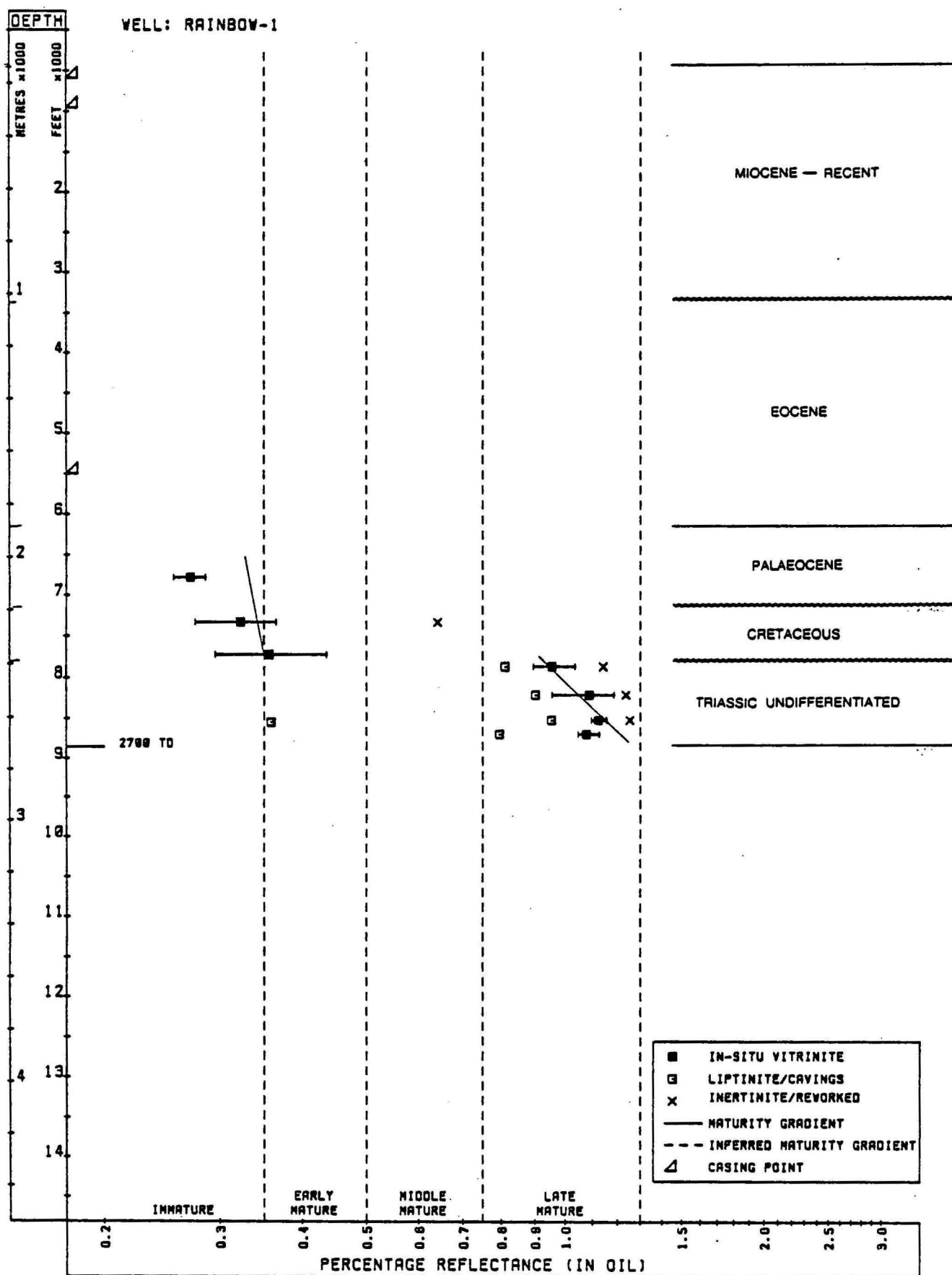


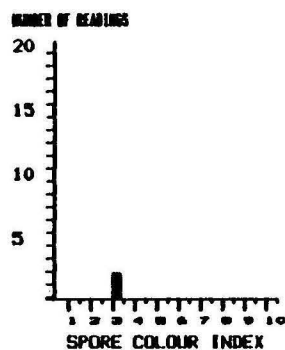
FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

RAINBOW-1

IN SITU POPULATION

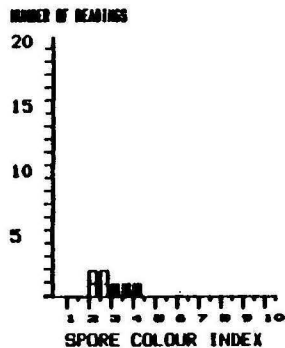
SAMPLE 2066-2078M
3.0 3.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0



SAMPLE 2234-2246M
2.0 2.0 2.5 2.5 3.0 3.5 4.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-4.0	3
BLEACHED/CAVINGS	2.0-2.5	4
STAINED/REWORKED	-	0

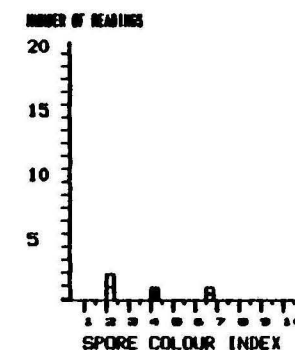


RAINBOW-1

IN SITU POPULATION

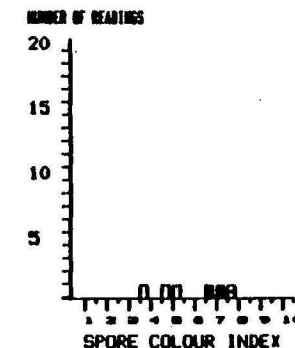
SAMPLE 2354-2366M
2.0 2.0 4.0 6.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.0-4.0	1
BLEACHED/CAVINGS	2.0-2.0	2
STAINED/REWORKED	6.5-6.5	1



SAMPLE 2396-2402M
3.5 4.5 5.0 6.5 7.0 7.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.5-7.0	2
BLEACHED/CAVINGS	3.5-5.0	3
STAINED/REWORKED	7.5-7.5	1

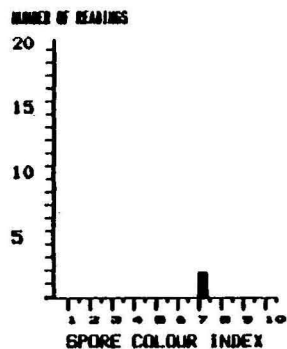


RAINBOW-1

IN SITU POPULATION

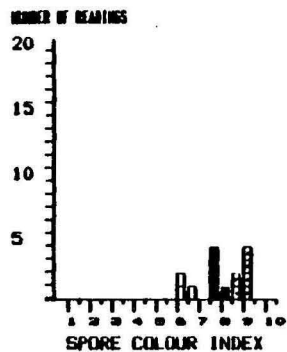
SAMPLE 2501-2513M
7.0 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.0-7.0	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0



SAMPLE 2597-2618M
6.0 6.0 6.5 7.5 7.5 7.5 7.5 8.0 8.5 8.5
9.0 9.0 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.5-8.0	5
BLEACHED/CAVINGS	6.0-6.5	3
STAINED/REWORKED	8.5-9.0	6

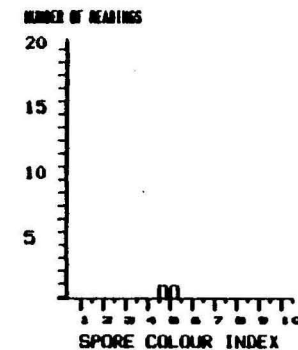


RAINBOW-1

IN SITU POPULATION

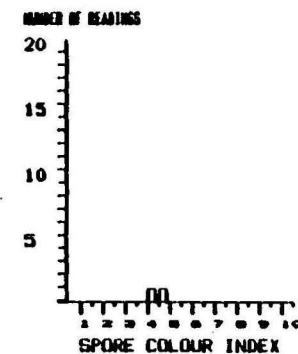
SAMPLE 2606-2618M
4.5 5.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	4.5-5.0	2
STAINED/REWORKED	-	0



SAMPLE 2651-2669M
4.0 4.5

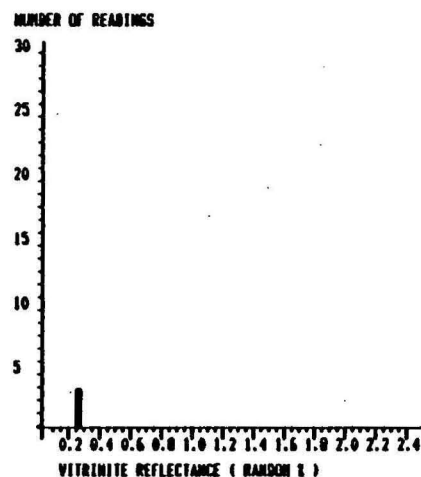
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	4.0-4.5	2
STAINED/REWORKED	-	0



RAINBOW-1

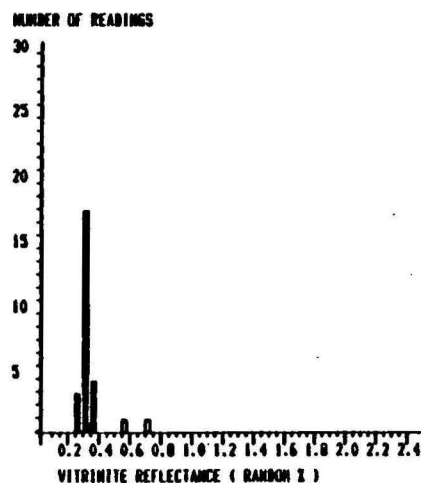
SAMPLE 2066-2070H
0.26 0.27 0.28

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.26-0.28	3	0.27	0.01



SAMPLE 2224-2246H
0.28 0.29 0.29 0.30 0.30 0.30 0.30 0.30 0.31 0.32
0.32 0.32 0.33 0.33 0.33 0.33 0.33 0.33 0.34 0.34
0.35 0.36 0.36 0.36 0.55 0.73

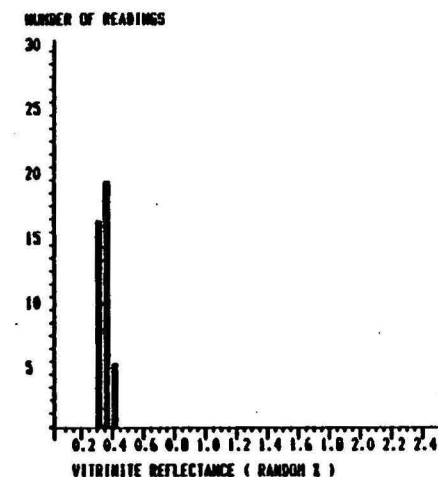
SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.28-0.36	24	0.32	0.02
INERTINITE/REWORKED	0.55-0.73	2	0.64	0.13



RAINBOW-1

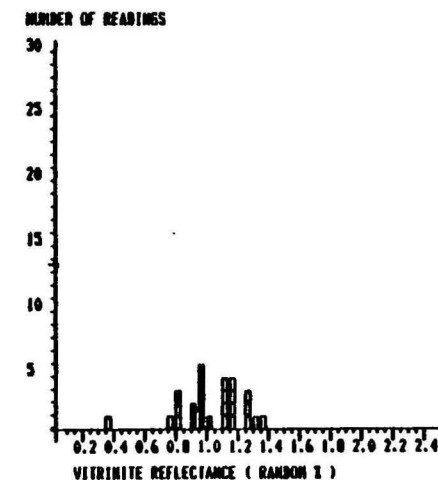
SAMPLE 2334-2366H
0.30 0.30 0.32 0.32 0.33 0.33 0.34 0.34 0.34 0.34
0.34 0.34 0.34 0.34 0.34 0.34 0.35 0.35 0.35 0.35
0.35 0.35 0.35 0.35 0.35 0.36 0.36 0.36 0.36 0.37
0.38 0.38 0.38 0.38 0.39 0.40 0.41 0.41 0.42 0.43

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.30-0.43	40	0.36	0.03



SAMPLE 2336-2402H
0.36 0.78 0.81 0.81 0.84 0.90 0.92 0.95 0.95 0.95
0.96 0.97 1.03 1.10 1.11 1.12 1.13 1.15 1.16 1.17
1.19 1.27 1.28 1.28 1.34 1.39

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.90-1.03	8	0.95	0.04
LIPITINITE/CAVINGS	0.78-0.84	4	0.81	0.02
INERTINITE/REWORKED	1.10-1.19	8	1.14	0.03
REWORKED	1.27-1.39	5	1.31	0.05

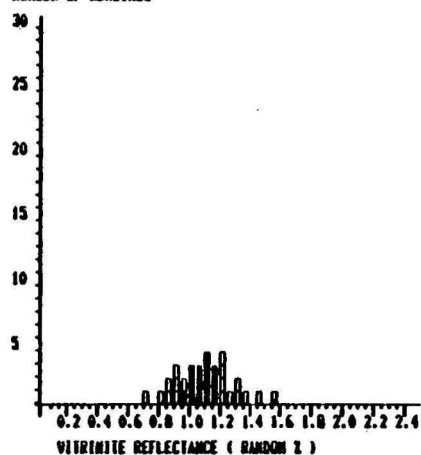


SAMPLE 2501-2513H

0.74 0.82 0.86 0.86 0.93 0.94 0.94 0.95 0.96 1.01
1.02 1.03 1.05 1.05 1.07 1.12 1.12 1.13 1.14 1.16
1.16 1.18 1.21 1.22 1.23 1.23 1.28 1.31 1.34 1.39
1.48 1.57

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.96-1.18	14	1.09	0.07
LIPTINITE/CAVINGS	0.82-0.95	7	0.90	0.05
INERTINITE/REWORKED	1.21-1.28	5	1.23	0.03
REWORKED	1.31-1.57	5	1.42	0.11

NUMBER OF READINGS

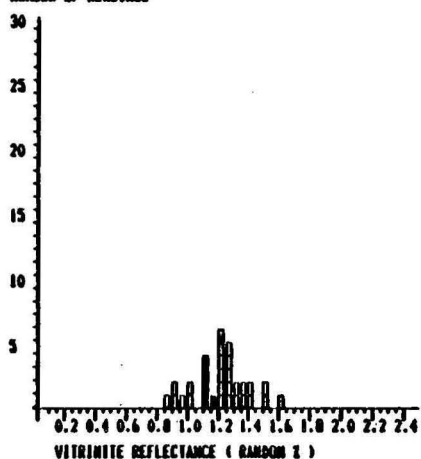


SAMPLE 2597-2618H

0.86 0.91 0.91 0.99 1.00 1.04 1.10 1.10 1.12 1.14
1.15 1.22 1.22 1.23 1.23 1.24 1.24 1.25 1.27 1.29
1.29 1.29 1.32 1.34 1.36 1.38 1.41 1.43 1.50 1.51
1.62

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	1.10-1.15	5	1.12	0.02
LIPTINITE/CAVINGS	0.86-1.04	6	0.95	0.07
INERTINITE/REWORKED	1.22-1.29	11	1.25	0.03
REWORKED	1.32-1.62	9	1.43	0.10

NUMBER OF READINGS



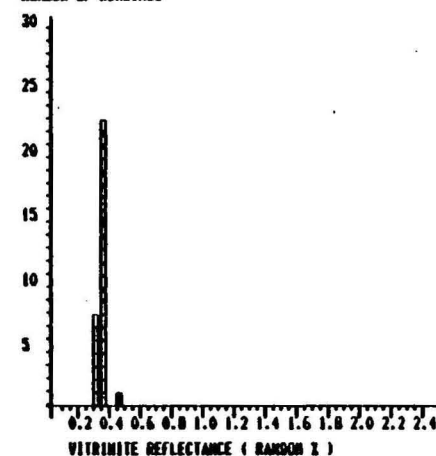
RAINBOW-1

SAMPLE 2606-2618H

0.33 0.33 0.33 0.34 0.34 0.34 0.34 0.35 0.35 0.35
0.35 0.35 0.35 0.36 0.36 0.36 0.36 0.36 0.36 0.36
0.37 0.37 0.37 0.37 0.38 0.39 0.39 0.39 0.39 0.45

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
LIPTINITE/CAVINGS	0.33-0.39	29	0.36	0.02

NUMBER OF READINGS

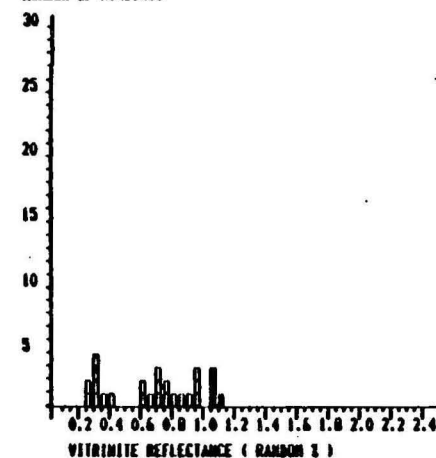


SAMPLE 2651-2662H

0.29 0.29 0.30 0.31 0.34 0.34 0.35 0.40 0.62 0.62
0.65 0.70 0.72 0.73 0.75 0.78 0.82 0.87 0.94 0.96
0.98 0.98 1.05 1.05 1.08 1.12

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	1.05-1.12	4	1.08	0.03
LIPTINITE/CAVINGS	0.62-0.98	14	0.79	0.13

NUMBER OF READINGS



ROB ROY-1 WELL

SUMMARY

Geochemical analyses of selected samples from the interval 582m to 2256m of the Rob Roy-1 well show that the well section is immature to around 1100m, early mature between 1100m and 1900m and middle mature below this depth to basement at 2255m. The vitrinite reflectance gradient indicates 200m of missing Early Permian to Middle Jurassic sediments at 1572m and 200m of missing Middle Jurassic to Neocomian section at the unconformity at 1461m. Extrapolation of the gradient to seabed indicates a cumulative total of possibly 600m of missing Palaeocene to Recent section at unconformities above 582m. The sediments analysed are not currently at their maximum depths of burial which were some 500m greater than those of the present day and were reached sometime during the Palaeocene to Recent.

Source rock analyses show good to very good oil and fair gas source potential in Middle Jurassic mudstones between 1524m and 1572m. Coals in this interval will also have very good oil and gas source potential if sufficiently thick. Early Permian mudstones in the interval have locally restricted poor to fair oil and poor gas source potential within the interval 1572m to 1762m.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 13° 58' 15.6"S, 124° 11' 57.1"E.

Operator and date of drilling: Bocal, 1972.

Well Status: Plugged and abandoned.

TD: 2286m.

Mud data: Seawater/gel system: Seabed to 672.5m.

Low solids seawater/gel dextrid mud system: 672.5m to 1292.5m.

Low solids/Polymer mud system: 1292.5m to to 2286m TD.

Casing data: 30" at 136m, 20" at 405m, 13³/₈" at 1280m.

BHT data: 57°C at 1292m, after 3 hours stopped circulation.

75°C at 2070m, after 4 hours stopped circulation.

81°C at 2285m, after 8 hours stopped circulation.

ROB ROY-1 WELL

Elevation: RT 9.5m ASL.

Water depth: 112m.

Interval analysed: 582m to 2256m.

Age of interval analysed:

	<u>Depths (in metres)</u>
Palaeocene	582- 700
Late Cretaceous	700- 774
Early-Late Cretaceous	774-1189
Early Cretaceous	1189-1461
Middle Jurassic	1461-1572
Early Permian	1572-2255
Proterozoic	2255-2256

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples yielded sufficient vitrinite for measurements. Analysis was hampered by abundant reworked and inertinitic kerogen. Results: Fair.
- b) Spore Colour Index: The samples analysed yielded sufficient indigenous sporomorphs for analysis. Measurements were hindered in the upper part of the section by reworked sporomorphs. Results: Fair to good.

Source rock data quality: Good.

Gas chromatography run at: 1537m to 1546m, 1570m to 1585m, 1622m to 1634m and 1744m to 1759m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from around 2.5 SCI units at 582m to around 5.5 SCI units at 2256m. Vitrinite reflectance values rise from 0.28% to 0.56% over the same interval. The results show the well section to be immature to around 1100m, early mature between 1100m and 1900m and middle mature below this depth to basement at 2255m. The vitrinite reflectance gradient shows

ROB ROY-1 WELL

around 200m of missing Early Permian to Middle Jurassic section at 1572m and 200m of missing Middle Jurassic to Neocomian sediments at the unconformity at 1461m. Extrapolation of the maturity gradients to the seabed indicates a cumulative total of possibly 600m of missing Palaeocene to Recent section at unconformities above 582m. The sediments analysed are not currently at their maximum depths of burial which were some 500m greater than those of the present day and were reached during the Palaeocene to Recent.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

Organically rich mudstones in the interval 1537m to 1759m in the Middle Jurassic to Early Permian section contain above average to average organic carbon contents of between 1.83% and 5.19%. These mudstones contain minor interbeds of coal in the interval 1570m to 1634m. Pyrolysis analysis of these coals and mudstones shows relatively high hydrogen indices of between 167 and 296 associated with low oxygen indices. This indicates that the samples contain significant quantities of algal and waxy sapropel and have good oil and gas source potential. Analysis of electric logs provided suggests that approximately 65m of organically rich shales are present in the interval 1537m to 1744m.

Extraction of samples at 1537m to 1546m, 1570m to 1585m, 1622m to 1634m and 1744m to 1759m yielded moderate to large quantities of extractable bitumen. Fractionation of these extracts shows them to contain abundant heteroatomic compounds and saturated hydrocarbons with lesser quantities of aromatic hydrocarbons. The alkane gas chromatograms of these samples show hydrocarbon distributions typical of hydrocarbons derived from a mixture of mature waxy and algal kerogens. They also show high unresolved naphthenic baseline humps indicating that the samples also contain small quantities of a biodegraded oil.

The results suggest good to very good oil and fair gas source potential in the Middle Jurassic sediments between 1524m and 1572m and locally poor to fair oil and gas source potential for Early Permian sediments within the interval 1572m to 1762m. Minor coals in the Middle Jurassic section will have good oil and gas source potential. These source rocks will require greater depths of burial than seen on structure before generating significant quantities of oil and gas.

ROB ROY-1 WELL

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1
and 2, Figure 3)

The remaining mudstones analysed in the intervals 912m to 1280m and 1899m to 2256m contain below average to average organic contents of between 0.02% and 1.59%. Pyrolysis analysis of samples with TOC values greater than 1% showed only low hydrogen indices of between 21 and 50 indicating predominantly humic kerogen content. Visual kerogen analysis shows only minor oil-prone kerogen content in these intervals.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
566		Palaeocene									
582-595	Ctg	SND, wht-pnk gy, occ carb	2.5	0.32(34)	25	65	10				
637-649	"	SND, a/a + mnr MDST, gn-blk	3.0	0.31(13)	20	65	15				
700		Maastrichtian									
774		Albian-Cenomanian									
777-790	"	SND, a/a, occ lithic fragments	3.0	0.31(23)	20	60	20				
848-860	"	SND + 50% SST, lt ol gy, lt gy, mod rd-brn, arg	3.0-3.5	0.32(13)	30	55	15				
912-915	"	MDST, yel gy	3.0-3.5	0.36(7)	40	40	20				
936-951	"	MDST, lt ol gy						90	10	*	*
985-1000	"	MDST, a/a	3.0-3.5	0.33(17)	45	30	25	85	15	*	*
1091-1107	"	MDST, a/a	3.0cvd	0.34(12)	35	65	tr				
1189		Aptian									
1183-1198	"	MDST, a/a	3.5-4.0	0.38(20)	40	50	10				
1231		Neocomian									
1229-1244	"	MDST, a/a						85	15	*	*
1265-1280	"	MDST, a/a	3.5-4.0	0.37(12)	35	40	25	85	15	*	*
1461		Middle Jurassic									
1537-1546	"	MDST, gy-brn + 60% SST, wht-lt gy + 10% SLTST, med-lt gy	4.5	0.45(9)	45	45	10				
	P	MDST, gy-brn						55	10	15	20
1551	Core	SST, wht	3.0cvd	0.35(16)cvd	30	60	10				
1572		Early Permian									
1570-1585	P	MDST, med gy						40	40	15	5
	P	COAL, blk						70	15	15	*
1622-1634	Ctg	MDST, med gy + 70% SST, wht-lt gy + mnr COAL, blk	2.0-3.5cvd	0.38(35)cvd	45	40	15				
	P	COAL, blk						60	10	30	*
1744-1759	Ctg	MDST, med-lt gy, v slty + 10% SST, wht-v lt gy	4.5-5.0	0.38(24)cvd	35	45	20				
	P	MDST, med-lt gy, v slty						5	80	5	10
1888.8+1889	Core	MDST, med gy	7.0-9.0rew	1.75(32)rew	50	50	*				
1899-1905	Ctg	MDST, med lt gy, v slty + 40% SST, a/a	2.5-4.0cvd	0.55(1)	45	35	20				

Table 1a Maturity and Kerogen Composition Data

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
2000-2015	Ctg	MDST, med-lt gy + 10% SST, wht	4.5-5.0	20.57(1)	50	40	10				
2116-2131	"	MDST, med gy-med-dk gy + mnf SST, wht	7.5-8.5rew	1.56(20)rew	70	30	mnf				
2209	Core	SLIST, lt gy-wht, f lam	8.0-10.0rew	1.70(43)rew	65	35	*				
2255		Proterozoic									
2247-2256	Ctg	MDST, a/a + 30% SST, wht	5.0-5.5	0.62(3)	60	40	*				

Table 1b Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS	
774		Albian-Cenomanian														
912-9150	Ctg	MDST, yel gy	0.44													
921-930	"	MDST, lt ol gy + mnr SND	0.77													
936-951	"	MDST, a/a + mnr SND	1.09	419	21	108	0.21	0.29								
985-1000	"	MDST, a/a	1.11	423	50	70	0.13	0.64								
1046-1061	"	MDST, a/a	0.95													
1092-1107	"	MDST, lt ol gy	0.91													
1137-1152	"	MDST, a/a	0.87													
1189		Aptian														
1183-1198	"	MDST, a/a	0.86													
1231		Neocomian														
1229-1244	"	MDST, lt ol gy	1.43	428	50	70	0.07	0.77								
1265-1280	"	MDST, a/a	1.59	418	33	52	0.12	0.60								
1461		Middle Jurassic														
1537-1546	"	MDST, gy-brn + 10% SLTST, med lt gy + 60% SST, wht -lt gy	1.90						2265	119	1180	62	45	7	48	
	P	MDST, gy-brn	4.90	419	296	17	0.15	17.10								
	P	SLTST, med lt gy	0.06													
1572		Early Permian														
1570-1585	Ctg	MDST, med gy + 80% SND + SST, wht-v lt gy + mnr COAL, blk	3.79						3745	99	2420	64	53	12	35	
	P	MDST, med gy	5.19	420	249	28	0.27	17.75								
	P	COAL, blk	55.95	410	167	21	0.19	114.95								
1622-1634	Ctg	MDST, med gy + 70% SST, wht-v lt gy + mnr COAL, blk	3.74						1710	46	1160	31	55	13	32	
	P	MDST, med gy	0.85													
	P	COAL, blk	50.28	408	291	15	0.18	177.85								
1744-1759	Ctg	MDST, med-lt gy, v slty + 10% SST, wht-v lt gy	0.90						695	77	340	38	40	9	51	
	P	MDST, med-lt gy, v slty	1.83	428	274	49	0.08	5.44								
1899-1905	Ctg	MDST, med-lt gy, v slty + 40% SST, wht-v lt gy	-													
	P	MDST, a/a	0.31													
1921-1933	Ctg	MDST, med lt gy, v slty +10% SST, wht	-													
	P	MDST, med lt gy, v slty	0.90													

Table 2a Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g TOC)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g TOC)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
2000-2015	Ctg	MDST, med-lt gy + 10% SST, wht	-												
	P	MDST, med-lt gy	0.02												
2116-2131	Ctg	MDST, med gy-med-dk gy + med SST, wht	0.04												
2255		Proterozoic													
2247-2256	"	MDST, med gy-med-dk gy + 30% SST, wht	-												
	P	MDST, a/a	0.85												

Table 2b Chemical Analysis Data

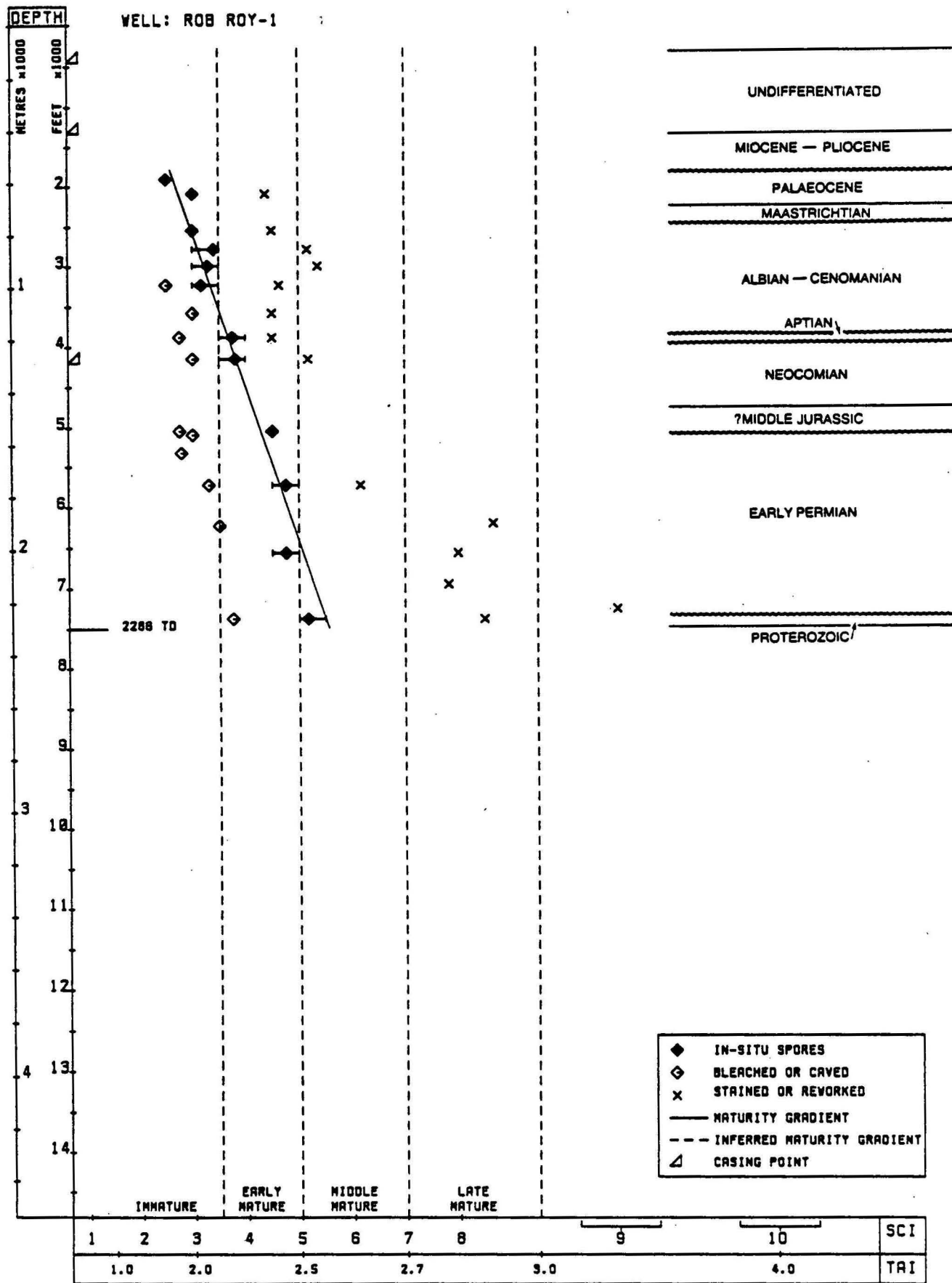


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

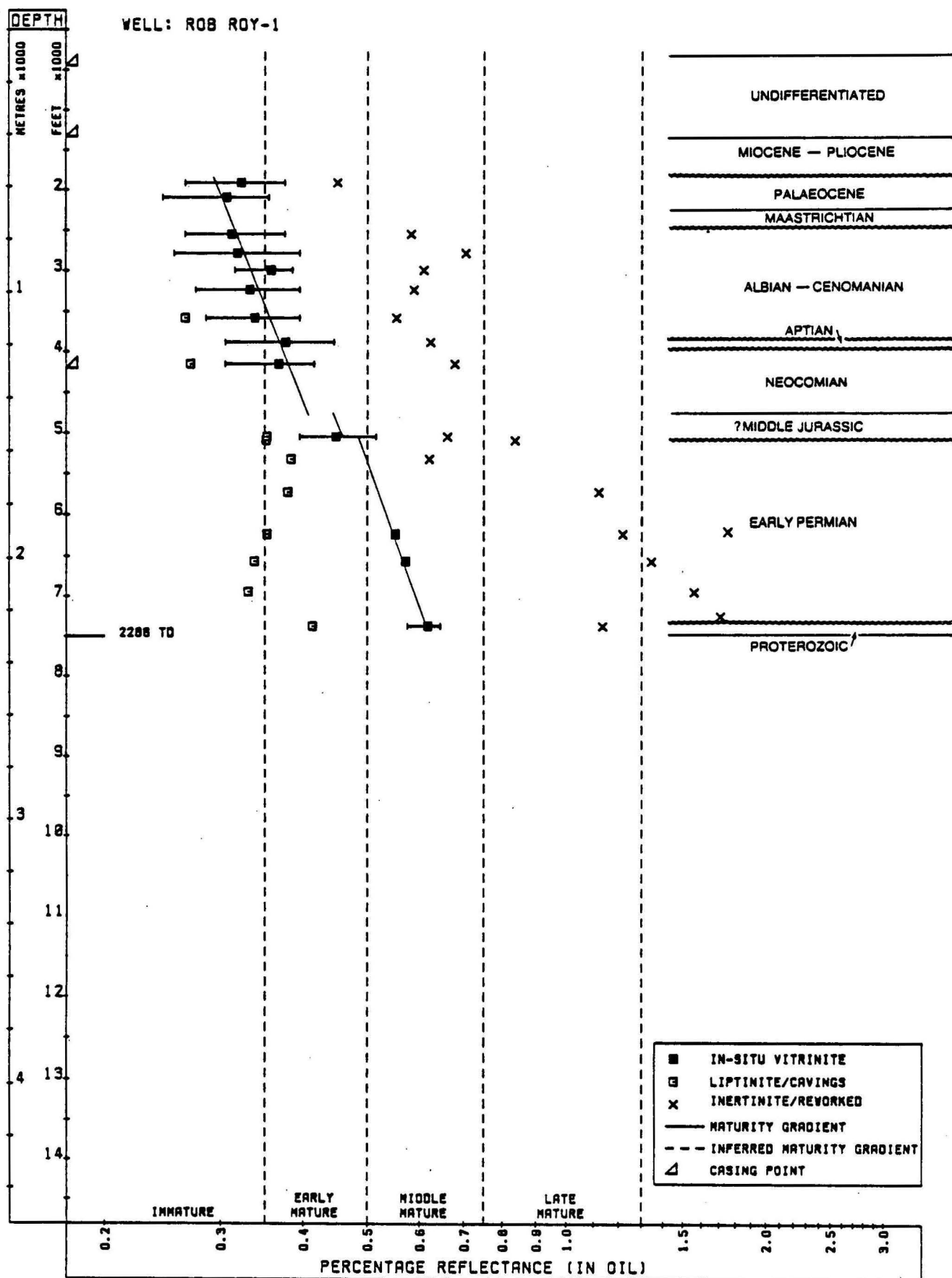
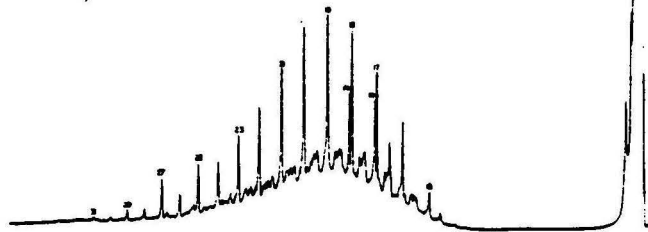
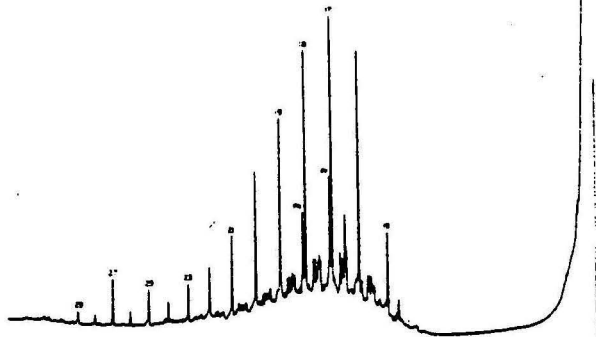


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Rob Roy-1
1537-1546m
?Middle Jurassic
SCI 4.5
Pr/Ph = 1.08
Pr/n-C₁₇ = 0.76
Ph/n-C₁₈ = 0.58
CPI = 1.70



Rob Roy-1
1570-1585m
Early Permian
SCI 4.5
Pr/Ph = 1.46
Pr/n-C₁₇ = 0.43
Ph/n-C₁₈ = 0.34
CPI = NDP



Rob Roy-1
1622-1634m
Early Permian
SCI 4.5
Pr/Ph = 1.24
Pr/n-C₁₇ = 0.42
Ph/n-C₁₈ = 0.35
CPI = NDP

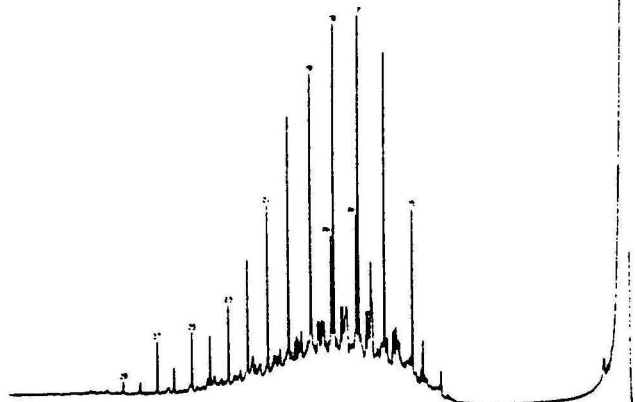


Figure 3a

Rob Roy-1
1744-1759m
Early Permian
SCI 4.5-5.0
Pr/Ph = 1.39
Pr/n-C₁₇ = 0.73
Ph/n-C₁₈ = 0.49
CPI = 1.68

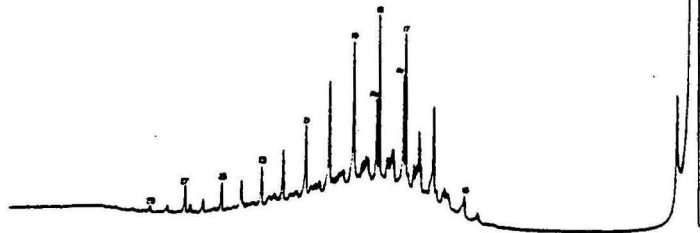


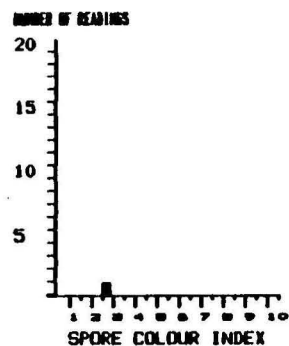
Figure 3b

ROB ROY-1

IN SITU POPULATION

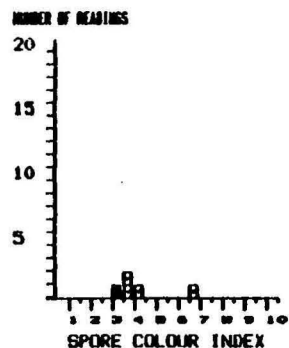
SAMPLE 582-595M
2.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.5-2.5	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0



SAMPLE 637-649M
3.0 3.5 3.5 4.0 6.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	3.5-6.5	4

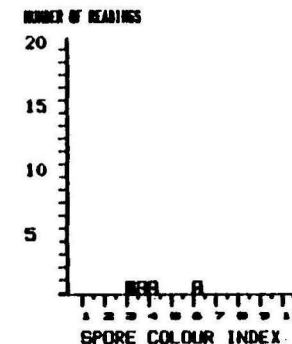


ROB ROY-1

IN SITU POPULATION

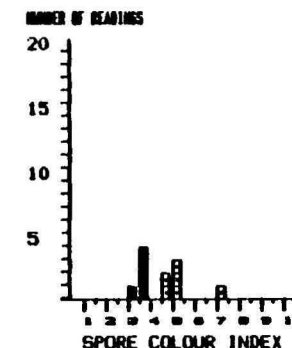
SAMPLE 777-790M
3.0 3.5 4.0 6.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	3.5-6.0	3



SAMPLE 848-860M
3.0 3.5 3.5 3.5 3.5 4.5 4.5 5.0 5.0 5.0
7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.5	5
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	4.5-7.0	6



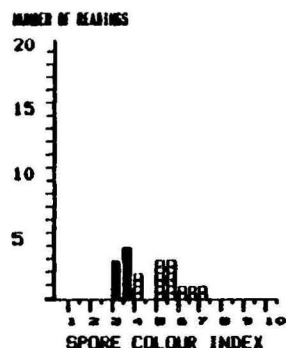
ROB ROY-1

IN SITU POPULATION

SAMPLE 912-915M

3.0 3.0 3.0 3.5 3.5 3.5 4.0 4.0 5.0
5.0 5.0 5.5 5.5 5.5 6.0 6.5 7.0

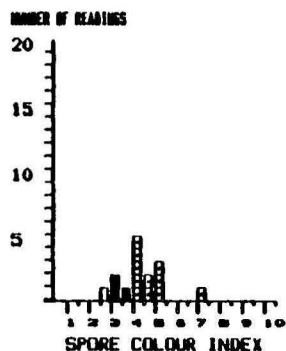
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.0-3.5	7
BLEACHED OR CAVED	-	0
STAINED OR REMORKED	4.0-7.0	11



SAMPLE 985-1000M

2.5 3.0 3.0 3.5 4.0 4.0 4.0 4.0 4.0 4.5
4.5 5.0 5.0 5.0 7.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.0-3.5	3
BLEACHED OR CAVED	2.5-2.5	1
STAINED OR REMORKED	4.0-7.0	11



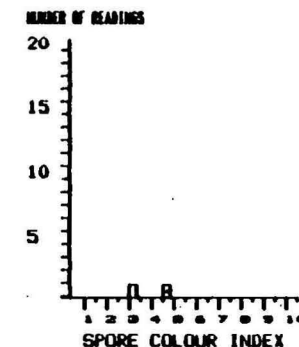
ROB ROY-1

IN SITU POPULATION

SAMPLE 1091-1107M

3.0 4.5

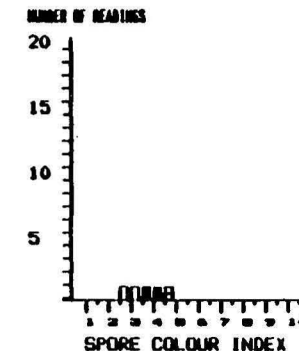
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	3.0-3.0	1
STAINED OR REMORKED	4.5-4.5	1



SAMPLE 1183-1198M

2.5 3.0 3.5 4.0 4.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.5-4.0	2
BLEACHED OR CAVED	2.5-3.0	2
STAINED OR REMORKED	4.5-4.5	1



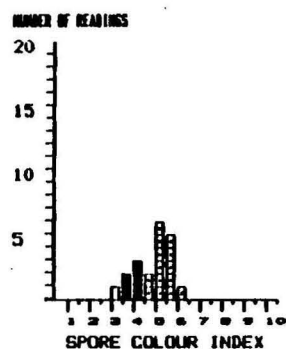
ROB ROY-1

■ IN SITU POPULATION

SAMPLE 1265-1280M

3.0 3.5 3.5 4.0 4.0 4.0 4.5 4.5 5.0 5.0
5.0 5.0 5.0 5.0 5.5 5.5 5.5 5.5 5.5 6.0

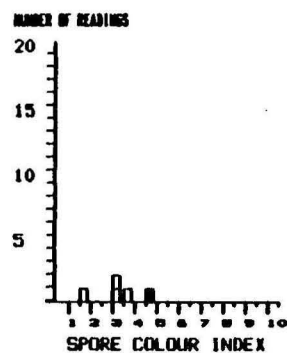
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	3.5-4.0	5
BLEACHED OR CAVED	3.0-3.0	1
STAINED OR REWORKED	4.5-6.0	14



SAMPLE 1537-1546M

1.5 3.0 3.0 3.5 4.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	4.5-4.5	1
BLEACHED OR CAVED	1.5-3.5	4
STAINED OR REWORKED	-	0



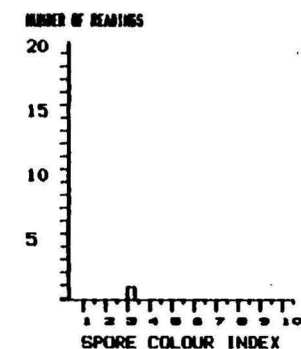
ROB ROY-1

■ IN SITU POPULATION

SAMPLE 1551M

3.0

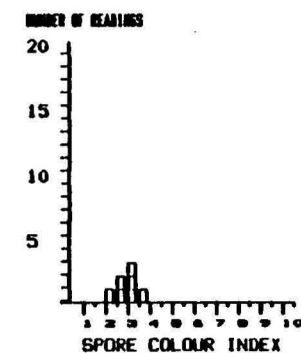
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	3.0-3.0	1
STAINED/REWORKED	-	0



SAMPLE 1622-1634M

2.0 2.5 2.5 3.0 3.0 3.0 3.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	2.0-3.5	7
STAINED OR REWORKED	-	0



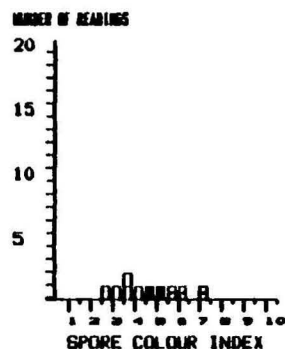
ROB ROY-1

IN SITU POPULATION

SAMPLE 1744-1759M

2.5 3.0 3.5 3.5 4.0 4.5 5.0 5.5 6.0 7.0

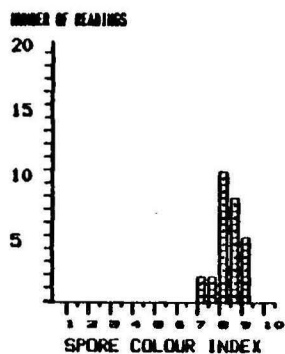
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	4.5-5.0	2
BLEACHED OR CAVED	2.5-4.0	5
STAINED OR REMORKED	5.5-7.0	3



SAMPLE 1888.8-1889M

7.0 7.0 7.5 7.5 8.0 8.0 8.0 8.0 8.0 8.0
8.0 8.0 8.0 8.0 8.5 8.5 8.5 8.5 8.5 8.5
8.5 8.5 9.0 9.0 9.0 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.0-9.0	27



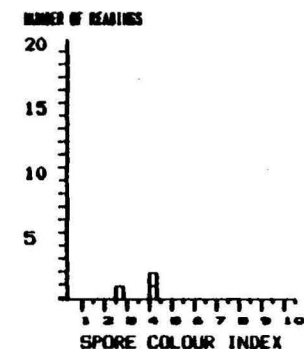
ROB ROY-1

IN SITU POPULATION

SAMPLE 1899-1905M

2.5 4.0 4.0

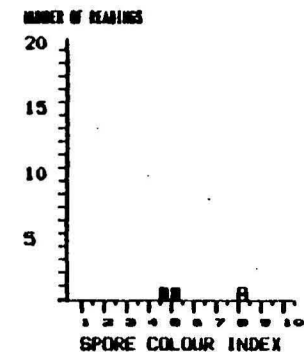
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	2.5-4.0	3
STAINED OR REMORKED	-	0



SAMPLE 2000-2015M

4.5 5.0 8.0

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	4.5-5.0	2
BLEACHED OR CAVED	-	0
STAINED OR REMORKED	8.0-8.0	1



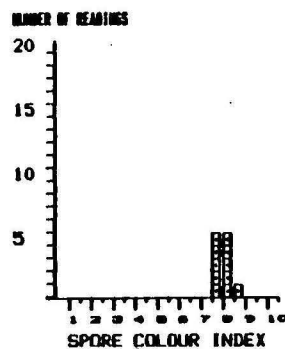
ROB ROY-1

IN SITU POPULATION

SAMPLE 2116-2131M

7.5 7.5 7.5 7.5 7.5 8.0 8.0 8.0 8.0 8.0
8.5

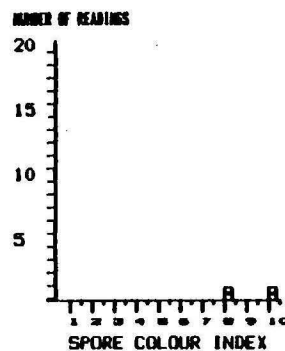
SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	-	0
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	7.5-8.5	11



SAMPLE 2209M

8.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.0-10.0	2



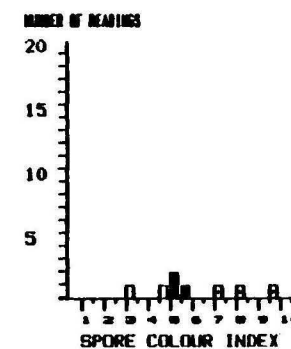
ROB ROY-1

IN SITU POPULATION

SAMPLE 2247-2256M

3.0 4.5 5.0 5.0 5.5 7.0 8.0 9.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	5.0-5.5	3
BLEACHED OR CAVED	3.0-4.5	2
STAINED OR REWORKED	7.0-9.5	3



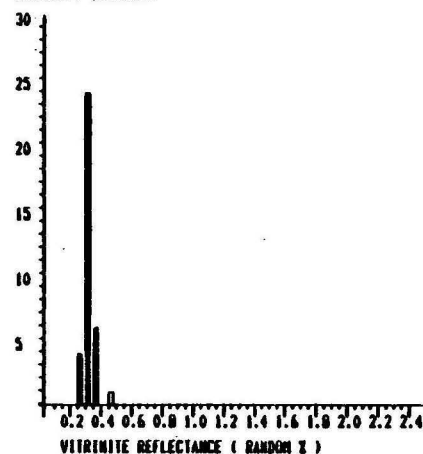
ROB ROY-1

SAMPLE 582-595H

0.27 0.28 0.29 0.29 0.30 0.30 0.30 0.30 0.31 0.31
0.31 0.31 0.31 0.32 0.32 0.32 0.32 0.32 0.32 0.33
0.33 0.33 0.33 0.33 0.33 0.34 0.34 0.34 0.35 0.35
0.35 0.36 0.36 0.37 0.45

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.27-0.37	34	0.32	0.02
INERTINITE/REWORKED	0.45-0.45	1	0.45	

NUMBER OF READINGS

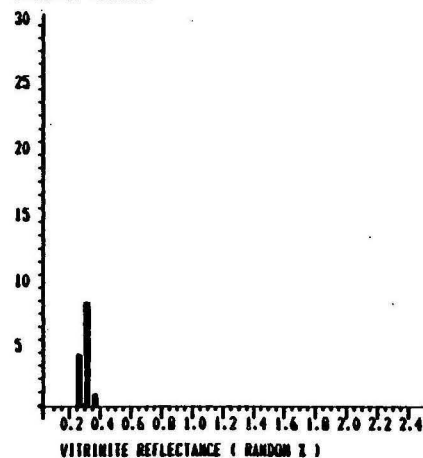


SAMPLE 637-649H

0.25 0.27 0.27 0.28 0.30 0.31 0.32 0.32 0.32 0.32
0.33 0.34 0.35

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.25-0.35	13	0.31	0.03

NUMBER OF READINGS



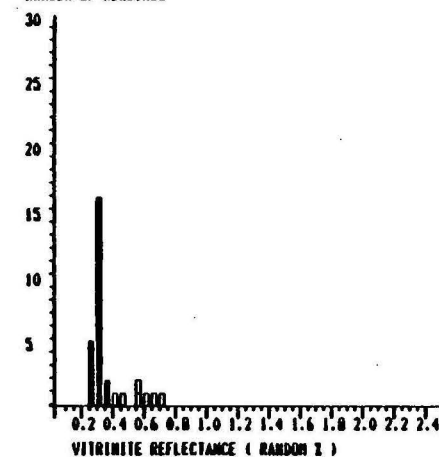
ROB ROY-1

SAMPLE 777-790H

0.27 0.28 0.28 0.28 0.29 0.30 0.30 0.30 0.31 0.31
0.31 0.31 0.31 0.31 0.32 0.32 0.32 0.32 0.32 0.33
0.34 0.36 0.37 0.40 0.48 0.56 0.59 0.63 0.69 0.72

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.27-0.37	23	0.31	0.02
INERTINITE/REWORKED	0.40-0.72	7	0.58	0.11

NUMBER OF READINGS

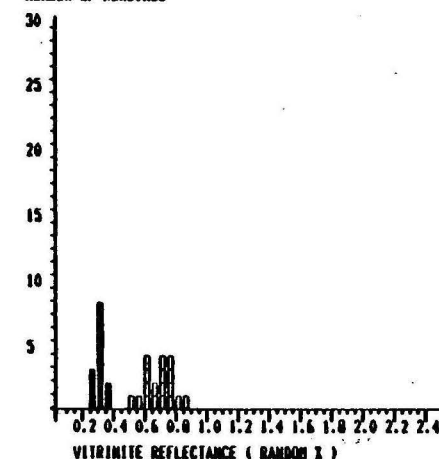


SAMPLE 848-860H

0.26 0.27 0.28 0.30 0.30 0.31 0.32 0.33 0.33 0.34
0.34 0.36 0.39 0.54 0.58 0.61 0.62 0.64 0.64 0.67
0.67 0.72 0.74 0.74 0.74 0.75 0.77 0.77 0.77 0.82
0.87

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.26-0.39	13	0.32	0.04
INERTINITE/REWORKED	0.54-0.87	10	0.70	0.09

NUMBER OF READINGS



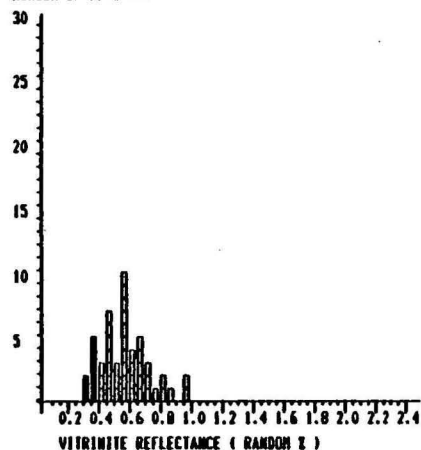
ROB ROY-1

SAMPLE 912-915H

0.32 0.34 0.35 0.36 0.37 0.38 0.38 0.40 0.41 0.42
0.45 0.45 0.46 0.47 0.47 0.48 0.49 0.52 0.54 0.54
0.55 0.55 0.55 0.56 0.56 0.57 0.58 0.58 0.59 0.59
0.60 0.60 0.62 0.63 0.65 0.65 0.66 0.66 0.69 0.72
0.72 0.74 0.76 0.81 0.83 0.87 0.95 0.97

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.32-0.38	7	0.36	0.02
INERTINITE/REWORKED	0.40-0.97	41	0.61	0.14

NUMBER OF READINGS

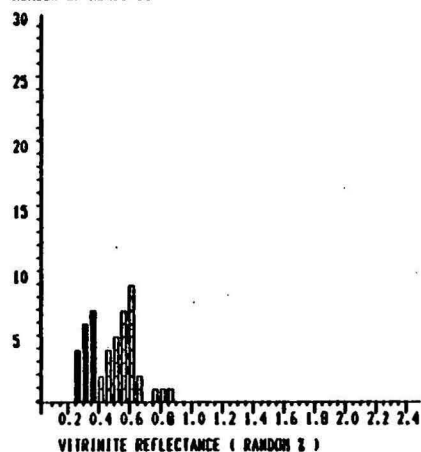


SAMPLE 985-1000H

0.28 0.28 0.28 0.28 0.30 0.31 0.31 0.32 0.33 0.34
0.35 0.37 0.37 0.37 0.38 0.38 0.39 0.41 0.44 0.46
0.46 0.47 0.49 0.52 0.53 0.53 0.54 0.54 0.55 0.55
0.55 0.56 0.56 0.56 0.59 0.60 0.62 0.62 0.62 0.63
0.63 0.63 0.63 0.64 0.68 0.68 0.77 0.83 0.88

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.28-0.39	17	0.33	0.04
INERTINITE/REWORKED	0.41-0.88	32	0.59	0.10

NUMBER OF READINGS



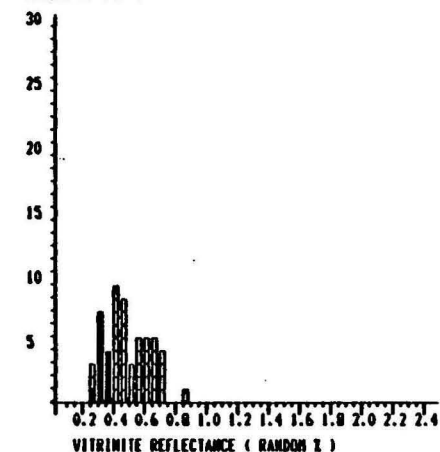
ROB ROY-1

SAMPLE 1091-1107H

0.26 0.27 0.29 0.30 0.31 0.32 0.33 0.33 0.34 0.34
0.35 0.37 0.38 0.39 0.40 0.41 0.41 0.41 0.42 0.43
0.43 0.43 0.43 0.45 0.46 0.46 0.46 0.46 0.47 0.47
0.49 0.53 0.53 0.53 0.55 0.57 0.58 0.59 0.59 0.60
0.60 0.61 0.61 0.62 0.65 0.66 0.67 0.68 0.69 0.71
0.72 0.72 0.74 0.85

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.29-0.39	12	0.34	0.03
LIPTINITE/CAVINGS	0.26-0.27	2	0.27	0.01
INERTINITE/REWORKED	0.40-0.85	40	0.55	0.12

NUMBER OF READINGS

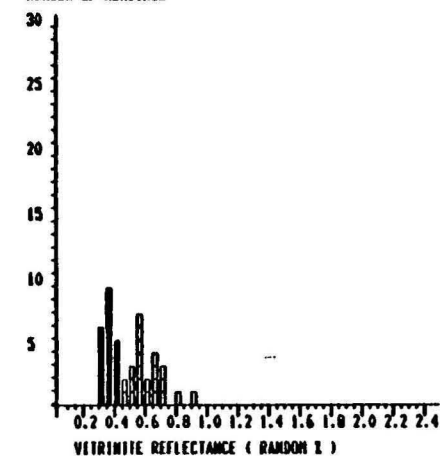


SAMPLE 1183-1198H

0.31 0.33 0.33 0.34 0.34 0.34 0.36 0.37 0.38 0.38
0.38 0.38 0.39 0.39 0.39 0.40 0.40 0.43 0.43 0.44
0.47 0.49 0.50 0.51 0.52 0.55 0.55 0.57 0.58 0.58
0.58 0.58 0.61 0.64 0.65 0.66 0.66 0.68 0.71 0.71
0.72 0.84 0.94

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.31-0.44	20	0.38	0.04
INERTINITE/REWORKED	0.47-0.94	23	0.62	0.11

NUMBER OF READINGS



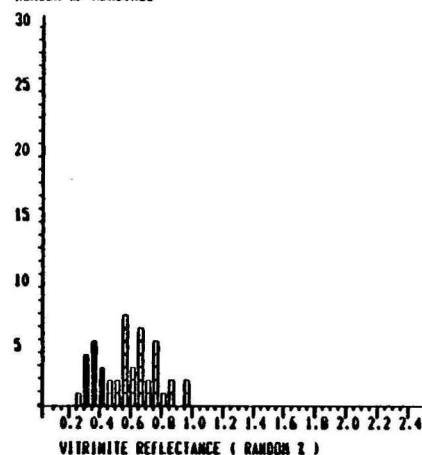
ROB ROY-1

SAMPLE 1265-1280M

0.27 0.31 0.32 0.33 0.34 0.36 0.37 0.38 0.38 0.39
0.40 0.41 0.41 0.48 0.49 0.52 0.54 0.55 0.55 0.57
0.58 0.58 0.59 0.59 0.61 0.62 0.63 0.66 0.67 0.67
0.67 0.68 0.69 0.70 0.72 0.75 0.76 0.76 0.78 0.79
0.82 0.85 0.87 0.95 0.96

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINIT	0.31-0.41	12	0.37	0.03
LIPITINITE/CAVINGS	0.27-0.27	1	0.27	
INERTINITE/REWORKED	0.48-0.96	32	0.68	0.13

NUMBER OF READINGS

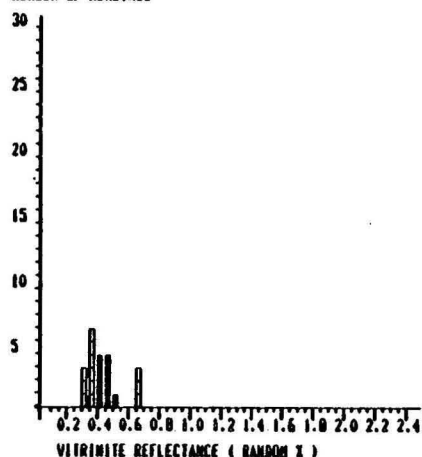


SAMPLE 1537-1546M

0.32 0.32 0.33 0.35 0.35 0.37 0.37 0.38 0.38 0.40
0.40 0.42 0.42 0.45 0.47 0.47 0.49 0.51 0.65 0.65
0.68

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINIT	0.40-0.51	9	0.45	0.04
LIPITINITE/CAVINGS	0.32-0.38	9	0.35	0.02
INERTINITE/REWORKED	0.65-0.68	3	0.66	0.02

NUMBER OF READINGS



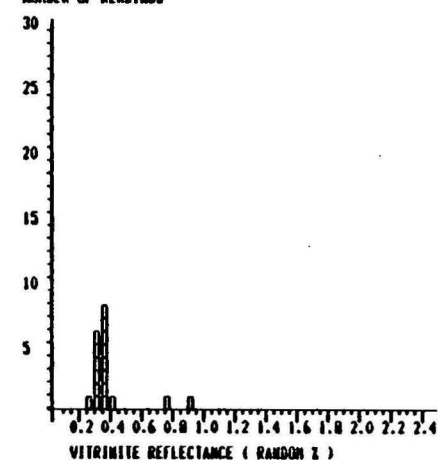
ROB ROY-1

SAMPLE 1551M

0.29 0.32 0.33 0.33 0.33 0.34 0.34 0.35 0.35 0.36
0.37 0.37 0.37 0.38 0.39 0.40 0.76 0.91

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
LIPITINITE/CAVINGS	0.29-0.40	16	0.35	0.03
INERTINITE/REWORKED	0.76-0.91	2	0.84	0.11

NUMBER OF READINGS

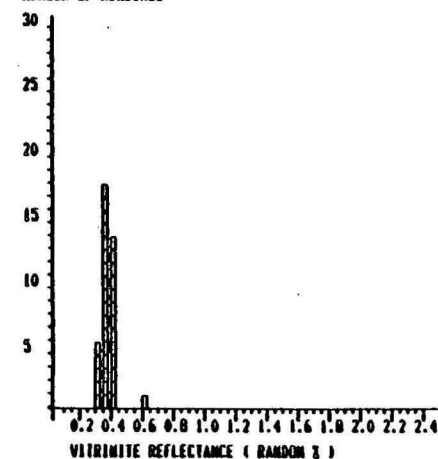


SAMPLE 1622-1634M

0.31 0.32 0.34 0.34 0.34 0.36 0.36 0.36 0.36 0.36
0.37 0.37 0.37 0.37 0.37 0.37 0.38 0.39 0.39 0.39
0.39 0.39 0.40 0.40 0.41 0.41 0.41 0.41 0.41 0.41
0.42 0.42 0.42 0.44 0.44 0.62

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
LIPITINITE/CAVINGS	0.31-0.44	35	0.38	0.03
INERTINITE/REWORKED	0.62-0.62	1	0.62	

NUMBER OF READINGS



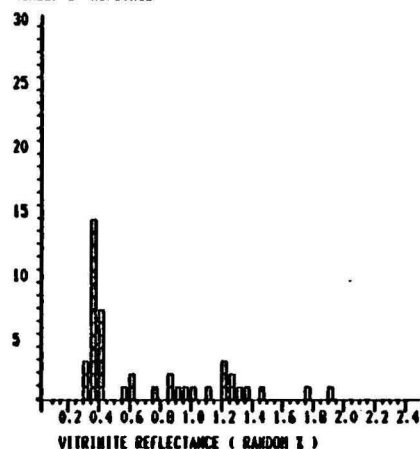
ROB ROY-1

SAMPLE 1744-1759M

0.33 0.33 0.34 0.35 0.35 0.35 0.36 0.36 0.36 0.36
0.37 0.38 0.38 0.38 0.38 0.39 0.39 0.40 0.40 0.41
0.42 0.42 0.43 0.44 0.59 0.61 0.62 0.76 0.85 0.87
0.93 0.99 1.03 1.14 1.20 1.21 1.22 1.25 1.28 1.30
1.38 1.46 1.76 1.91

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
LIPTINITE/CAVINGS	0.33-0.44	24	0.38	0.03
INERTINITE/REWORKED	0.59-1.91	20	1.12	0.36

NUMBER OF READINGS

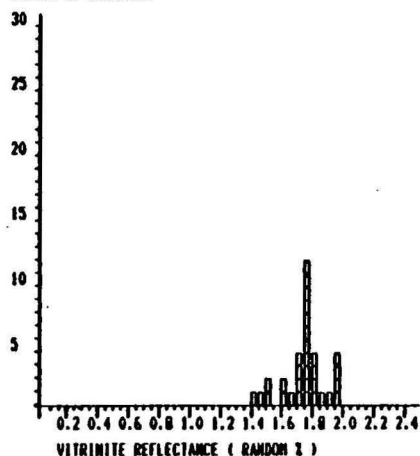


SAMPLE 1888.8-1889M

1.43 1.48 1.52 1.53 1.60 1.61 1.66 1.70 1.70 1.72
1.72 1.75 1.75 1.75 1.76 1.76 1.76 1.77 1.77 1.78
1.78 1.78 1.81 1.82 1.82 1.82 1.87 1.90 1.95 1.95
1.96 1.97

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
INERTINITE/REWORKED	1.43-1.97	32	1.75	0.14

NUMBER OF READINGS



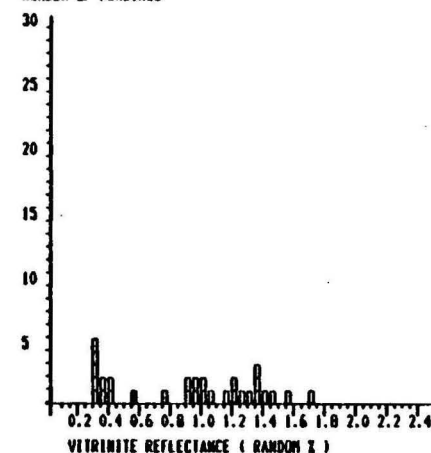
ROB ROY-1

SAMPLE 1899-1905M

0.31 0.33 0.34 0.34 0.34 0.35 0.36 0.40 0.40 0.55
0.79 0.92 0.94 0.99 0.99 1.03 1.04 1.06 1.17 1.20
1.24 1.28 1.32 1.36 1.37 1.39 1.44 1.49 1.56 1.72

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.55-0.55	1	0.55	
LIPTINITE/CAVINGS	0.31-0.40	9	0.35	0.03
INERTINITE/REWORKED	0.79-1.72	20	1.22	0.24

NUMBER OF READINGS

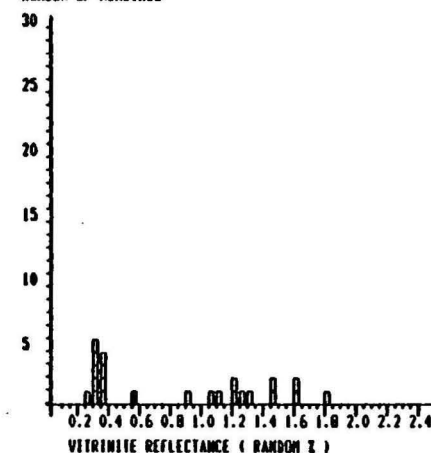


SAMPLE 2000-2015M

0.29 0.30 0.30 0.32 0.32 0.34 0.35 0.37 0.39 0.39
0.57 0.90 1.06 1.14 1.21 1.23 1.26 1.31 1.47 1.48
1.60 1.61 1.83

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.57-0.57	1	0.57	
LIPTINITE/CAVINGS	0.29-0.39	10	0.34	0.04
INERTINITE/REWORKED	0.90-1.83	12	1.34	0.26

NUMBER OF READINGS



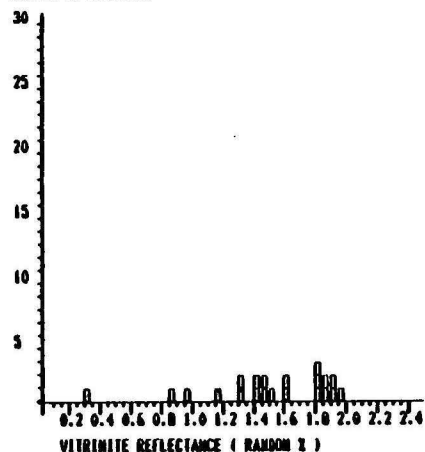
ROD ROY-1

SAMPLE 2116-2131H

0.33 0.87 0.95 1.18 1.30 1.32 1.41 1.44 1.45 1.47
1.50 1.61 1.63 1.80 1.80 1.84 1.85 1.86 1.93 1.94
1.95

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
LIPTINITE/CAVINGS	0.33-0.33	1	0.33	
INERTINITE/REWORKED	0.87-1.95	20	1.56	0.32

NUMBER OF READINGS

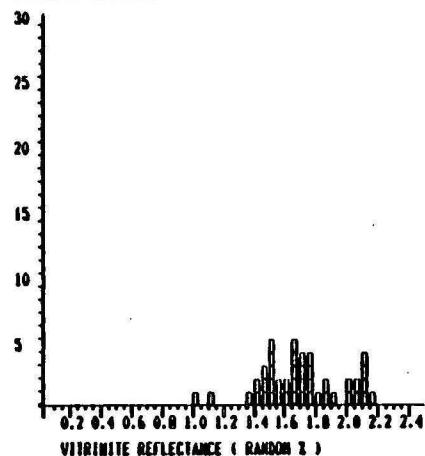


SAMPLE 2209H

1.02 1.12 1.35 1.42 1.43 1.46 1.47 1.48 1.50 1.50
1.51 1.53 1.54 1.55 1.59 1.60 1.64 1.65 1.66 1.67
1.68 1.68 1.70 1.71 1.71 1.74 1.76 1.77 1.78 1.78
1.82 1.85 1.86 1.91 2.02 2.03 2.07 2.09 2.10 2.12
2.13 2.14 2.15

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
INERTINITE/REWORKED	1.02-2.15	43	1.70	0.27

NUMBER OF READINGS



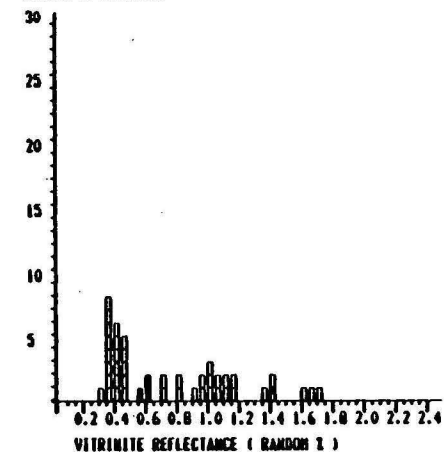
ROD ROY-1

SAMPLE 2247-2256H

0.34 0.36 0.37 0.38 0.38 0.39 0.39 0.39 0.39 0.41
0.42 0.42 0.43 0.43 0.44 0.45 0.45 0.46 0.46 0.49
0.58 0.63 0.64 0.71 0.74 0.82 0.84 0.94 0.96 0.97
1.00 1.00 1.00 1.07 1.09 1.10 1.10 1.19 1.19 1.39
1.42 1.43 1.60 1.66 1.70

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.58-0.64	3	0.62	0.03
LIPTINITE/CAVINGS	0.34-0.49	20	0.41	0.04
INERTINITE/REWORKED	0.71-1.70	22	1.13	0.29

NUMBER OF READINGS



SAHUL SHOAL-1 WELL

SUMMARY

Spore colour and vitrinite reflectance analysis of samples from the interval 521m to 3750m of the Sahul Shoal-1 well have shown that the well section is immature to 900m, early mature between 900m and 1900m, middle mature between 1900m and 3200m and late mature between 3200m and 3802m TD. The vitrinite reflectance gradient shows 1300m of missing section at the unconformity at 1793m, removed during Late Triassic to Cretaceous uplift and erosion. Extrapolation of the maturity gradients to seabed shows that the maximum depth of burial of the well section was some 800m greater than that of the present day. Maximum burial occurred sometime during the Oligocene to Recent. A cumulative total of 800m of Oligocene to Recent section is missing at unconformities above 854m.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 11° 25' 36"S, 124° 32' 50"E.

Operator and date of drilling: Bocal, 1970.

Well Status: Plugged and abandoned.

TD: 3802m.

Mud data: Seawater/gel mud system: Seabed to 997m.
Brackish water/gel/lignosulphate mud converted low solids Dextrid system: 997m to 2774m.
Kalzan XC polymer low solids mud: 2774m to 3774m.
Bentonite/lignosulphonite: 3774m to 3802m TD.

Casing data: 30" at 62m, 20" at 304m, 13³/₈" at 984m, 9⁵/₈" at 2756m.

BHT data: 40°C at 985m, stopped circulation time unknown.
58°C at 1956m, stopped circulation time unknown.
75°C at 2768m, stopped circulation time unknown.
114°C at 3585m, stopped circulation time unknown.
104°C at 3783m, stopped circulation time unknown.

Elevation: RT 9.5m ASL.

Water depth: 28m.

SAHUL SHOAL-1 WELL

Interval analysed: 521m to 3750m.

Age of interval analysed:

Depths (in metres)

Miocene-Recent	521- 875
Oligocene	875-1161
Eocene	1161-1600
Palaeocene	1600-1661
Cretaceous	1661-1793
Late Triassic	1793-2767
Middle Triassic	2767-3261
Early Triassic	3261-3740
Late Permian	3740-3750

Sample type and quality: Dried ditch cutting of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed yielded sufficient vitrinite for measurements. Results: Good.
- b) Spore Colour Index: The samples analysed yielded sufficient sporomorphs for measurements but interpretation was hindered by caved and reworked sporomorphs. Results: Fair.

Source rock data quality: No analyses performed.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise from around 3 SCI units at 854m to 8 SCI units at 3750m. Vitrinite reflectance results rise from 0.3% to 0.8% over the same interval. There is a marked break in the vitrinite reflectance gradient at 1793m consistent with uplift and erosion of 1300m of Late Triassic to Cretaceous sediments at the unconformity at this depth. Extrapolation of the maturity gradients to seabed shows that the maximum depth of burial of the well section was around 800m greater than present day burial depths and was reached sometime during the Oligocene to Recent. A cumulative total of 800m of Oligocene to Recent section is missing at unconformities above 854m.

The results show that the well section is immature to 900m, early mature between 900m and 1900m, middle mature between 1900m and 3200m and late mature between 3200m and 3802m TD.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
37.8		Miocene-Recent									
521-537	Ctg	LST, wht	*	*							
854	"	MDST, dk gy, sndy	3.0	0.32(2)							
875		Oligocene									
1161		Eocene									
1524-1540	"	MDST, lt gy, calc	4.5	0.35(1)							
1600		Palaeocene									
1661		Cretaceous									
1793		Late Triassic									
1966-1982	"	MDST, med gy	4.5-5.5	0.58(20)							
2454-2470	"	SLTST, lt gy-lt rd brn, sndy + 20% MDST, a/a	6.0-6.5	0.64(34)							
2767		Middle Triassic									
2896-2912	"	MDST, med dk gy + 10% MDST, mod brn + 10% SST, wht	6.5-7.0	0.66(52)							
3261		Mt Goodwin Fm									
3354-3369	"	MDST, med gy, slty + 10% MDST, mod brn, slty + mnr SST, a/a	7.0-7.5	0.73(22)							
3740		Byland Bay Fm Eqv									
3735-3750	"	MDST, dk gy	8.0	0.79(24)							

Table 1 Maturity and Kerogen Composition Data

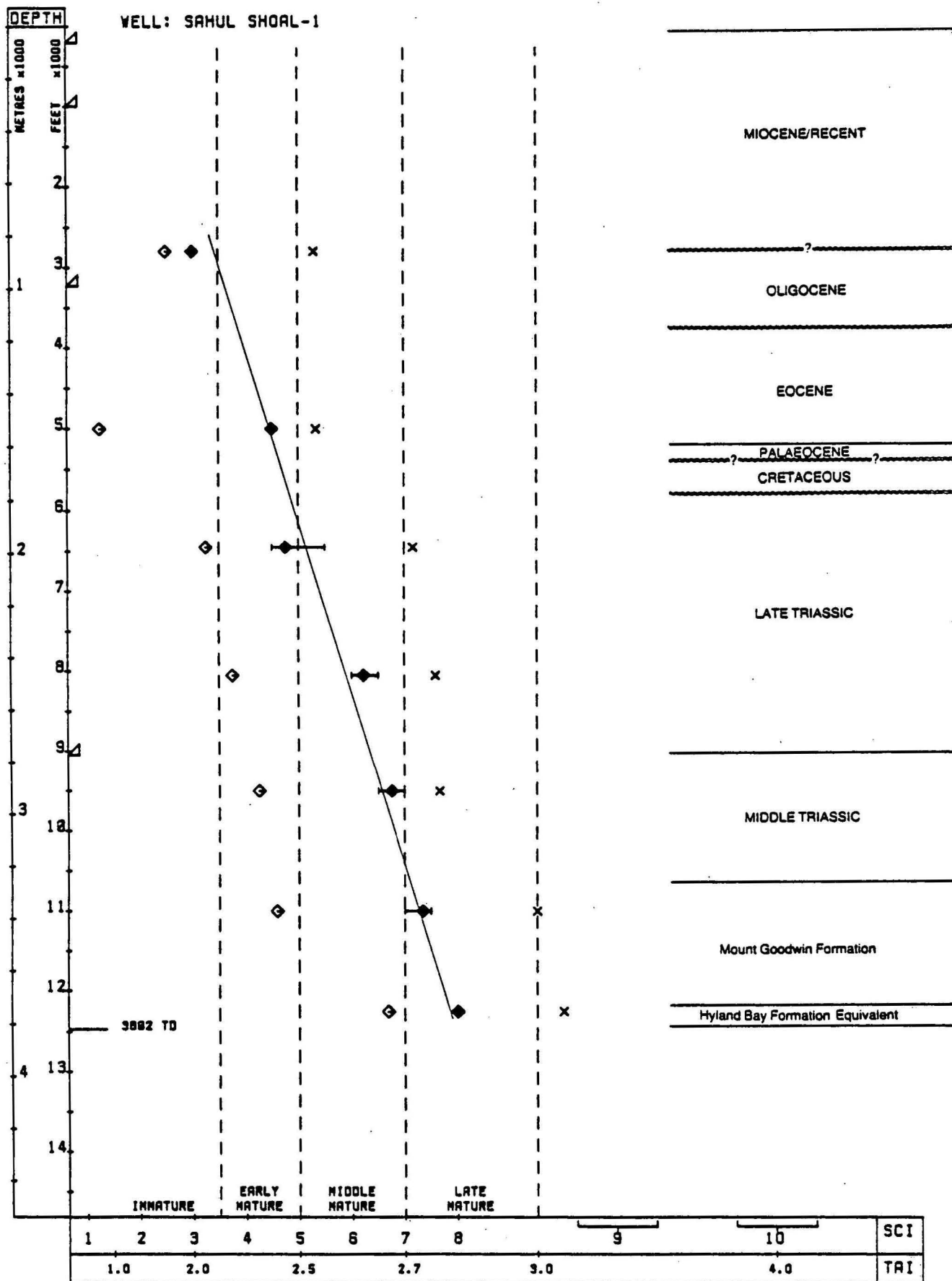


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

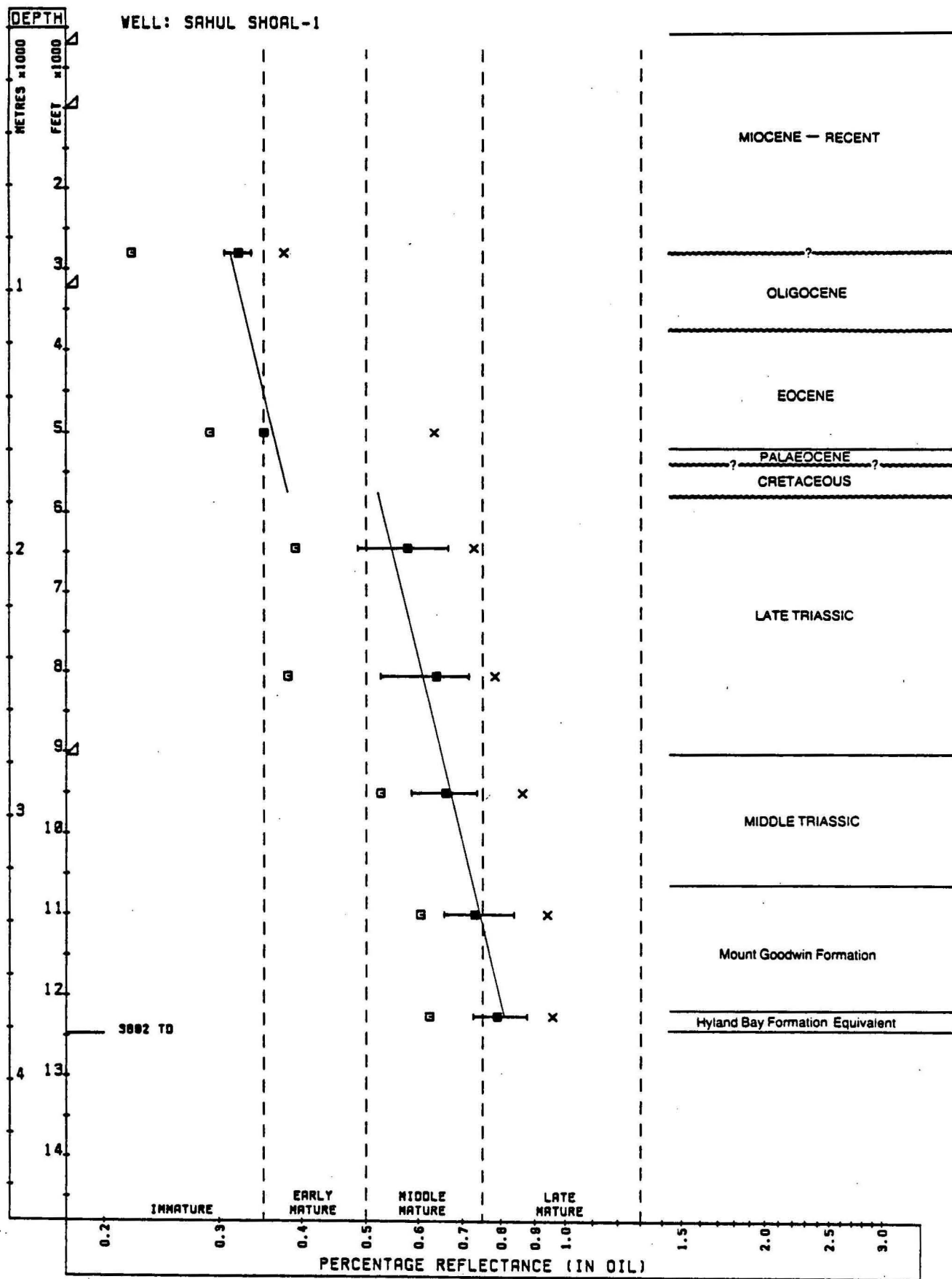


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

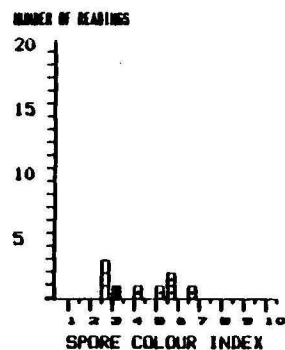
SAHUL SHOAL-1

IN SITU POPULATION

SAMPLE 854M

2.5 2.5 2.5 3.0 4.0 5.0 5.5 5.5 6.5

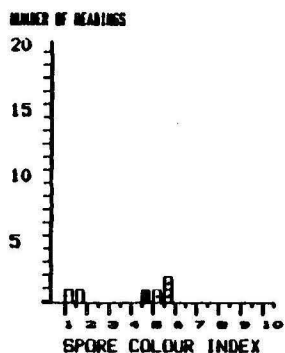
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	1
BLEACHED/CAVINGS	2.5-2.5	3
STAINED/REWORKED	4.0-6.5	5



SAMPLE 1524-1540M

1.0 1.5 4.5 5.0 5.5 5.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.5-4.5	1
BLEACHED/CAVINGS	1.0-1.5	2
STAINED/REWORKED	5.0-5.5	3



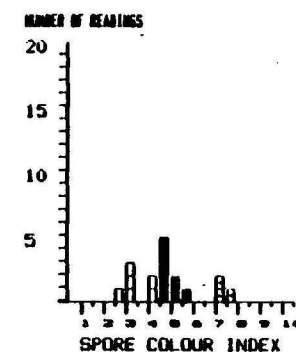
SAHUL SHOAL-1

IN SITU POPULATION

SAMPLE 1966-1982M

2.5 3.0 3.0 3.0 4.0 4.5 4.5 4.5 4.5
4.5 5.0 5.0 5.5 7.0 7.0 7.5

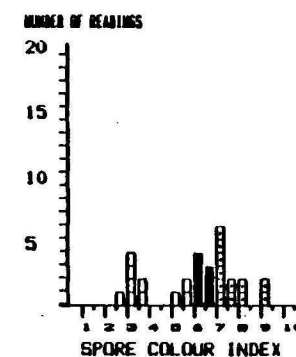
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.5-5.5	8
BLEACHED/CAVINGS	2.5-4.0	6
STAINED/REWORKED	7.0-7.5	3



SAMPLE 2454-2470M

2.5 3.0 3.0 3.0 3.0 3.5 3.5 5.0 5.5 5.5
6.0 6.0 6.0 6.0 6.5 6.5 6.5 7.0 7.0 7.0
7.0 7.0 7.0 7.5 7.5 8.0 8.0 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.5	7
BLEACHED/CAVINGS	2.5-5.5	10
STAINED/REWORKED	7.0-9.0	12



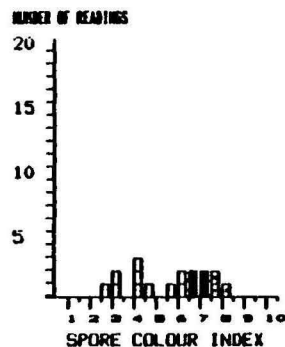
SAHIL SHOAL-1

IN SITU POPULATION

SAMPLE 2896-2912M

2.5 3.0 3.0 4.0 4.0 4.0 4.5 5.5 6.0 6.0
6.5 6.5 7.0 7.0 7.5 7.5 8.0

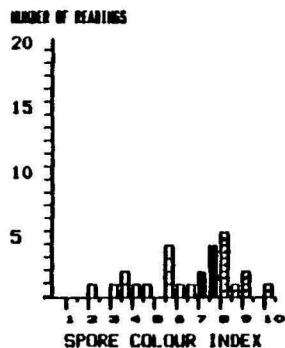
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.5-7.0	4
BLEACHED/CAVINGS	2.5-6.0	10
STAINED/REWORKED	7.5-8.0	3



SAMPLE 3354-3369M

2.0 3.0 3.5 3.5 4.0 4.5 5.5 5.5 5.5 5.5
6.0 6.5 7.0 7.0 7.5 7.5 7.5 7.5 8.0 8.0
8.0 8.0 8.0 8.5 9.0 9.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.0-7.5	6
BLEACHED/CAVINGS	2.0-6.5	12
STAINED/REWORKED	8.0-10.0	9



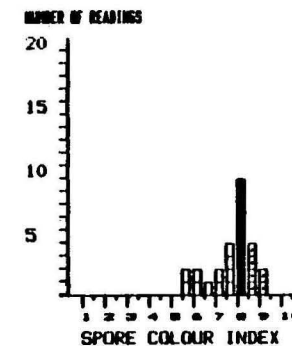
SAHIL SHOAL-1

IN SITU POPULATION

SAMPLE 3735-3750M

5.5 5.5 6.0 6.0 6.5 7.0 7.0 7.5 7.5 7.5
7.5 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0
8.5 8.5 8.5 8.5 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	8.0-8.0	9
BLEACHED/CAVINGS	5.5-7.5	11
STAINED/REWORKED	8.5-9.0	6

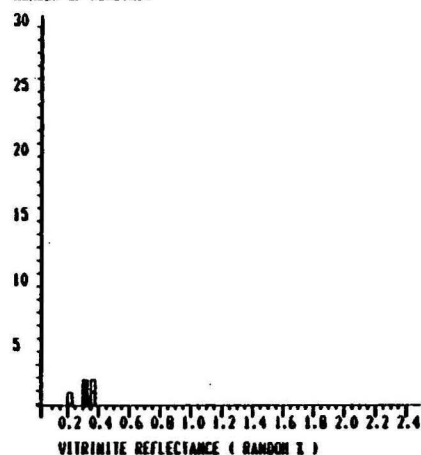


SAMPLE 854M

0.22 0.31 0.33 0.36 0.39

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	0.31-0.33	2	0.32	0.01
LIPTINITE/CAVINGS	0.22-0.22	1	0.22	
INERTINITE/REWORKED	0.36-0.39	2	0.38	0.02

NUMBER OF READINGS

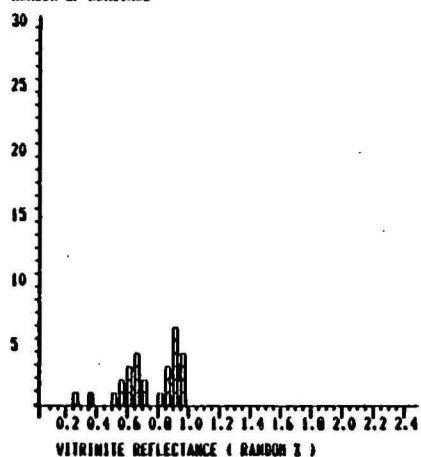


SAMPLE 1524-1540M

0.29 0.35 0.52 0.56 0.57 0.61 0.61 0.62 0.67 0.68
0.68 0.68 0.70 0.70 0.81 0.85 0.87 0.89 0.90 0.91
0.92 0.93 0.93 0.94 0.95 0.96 0.96 0.97

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	0.35-0.35	1	0.35	
LIPTINITE/CAVINGS	0.29-0.29	1	0.29	
INERTINITE/REWORKED	0.52-0.70	12	0.63	0.06
REWORKED	0.81-0.97	14	0.91	0.05

NUMBER OF READINGS

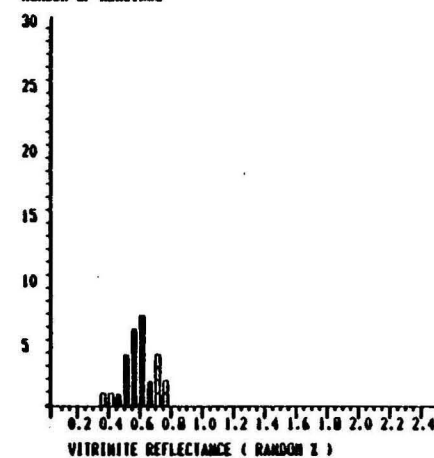


SAMPLE 1966-1982M

0.38 0.40 0.49 0.50 0.51 0.51 0.54 0.55 0.55 0.55
0.55 0.57 0.58 0.60 0.60 0.61 0.62 0.63 0.63 0.64
0.65 0.66 0.70 0.70 0.72 0.73 0.75 0.76

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	0.49-0.66	20	0.58	0.05
LIPTINITE/CAVINGS	0.38-0.40	2	0.39	0.01
INERTINITE/REWORKED	0.70-0.76	6	0.73	0.03

NUMBER OF READINGS

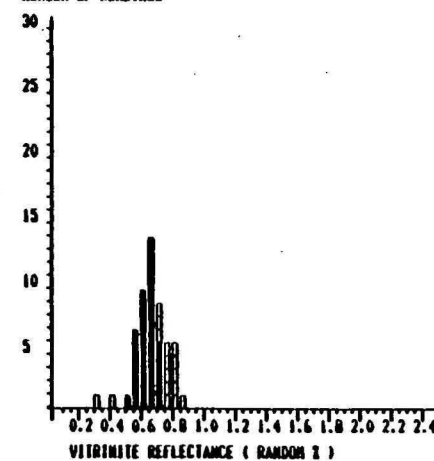


SAMPLE 2454-2470M

0.34 0.42 0.53 0.55 0.56 0.57 0.57 0.57 0.59 0.60
0.61 0.62 0.62 0.62 0.63 0.63 0.64 0.64 0.65 0.65
0.65 0.65 0.65 0.65 0.65 0.66 0.66 0.67 0.68 0.69
0.69 0.70 0.70 0.71 0.71 0.71 0.73 0.74 0.74 0.75
0.76 0.76 0.76 0.77 0.80 0.80 0.81 0.83 0.83 0.86

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST. DEV
IN SITU VITRINITE	0.53-0.71	34	0.64	0.05
LIPTINITE/CAVINGS	0.34-0.42	2	0.38	0.06
INERTINITE/REWORKED	0.73-0.86	14	0.78	0.04

NUMBER OF READINGS



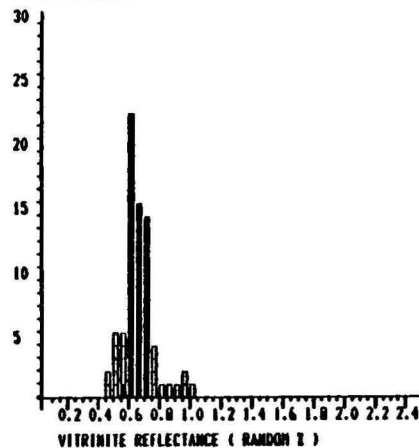
SAHIL SHAOL-1

SAMPLE 2896-2912M

0.45 0.49 0.50 0.51 0.53 0.53 0.54 0.55 0.55 0.56
0.57 0.59 0.60 0.60 0.60 0.60 0.61 0.62 0.62 0.62
0.62 0.62 0.62 0.63 0.63 0.63 0.63 0.63 0.63 0.64
0.64 0.64 0.64 0.64 0.65 0.65 0.65 0.65 0.65 0.66
0.66 0.66 0.66 0.67 0.67 0.67 0.68 0.68 0.68 0.70
0.70 0.71 0.71 0.71 0.71 0.71 0.72 0.72 0.72 0.72
0.73 0.73 0.73 0.75 0.75 0.77 0.79 0.81 0.88 0.92
0.95 0.96 1.02

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.59-0.73	52	0.66	0.04
LIPTINITE/CAVINGS	0.45-0.57	11	0.53	0.04
INERTINITE/REWORKED	0.75-1.02	10	0.85	0.10

NUMBER OF READINGS

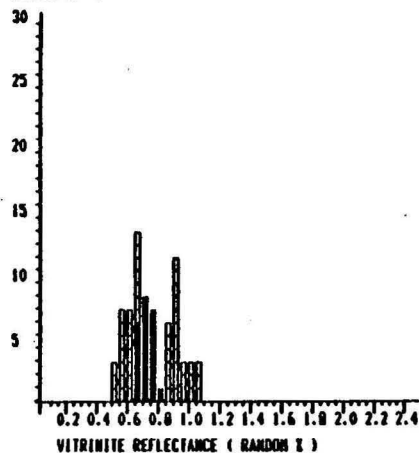


SAMPLE 3354-3369M

0.50 0.51 0.54 0.55 0.58 0.58 0.58 0.58 0.59 0.59
0.60 0.61 0.62 0.62 0.62 0.62 0.64 0.65 0.65 0.65
0.65 0.65 0.65 0.65 0.66 0.66 0.67 0.67 0.68 0.69
0.70 0.70 0.71 0.71 0.72 0.73 0.74 0.74 0.75 0.75
0.77 0.78 0.79 0.79 0.79 0.83 0.83 0.85 0.86 0.86
0.88 0.88 0.90 0.91 0.91 0.91 0.92 0.92 0.93 0.94
0.94 0.94 0.94 0.95 0.95 0.95 1.00 1.01 1.03 1.05
1.06 1.06

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.66-0.83	22	0.73	0.05
LIPTINITE/CAVINGS	0.50-0.65	24	0.60	0.04
INERTINITE/REWORKED	0.85-1.06	26	0.94	0.06

NUMBER OF READINGS



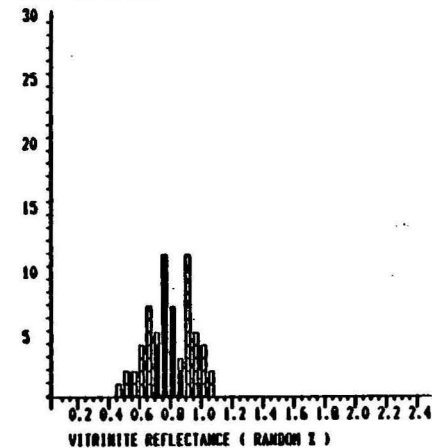
SAMR SHAOL-1

SAMPLE 3735-3750M

0.47 0.53 0.54 0.56 0.56 0.61 0.62 0.62 0.64 0.67
0.67 0.67 0.68 0.68 0.68 0.69 0.70 0.73 0.73 0.74
0.74 0.76 0.76 0.76 0.77 0.77 0.77 0.78 0.78 0.79
0.79 0.79 0.80 0.80 0.81 0.82 0.82 0.84 0.84 0.86
0.87 0.89 0.90 0.90 0.91 0.91 0.92 0.92 0.93 0.93
0.93 0.93 0.94 0.95 0.95 0.96 0.96 0.97 1.00 1.01
1.02 1.04 1.06 1.06

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.73-0.87	24	0.79	0.04
LIPTINITE/CAVINGS	0.47-0.70	17	0.62	0.07
INERTINITE/REWORKED	0.89-1.06	23	0.96	0.05

NUMBER OF READINGS



SCOTT REEF-1 WELL

SUMMARY

Vitrinite reflectance and spore colour index analysis of samples from the interval 732m to 4619m of the Scott Reef-1 well shows that the well section is immature to 1700m, early mature between 1700m and 3200m, middle mature between 3200m and 4400m, late mature between 4400m and 4600m and post mature between 4600m and 4730m TD. Sediments below around 4600m are mature enough to generate significant quantities of gas from potential sources within the well section.

The maturity gradients show no evidence of any major erosional unconformities within the section analysed and extrapolation of the gradient to seabed suggests that 200m of Oligocene to Recent section is missing above 2256m. The maximum depth of burial of the well section was 200m greater than present day burial depths.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 14° 04' 34"S, 121° 49' 28.8"E.

Operator and date of drilling: Bocal, 1971.

Well Status: Suspended gas condensate discovery with oil shows.

TD: 4730m.

Mud data: Seawater with Q mix slugs: Seabed to 1783m.
Low solids, seawater/Dextrid mud system: 1783m to 3396m.
Seawater/Dextrid mud system: 3396m to 4730m TD.

Casing data: 30" at 83m, 20" at 316m, 13³/₈" at 1771m, 9⁵/₈" at 3383m, 7" liner set between 3274m and 4412m.

BHT data: 54°C at 1787m, stopped circulation time unknown.
55°C at 2744m, stopped circulation time unknown.
61.5°C at 3395m, stopped circulation time unknown.
103°C at 4410m, stopped circulation time unknown.

Elevation: RT 9.5m ASL.

Water depth: 49.5m.

Interval analysed: 732m to 4619m.

SCOTT REEF-1 WELL

Age of interval analysed:

Depths (in metres)

Miocene-Recent	732-2275
Oligocene	2275-2363
Eocene	2363-3383
Late Cretaceous	3383-3671
Early-Late Cretaceous	3671-4259
Late Jurassic	4259-4293
Early-Middle Jurassic	4293-4355
Late Triassic	4355-4619

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite reflectance: The samples analysed generally yielded sufficient vitrinite for measurements but also contain abundant caved material. Sparse sampling due to lithological factors has made interpretation of a reflectance gradient difficult. Results: Fair.
- b) Spore Colour Index: The samples analysed generally yielded sufficient sporomorphs for reliable measurements. Sparse sampling due to lithological factors has made interpretation of a spore colour index gradient difficult. Results: Fair.

Source rock data quality: No analyses performed.

Gas chromatography run at: 4299m to 4308m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values are interpreted as rising steadily from around 2.5 SCI units at 732m to around 6 SCI units at 4300m. Below this depth values rise rapidly from 6 SCI units to 9 SCI units at 4730m TD. Vitrinite reflectance results rise steadily from interpreted values of 0.33% at 2256m to around 0.55% at 4300m. Below this depth values rise rapidly from 0.55% to in excess of 1.5% at 4730m TD. The non-linearity in the maturity gradient below 4300m is interpreted as being due to an igneous intrusive close to the base of the well section. Interpretation

SCOTT REEF-1 WELL

of the maturity gradients has been hindered by the lack of suitable lithologies for analysis in the predominantly limestone sequence above 3650m. The interpreted maturity gradients show no evidence of any major erosional unconformities within the section analysed and extrapolation of the gradient to the seabed shows that around 200m of Oligocene to Recent section is missing above 2256m. The maximum depth of burial of the well section was some 200m greater than present day burial depths.

The results show that the well section is immature to 1700m, early mature between 1700m and 3200m, middle mature between 3200m and 4400m, late mature between 4400m and 4600m and post mature between 4600m and 4730m TD. The section below around 4600m is sufficiently mature to generate gas from potential source rocks in the section.

MIGRANT HYDROCARBONS (Table 2, Figure 3)

Extraction of samples at 4299m to 4308m and 4381m to 4390m taken over the tested interval 4300m to 4306m and 4381m to 4387m yielded only small quantities of extractable bitumen. Gas chromatography of the sample at 4299m to 4308m shows that it contains small quantities of hydrocarbons derived from mature waxy kerogens.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
59		Miocene-Recent									
732-747	Ctg	LST, wht	2.5	*							
1677-1692	"	LST, wht-off wht	4.5rew	*							
2256-2271	"	LST, lt gy, arg	4.0	0.33(18)							
2275		Oligocene									
2363		Eocene									
3383		Palaeocene									
3497		Turonian-Maastrichtian									
3671		Late Neocomian-Cenomanian									
3674-3689	Ctg	MDST, med lt gy + 10% LST, wht	7.0-9.5rew	1.55(40)rew							
4085-4101	"	MDST, dk gy	6.5	0.49(6)							
4259		Late Jurassic									
4268-4284	"	MDST, med gy	5.0	0.53(2)							
4289		Volcanics									
4293		Early-Middle Jurassic									
4314-4329	"	MDST, med dk gy	5.0-5.5	0.59(3)							
4355		Late Triassic									
4421-4436	"	MDST, med gy + 60% SLTST, wht-off wht	5.5	0.94(6)							
4604-4619	"	MDST, med lt gy	8.5-9.0	1.49(4)							

Table 1 Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
4299-4308	Ctg	MDST, med gy + unr SST, wht	0.80						525	66	165	21	26	6	68
4381-4390	"	MDST, med-med dk gy + 10% SST, wht	0.58						160	28					

Table 2 Chemical Analysis Data

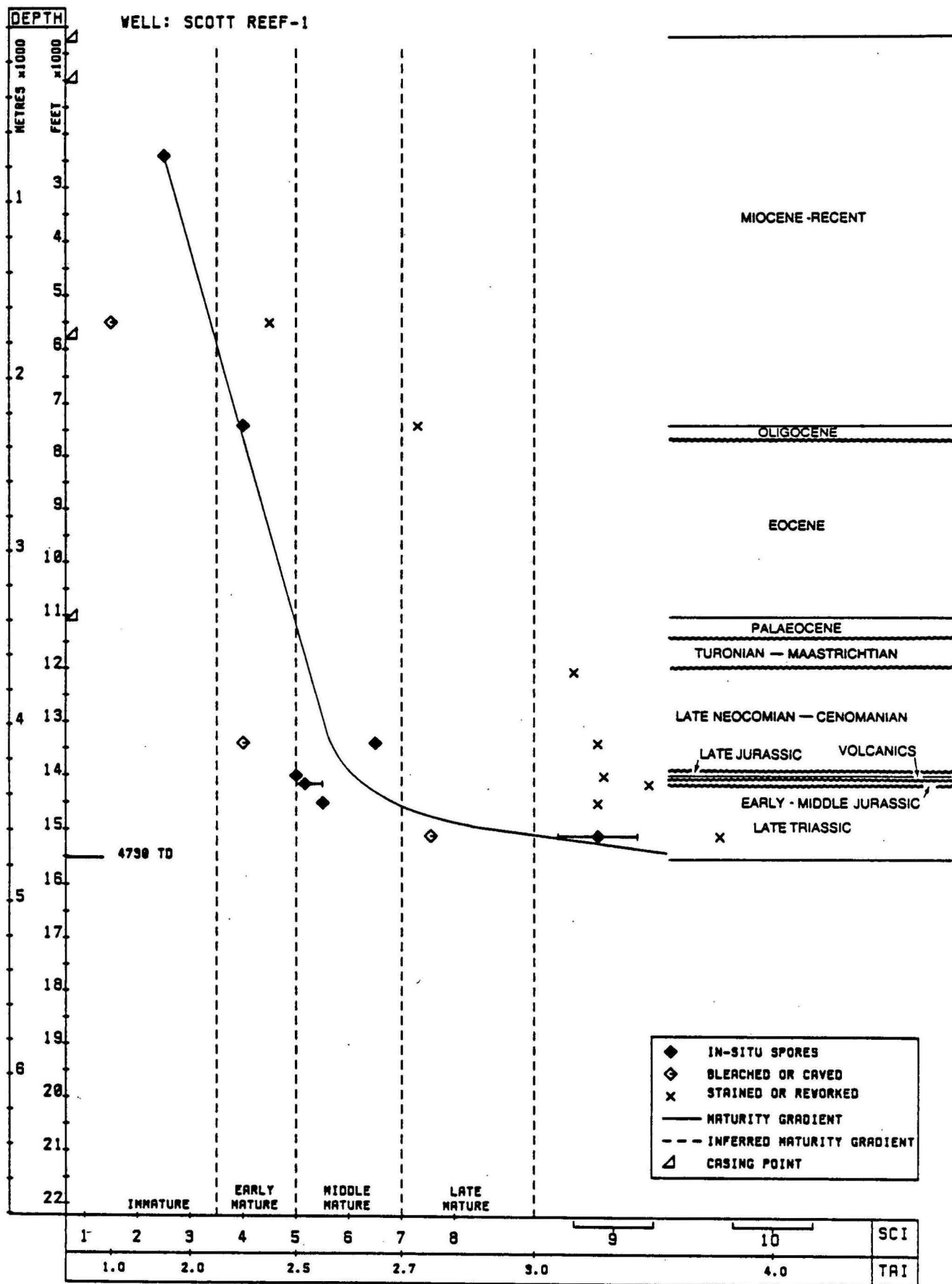


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

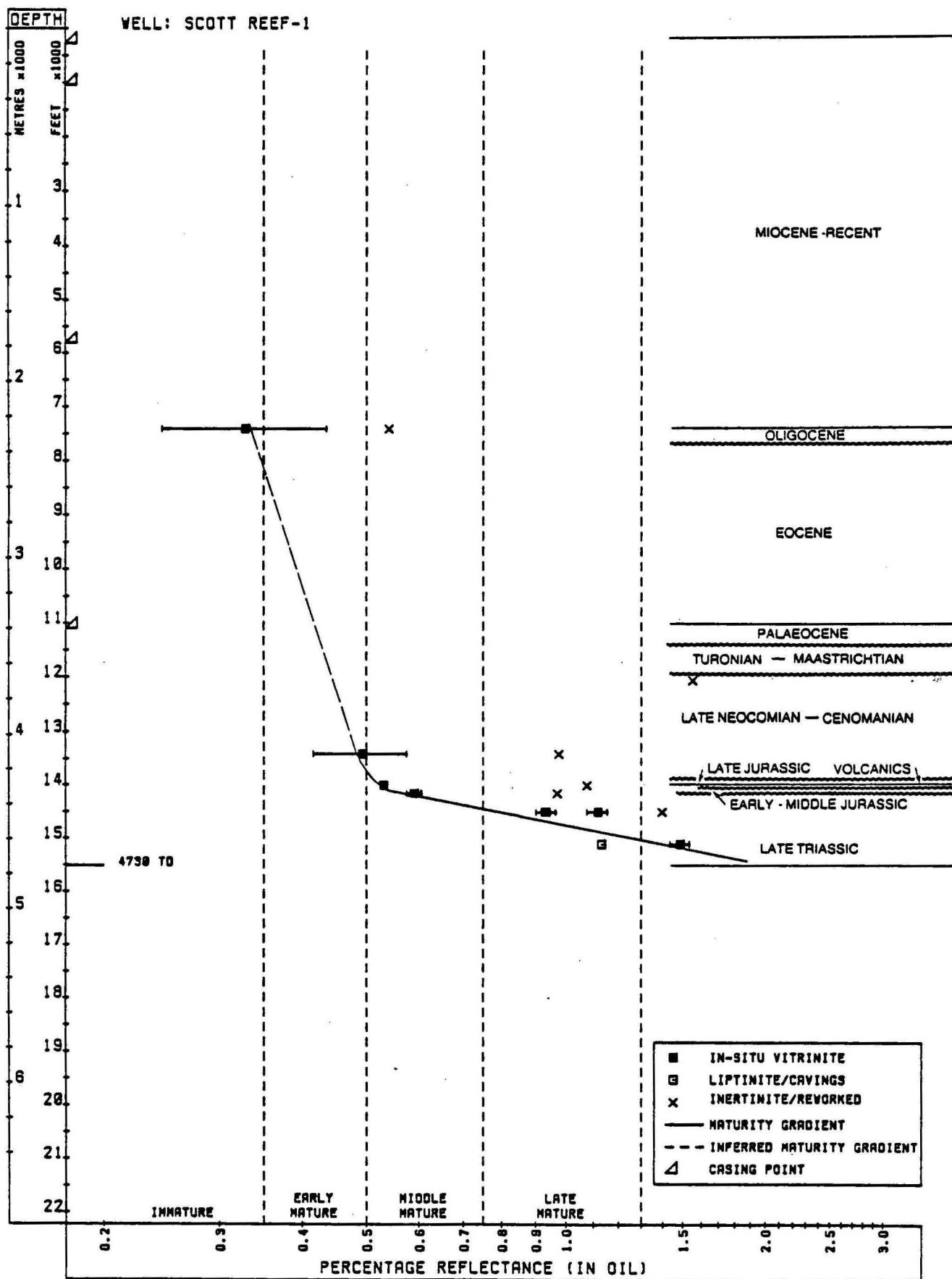


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Scott Reef-1
4299-4308m
Early-Middle Jurassic
Pr/Ph = 1.39
Pr/n-C₁₇ = 0.54
Ph/n-C₁₈ = 0.37
CPI = 1.10

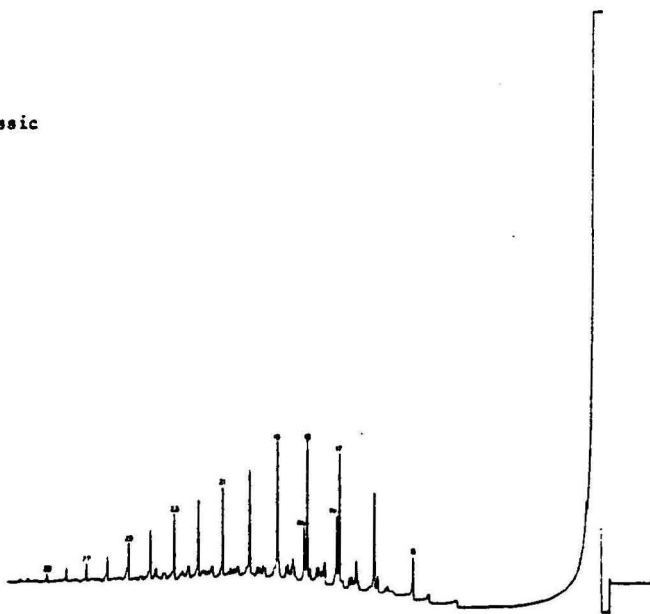


Figure 3

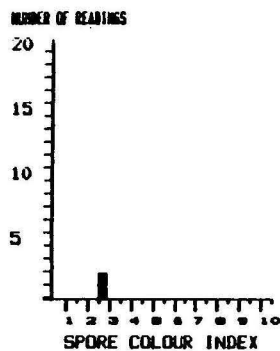
SCOTT REEF-1

IN SITU POPULATION

SAMPLE 732-747M

2.5 2.5

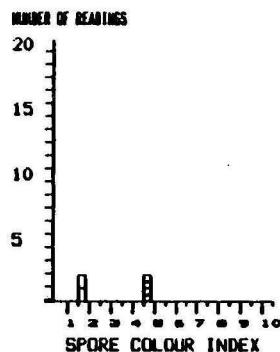
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.5-2.5	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0



SAMPLE 1677-1692M

1.5 1.5 4.5 4.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	1.5-1.5	2
STAINED/REWORKED	4.5-4.5	2



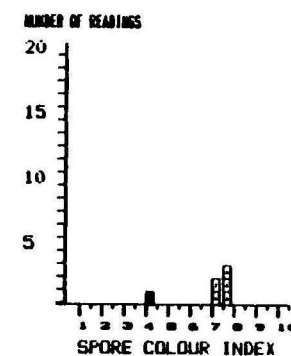
SCOTT REEF-1

IN SITU POPULATION

SAMPLE 2256-2271M

4.0 7.0 7.0 7.5 7.5 7.5

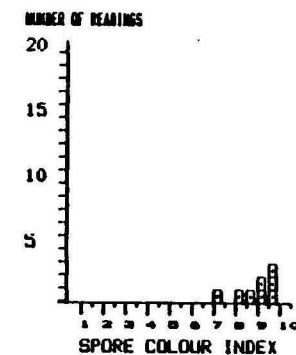
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.0-4.0	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.0-7.5	5



SAMPLE 3674-3689M

7.0 8.0 8.5 9.0 9.0 9.5 9.5 9.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.0-9.5	8

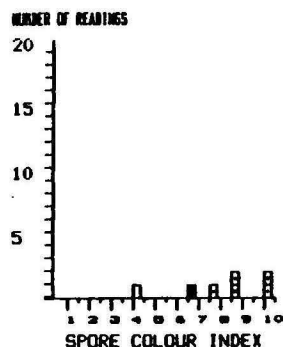


SCOTT REEF-1

IN SITU POPULATION

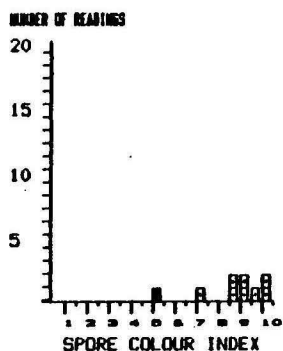
SAMPLE 4085-4101M
4.0 6.5 7.5 8.5 8.5 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.5-6.5	1
BLEACHED/CAVINGS	4.0-4.0	1
STAINED/REWORKED	7.5-10.0	5



SAMPLE 4268-4284M
5.0 7.0 8.5 8.5 9.0 9.0 9.5 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.0	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.0-10.0	8

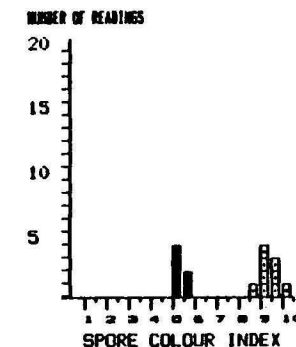


SCOTT REEF-1

IN SITU POPULATION

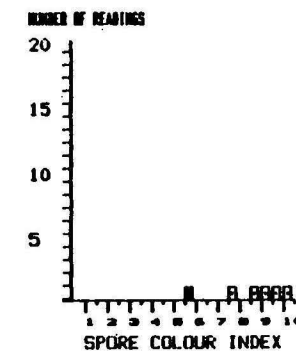
SAMPLE 4314-4329M
5.0 5.0 5.0 5.0 5.5 5.5 8.5 9.0 9.0 9.0
9.0 9.5 9.5 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.5	6
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.5-10.0	9



SAMPLE 4421-4436M
5.5 7.5 8.5 9.0 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-5.5	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.5-10.0	5



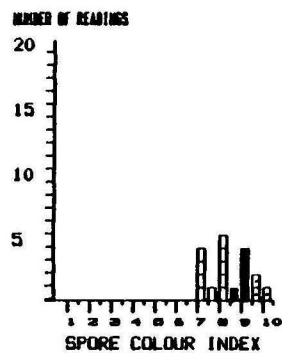
SCOTT REEF-1

IN SITU POPULATION

SAMPLE 4604-4619M

7.0 7.0 7.0 7.0 7.5 8.0 8.0 8.0 8.0 8.0
8.5 9.0 9.0 9.0 9.0 9.5 9.5 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	8.5-9.0	5
BLEACHED/CAVINGS	7.0-8.0	10
STAINED/REWORKED	9.5-10.0	3



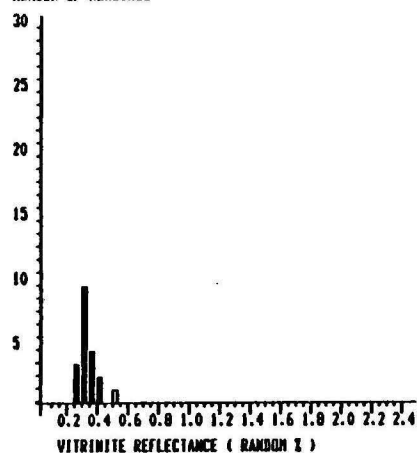
SCOTT REEF-1

SAMPLE 2256-2271M

0.25 0.28 0.29 0.30 0.30 0.31 0.31 0.31 0.31 0.32
0.33 0.33 0.35 0.35 0.35 0.38 0.40 0.43 0.54

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.25-0.43	18	0.33	0.04
INERTINITE/REWORKED	0.54-0.54	1	0.54	

NUMBER OF READINGS

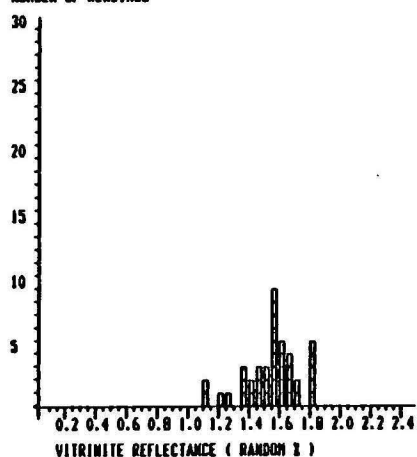


SAMPLE 3674-3689M

1.12 1.13 1.20 1.28 1.36 1.39 1.39 1.40 1.41 1.45
1.48 1.49 1.50 1.53 1.54 1.55 1.56 1.56 1.58
1.58 1.59 1.59 1.59 1.60 1.60 1.61 1.62 1.64 1.65
1.65 1.67 1.69 1.71 1.73 1.80 1.81 1.83 1.83 1.83

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
INERTINITE/REWORKED	1.12-1.83	40	1.55	0.18

NUMBER OF READINGS



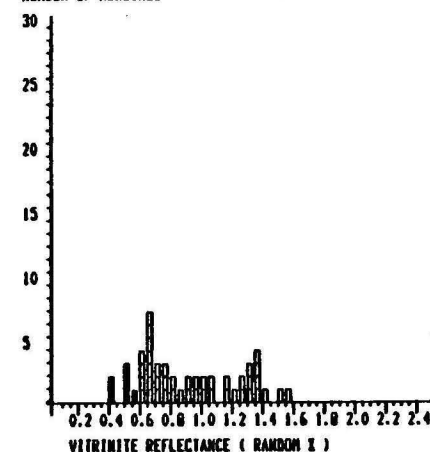
SCOTT REEF-1

SAMPLE 4085-4101M

0.42 0.44 0.50 0.51 0.52 0.57 0.61 0.63 0.63 0.64
0.65 0.65 0.66 0.66 0.66 0.67 0.68 0.70 0.71 0.71
0.75 0.75 0.79 0.81 0.82 0.89 0.90 0.90 0.95 0.98
1.03 1.04 1.07 1.09 1.15 1.15 1.22 1.25 1.27 1.30
1.30 1.31 1.35 1.35 1.36 1.36 1.42 1.54 1.55

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.42-0.57	6	0.49	0.06
INERTINITE/REWORKED	0.61-1.55	43	0.97	0.30

NUMBER OF READINGS

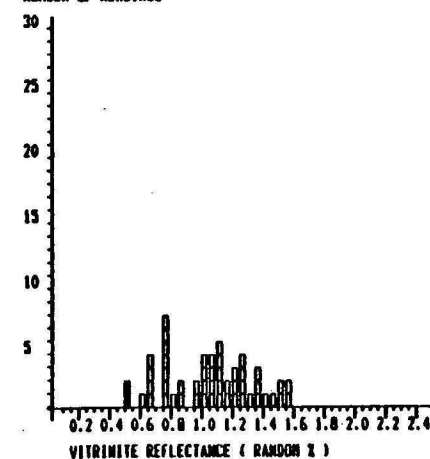


SAMPLE 4268-4284M

0.53 0.53 0.61 0.66 0.67 0.67 0.68 0.75 0.76 0.76
0.76 0.76 0.77 0.78 0.82 0.86 0.88 0.98 0.99 1.00
1.01 1.02 1.03 1.06 1.08 1.08 1.08 1.10 1.11 1.12
1.13 1.14 1.15 1.15 1.21 1.22 1.24 1.25 1.26 1.28
1.29 1.34 1.36 1.37 1.38 1.40 1.47 1.51 1.54 1.55
1.55

SELECTED CLASS	RANGE (Z)	COUNT	AV(Z)	ST.DEV
IN SITU VITRINITE	0.53-0.53	2	0.53	
INERTINITE/REWORKED	0.61-1.55	49	1.07	0.27

NUMBER OF READINGS



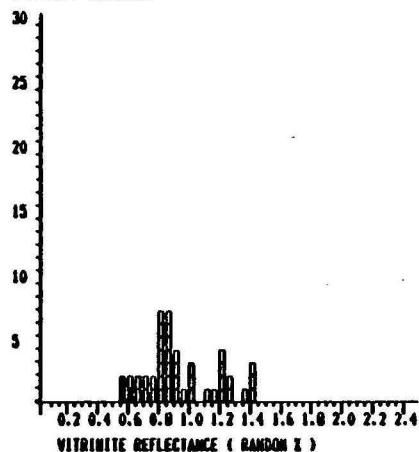
SCOTT REEF-1

SAMPLE 4314-4329M

0.58 0.59 0.60 0.63 0.65 0.65 0.74 0.74 0.75 0.77
0.81 0.81 0.82 0.83 0.83 0.84 0.84 0.85 0.85 0.86
0.87 0.87 0.87 0.88 0.90 0.92 0.93 0.93 0.97 1.01
1.01 1.02 1.12 1.17 1.20 1.21 1.21 1.21 1.25 1.26
1.38 1.40 1.43 1.44

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.58-0.60	3	0.59	0.01
INERTINITE/REWORKED	0.63-1.44	41	0.97	0.22

NUMBER OF READINGS

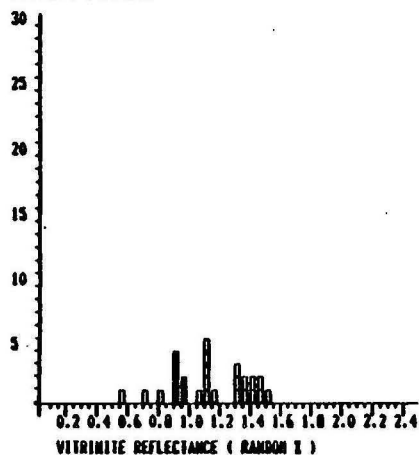


SAMPLE 4421-4436M

0.58 0.70 0.80 0.92 0.93 0.94 0.94 0.96 0.96 1.08
1.11 1.11 1.12 1.12 1.13 1.15 1.30 1.31 1.33 1.35
1.36 1.42 1.44 1.47 1.48 1.50

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.92-0.96	6	0.94	0.02
LIPTINITE/CAVINGS	0.58-0.80	3	0.69	0.11
INERTINITE/REWORKED	1.08-1.50	17	1.20	0.15

NUMBER OF READINGS



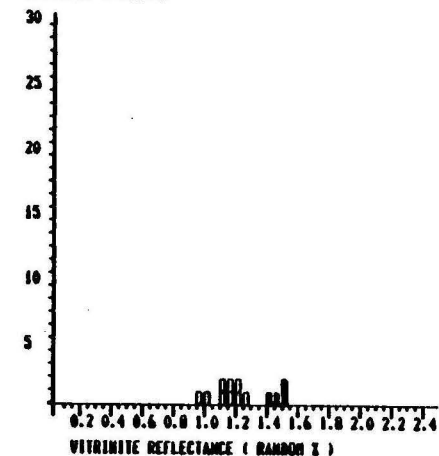
SCOTT REEF-1

SAMPLE 4604-4619M

0.95 1.00 1.12 1.14 1.15 1.15 1.21 1.22 1.25 1.44
1.47 1.51 1.53

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	1.44-1.53	4	1.49	0.04
LIPTINITE/CAVINGS	0.95-1.25	9	1.13	0.10

NUMBER OF READINGS



SKUA-1 WELL

SUMMARY

Geochemical analysis of samples from the interval 1463m to 3034m of the Skua-1 well has shown that the well section is immature to 1800m, early mature between 1800m and 2500m and middle mature below this depth to 3048m TD. The maturity gradients show no evidence of any major erosional unconformities in the section analysed. Extrapolation of the gradients to surface does not provide evidence of any large amounts of Palaeocene or younger section missing above 1463m. The sediments analysed are presently at or near their maximum depths of burial.

Algal rich coals and mudstones in the interval 2427m to 3034m of the Petrel Formation: Member "C" have very good oil and good gas source potential and will have already generated significant quantities of oil.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 12° 30' 19"S, 124° 25' 58"E.

Operator and date of drilling: Arco Australia Ltd, 1974.

Well Status: Plugged and abandoned.

TD: 3048m.

Mud Data: Seawater and high viscosity pills: Seabed to 1235m.
Seawater/Spersene/XP 20 system: 1235m to 3048m TD.

Casing data: 30" at 126m, 20" at 243m, 13³/₈" at 1221m, 9⁵/₈" at 2064m.

BHT data: 60.5°C at 1230.5m, stopped circulation time unknown.
65°C at 1855m, stopped circulation time unknown.
92°C at 3039m, stopped circulation time unknown.

Elevation: RT 29.5m ASL.

Water depth: 80.5m.

Interval analysed: 1463m to 3034m.

SKUA-1 WELL

Age of interval analysed:

	<u>Depths (in metres)</u>
Palaeocene	1463-1898
Early-Late Cretaceous	1898-2418
Middle Jurassic	2418-2803
Early Jurassic	2803-3034

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed contained enough vitrinitic kerogen for measurements, measurements were complicated by abundant reworked material. Results: Fair.
- b) Spore Colour Index: The samples analysed contained sufficient sporomorphs for measurements. Interpretation was hampered by abundant reworked material. Results: Fair.

Source rock data quality: Good.

Gas chromatography run at: 2427m to 2439m, 2540m to 2549m, 2637m to 2640m, 2659m to 2674m, 2768m to 2787m, 2823m to 2835m, 2991m to 3000m and 3021m to 3034m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Interpreted spore colour index values rise from 3 SCI units at 1463m to around 5.5 SCI units at 3034m. Vitrinite reflectance results rise from around 0.3% to 0.57% over the same interval. The results show that the well section is immature to around 1800m, early mature between 1800m and 2500m and middle mature between 2500m and 3048m TD. The maturity gradients show no evidence of any major uplift and erosion at unconformities within the section analysed. Extrapolation of the gradients to seabed suggests that little Palaeocene and younger section is missing above 1463m. The sediments analysed are currently at or near their maximum depths of burial.

SKUA-1 WELL

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

The well developed coals and organically rich mudstones in the interval 2427m to 3034m of the Petrel Formation: Member "C" contain abundant oil-prone kerogen. Pyrolysis analysis shows high hydrogen indices of between 301 and 533 associated with low oxygen indices of between 8 and 25 for the coals analysed. These figures indicate between 35% to 70% oil-prone kerogen content. The low Tmax figures suggest that much of this oil-prone material is algal material.

The interbedded mudstones are organically rich in the intervals 2457m to 2674m (1.12% to 7.88%) and 2823m to 3034m (2.73% to 7.89%). In the lower interval high organic carbon contents are restricted to dark grey, carbonaceous mudstones which make up around 30% of the argillaceous sediments in this section. These mudstones have relatively high hydrogen indices of between 119 and 420 and contain between 10% and 65% oil-prone kerogen. The low Tmax figures suggest that the major part of the oil-prone kerogen is algal material.

Extraction, fractionation and gas chromatography analyses of source rocks at 2427m to 2439m, 2540m to 2549m, 2637m to 2640m, 2659m to 2674m, 2768m to 2787m, 2823m to 2835m, 2991m to 3000m and 3021m to 3034m shows that all these samples contain hydrocarbons derived from an early to middle mature source containing predominantly algal sapropel mixed with smaller quantities of waxy sapropel.

The coals and mudstones in the interval 2427m to 3034m have very good oil and gas source potential. Although presently only early mature to middle mature, these source rocks are organically rich enough to have already generated significant quantities of an "early mature" oil.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

The limestones of the Palaeocene section and mudstones and interbedded sandstones of the Late Albian to Maastrichtian have not been analysed for potential source rocks. Regional evidence suggests that these intervals have no significant oil or gas source potential.

Mudstones interbedded with coals in the interval 2689m to 2835m and lighter coloured, organically lean to fair mudstones in the

SKUA-1 WELL

interval 2912m to 3034m contain between 0.73% and 1.86% organic carbon. Pyrolysis analysis shows that these mudstones contain only humic kerogen and therefore have no significant oil source potential.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
1372		Palaeocene									
1463-1476	Ctg	LST, yel-gy, v arg	3.0	0.50(7)rew	75	25	*				
1756-1768	"	LST, off-wht	3.0	0.35(1)	70	20	10				
1898		Late Albian-Maastrichtian									
2122-2134	"	MDST, lt gy, v calc	4.0	0.53(8)rew	30	60	10				
2396-2409	"	MDST, med gy + 30% MDST, dk gy + mnr SST, wht	2.0cvd	0.73(8)rew	60	40	mnr	50	50	*	*
2418		Middle Jurassic									
2427-2439	P	COAL, blk						35	20	15	30
2457-2470	P	MDST, med-med dk gy						45	25	10	20
2488-2497	P	MDST, dk gy						45	35	10	10
2540-2549	P	COAL, blk		0.48(44)				40	25	25	10
2564-2579	Ctg	COAL, blk + 30% MDST, lt gy gn + med gy + 10% SST, wht	5.0	0.45(16)	40	50	10				
	P	MDST, a/a						35	50	5	10
	P	COAL, blk						35	20	25	20
2582-2595	P	COAL, blk		0.47(11)				55	10	25	10
2598-2607	P	COAL, blk						40	10	40	10
2637-2640	P	COAL, blk		0.49(19)				20	10	45	25
	P	MDST, lt gy gn						35	50	15	*
2643-2655	P	MDST, lt med gy						20	60	10	10
	P	COAL, blk						40	10	30	20
2659-2674	P	MDST, med gy						10	45	10	35
	P	COAL, blk						35	15	35	15
2689-2701	P	COAL, blk		0.45(12)LRV				45	10	30	15
2704-2716	Ctg	MDST, lt med gy + 10% COAL	5.0	0.50(28)	30	45	25				
	P	COAL						35	10	35	20
2720-2729	P	MDST, lt med gy						45	50	5	*
	P	COAL, blk						45	10	30	15
2768-2787	P	COAL, blk		0.41(26)LRV				15	20	45	20
2803		Early Jurassic									
2823-2835	P	MDST, lt gy gn						55	40	5	*
	P	MDST, dk gy, carb						10	25	45	20
2912-2918	Ctg	MDST, lt gy gn + 30% MDST, dk gy, carb + 10% SST, wht-lt gy	5.0-6.0	0.55(7)	35	55	10				
	P	MDST, dk gy, carb						35	45	10	10

Table 1a Maturity and Kerogen Composition Data

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
2942-2948	P	MDST, dk gy, carb	5.5	0.59(7)	30	60	10	35	35	20	10
2970-2979	P	MDST, lt gy gn-med gy						40	60	*	*
	P	MDST, dk gy, carb						35	30	25	10
2991-3000	P	MDST, lt gy gn-med gy						65	35	*	*
	P	MDST, dk gy, carb						60	30	10	*
3021-3034	Ctg	SST, wht-lt gy + 30% MDST, lt gy gn + med gy + 20% MDST, dk gy, carb									
	P	MDST, lt gy gn-med gy						40	60	*	*
	P	MDST, dk gy, carb						10	40	40	10
		LRV: Low Reflecting Vitrinite									

Table 1b Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
1372		Palaeocene													
1463-1476	Ctg	LST, yel gy + v arg	-												
1756-1768	"	LST, off-wht	-												
1898		Late Albian-Maastrichtian													
2122-2134	"	MDST, lt gy, v calc	-												
2396-2409	"	MDST, med gy + 30% MDST, dk gy + mnr SST, wht	1.01	NDP	68	75	0.26	0.93							
2418		Middle Jurassic													
2427-2439	"	MDST, med-dk gy + 10% COAL, blk	12.49						4690	38	2700	22	36	22	42
	P	MDST, med-dk gy	0.93												
	"	COAL, blk	44.80	421	359	13	0.07	172.35							
2457-2470	Ctg	SST, med gy + 70% MDST, med-med dk gy	-												
	P	MDST, med-med dk gy	6.05	426	257	15	0.06	16.45							
2488-2497	Ctg	MDST, dk gy + abnt mica contam	-												
	P	MDST, dk gy	7.88	424	233	18	0.09	20.08							
2540-2549	Ctg	COAL, blk + 10% SST, lt gy	13.81						7100	51	3125	23	25	19	56
	P	COAL, blk	51.00	413	329	15	0.07	179.85							
2564-2579	Ctg	COAL, blk + 30% MDST, lt gy gn-med gy + 10% SST, wht	-												
	P	MDST, lt gy gn-med gy	2.21	428	169	38	0.07	4.03							
	"	COAL, blk	41.60	421	347	14	0.05	152.10							
2582-2595	Ctg	COAL, blk + 10% SST, lt gy	-												
	P	COAL, blk	57.30	418	301	9	0.07	185.30							
2598-2607	Ctg	COAL, blk + mnr MDST, lt gy gn	-												
	P	COAL, blk	63.53	411	400	9	0.09	278.65							
2637-2640	Ctg	COAL, blk + 10% MDST, lt gy gn	38.75						22050	57	11860	31	46	8	46
	P	MDST, lt gy gn	1.12	423	119	60	0.31	1.69							
	"	COAL, blk	51.83	412	533	11	0.07	297.75							
2643-2655	Ctg	MDST, lt-med gy + 20% COAL, blk	-												
	P	MDST, lt-med gy	1.43	434	249	59	0.11	4.01							
	"	COAL, blk	51.50	415	370	10	0.09	209.90							

Table 2a Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
2659-2674	Ctg	COAL, blk + 20% MDST, med gy + mar SST, wht- lt gy	8.42						3110	37	2195	26	60	11	29
	P	MDST, med gy	3.29	433	426	29	0.06	14.90							
	"	COAL, blk	46.30	416	411	11	0.06	203.20							
2689-2701	Ctg	COAL, a/a + 40% MDST, lt gy gn + 10% SST, wht-lt gy	-												
	P	MDST, lt gy gn	0.85												
	"	COAL, blk	66.50	417	368	8	0.07	261.70							
2704-2716	Ctg	MDST, lt-med gy + 10% COAL	-												
	P	MDST, lt-med gy	0.73												
	"	COAL	33.98	418	442	10	0.04	156.10							
2720-2729	Ctg	COAL, blk + 10% MDST, a/a	-												
	P	MDST, lt med gy	1.09	428	124	50	0.18	1.65							
	"	COAL, blk	57.70	416	386	10	0.06	235.90							
2768-2787	Ctg	COAL, blk + mar SST, wht	11.11						2585	23	1460	13	40	16	44
	P	COAL, blk	50.10	415	523	11	0.03	269.20							
2803		Early Jurassic													
2823-2835	Ctg	MDST, lt gy-gn + 40% MDST, dk gy, carb + 10% SST, wht-lt-gy	3.45						765	22	500	15	61	5	35
	P	MDST, lt gy gn	1.40	429	91	52	0.18	1.56							
	"	MDST, dk gy, carb	7.89	421	522	17	0.05	43.26							
2912-2918	Ctg	MDST, lt gy-gn + 30% MDST, dk gy, carb + 10% SST, wht-lt gy	-												
	P	MDST, lt gy-gn	0.87												
	"	MDST, dk gy, carb	2.73	429	224	21	0.06	6.48							
2942-2948	Ctg	MDST, a/a + 10% MDST, dk gy, carb + 20% SST, wht-lt gy	-												
	P	MDST, lt gy-gn	0.74												
	"	MDST, dk gy, carb	2.92	427	267	17	0.05	8.22							
2970-2979	Ctg	MDST, lt-gy-gn-med gy + 40% MDST, dk gy, carb + 10% SST, a/a	-												
	P	MDST, lt gy-gn-med gy	1.22												
	"	MDST, dk gy, carb	3.69	425	318	16	0.05	12.28							
2991-3000	Ctg	MDST, lt gy-gn-med gy + 40% MDST, dk gy, carb + 20% SST, a/a	2.59						950	37	685	26	68	4	28

Table 2b Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA														
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION								
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)				
2991-3000	P	MDST, lt gy-gn-med gy	1.86	429	67	34	0.17	1.50									
	"	MDST, dk gy, carb	4.79	424	115	14	0.10	6.08									
3021-3034	Ctg	SST, a/a + 30% MDST, lt gy-gn-med gy + 20% MDST, dk gy, carb	3.41						1290	38	745	22	52	6	42		
	P	MDST, lt gy gn-med gy	1.07	432	99	65	0.13	1.22									
	"	MDST, dk gy, carb	4.12	425	420	26	0.07	18.66									

Table 2c Chemical Analysis Data

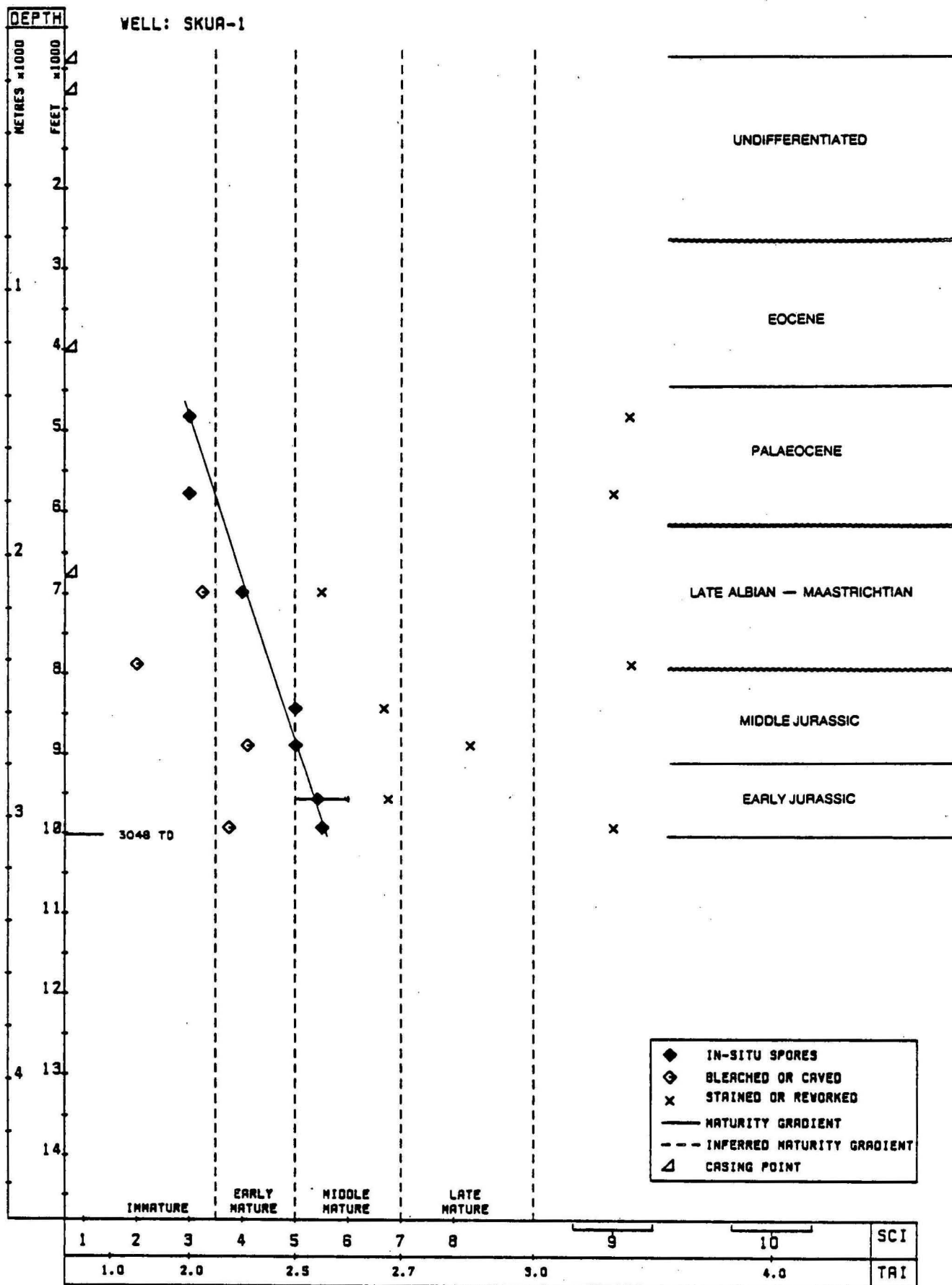
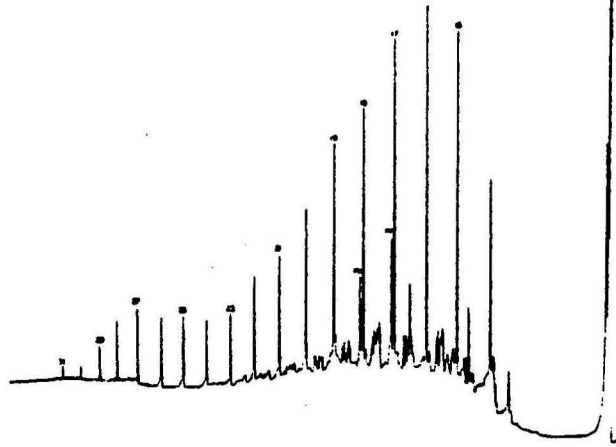
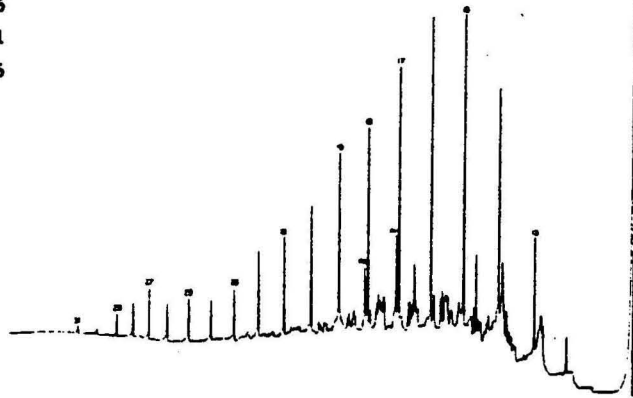


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

Skua-1
2427-2439m
Middle Jurassic
SCI 4.5
Pr/Ph = 1.50
Pr/n-C₁₇ = 0.40
Ph/n-C₁₈ = 0.34
CPI = 1.10



Skua-1
2540-2549m
Middle Jurassic
SCI 4.75
Pr/Ph = 1.56
Pr/n-C₁₇ = 0.36
Ph/n-C₁₈ = 0.31
CPI = 1.26



Skua-1
2637-2640m
Middle Jurassic
SCI 5.0
Pr/Ph = 1.30
Pr/n-C₁₇ = 0.32
Ph/n-C₁₈ = 0.30
CPI = 1.13

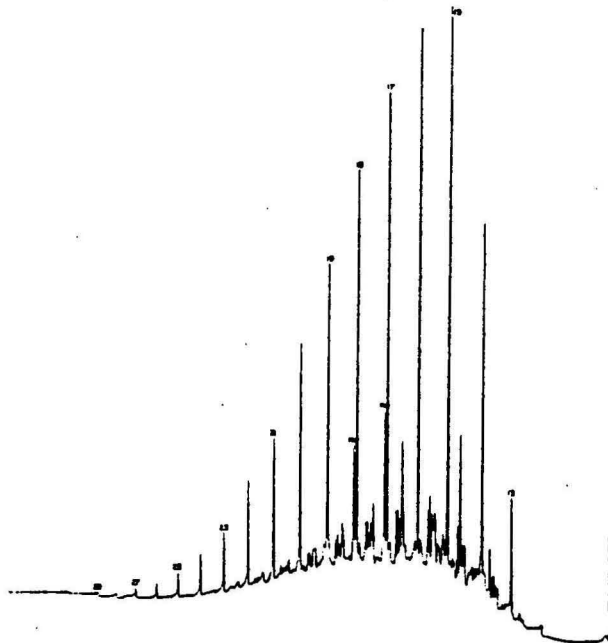
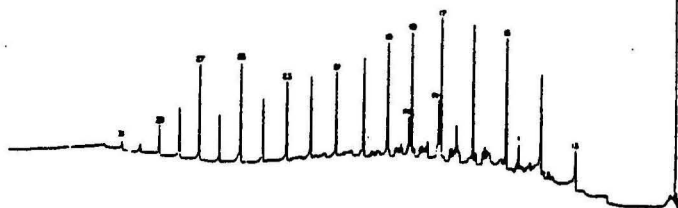
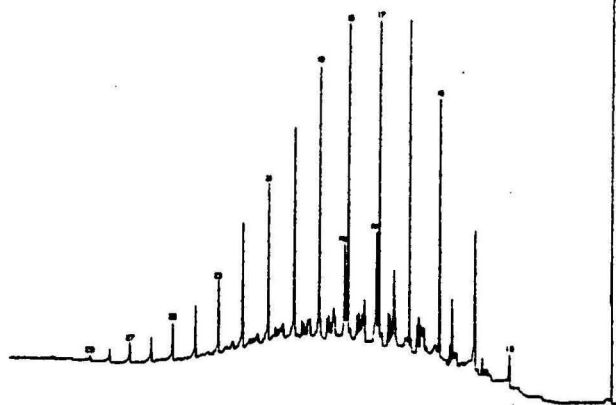


Figure 3a

Skua-1
2659-2674m
Middle Jurassic
SCI 5.0
Pr/Ph = 1.51
Pr/n-C₁₇ = 0.43
Ph/n-C₁₈ = 0.33
CPI = 1.64



Skua-1
2768-2787m
Middle Jurassic
SCI 5.25
Pr/Ph = 1.18
Pr/n-C₁₇ = 0.35
Ph/n-C₁₈ = 0.31
CPI = 1.10



Skua-1
2823-2835m
Early Jurassic
SCI 5.25
Pr/Ph = 1.15
Pr/n-C₁₇ = 0.52
Ph/n-C₁₈ = 0.46
CPI = 1.25

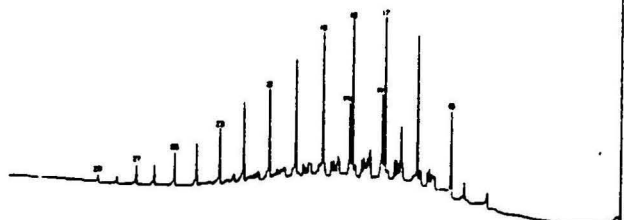
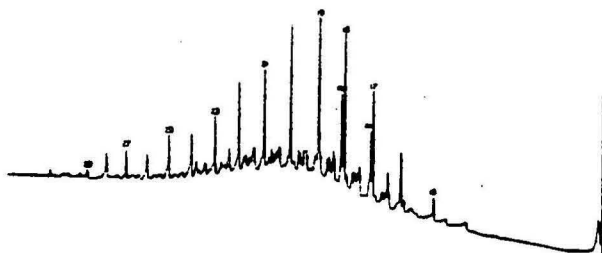


Figure 3b

Skua-1
2991-3000m
Early Jurassic
SCI 5.5
Pr/Ph = 0.73
Pr/n-C₁₇ = 0.63
Ph/n-C₁₈ = 0.61
CPI = 1.20



Skua-1
3021-3034m
Early Jurassic
SCI 5.5
Pr/Ph = 0.99
Pr/n-C₁₇ = 0.48
Ph/n-C₁₈ = 0.44
CPI = 1.23

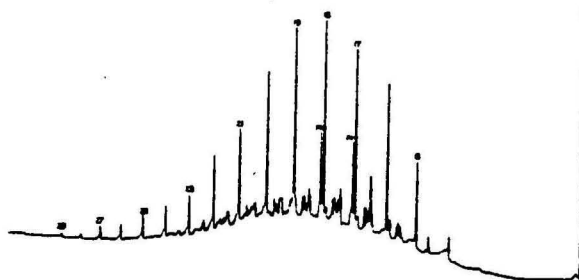


Figure 3c

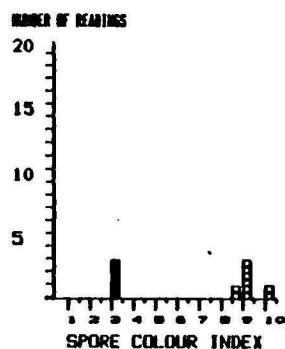
SKUA-1

IN SITU POPULATION

SAMPLE 1463-1476M

3.0 3.0 3.0 8.5 9.0 9.0 9.0 10.0

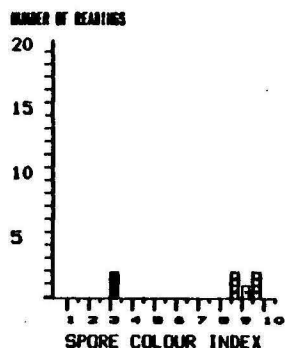
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	3
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.5-10.0	5



SAMPLE 1756-1768M

3.0 3.0 8.5 8.5 9.0 9.5 9.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.0-3.0	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.5-9.5	5



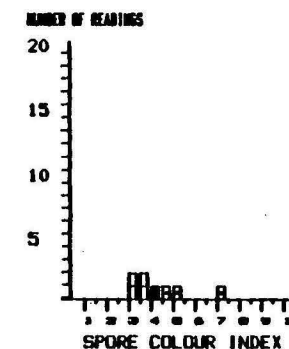
SKUA-1

IN SITU POPULATION

SAMPLE 2122-2134M

3.0 3.0 3.5 3.5 4.0 4.5 5.0 7.0

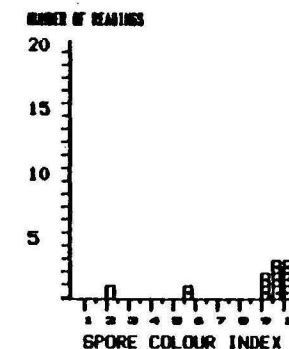
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.0-4.0	1
BLEACHED/CAVINGS	3.0-3.5	4
STAINED/REWORKED	4.5-7.0	3



SAMPLE 2396-2409M

2.0 5.5 9.0 9.0 9.5 9.5 9.5 10.0 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	2.0-2.0	1
STAINED/REWORKED	5.5-10.0	9



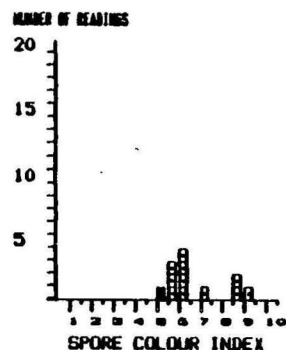
SKUA-1

IN SITU POPULATION

SAMPLE 2564-2579M

5.0 5.5 5.5 5.5 6.0 6.0 6.0 6.0 7.0 8.5
8.5 9.0

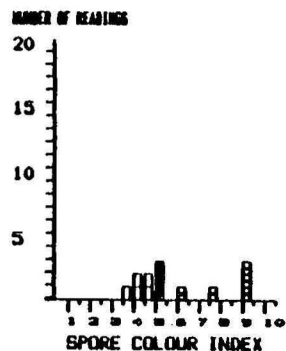
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.0	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	5.5-9.0	11



SAMPLE 2704-2716M

3.5 4.0 4.0 4.5 4.5 5.0 5.0 5.0 6.0 7.5
9.0 9.0 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.0	3
BLEACHED/CAVINGS	3.5-4.5	5
STAINED/REWORKED	6.0-9.0	5



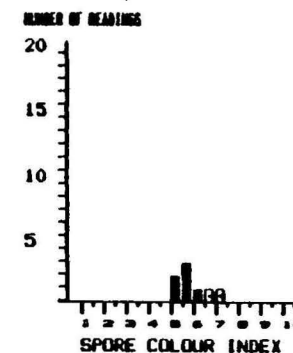
SKUA-1

IN SITU POPULATION

SAMPLE 2912-2918M

5.0 5.0 5.5 5.5 5.5 6.0 6.5 7.0

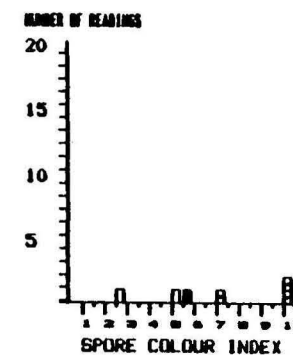
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-6.0	6
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	6.5-7.0	2



SAMPLE 3021-3034M

2.5 5.0 5.5 7.0 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-5.5	1
BLEACHED/CAVINGS	2.5-5.0	2
STAINED/REWORKED	7.0-10.0	3



SKUA-1

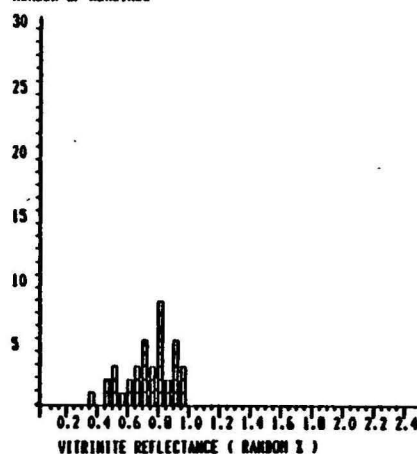
SAMPLE 1463-1476H

0.39 0.47 0.48 0.50 0.53 0.54 0.58 0.61 0.64 0.65
0.67 0.69 0.70 0.71 0.73 0.73 0.74 0.75 0.76 0.77
0.80 0.80 0.80 0.81 0.82 0.83 0.83 0.84 0.85 0.85
0.91 0.91 0.92 0.93 0.94 0.97 0.98 0.99

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
----------------	-----------	-------	-------	--------

REWORKED	0.39-0.58	7	0.50	0.06
INERTINITE/REWORKED	0.61-0.99	31	0.80	0.10

NUMBER OF READINGS



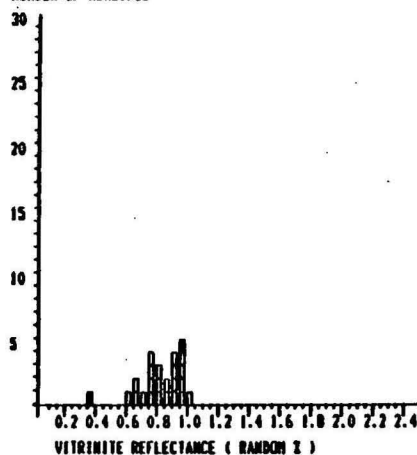
SAMPLE 1756-1768H

0.35 0.61 0.65 0.69 0.71 0.76 0.76 0.77 0.77 0.82
0.82 0.83 0.85 0.86 0.90 0.90 0.93 0.94 0.95 0.95
0.97 0.97 0.98 1.00

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
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IN SITU VITRINITE	0.35-0.35	1	0.35	
REWORKED	0.61-0.71	4	0.67	0.04
INERTINITE/REWORKED	0.76-1.00	19	0.80	0.08

NUMBER OF READINGS



SKUA-1

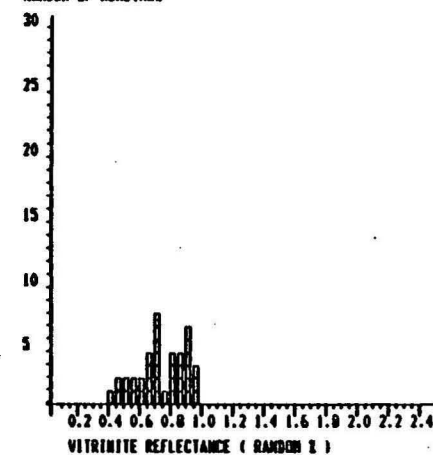
SAMPLE 2122-2134H

0.43 0.46 0.47 0.54 0.54 0.58 0.59 0.61 0.64 0.65
0.67 0.69 0.69 0.70 0.72 0.72 0.73 0.73 0.74 0.74
0.76 0.80 0.80 0.81 0.83 0.85 0.86 0.87 0.88 0.90
0.90 0.91 0.91 0.92 0.94 0.97 0.98 0.98

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
----------------	-----------	-------	-------	--------

REWORKED	0.43-0.61	8	0.53	0.07
INERTINITE/REWORKED	0.64-0.98	30	0.81	0.10

NUMBER OF READINGS



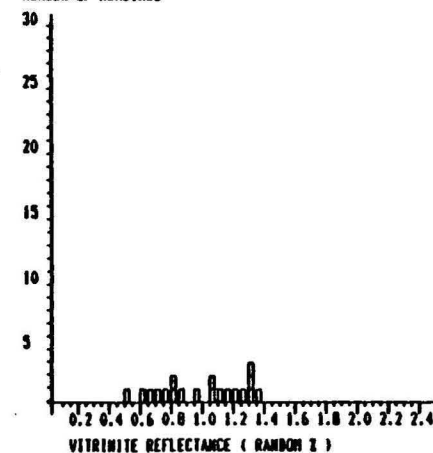
SAMPLE 2396-2409H

0.54 0.63 0.67 0.71 0.77 0.82 0.84 0.86 0.99 1.07
1.08 1.10 1.15 1.21 1.26 1.30 1.30 1.33 1.39

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
----------------	-----------	-------	-------	--------

REWORKED	0.54-0.86	8	0.73	0.11
INERTINITE/REWORKED	0.99-1.39	11	1.20	0.13

NUMBER OF READINGS



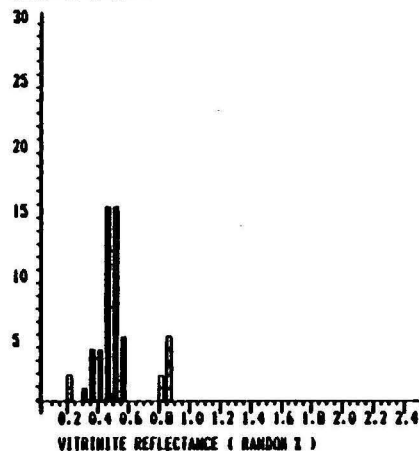
SKUA-1

SAMPLE 2540-2549H COAL

0.22 0.22 0.34 0.35 0.37 0.37 0.39 0.40 0.41 0.43
0.44 0.45 0.45 0.46 0.46 0.46 0.47 0.47 0.47 0.48
0.48 0.48 0.48 0.49 0.49 0.49 0.50 0.50 0.50 0.50
0.51 0.51 0.51 0.52 0.53 0.53 0.53 0.53 0.53 0.53
0.54 0.55 0.55 0.56 0.57 0.58 0.83 0.84 0.85 0.85
0.86 0.86 0.87

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.34-0.58	44	0.48	0.06
LIPITINITE/CAVINGS	0.22-0.22	2	0.22	
INERTINITE/REWORKED	0.83-0.87	7	0.85	0.01

NUMBER OF READINGS

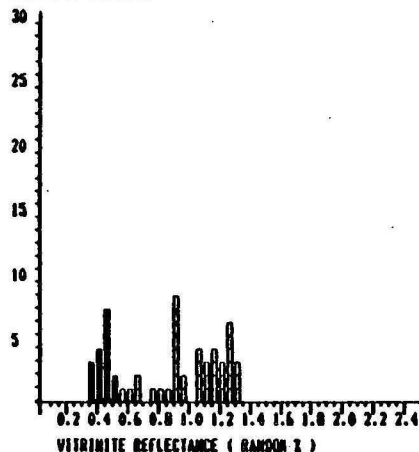


SAMPLE 2564-2579H

0.39 0.39 0.39 0.41 0.42 0.42 0.44 0.45 0.46 0.46
0.47 0.48 0.48 0.48 0.51 0.53 0.58 0.60 0.66 0.69
0.77 0.82 0.86 0.91 0.91 0.93 0.93 0.93 0.94 0.94
0.94 0.97 0.98 1.05 1.06 1.08 1.09 1.10 1.10 1.14
1.15 1.16 1.17 1.19 1.21 1.22 1.22 1.25 1.26 1.27
1.27 1.28 1.29 1.30 1.30 1.31

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.39-0.53	16	0.45	0.04
REWORKED	0.58-0.69	4	0.63	0.05
INERTINITE/REWORKED	0.77-1.31	36	1.09	0.16

NUMBER OF READINGS



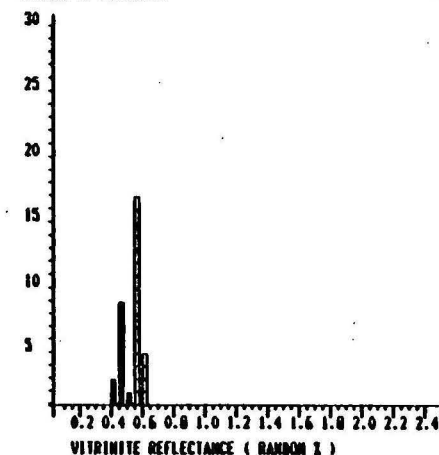
SKUA-1

SAMPLE 2582-2595H COAL

0.44 0.44 0.45 0.45 0.47 0.47 0.47 0.47 0.49 0.49
0.53 0.55 0.56 0.57 0.57 0.57 0.57 0.57 0.57 0.58
0.58 0.58 0.58 0.58 0.59 0.59 0.59 0.61 0.61 0.61
0.61

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.44-0.53	11	0.47	0.03
INERTINITE/REWORKED	0.55-0.61	20	0.58	0.02

NUMBER OF READINGS

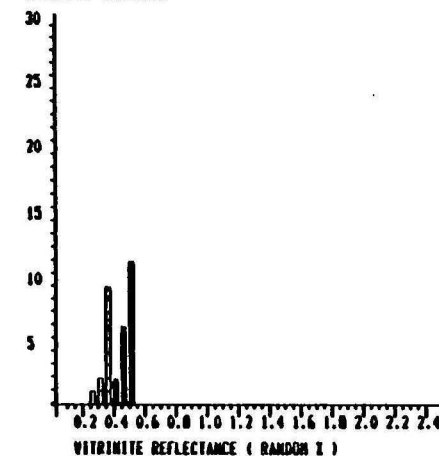


SAMPLE 2637-2640H COAL

0.29 0.30 0.30 0.35 0.37 0.37 0.37 0.37 0.37 0.38
0.38 0.39 0.43 0.44 0.47 0.48 0.48 0.48 0.48 0.49
0.50 0.50 0.50 0.50 0.50 0.51 0.51 0.51 0.51 0.51
0.52

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.43-0.52	19	0.49	0.02
LOW REFLECTING VIT.	0.35-0.39	9	0.37	0.01

NUMBER OF READINGS



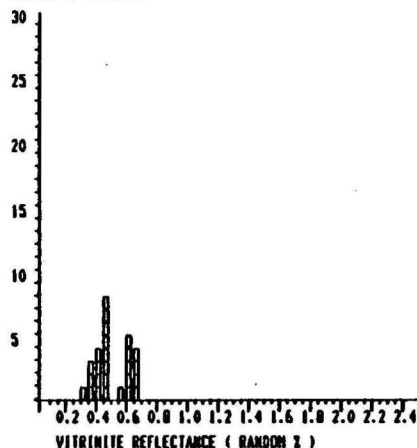
SKUA-1

SAMPLE 2689-2701M COAL

0.34 0.35 0.36 0.38 0.41 0.43 0.43 0.43 0.45 0.45
0.45 0.45 0.46 0.46 0.46 0.49 0.57 0.60 0.60 0.61
0.62 0.63 0.65 0.65 0.66 0.67

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
LOW REFLECTING VIT.	0.41-0.49	12	0.45	0.02
INERTINITE/REWORKED	0.57-0.67	10	0.63	0.03

NUMBER OF READINGS

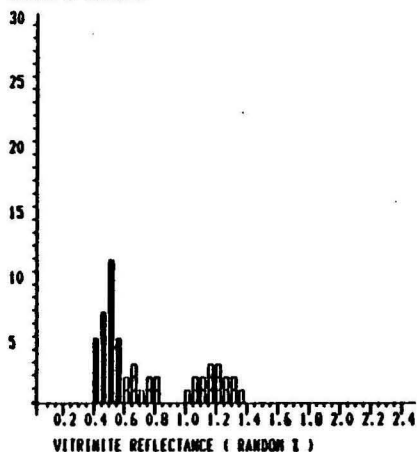


SAMPLE 2704-2716M

0.40 0.41 0.43 0.43 0.44 0.45 0.46 0.46 0.47 0.47
0.49 0.49 0.50 0.51 0.51 0.51 0.53 0.53 0.53 0.53
0.54 0.54 0.54 0.56 0.58 0.58 0.59 0.59 0.61 0.63
0.65 0.68 0.69 0.73 0.75 0.77 0.80 0.82 1.04 1.08
1.09 1.12 1.13 1.16 1.17 1.17 1.21 1.23 1.23 1.25
1.29 1.32 1.34 1.36

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.40-0.59	28	0.50	0.05
REWORKED	0.61-0.82	10	0.71	0.07
INERTINITE/REWORKED	1.04-1.36	16	1.20	0.10

NUMBER OF READINGS



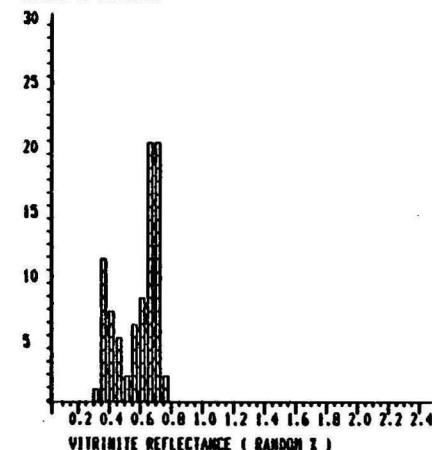
SKUA-1

SAMPLE 2768-2787M COAL

0.32 0.35 0.35 0.35 0.35 0.36 0.36 0.37 0.38 0.38
0.38 0.38 0.40 0.40 0.40 0.41 0.42 0.44 0.44 0.46
0.47 0.48 0.48 0.49 0.52 0.52 0.56 0.58 0.58 0.58
0.59 0.59 0.60 0.60 0.62 0.62 0.63 0.63 0.63 0.64
0.65 0.65 0.66 0.66 0.66 0.66 0.66 0.66 0.66 0.67
0.67 0.67 0.68 0.68 0.68 0.68 0.69 0.69 0.69 0.69
0.70 0.70 0.70 0.70 0.70 0.70 0.71 0.71 0.72 0.72
0.72 0.73 0.73 0.73 0.73 0.74 0.74 0.74 0.74 0.74
0.75 0.76

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
LOW REFLECTING VIT.	0.32-0.32	26	0.41	0.06
INERTINITE/REWORKED	0.56-0.76	56	0.67	0.05

NUMBER OF READINGS

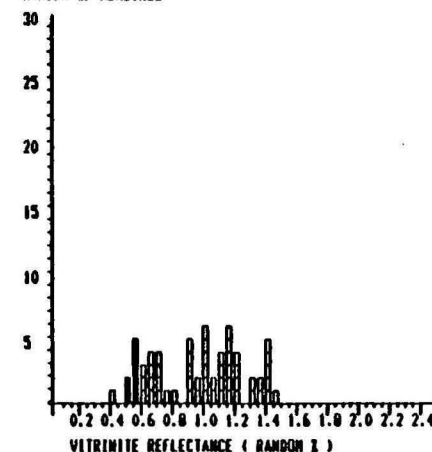


SAMPLE 2912-2918M

0.44 0.52 0.53 0.55 0.56 0.56 0.57 0.58 0.60 0.61
0.62 0.66 0.67 0.68 0.69 0.71 0.72 0.73 0.74 0.77
0.82 0.90 0.93 0.93 0.93 0.93 0.95 0.96 1.00 1.03
1.04 1.04 1.04 1.04 1.08 1.09 1.12 1.12 1.13 1.13
1.15 1.16 1.17 1.17 1.18 1.19 1.21 1.21 1.23 1.24
1.32 1.34 1.37 1.38 1.41 1.42 1.43 1.43 1.43 1.49

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.52-0.58	7	0.55	0.02
LIPITINITE/CAVINGS	0.44-0.44	1	0.44	
REWORKED	0.60-0.82	13	0.69	0.06
INERTINITE/REWORKED	0.90-1.49	39	1.16	0.17

NUMBER OF READINGS



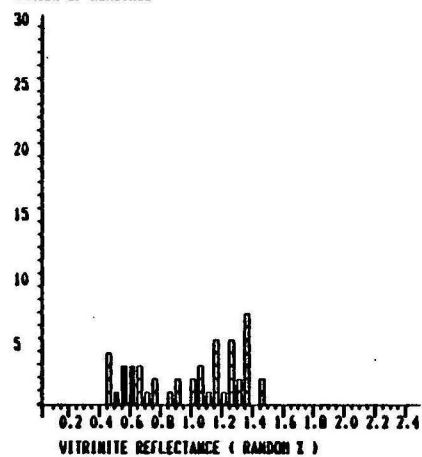
SKUA-1

SAMPLE 3021-3034H

0.46 0.46 0.47 0.49 0.53 0.57 0.58 0.59 0.62 0.62
0.63 0.66 0.66 0.69 0.72 0.75 0.76 0.86 0.92 0.93
1.02 1.03 1.06 1.07 1.09 1.13 1.15 1.16 1.16 1.18
1.18 1.22 1.26 1.27 1.28 1.28 1.29 1.32 1.32 1.35
1.37 1.38 1.39 1.39 1.39 1.39 1.45 1.48

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST. DEV
IN SITU VITRINITE	0.53-0.63	7	0.59	0.04
LIPYINITE/CAVINGS	0.46-0.49	4	0.47	0.01
REWORKED	0.66-0.76	6	0.71	0.04
INERTINITE/REWORKED	0.86-1.48	31	1.22	0.16

NUMBER OF READINGS



SWAN-1 WELL

SUMMARY

Geochemical analysis of samples from the interval 838m to 3284m TD of the Swan-1 well has shown that the well section is immature to 1700m, early mature between 1700m and 2850m and middle mature between 2850m and 3284m TD. The interpreted maturity gradients indicate 700m of missing Early Cretaceous section at the unconformity at 2630m. Extrapolation of the gradients to the surface indicates that around 200m of Miocene and younger section is missing above 838m. The sediments analysed are currently at or near their maximum depth of burial.

Mudstones in the interval 2930m to 3067m and 3189m to 3284m TD of the Late Jurassic to Early Neocomian have fair and good oil source potential respectively. The lower source unit will have already generated significant quantities of oil at its present level of maturity. Mudstones of the Late Jurassic to Early Neocomian between 2630m and 3284m TD have fair gas source potential at optimum maturity.

The sample at 2360m to 2366m, of Late Cretaceous age is stained by a migrant oil derived from mature waxy kerogens.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 12° 11' 17"S, 124° 29' 34"E.

Operator and date of drilling: Arco Australia Ltd, Jan. 1973.

Well Status: Plugged and abandoned.

TD: 3284m.

Mud data: Seawater/high viscosity gel mud: Seabed to 296.5m.
Fully inhibited seawater/Spersene/CMC mud system: 296.5m to 1087m.
Fully inhibited seawater/Spersene/XP20 mud system: 1087m to 3284m TD.

Casing data: 30" at 177m, 20" at 258.5m, 13³/₈" at 1072m.

SWAN-1 WELL

BHT data: 59°C at 1087.5m, after 7 hours stopped circulation.
81°C at 2831m, after 9 hours stopped circulation.
92°C at 3210m, after 8.5 hours stopped circulation.
99°C at 3284m TD, after 6 hours stopped circulation.

Elevation: RT 34m ASL.

Water depth: 109m.

Interval analysed: 838m to 3284m TD.

Age of interval analysed:

	<u>Depths (in metres)</u>
Miocene	838- 873
Eocene	873-1570
Palaeocene	1570-2153
Late Cretaceous	2153-2630
Late Jurassic-Early Cretaceous	2630-3284 TD

Sample type and quality: Dried ditch cuttings of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: Samples analysed in Phase II contained only small quantities of in situ vitrinite. Results: Poor. Phase I data quality unknown.
- b) Spore Colour Index: The samples analysed in Phase II contain only a few in situ sporomorphs. Results: Poor to fair. Phase I data quality unknown.

Source rock data quality: Phase II data quality good. Phase I data quality unknown.

Gas chromatography run at: 2360m to 2366m, 2884m to 2899m, 2930m to 2942m, 3052m to 3067m, 3098m to 3113m and 3235m to 3247m.

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise steadily from 2 to 3 units at 838m to around 5.5 units at 3284m TD. Vitrinite reflectance results rise steadily from 0.28% to 0.42% over the interval 838m to

SWAN-1 WELL

2630m. The unconformity between the Late Cretaceous and the Late Jurassic to Early Neocomian is marked by a discontinuity in the vitrinite reflectance gradient indicating around 700m of missing Early Cretaceous section at this horizon. Vitrinite reflectance values rise steadily from 0.52% at 2630m to 0.61% at 3284m TD.

The results show that the well section is immature to 1700m, early mature between 1700m and 2850m and middle mature between 2850m and 3284m TD. Extrapolation of the gradients to surface indicates that around 200m of Miocene and younger sediments are missing above 838m.

The well section is currently at or near its maximum depth of burial.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

Light to dark grey mudstones in the interval 2930m to 3067m and mudstones in the interval 3189m to 3284m TD of the Late Jurassic to Early Neocomian contain average to slightly above average organic carbon contents of between 1.12% and 2.21%. Pyrolysis analysis of these mudstones shows that they contain an average of 20% oil-prone kerogen. Extraction, fractionation and gas chromatography analysis of samples at 2930m to 2942m, 3052m to 3067m, 3098m to 3113m and 3235m to 3247m shows that these samples contain hydrocarbons derived from early to middle mature waxy kerogens.

The intervals 2930m to 3067m and 3189m to 3284m TD have fair and good oil source potential respectively. The lower interval will have generated significant quantities of oil at its present maturity.

The remaining mudstones analysed in the interval 2630m to 3284m TD in the Late Jurassic to Early Neocomian generally contain average to above average organic carbon contents of between 1.18% and 2.72%. These mudstones contain around 40% to 50% of vitrinitic gas-prone kerogen and are very thick (650m). These mudstones are likely to have fair gas source potential at optimum maturity.

Extraction, fractionation and gas chromatography analysis of the sample at 2884m to 2899m shows that this sample contains small quantities of hydrocarbons derived from mature waxy sapropel.

SWAN-1 WELL

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1
and 2, Figure 3)

Mudstones analysed in the Bathurst Island Formation contain below average organic carbon contents of between 0.39% and 0.86%. Visual kerogen typing indicates that these samples contain mostly humic kerogen. These samples have no significant oil or gas source potential.

Extraction, fractionation and gas chromatography analysis of the sample at 2360m to 2366m shows that this sample contains migrant oil derived from waxy kerogens.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol.) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
296		Miocene									
838-857	Ctg	LST, off-wht + 30% MDST, lt ol gy, v calc	2.0-3.0	0.26(15)	35	60	5				
873		Eocene									
1570		Palaeocene									
1677-1680	"	LST, a/a + tr MDST, a/a	*	0.38(4)	70	25	5				
2153		Late Cretaceous									
2220-2232	"	MDST, lt gy/med gy	3.0cvd		*	*	*				
2293-2305	"	MDST, a/a	3.0cvd		70	25	5				
2360-2366	"	MDST, med dk gy	4.5	0.86(21) rev	65	35	mnr				
2366-2378	"	MDST, med gy, calc	3.0-3.5cvd	0.38(5)	55	35	10				
2607-2622	"	MDST, med gy/med dk gy, calc + 25% LST, gy, arg	3.0-3.5cvd	0.42(4)	65	30	5				
2630		Late Jurassic-Early Neocomian									
2637-2652	"	MDST, a/a + 25% LST, a/a	4.5	0.54(15)	80	15	5				
	P	MDST, a/a						90	10	*	*
2652-2668	Ctg	MDST, a/a + 10% SLTST, lt ol gy/brn gy						85	15	*	*
2698-2713	"	MDST, a/a + 15% SLTST, brn gy	4.5	0.53(7)	80	20	mnr				
2729-2744	"	MDST, a/a + 15% SLTST, ol gy/brn gy						90	10	*	*
2774-2790	"	MDST, med dk gy/dk gy + 15% SLTST, brn gy	5.0	0.54(18)	70	25	5				
2805-2820	P	SLTST, ol gy/brn gy						75	25	*	*
2866-2881	Ctg	MDST, a/a + 10% SLTST, brn gy	5.0	0.60(16)	*	*	*				
2884-2899	"	MDST, dk gy + 20% MDST, lt gy gn + 60% MDST, ol gy	5.0-5.5	0.61(18)	30	30	40				
	P	MDST, dk gy						80	10	*	10
	P	MDST, lt gy gn						50	50	*	*
	P	MDST, ol gy						65	20	*	15
2899-2915	P	MDST, dk ol gy						65	35	*	*
	P	MDST, lt gy gn						50	50	*	*
2915-2930	P	MDST, lt ol gy-med gy						50	50	*	*
	P	MDST, dk gy/dk ol gy						50	50	*	*

Table 1a Maturity and Kerogen Composition Data

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
2930-2942	P	MDST, dk gy/dk ol gy						70	15	*	15
	P	MDST, lt gy gn-med gy						50	40	*	10
2942-2957	P	MDST, med dk gy						60	40	*	*
2957-2973	Ctg	MDST, med dk gy/dk gy	5.0	0.59(4)	50	40	10	40	40	5	15
3003-3018	"	MDST, s/a, sl calc						60	40	*	*
3034-3049	"	MDST, med dk gy	5.0	*	40	30	30				
3052-3067	"	MDST, dk gy-gy blk + 40% MDST, med gy-dk gy + mnr SST, wht	5.0	0.61(4)	20	50	30				
	P	MDST, dk gy-gy blk						45	35	5	15
	P	MDST, med gy-dk gy						30	65	5	*
3067-3082	Ctg	MDST, med dk gy-dk gy						35	55	*	10
3082-3098	"	MDST, dk gy, carb						35	55	*	10
3098-3113	"	MDST, med dk gy, occ carb						35	50	*	15
3113-3128	"	MDST, dk gy + mnr MDST, lt gy gn						50	35	5	10
3128-3143	"	MDST, dk gy, occ carb						65	15	5	15
3143-3159	"	MDST, med dk gy						50	50	*	*
3159-3174	"	MDST, dk gy, occ, carb + mnr SND	7.0rew	0.58(2)	30	40	30	50	45	*	5
3171-3186	"	MDST, med dk gy/dk gy	5.0-5.5	*	*	*	*				
3174-3189	"	MDST, dk gy, occ carb + mnr SST, wht -med gy						40	45	*	15
3189-3204	P	MDST, lt med gy, slty						45	45	5	5
	P	MDST, med dk gy						60	15	*	25
3204-3220	Ctg	MDST, dk gy-gy blk + mnr SST, wht						45	50	*	5
3220-3235	"	MDST, med dk gy + mnr SST, lt gy gn						20	55	5	20
3235-3247	"	MDST, dk gy + 20% SST, lt gy gn, slty	6.0-7.0rew	0.96(4)rew	20	40	40				
	P	MDST, dk gy						35	35	5	25
3262-3277	Ctg	MDST, med dk gy/dk gy + 10% SST, lt ol gy	5.5	0.61(6)	45	40	15	45	55	*	*

Table 1b Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)			
														SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
296		Miocene														
838-857	Ctg	LST, off wht + 30% MDST, lt ol gy, v calc	-													
873		Eocene														
1570		Palaeocene														
1677-1695	"	LST, a/a + tr MDST, a/a	-													
2153		Late Cretaceous														
2165-2183	"	MDST, lt gy/med gy, v calc + tr LST, wht/v lt gy	0.47													
2183-2195	"	MDST, a/a	0.48													
2195-2207	"	MDST, a/a	0.39													
2207-2220	"	MDST, a/a	0.41													
2220-2232	"	MDST, a/a	0.44													
2232-2244	"	MDST, a/a	0.48													
2244-2256	"	MDST, a/a	0.42													
2256-2268	"	MDST, a/a	0.45													
2268-2280	"	MDST, a/a	0.35													
2280-2293	"	MDST, a/a	0.49													
2293-2305	"	MDST, a/a	0.61													
2305-2317	"	MDST, med gy, calc + 40% MDST, lt gy	0.64													
2317-2329	"	MDST, a/a + 40% MDST, a/a	0.63													
2329-2341	"	MDST, a/a + 40% MDST, a/a	0.49													
2341-2354	"	MDST, a/a + 40% MDST, a/a	0.50													
2354-2366	"	MDST, a/a + mnr SST, wht + mnr LST, v lt gy	0.86													
2360-2366	"	MDST, med-dk gy	0.51							1270	249	455	89	33	3	64
2366-2378	"	MDST, med gy, calc + mnr SST, a/a + mnr LST, a/a	0.41													
2591-2607	"	MDST, med gy/med-dk gy + 25% LST gn-gy/pnk-gy/v lt gy, v arg + tr SST, v lt gy	1.04													
2607-2622	"	MDST, a/a + 25% LST, a/a + tr SST, a/a	1.44													
2630		Late Jurassic to Early Neocomian														
2622-2637	"	MDST, a/a + 25% LST, a/a + tr SST, a/a	0.66													
2637-2652	"	MDST, a/a + 25% LST, a/a + tr SST, a/a	-													
	P	MDST, a/a	1.30	431	15	39	0.00	0.20								

Table 2a Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA														
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION								
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T O C)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T O C)	EXTRACT COMPOSITION (%)				
2652-2668	Ctg	MDST, med gy/med-dk gy, calc + 10% SLTST, lt ol-gy/brn-gy	2.01	430	30	30	0.00	0.60									
2668-2683	"	MDST, a/a + 10% SLTST, ol-gy/brn-gy	2.16														
2683-2698	"	MDST, med-dk gy/dk gy, calc + 15% SLTST	1.87														
2698-2713	"	MDST, a/a + 15% SLTST, a/a	1.88														
2713-2729	"	MDST, a/a + 15% SLTST, a/a	2.03														
2729-2744	"	MDST, med gy/med-dk gy, calc + 15% SLTST, a/a	2.03	431	25	39	0.00	0.50									
2744-2759	"	MDST, med-dk gy, calc + 15% SLTST, a/a	1.88														
2759-2774	"	MDST, dk gy, calc + 40% MDST, med-dk gy + 15% SLTST, a/a	-														
	P	MDST, med-dk gy, calc	1.20														
2774-2790	Ctg	MDST, med-dk gy, calc + 15% SLTST, a/a	2.18														
2790-2805	"	MDST, a/a + 15% SLTST, a/a	1.61														
2805-2820	"	MDST, dk gy, calc + 40% MDST, med-dk gy + 15% SLTST, a/a	-														
	P	MDST, med-dk gy, calc	1.28														
	P	SLTST, a/a	1.59	427	38	58	0.11	0.67									
2820-2831	Ctg	MDST, med-dk gy/dk gy calc + 10% SLTST, a/a	1.57														
2838-2851	"	MDST, a/a + 10% SLTST, a/a	1.26														
2851-2866	"	MDST, a/a + 10% SLTST, a/a	1.31														
2866-2881	"	MDST, a/a, calc + 10% SLTST, a/a	-														
	P	MDST, a/a	1.18														
2884-2899	Ctg	MDST, dk gy + 20% MDST, lt gy-gn + 60% MDST, ol gy	1.55						1285	83	605	39	44	3	53		
	P	MDST, dk gy	2.96	435	81	8	0.07	2.58									
	P	MDST, lt gy-gn	1.32	428	48	31	0.12	0.73									
	P	MDST, ol-gy	2.34	434	142	13	0.07	3.60									
2896-2912	Ctg	MDST, med-dk gy/dk gy, sl calc + 10% SST, wht, oil-stained	1.50														
2899-2915	"	MDST, dk ol gy + 20% MDST, lt gy gn + 20% SST, wht-lt gy gn	-														
	P	MDST dk ol gy	2.73	434	77	17	0.09	2.31									
	P	MDST, lt gy-gn	1.65	428	63	36	0.10	1.16									

Table 2b Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
2915-2930	Ctg	SST, wht + 30% MDST, lt ol gy-med gy + 40% MDST, dk gy-dk ol gy	-												
	P	MDST, lt ol gy-med gy	1.48	432	64	29	0.07	1.02							
	P	MDST, dk gy-dk ol gy	2.12	435	95	22	0.07	2.16							
2930-2942	Ctg	MDST, dk gy-dk ol gy + 20% MDST, lt gy gn-med gy + 20% SST, wht	1.99						905	45	525	26	50	8	42
	P	MDST, dk gy-dk ol-gy	2.54	436	128	11	0.03	3.34							
	P	MDST, lt gy gn-med gy	1.80	433	153	22	0.02	2.82							
2942-2957	Ctg	MDST, dk gy + 50% MDST, med-dk gy	-												
	P	MDST, med-dk gy	1.54	434	58	26	0.00	0.90							
2957-2973	Ctg	MDST, med-dk gy/dk gy, sl calc	1.45	430	193	52	0.00	2.80							
2973-2988	"	MDST, a/a	1.93												
2988-3003	"	MDST, dk gy + 50% MDST, med-dk gy	-												
	P	MDST, med-dk gy	1.25												
3003-3018	Ctg	MDST, med-dk gy/dk gy, sl calc	1.62	426	74	49	0.00	1.20							
3018-3034	"	MDST, a/a	1.83												
3034-3049	"	MDST, a/a	1.60												
3052-3067	"	MDST, dk gy-gy-blk + 40% MDST, med gy-dk gy + mnr SST, wht	2.02						1260	62	860	43	61	7	32
	P	MDST, dk gy-gy-blk	2.09	435	188	20	0.08	4.27							
	P	MDST, med gy-dk gy	2.08	427	121	27	0.11	2.82							
3067-3082	Ctg	MDST, med dk-dk gy	1.93	437	154	36	0.13	3.42							
3082-3098	"	MDST, dk gy, carb	1.06	437	158	37	0.22	4.75							
3098-3113	"	MDST, med-dk gy, occ carb	1.76	436	179	31	0.11	3.55	2165	123	1625	92	69	6	25
3113-3128	"	MDST, dk gy + mnr MDST, lt gy gn	2.12	435	153	18	0.10	3.61							
3128-3143	"	MDST, dk gy, occ carb	2.26	435	138	11	0.08	3.38							
3143-3159	"	MDST, med dk gy	2.57	434	69	20	0.10	1.98							
3159-3174	"	MDST, dk gy, occ carb + mnr SND	1.90	435	119	19	0.11	2.55							
3174-3189	"	MDST, a/a + mnr SST, wht-med gy	1.17	438	152	54	0.06	1.90							
3189-3204	"	MDST, lt-med gy, slty + 50% MDST, med dk gy	-												
	P	MDST, lt med-gy, slty	2.04	434	145	30	0.13	3.39							
	P	MDST, med-dk gy	1.94	437	194	12	0.08	4.09							

Table 2c Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg g TOC)	HYDROCARBONS (ppm)	HYDROCARBONS (mg g TOC)	EXTRACT COMPOSITION (%)			
														SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
3204-3220	Ctg	MDST, dk gy-gy blk + mnr SST, wht	2.21	438	122	23	0.09	2.97								
3220-3235	"	MDST, med-dk gy + mnr SST, lt gy-gn	1.12	437	221	34	0.07	2.67								
3235-3247	"	MDST, dk gy + 20% SST, lt gy gn, slty	1.44						880	61	440	31	46	4	50	
	P	MDST, dk gy	2.03	435	237	18	0.07	5.16								
3247-3262	Ctg	MDST, med-dk gy/dk gy + 5% SST, lt ol gy	1.65													
3262-3277	"	MDST, a/a + 10% SST, a/a	1.97	427	112	59	0.00	2.20								
3277-3284	"	MDST, a/a	1.54													

Table 2d Chemical Analysis Data

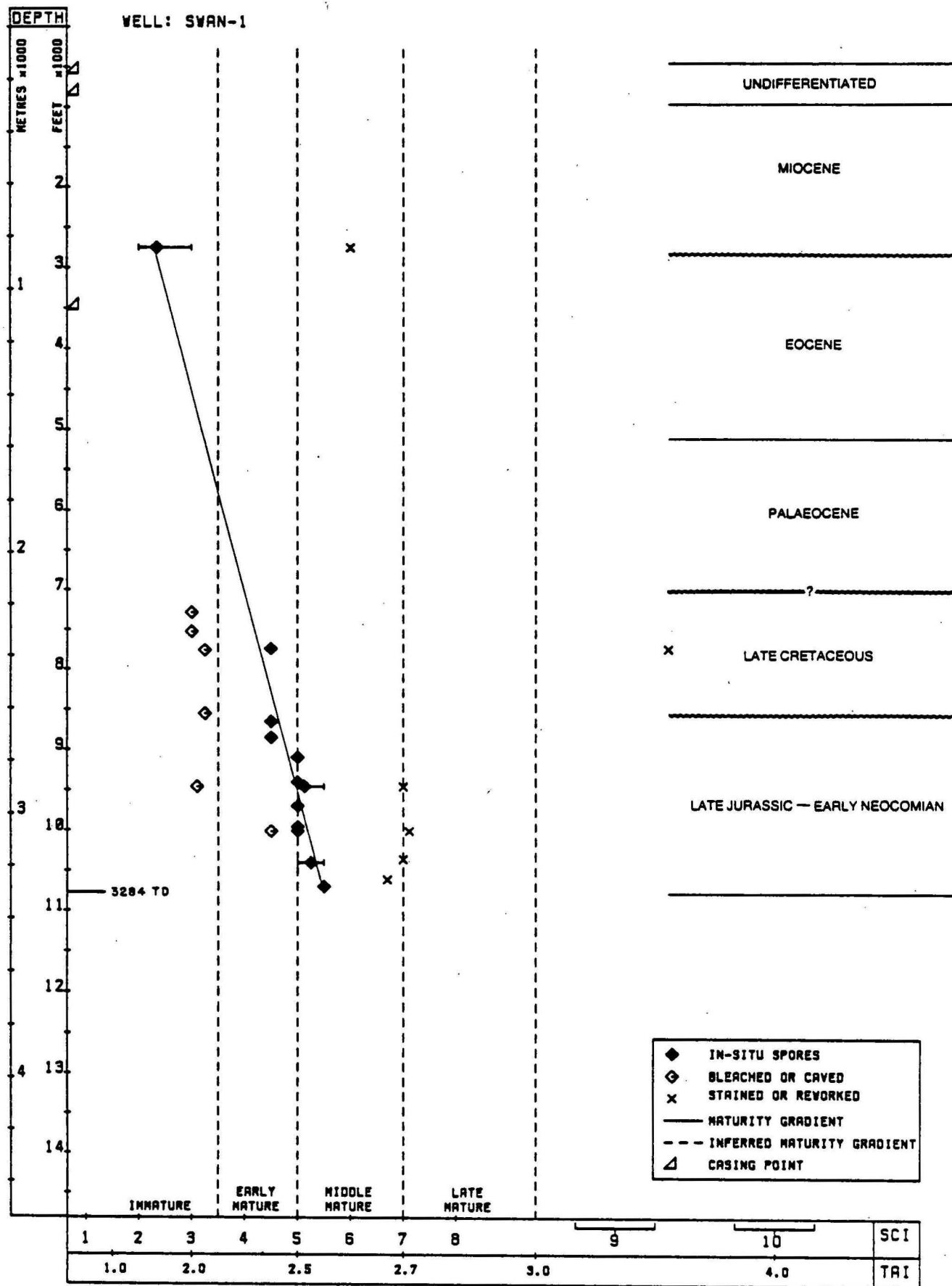
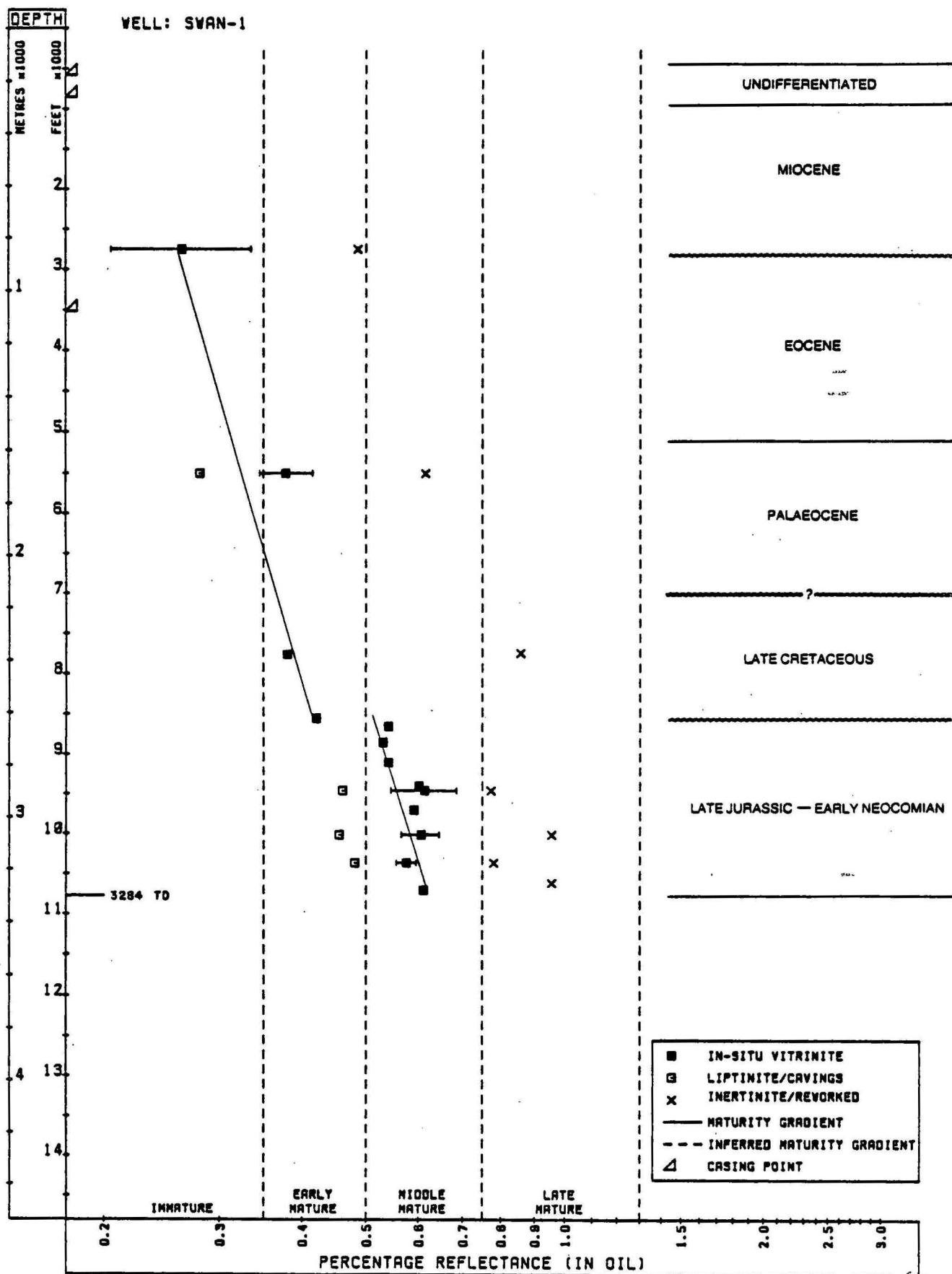
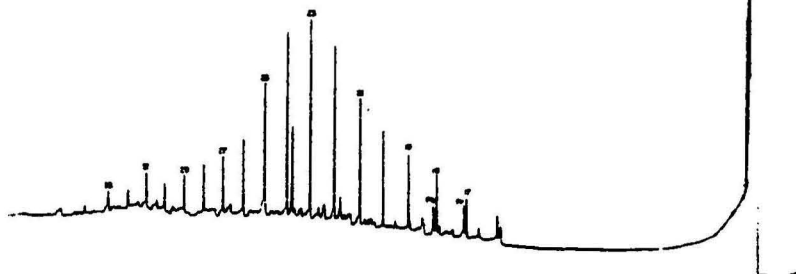


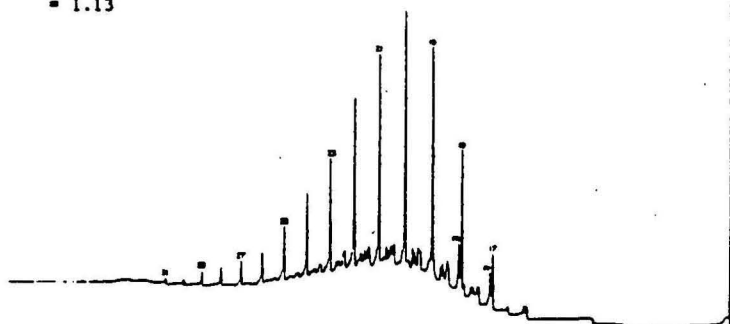
FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH



Swan-1
2360-2366m
Late Cretaceous
SCI 4.5
Pr/Ph = 1.14
Pr/n-C₁₇ = 0.84
Ph/n-C₁₈ = 0.48
CPI = 1.08



Swan-1
2884-2899m
L. Jurassic-E. Neocomian
SCI 5.0-5.5
Pr/Ph = 0.81
Pr/n-C₁₇ = 0.66
Ph/n-C₁₈ = 0.32
CPI = 1.13



Swan-1
2930-2942m
L. Jurassic-E. Neocomian
SCI 5.0
Pr/Ph = 1.55
Pr/n-C₁₇ = 0.59
Ph/n-C₁₈ = 0.22
CPI = 1.25

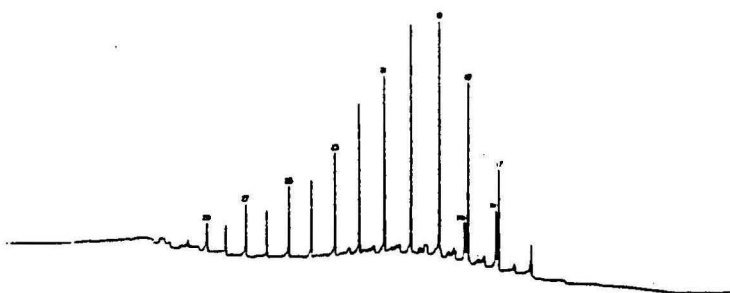
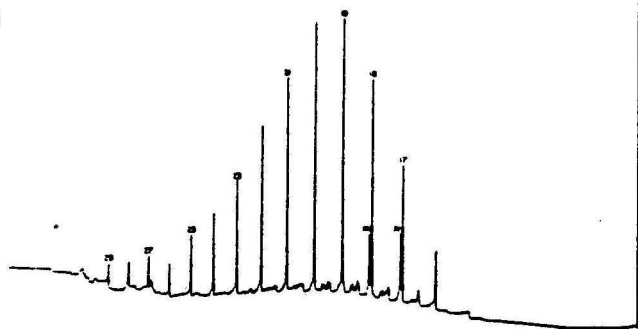
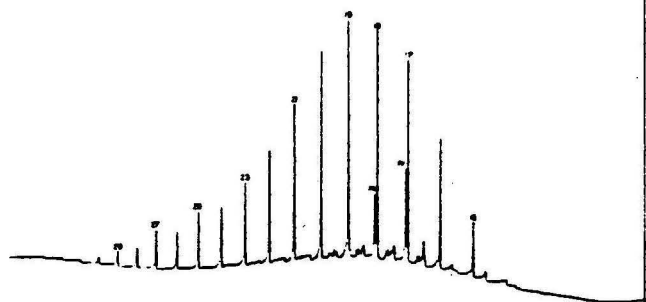


Figure 3a

Swan-1
3052-3067m
L.Jurassic-E.Neocomian
SCI 5.0
Pr/Ph = 1.14
Pr/n-C₁₇ = 0.50
Ph/n-C₁₈ = 0.28
CPI = 1.25



Swan-1
3098-3113m
L.Jurassic-E.Neocomian
SCI 5.25
Pr/Ph = 1.46
Pr/n-C₁₇ = 0.47
Ph/n-C₁₈ = 0.28
CPI = 1.23



Swan-1
3235-3247m
L.Jurassic-E.Neocomian
SCI 5.5
Pr/Ph = 0.81
Pr/n-C₁₇ = 0.84
Ph/n-C₁₈ = 0.25
CPI = 1.15

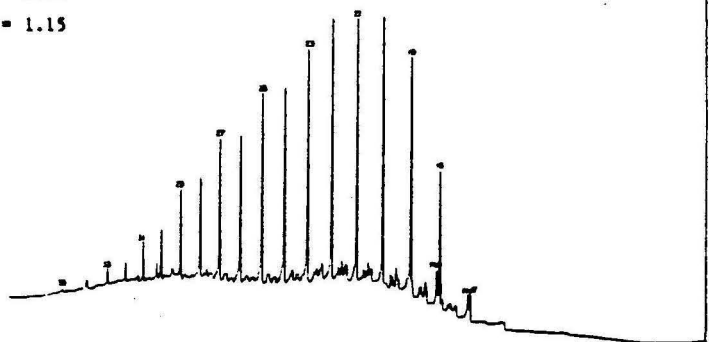


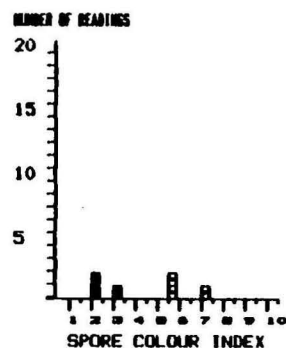
Figure 3b

SWAN-1

IN SITU POPULATION

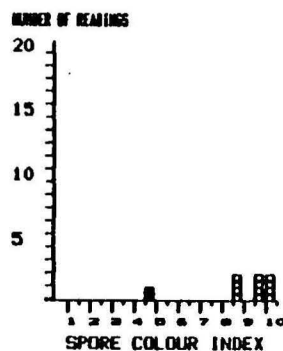
SAMPLE 838-857M
2.0 2.0 3.0 5.5 5.5 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.0-3.0	3
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	5.5-7.0	3



SAMPLE 2360-2366M
4.5 8.5 8.5 9.5 9.5 10.0 10.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	4.5-4.5	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.5-10.0	6

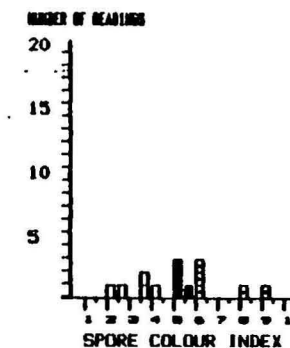


SWAN-1

IN SITU POPULATION

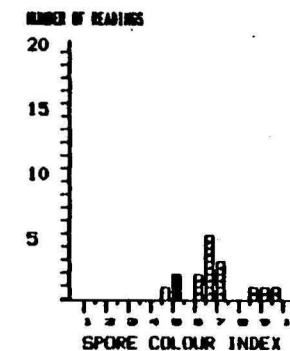
SAMPLE 2884-2899M
2.0 2.5 3.5 3.5 4.0 5.0 5.0 5.0 5.5 6.0
6.0 6.0 8.0 9.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.5	4
BLEACHED/CAVINGS	2.0-4.0	5
STAINED/REWORKED	6.0-9.0	5



SAMPLE 3052-3067M
4.5 5.0 5.0 6.0 6.0 6.5 6.5 6.5 6.5 6.5
7.0 7.0 7.0 8.5 9.0 9.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.0	2
BLEACHED/CAVINGS	4.5-4.5	1
STAINED/REWORKED	6.0-9.5	13

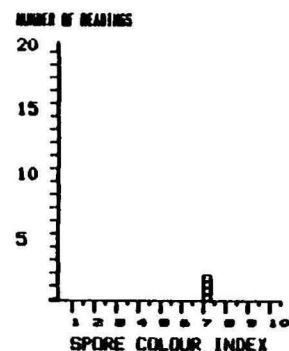


SWAN-1

IN SITU POPULATION

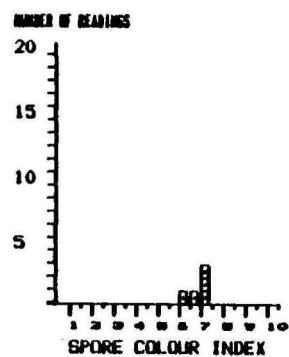
SAMPLE 3159-3174M
7.0 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.0-7.0	2



SAMPLE 3235-3247M
6.0 6.5 7.0 7.0 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	-	0
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	6.0-7.0	5



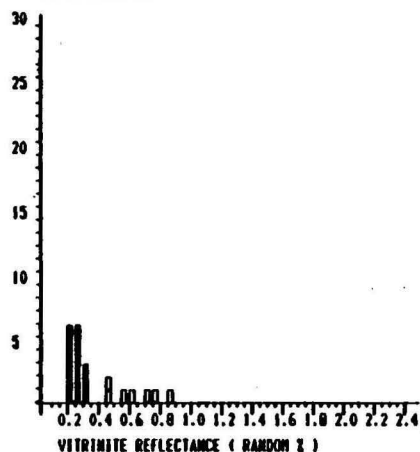
SWAN-1

SAMPLE 838-857H

0.21 0.21 0.23 0.24 0.24 0.24 0.25 0.26 0.27 0.27
0.29 0.29 0.30 0.31 0.33 0.40 0.49 0.59 0.64 0.74
0.76 0.87

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.21-0.33	15	0.26	0.04
REWORKED/INERTINITE	0.48-0.49	2	0.49	0.01
REWORKED	0.59-0.87	5	0.72	0.11

NUMBER OF READINGS

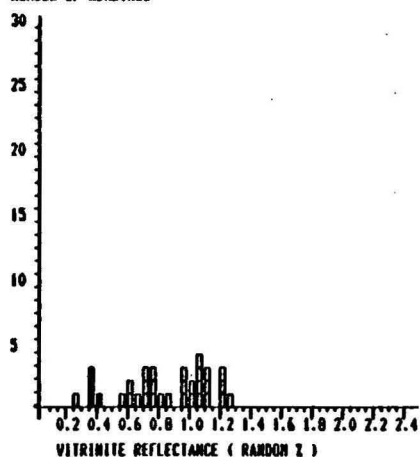


SAMPLE 1677-1680H

0.28 0.35 0.37 0.38 0.41 0.55 0.63 0.63 0.65 0.70
0.70 0.72 0.75 0.75 0.77 0.84 0.86 0.97 0.98 0.99
1.01 1.02 1.05 1.06 1.07 1.08 1.10 1.11 1.11 1.20
1.23 1.24 1.28

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.35-0.41	4	0.38	0.02
LIPITINITE/CAVINGS	0.28-0.28	1	0.28	
INERTINITE/REWORKED	0.55-0.65	4	0.62	0.04
REWORKED	0.70-1.28	24	0.98	0.18

NUMBER OF READINGS



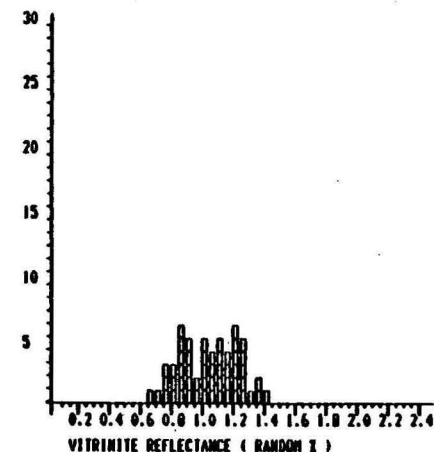
SWAN-1

SAMPLE 2360-2366H

0.69 0.70 0.77 0.79 0.79 0.82 0.82 0.83 0.85 0.86
0.87 0.88 0.88 0.89 0.91 0.91 0.93 0.93 0.94 0.96
0.97 1.00 1.00 1.01 1.01 1.02 1.06 1.07 1.08 1.09
1.10 1.12 1.12 1.13 1.14 1.16 1.18 1.19 1.19 1.20
1.21 1.22 1.23 1.24 1.24 1.25 1.27 1.28 1.28 1.29
1.30 1.36 1.38 1.42

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
INERTINITE/REWORKED	0.69-0.97	21	0.86	0.08
REWORKED	1.00-1.42	33	1.18	0.11

NUMBER OF READINGS

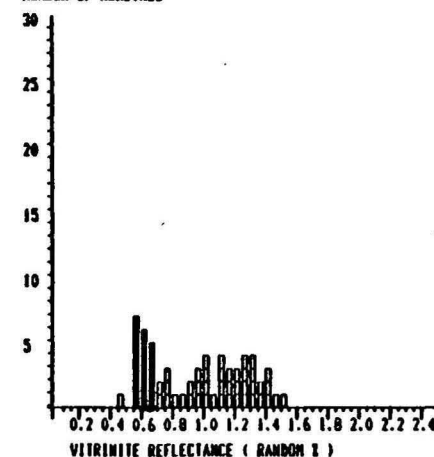


SAMPLE 2084-2092H

0.46 0.55 0.55 0.56 0.57 0.58 0.59 0.59 0.60 0.61
0.62 0.62 0.63 0.64 0.65 0.65 0.66 0.67 0.68 0.70
0.73 0.76 0.76 0.78 0.83 0.85 0.91 0.94 0.97 0.98
0.98 1.00 1.00 1.02 1.04 1.08 1.10 1.10 1.11 1.11
1.15 1.15 1.17 1.21 1.22 1.23 1.25 1.27 1.29 1.29
1.32 1.32 1.33 1.34 1.38 1.39 1.40 1.43 1.43 1.48
1.52

SELECTED CLASS	RANGE (%)	COUNT	AV(%)	ST.DEV
IN SITU VITRINITE	0.55-0.68	18	0.61	0.04
LIPITINITE/CAVINGS	0.46-0.46	1	0.46	
INERTINITE/REWORKED	0.70-0.85	7	0.77	0.05
REWORKED	0.91-1.52	35	1.20	0.17

NUMBER OF READINGS



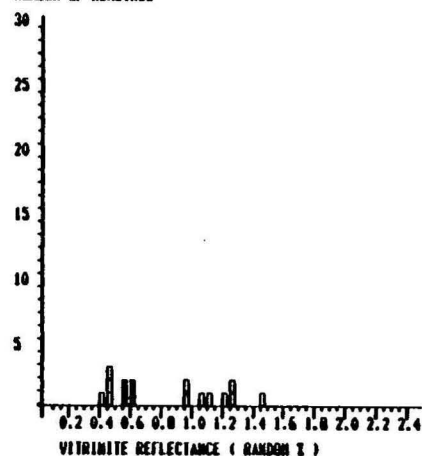
SWAN-1

SAMPLE 3052-3067H

0.41 0.46 0.47 0.48 0.57 0.58 0.63 0.64 0.95 0.96
1.07 1.14 1.23 1.25 1.29 1.48

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.57-0.64	4	0.61	0.04
LIPTINITE/CAVINGS	0.41-0.48	4	0.46	0.03
INERTINITE/REWORKED	0.95-0.96	2	0.96	0.01
REWORKED	1.07-1.48	6	1.24	0.14

NUMBER OF READINGS

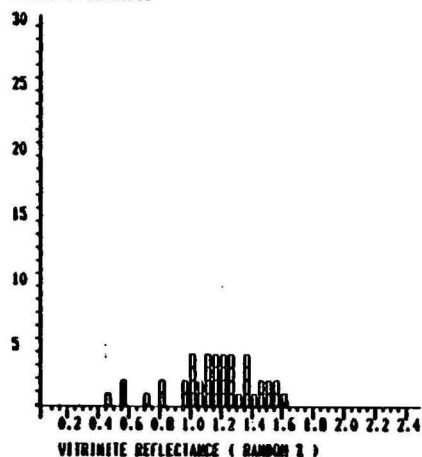


SAMPLE 3159-3174H

0.48 0.56 0.59 0.70 0.80 0.84 0.98 0.98 1.00 1.01
1.02 1.03 1.07 1.09 1.12 1.12 1.13 1.14 1.15 1.17
1.17 1.19 1.21 1.22 1.22 1.22 1.25 1.27 1.27 1.29
1.33 1.36 1.36 1.38 1.38 1.40 1.47 1.48 1.52 1.52
1.55 1.56 1.63

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
IN SITU VITRINITE	0.56-0.59	2	0.58	0.02
LIPTINITE/CAVINGS	0.48-0.48	1	0.48	
INERTINITE/REWORKED	0.70-0.84	3	0.78	0.07
REWORKED	0.98-1.63	37	1.25	0.18

NUMBER OF READINGS



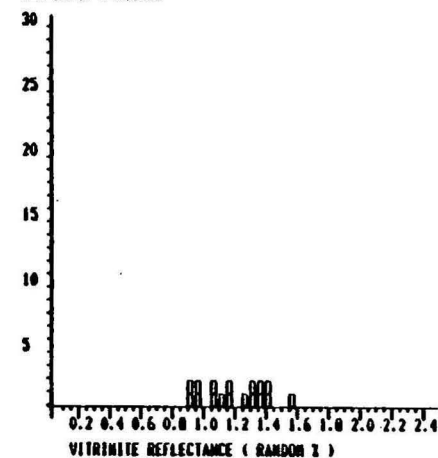
SWAN-1

SAMPLE 3225-3247H

0.93 0.94 0.97 0.98 1.07 1.08 1.11 1.17 1.19 1.27
1.30 1.32 1.37 1.38 1.40 1.44 1.59

SELECTED CLASS	RANGE (1)	COUNT	AV(1)	ST.DEV
INERTINITE/REWORKED	0.93-0.98	4	0.96	0.02
REWORKED	1.07-1.59	13	1.28	0.16

NUMBER OF READINGS



YAMPI-1 WELL

SUMMARY

Geochemical analysis of samples from the interval 600m to 4176m TD of the Yampi-1 well has shown that the interval analysed is immature to 1550m, early mature between 1550m and 2550m, middle mature between 2550m and 3600m and late mature between 3600m and 4176m TD. The sediments analysed are currently at or near their maximum depths of burial. The vitrinite reflectance gradient shows that up to 500m of Middle to Late Jurassic section is missing at the unconformity at 3135m, 300m of Early to Middle Jurassic section is missing at the unconformity at 3390m and 1000m of Early Permian to Late Triassic section is missing from the unconformity at 3825m. The gradient shows no evidence of any major amounts of missing Late Cretaceous and younger section above 600m.

The mudstones in the interval 3148m to 3260m of the Middle Jurassic Petrel Formation: Member "C" equivalent have good oil source potential and will have generated sufficient quantities of oil in reaching their present level of maturity.

Samples at 4025m to 4040m and 4160m to 4176m TD contain small quantities of migrant oil. This oil is composed of a biodegraded oil and a "live" oil generated from a mature source possibly containing predominantly waxy sapropel.

GENERAL COMMENTS

Basin: Browse Basin.

Location: 14° 33' 32"S, 123° 16' 33.88"E.

Operator and date of drilling: Bocal, 1973.

Well Status: Plugged and abandoned.

TD: 4176m.

Mud data: Seawater with gel slugs: Seabed to 408m.
Seawater/gel slugs building up to dispersed seawater/
polymer system: 408m to 1530m.
Seawater/non dispersed polymer system: 1530m to 3048m.
Low solids seawater/prehydrated gel/Dextrid system:
3048m to 4176m TD.

YAMPI-1 WELL

Casing data: 30" at 123m, 20" at 399m, 13³/₈" at 1520m, 9⁵/₈" at 3035m.

BHT data: 99°C at 3051m, after 15 hours stopped circulation.
121°C at 3572m, after 8 hours stopped circulation.
143°C at 4176m TD, after 20 hours stopped circulation.

Elevation: RT 13m ASL.

Water depth: 91m.

Interval analysed: 600m to 4176m TD.

Age of interval analysed:

	<u>Depths</u> (in metres)
Early Miocene-Pliocene	600- 789
Palaeocene-Eocene	789-1014
Late Cretaceous	1014-1549
Early Cretaceous	1549-2570
Early Cretaceous-Late Jurassic	2570-2830
Late Jurassic	2830-3135
Middle Jurassic	3135-3390
Jurassic undiff.	3390-3587
Late Triassic	3587-3825
Permian	3825-4176 TD

Sample type and quality: Dried ditch cuttings and one core piece of good quality for geochemical analysis.

Maturation data quality:

- a) Vitrinite Reflectance: The samples analysed yielded enough vitrinitic kerogen for measurements. Results: Good.
- b) Spore Colour Index: The samples analysed generally yielded sufficient indigenous sporomorphs for measurements. Results: Good.

Source rock data quality: Phase II data quality: good. Phase I unknown.

Gas chromatography run at: 3173.4m, 4025m to 4040m and 4160m to 4176m.

YAMPI-1 WELL

MATURATION (Table 1, Figures 1 and 2, Appendices 1 and 2)

Spore colour index values rise steadily from around 2 SCI units at 600m to a value of between 6 and 6.5 SCI units at around 3600m. Below this depth values increase more rapidly from 6 to 6.5 units to around 8 units at 4176m TD. The interpreted gradient shows that the sediments analysed are currently at or near their maximum depths of burial.

The vitrinite reflectance gradient increases steadily from around 0.3% at 600m to 0.6% at 3125m. The unconformities at 3135m, 3390m and 3825m are all marked by discontinuities in the reflectance gradient consistent with considerable uplift and erosion at these horizons. The interpreted gradient shows 500m of missing Middle to Late Jurassic section at 3135m, 300m of missing Early to Middle Jurassic section at 3390m and 1000m of missing Early Permian to Late Triassic sediments at 3825m. Extrapolation of the vitrinite reflectance gradient to the surface shows that little Late Cretaceous and younger section is missing above 600m.

The maturity gradients show that the well section is immature to around 1550m, early mature between 1550m and 2550m, middle mature between 2550m and 3600m and late mature between 3600m and 4176m TD.

OIL AND GAS SOURCE ROCKS (Tables 1 and 2, Figure 3)

Dark grey and medium dark grey mudstones in the interval 3148m to 3260m of the Middle Jurassic, Petrel Formation: Member "C" Equivalent, contain above average organic carbon contents of between 3.21% and 3.64%. Pyrolysis analysis of samples from this interval suggests that the darker mudstones contain mostly humic kerogen mixed with an average of 20% oil-prone sapropelic kerogen. Interpretation of the electric logs from this interval suggests a cumulative total of 30m of organically rich, high gamma response mudstones.

Extraction of samples at 3165m to 3180m and 3173.4m shows that these samples contain indigenous hydrocarbons consistent with fair to good oil source potential. The alkane gas chromatogram of the sample at 3173.4m shows a hydrocarbon distribution typical of hydrocarbons derived from mature, terrestrially sourced, waxy kerogens.

YAMPI-1 WELL

The mudstones in the interval 3148m to 3260m are a good oil source and will have already generated significant quantities of oil at their present level of maturity.

GEOCHEMICAL CHARACTERISTICS OF THE REMAINING SEDIMENTS (Tables 1 and 2, Figure 3)

Medium to dark grey mudstones in the interval 2520m to 2860m in the Petrel Formation: Member "A" Equivalent are organically rich containing between 2.11% and 2.42% organic carbon. Pyrolysis analysis of samples in this interval shows that they contain mostly inertinitic kerogen and have no oil or gas source potential. The medium to dark grey mudstone at 4115m to 4130m is also organically rich, but again it contains mostly inertinite.

The remaining samples analysed contain mostly average to below average organic carbon contents and have no significant oil or gas source potential. Extraction, fractionation and gas chromatography analysis of samples at 3995m to 4010m, 4025m to 4040m, 4115m to 4130m and 4160m to 4175m shows that the samples at 4025m to 4040m and 4160m to 4175m contain small amounts of migrant oil. Gas chromatography analysis suggests that this oil stain contains both a biodegraded oil residue and hydrocarbons derived from a mature source, possibly containing waxy sapropel.

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt.) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
408		Early Miocene-Pliocene									
600-615	Ctg	LST, off wht	2.5	0.25(2)	20	65	15				
789		Palaeocene-Eocene									
945-970	"	SND + 20% MDST, dk brn	2.0-2.5	0.27(32)	15	60	25				
1014		Coniacian-Campanian									
1150-1165	"	SND, wht-yel gy	3.5-4.0	0.30(18)	25	55	20				
1549		Albian									
1800-1815	"	MDST, med gy	3.5-4.0	0.46(27)	50	30	20				
1832		Late Neocomian-Aptian									
1920-1950	"	MDST, ol gy/med dk gy + 10% MDST, gn gy						70	30	*	*
1940-1955	"	MDST, med gy	3.5	0.48(21)	35	50	15				
2020-2050	P	MDST, ol gy/med dk gy						60	40	*	*
	P	MDST, gn gy						55	45	*	*
2250-2280	Ctg	MDST, ol gy/med dk gy						60	40	*	*
2400-2420	"	MDST, med dk gy						55	45	*	*
2520-2550	"	MDST, med dk gy						60	40	*	*
2525-2540	"	MDST, med gy	5.5	0.54(7)	40	35	25				
2555		Early Neocomian									
2570		Petrel Fm Mbr "A" Eqv									
2720-2750	P	MDST, dk gy/med dk gy						55	40	*	5
2730-2745	Ctg	SST, wht + 20% MDST, med gy	5.0-5.5	0.54(17)	35	30	35				
2830		Petrel Fm Mbr "B" Eqv									
2975-2990	"	SST, wht, slty + MDST, med lt gy, slty, mic	5.0	0.55(13)	35	50	15				
3040-3070	P	MDST, med dk gy						50	50	*	*
3110-3125	Ctg	SST, lt gy, slty + 80% MDST, med lt gy	5.0-5.5	0.60(4)	25	45	30				
3135		Petrel Fm Mbr "C" Eqv									
3150-3165	"	MDST, med dk gy + mnr SST, a/a	5.5-6.0	0.75(19)	40	40	20				
3160-3190	P	MDST, med dk gy						50	50	*	*
3173.4	Core	MDST, dk gy						50	20	10	20
3250-3280	P	MDST, med dk gy						40	50	*	10

Table 1a Maturity and Kerogen Composition Data

SAMPLE DEPTH (METRES)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY (R oil av %)	KEROGEN COMPOSITION (% vol) (by microscopic examination)			KEROGEN COMPOSITION (% wt) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
3305		Middle Jurassic (Volcanics)									
3390		Jurassic (undiff)									
3545-3560	Ctg	SST, lt gy + 30% MDST, lt med gy + 20% MDST, med dk gy	6.0	0.94(12)	50	40	10				
3587		Late Triassic									
3710-3725	"	MDST, lt gy-med-lt gy + 30% SST, lt gy + 20% SLTST, pal rd brn	7.0-7.5	1.10(2)	60	30	10				
3715-3730	"	SST, wht-pnk gy + 70% MDST, lt gy-med gy	7.0	1.08(13)	40	55	5				
3825		Permian									
3830-3845	"	MDST, med gy + 20% SLTST, lt gy + 50% SST, wht-v lt gy	7.5	1.76(6)	85	15	*				
3940-3955	"	MDST, med gy-med-dk gy, slty + 20% SST, wht	7.5	1.83(11)	100	mnr	*				
4020-4040	"	SLTST, lt gy, sndy + 30% MDST, med dk gy	7.5-8.0	1.92(9)	60	40	*				
4055-4070	"	SST, wht-lt gy + 20% MDST, med gy	*	2.07(9)	80	20	tr				
4145-4160	"	MDST, med gy	*	2.10(14)	75	25	*				

Table 1b Maturity and Kerogen Composition Data

GENERAL DATA			CHEMICAL ANALYSIS DATA										
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION				
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)
789		Palaeocene-Eocene											
850-80	Ctg	SND/SST, wht/lt gy + 40% COAL, brn/ol-blk, soft	9.25										
940-960	"	SND/SST, a/a + 20% COAL, a/a	2.63										
1014		Coniacian-Campanian											
1140-1170	"	SND/SST, a/a + 10% MDST, lt ol-gy, v calc + mnr COAL, a/a	0.55										
1170-1180	"	MDST, a/a + 40% SND/SST, a/a + mnr COAL, a/a	1.40										
1300-1330	"	MDST, a/a + mnr SND/SST, a/a	0.51										
1450-1480	"	MDST, a/a + SND/SST, a/a	0.32										
1549		Albian											
1570-1600	"	MDST, gn-gy/lt ol-gy, calc + mnr SND/SST, a/a	0.56										
1770-1800	"	MDST, med-dk gy, sl calc	1.34										
1832		Late Neocomian-Aptian											
1920-1950	"	MDST, ol-gy/med-dk gy, sl calc, occ glauc + 10% MDST, gn-gy	4.4	426	40	81	0.00	0.50					
2020-2050	Ctg	MDST, gn-gy/med-dk gy, sl calc + 10% MDST, gn-gy	-										
	P	MDST, a/a	1.52	423	66	59	0.00	1.00					
	P	MDST, gn-gy	0.61										
2150-2180	Ctg	MDST, ol-gy/med-dk gy, sl calc + mnr MDST, gn-gy	1.25										
2250-2280	"	MDST, a/a + mnr MDST, a/a	1.87	428	75	32	0.03	1.44					
2400-2420	"	MDST, med-dk gy + mnr MDST, ol-gy, calc	1.95	429	82	41	0.10	1.78					
2520-2550	"	MDST, a/a + mnr MDST, a/a + mnr SND/SST, glauc	2.31	436	82	24	0.03	1.96					
2555		Early Neocomian											
2570		Petrel Fan Mbr "A" Eqv											
2650-2680	"	MDST, a/a + mnr MDST, a/a + mnr SND/SST, a/a	2.42										
2720-2750	"	SST, lt ol-gy, glauc, sl calc + 25% MDST, dk gy/med-dk gy	-										
	P	MDST, a/a	2.11	424	100	24	0.10	2.33					
2830		Petrel Fan Mbr "B" Eqv											
2830-2860	Ctg	MDST, med dk gy + 40% SST, lt ol-gy	2.19										
2920-2950	"	MDST, a/a + 50% SST, a/a	1.83										

Table 2a Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA													
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION							
				TEMPERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g TOC)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g TOC)	EXTRACT COMPOSITION (%)			
3040-3070	Ctg	SST, lt ol-gy + 40% MDST, med-dk gy	-													
	P	SST, a/a	0.32													
	P	MDST, a/a	1.52	421	79	99	0.20	1.50								
3130-3160	Ctg	MDST, a/a + 20% SST, a/a + 20% MDST, med, yel-brn	1.29													
3135		Petrel Pmn Mbr "C" Eqv														
3173	Core	MDST, dk-gy, slty + 50% MDST, lt ol-gy/ol-gy, slty	-													
	P	MDST, dk gy, slty	3.21	425	196	9	0.10	7.00								
	P	MDST, lt ol-gy/ol-gy, slty	1.33													
3173.4	Core	MDST, dk gy, mic	0.80						825	103	415	52	36	14	50	
3165-3180	Ctg	SST, wht-yel gy + 60% MDST, dk gy	0.79						555	70	315	40	48	9	43	
3160-3190	"	SST, lt gy/lt ol-gy + 40% MDST, med-dk gy, slty	-													
	P	SST, lt gy/lt ol-gy	0.31													
	P	MDST, a/a	2.38	420	101	23	0.10	2.67								
3190-3220	"	SST, lt gy/lt ol-gy + 30% MDST, med-dk gy, slty	-													
3220-3250	"	SST, a/a + 20% MDST, a/a	-													
3250-3280	Ctg	SST, lt gy/lt ol-gy + 20% MDST, med-dk gy	-													
	P	MDST, med dk gy	3.64	423	135	22	0.10	5.44								
3305		Jurassic (undiff)														
3587		Late Triassic														
3280-3310	Ctg	SST, lt gy/lt ol-gy + 15% MDST, med-dk gy, slty	-													
3390		Jurassic (undiff)														
3587		Late Triassic														
3710-3725	"	MDST, lt gy-med lt gy + 20% SLTST, pal rd brn + 30% SST, lt gy	-													
	P	MDST, a/a	0.14													
3755-3765	Ctg	MDST, med gy + 20% SLTST, lt gy + 40% SST, wht-v lt gy	-													
	P	MDST, med gy	0.20													
	P	SST, wht-v lt gy	0.04													
3825		Permian														

Table 2b Chemical Analysis Data

GENERAL DATA			CHEMICAL ANALYSIS DATA												
SAMPLE DEPTH (METRES)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	PYROLYSIS					SOLVENT EXTRACTION						
				TEMPERATURE C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (kg/Tonne)	TOTAL EXTRACT (ppm)	TOTAL EXTRACT (mg/g T.O.C.)	HYDROCARBONS (ppm)	HYDROCARBONS (mg/g T.O.C.)	EXTRACT COMPOSITION (%)		
													SATURATED HYDROCARBONS	AROMATIC HYDROCARBONS	POLAR COMPOUNDS
3830-3845	Ctg	MDST, med-gy + 20% SLTST, lt gy + 50% SST, wht-v lt gy	-												
	P	MDST, a/a	0.37												
	P	SLTST, lt gy	0.06												
3910-3920	Ctg	MDST, med dk gy + 70% SST, lt-med gy-wht	-												
	P	MDST, a/a	0.66												
3940-3955	Ctg	MDST, med gy-med-dk gy, slty + 20% SST, wht	-												
	P	MDST, a/a	1.44	483	38	61	0.28	0.76							
3995-4010	Ctg	SST, wht-lt gy + mnr MDST, dk gy	0.59						320	54					
4025-4040	"	MDST, med gy-med-dk gy, slty + 30% SLTST, v lt gy-lt gy	-						565	88	300	47	46	7	47
	P	MDST, a/a	1.31	485	27	45	0.20	0.45							
	P	SLTST, v lt gy-lt gy	0.02												
4055-4070	Ctg	SST, wht-lt gy + 20% MDST, med gy	-												
	P	MDST, med gy	0.53												
4085-4070	Ctg	MDST, med-dk gy + 20% SST, wht lt gy	-												
	P	MDST, a/a	1.61	476	34	30	0.18	0.67							
4115-4130	Ctg	MDST, med-dk gy, slty + 20% SLTST, lt gy-lt-med gy	1.27						165	13					
	P	MDST, med-dk gy, slty	2.20	431	39	75	0.13	0.99							
	P	SLTST, lt gy-lt-med gy	0.51												
4130-4145	Ctg	MDST, med-dk gy + 20% SLTST, lt gy-lt-med gy	-												
	P	MDST, a/a	1.46	482	34	29	0.18	0.16							
	P	SLTST, lt gy-lt med gy	0.07												
4145-4160	Ctg	MDST, med gy	1.01	NDP	56	65	0.52	1.19							
4160-4175	"	MDST, a/a	1.00	NDP	73	62	0.52	1.51	1585	159	1325	133	78	6	16

Table 2c Chemical Analysis Data

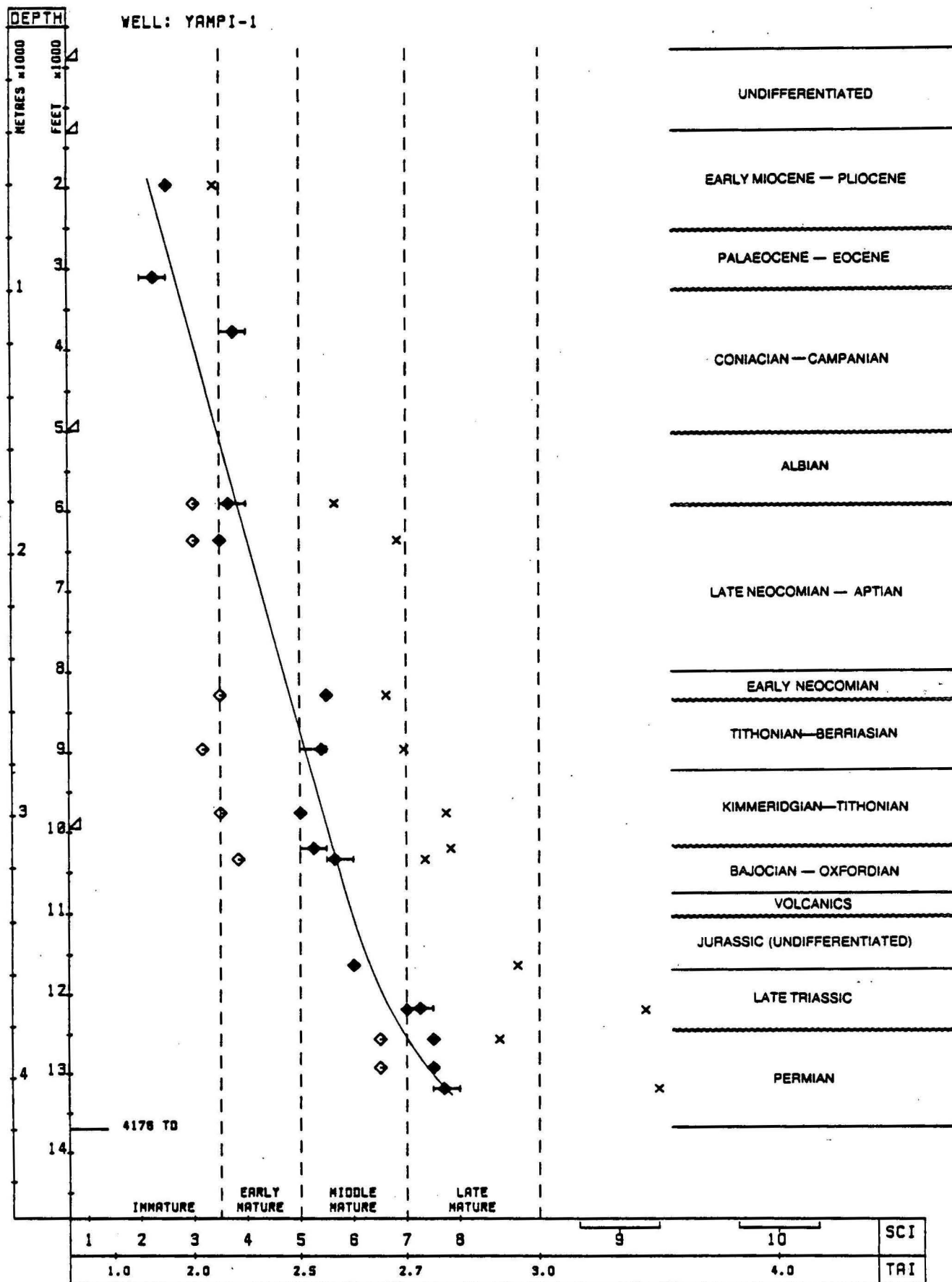


FIGURE 1 SPORE COLOUR INDEX AGAINST DEPTH

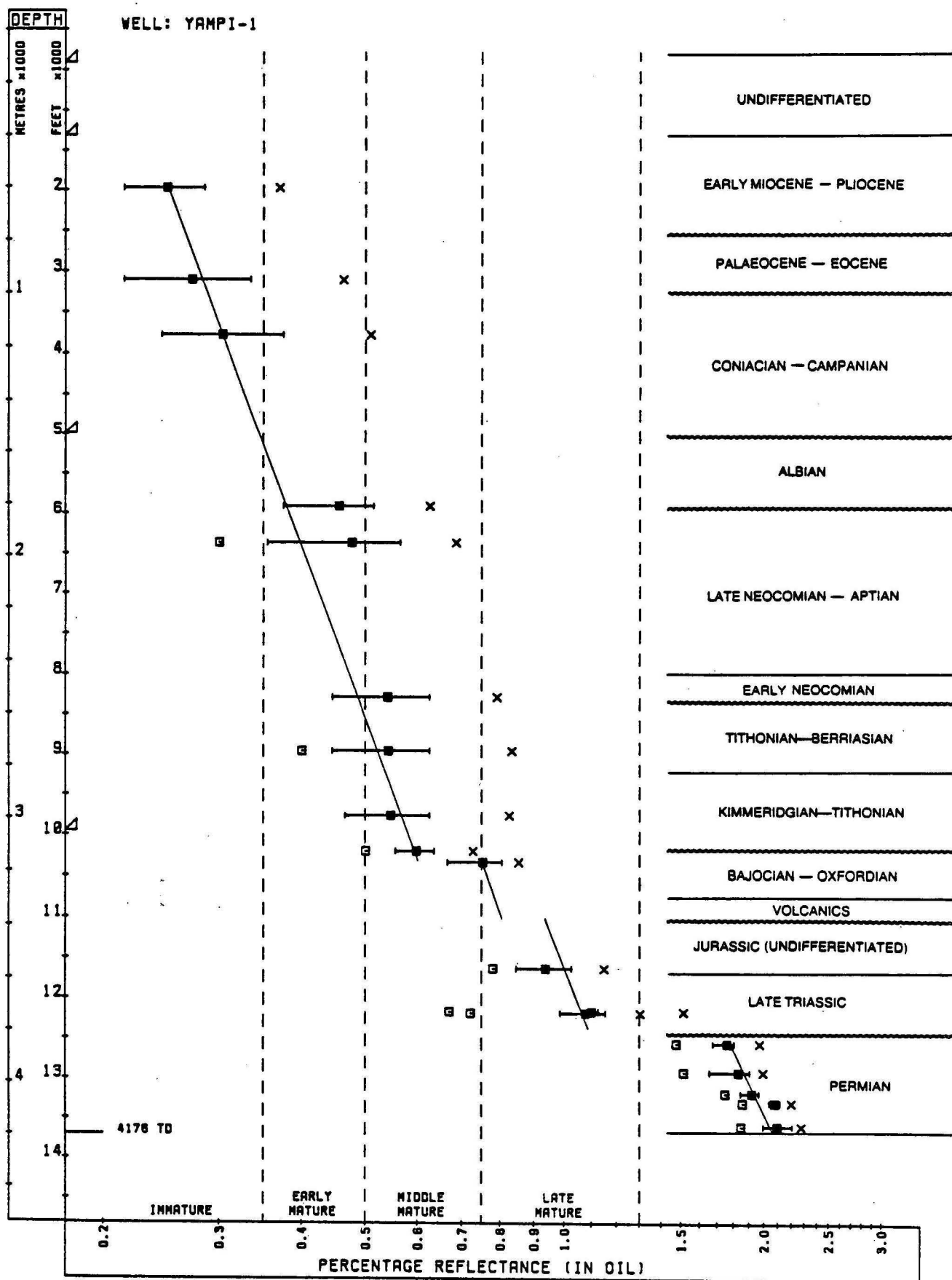
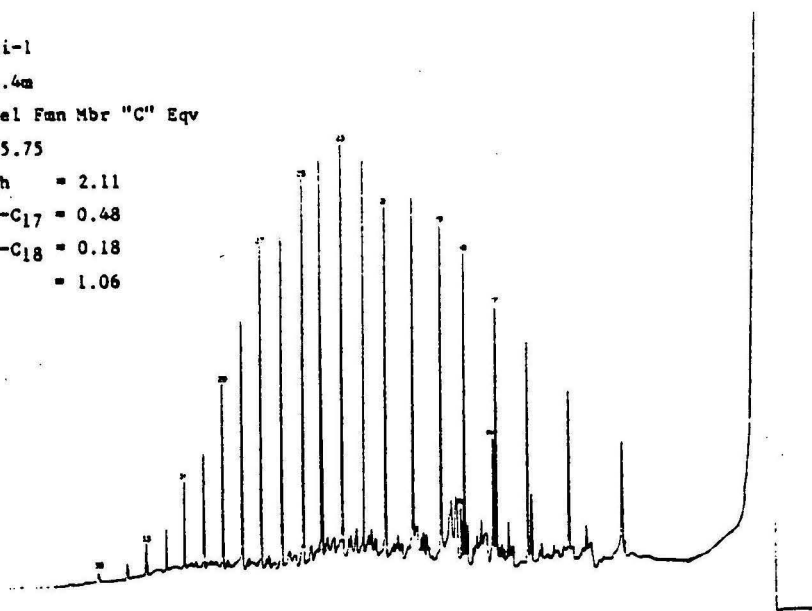
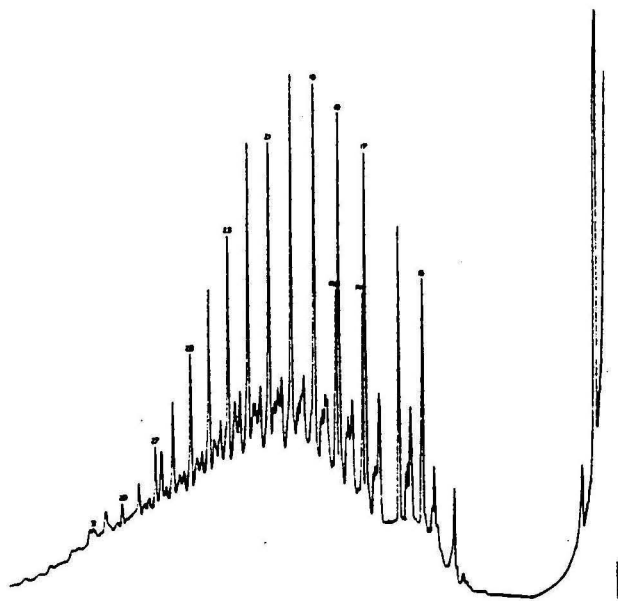


FIGURE 2 VITRINITE REFLECTANCE AGAINST DEPTH

Yampi-1
3173.4m
Petrel Fan Mbr "C" Eqv
SCI 5.75
Pr/Ph = 2.11
Pr/n-C₁₇ = 0.48
Ph/n-C₁₈ = 0.18
CPI = 1.06



Yampi-1
4025-4040m
Permian
SCI 7.75
Pr/Ph = 1.15
Pr/n-C₁₇ = 0.61
Ph/n-C₁₈ = 0.52
CPI = 1.02



Yampi-1
4160-4175m
Permian
SCI 8.0
Pr/Ph = 0.70
Pr/n-C₁₇ = 0.49
Ph/n-C₁₈ = 0.60
CPI = NDP

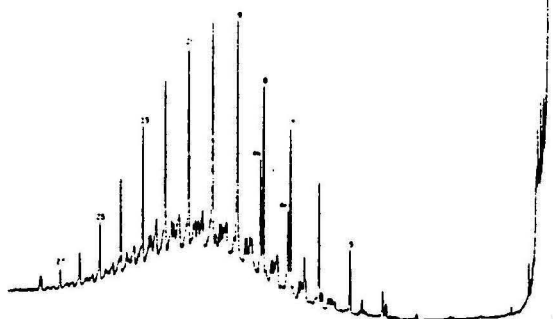


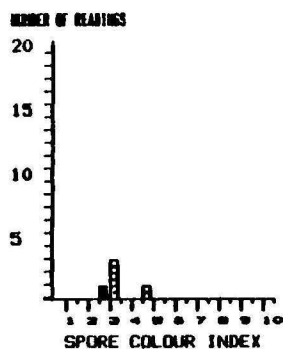
Figure 3

YAMPI-1

IN SITU POPULATION

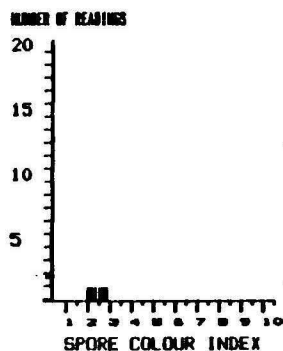
SAMPLE 600-615M
2.5 3.0 3.0 3.0 4.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.5-2.5	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	3.0-4.5	4



SAMPLE 945-970M
2.0 2.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	2.0-2.5	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0

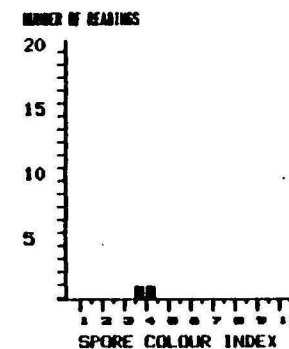


YAMPI-1

IN SITU POPULATION

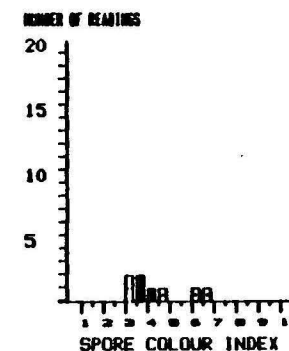
SAMPLE 1150-1165M
3.5 4.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.5-4.0	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	-	0



SAMPLE 1800-1815M
3.0 3.0 3.5 3.5 4.0 4.5 6.0 6.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.5-4.0	3
BLEACHED/CAVINGS	3.0-3.0	2
STAINED/REWORKED	4.5-6.5	3



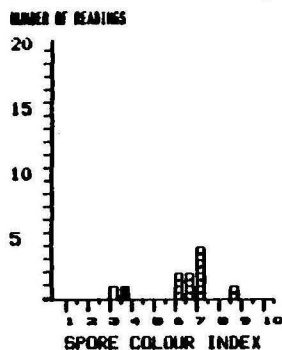
YAMPI-1

IN SITU POPULATION

SAMPLE 1940-1955M

3.0 3.5 6.0 6.0 6.5 6.5 7.0 7.0 7.0 7.0
8.5

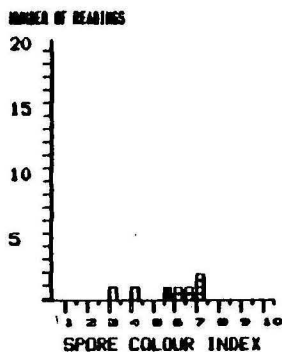
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	3.5-3.5	1
BLEACHED/CAVINGS	3.0-3.0	1
STAINED/REWORKED	6.0-8.5	9



SAMPLE 2525-2540M

3.0 4.0 5.5 6.0 6.5 7.0 7.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-5.5	1
BLEACHED/CAVINGS	3.0-4.0	2
STAINED/REWORKED	6.0-7.0	4



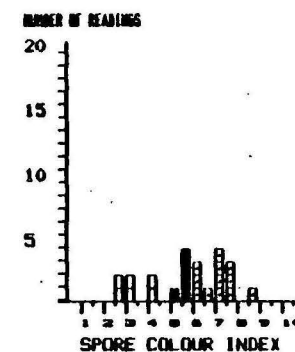
YAMPI-1

IN SITU POPULATION

SAMPLE 2730-2745M

2.5 2.5 3.0 3.0 4.0 4.0 5.0 5.5 5.5 5.5
5.5 6.0 6.0 6.0 6.5 7.0 7.0 7.0 7.0 7.5
7.5 7.5 8.5

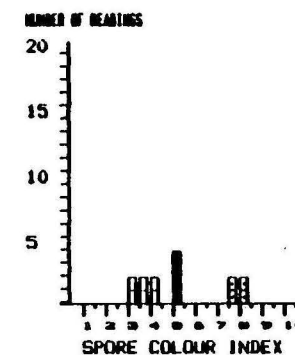
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.5	5
BLEACHED/CAVINGS	2.5-4.0	6
STAINED/REWORKED	6.0-8.5	12



SAMPLE 2975-2990M

3.0 3.0 3.5 3.5 4.0 4.0 5.0 5.0 5.0 5.0
7.5 7.5 8.0 8.0

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.0	4
BLEACHED/CAVINGS	3.0-4.0	6
STAINED/REWORKED	7.5-8.0	4



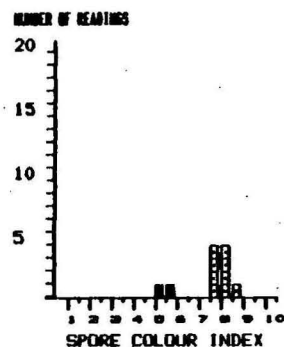
YAMPI-1

■ IN SITU POPULATION

SAMPLE 3110-3125M

5.0 5.5 7.5 7.5 7.5 7.5 8.0 8.0 8.0 8.0
8.5

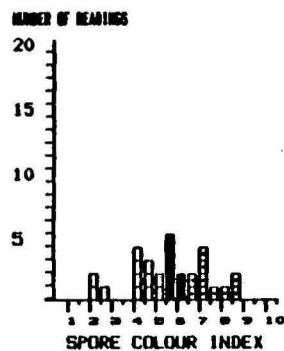
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.0-5.5	2
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.5-8.5	9



SAMPLE 3150-3165M

2.0 2.0 2.5 4.0 4.0 4.0 4.0 4.5 4.5 4.5
5.0 5.0 5.5 5.5 5.5 5.5 5.5 6.0 6.0 6.5
6.5 7.0 7.0 7.0 7.0 7.5 8.0 8.5 8.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	5.5-6.0	7
BLEACHED/CAVINGS	2.0-5.0	12
STAINED/REWORKED	6.5-8.5	10



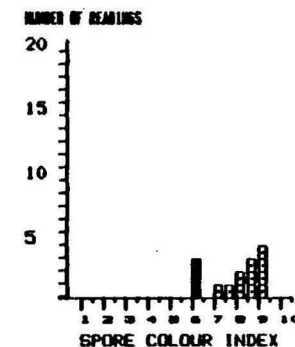
YAMPI-1

■ IN SITU POPULATION

SAMPLE 3545-3560M

6.0 6.0 6.0 7.0 7.5 8.0 8.0 8.5 8.5 8.5
9.0 9.0 9.0 9.0

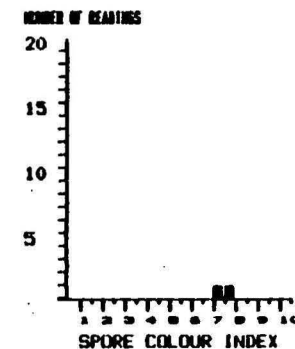
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	6.0-6.0	3
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	7.0-9.0	11



SAMPLE 3710-3725M

7.0 7.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.0-7.5	2
BLEACHED OR CAVED	-	0
STAINED OR REWORKED	-	0

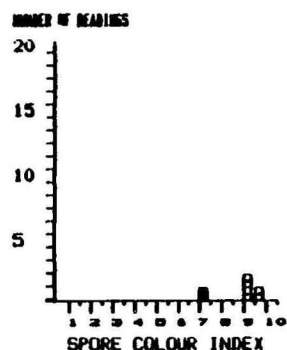


YAMPI-1

IN SITU POPULATION

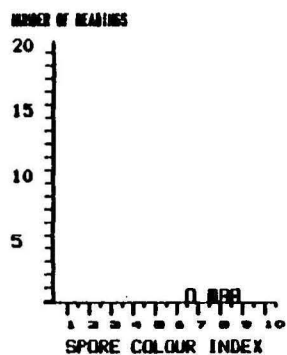
SAMPLE 3715-3730M
7.0 9.0 9.0 9.5

SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.0-7.0	1
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	9.0-9.5	3



SAMPLE 3830-3845M
6.5 7.5 8.0 8.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.5-7.5	1
BLEACHED OR CAVED	6.5-6.5	1
STAINED OR REWORKED	8.0-8.5	2

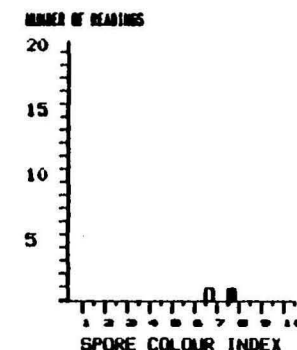


YAMPI-1

IN SITU POPULATION

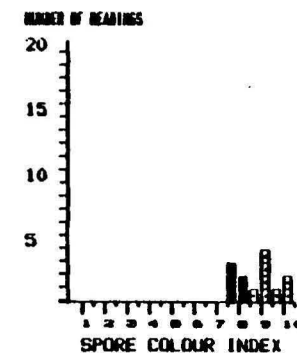
SAMPLE 3940-3955M
6.5 7.5

SELECTED CLASS	RANGE	COUNT
IN-SITU SPORES	7.5-7.5	1
BLEACHED OR CAVED	6.5-6.5	1
STAINED OR REWORKED	-	0



SAMPLE 4020-4040M
7.5 7.5 7.5 8.0 8.0 8.0 8.5 9.0 9.0 9.0 9.0
9.5 10.0 10.0

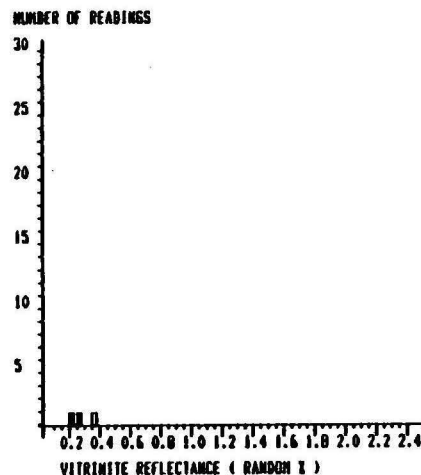
SELECTED CLASS	RANGE	COUNT
IN SITU SPORES	7.5-8.0	5
BLEACHED/CAVINGS	-	0
STAINED/REWORKED	8.5-10.0	8



YAPI-1

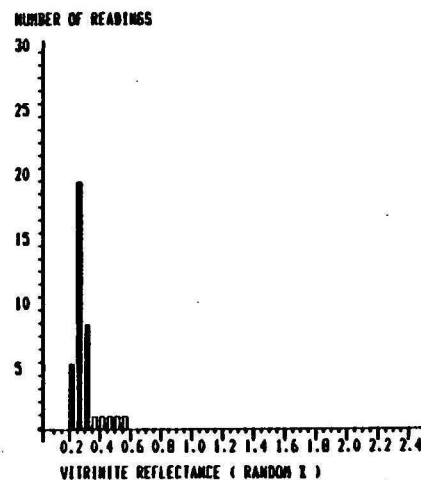
SAMPLE 600-615M
0.22 0.28 0.37

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.22-0.28	2	0.25	0.04
INERTINITE/REWORKED	0.37-0.37	1	0.37	



SAMPLE 945-970M
0.22 0.23 0.24 0.24 0.24 0.25 0.25 0.25 0.25 0.26
0.26 0.26 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.28
0.28 0.29 0.29 0.29 0.30 0.30 0.30 0.30 0.31 0.31
0.31 0.33 0.36 0.40 0.46 0.53 0.56

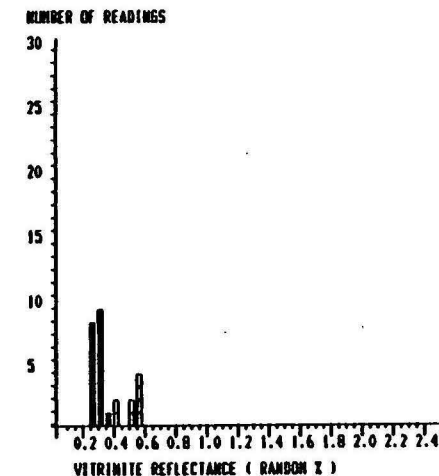
SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.22-0.33	32	0.27	0.03
INERTINITE/REWORKED	0.36-0.56	5	0.46	0.08



YAPI-1

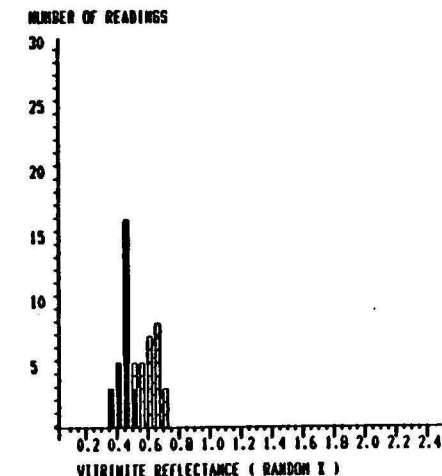
SAMPLE 1150-1165M
0.25 0.27 0.27 0.28 0.29 0.29 0.29 0.29 0.30 0.30
0.31 0.31 0.31 0.32 0.33 0.34 0.34 0.37 0.40 0.40
0.50 0.50 0.55 0.56 0.57 0.59

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.25-0.37	18	0.30	0.03
INERTINITE/REWORKED	0.40-0.59	8	0.51	0.07



SAMPLE 1800-1815M
0.38 0.39 0.39 0.40 0.41 0.42 0.43 0.44 0.45 0.45
0.45 0.46 0.46 0.47 0.47 0.47 0.47 0.48 0.48
0.48 0.49 0.49 0.49 0.50 0.50 0.51 0.53 0.54 0.55
0.57 0.57 0.58 0.59 0.60 0.60 0.60 0.61 0.62 0.62
0.64 0.65 0.65 0.65 0.65 0.66 0.67 0.68 0.69 0.70
0.71 0.72

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.38-0.51	27	0.46	0.04
INERTINITE/REWORKED	0.53-0.72	25	0.63	0.05



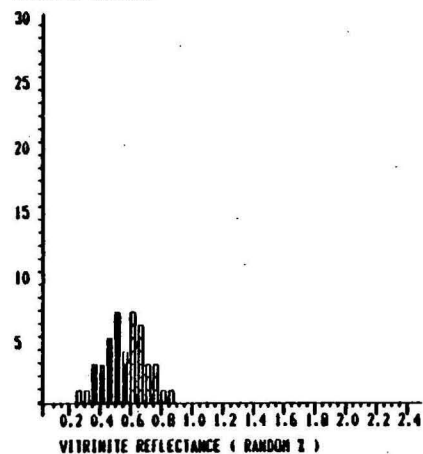
YAPI-1

SAMPLE 1940-1955M

0.26 0.34 0.36 0.36 0.37 0.42 0.43 0.44 0.45 0.46
0.48 0.48 0.49 0.50 0.51 0.51 0.51 0.52 0.53 0.53
0.55 0.55 0.56 0.58 0.60 0.60 0.63 0.63 0.64 0.64
0.64 0.65 0.65 0.66 0.66 0.68 0.69 0.72 0.74 0.74
0.75 0.75 0.76 0.82 0.86

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
IN SITU VITRIMITE	0.36-0.56	21	0.48	0.06
LIPITIMITE/CAVINGS	0.26-0.34	2	0.30	0.06
INERTIMITE/REWORKED	0.58-0.86	22	0.69	0.07

NUMBER OF READINGS

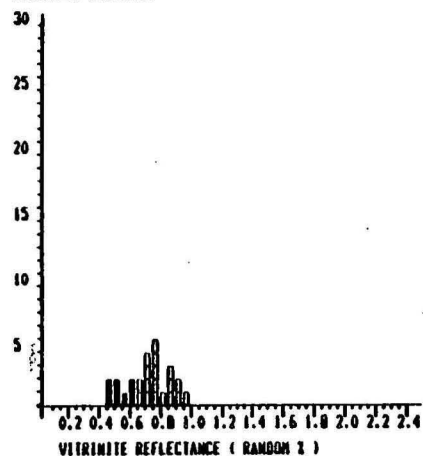


SAMPLE 2525-2540H

0.45 0.48 0.52 0.53 0.57 0.61 0.62 0.68 0.68 0.71
0.73 0.73 0.74 0.75 0.75 0.77 0.77 0.78 0.81 0.85
0.85 0.86 0.90 0.93 0.95

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
IN SITU VITRIMITE	0.45-0.62	7	0.54	0.06
INERTIMITE/REWORKED	0.68-0.95	18	0.79	0.08

NUMBER OF READINGS



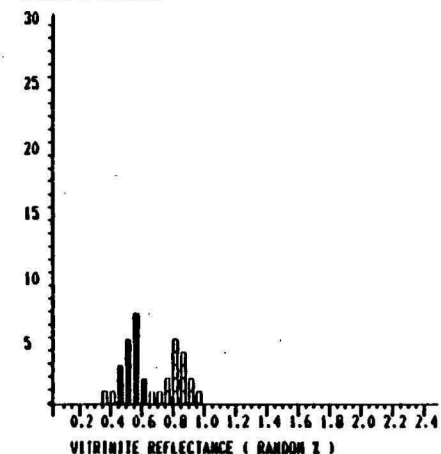
YAPI-1

SAMPLE 2730-2745H

0.39 0.41 0.45 0.46 0.48 0.51 0.51 0.52 0.53 0.54
0.55 0.56 0.56 0.56 0.57 0.59 0.59 0.61 0.62 0.67
0.70 0.76 0.77 0.81 0.82 0.83 0.83 0.84 0.86 0.87
0.87 0.89 0.90 0.91 0.99

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
IN SITU VITRIMITE	0.45-0.62	17	0.54	0.05
LIPITIMITE/CAVINGS	0.39-0.41	2	0.40	0.01
INERTIMITE/REWORKED	0.67-0.99	16	0.83	0.08

NUMBER OF READINGS

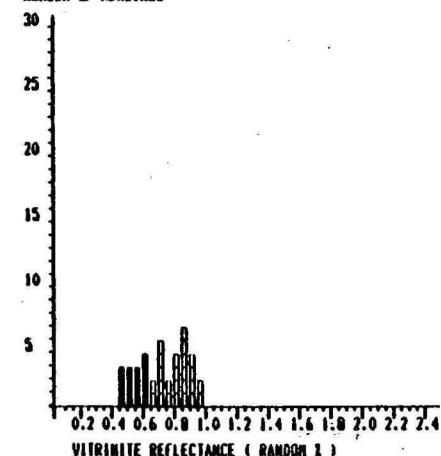


SAMPLE 2975-2990H

0.47 0.49 0.49 0.50 0.50 0.53 0.55 0.56 0.58 0.60
0.60 0.61 0.62 0.68 0.68 0.71 0.71 0.73 0.73 0.74
0.76 0.77 0.80 0.82 0.82 0.84 0.85 0.85 0.85 0.86
0.88 0.89 0.90 0.91 0.92 0.94 0.99 0.99

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST. DEV
IN SITU VITRIMITE	0.47-0.62	13	0.55	0.05
INERTIMITE/REWORKED	0.68-0.99	25	0.82	0.09

NUMBER OF READINGS

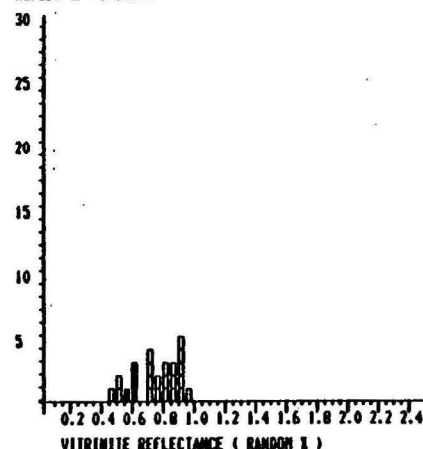


SAMPLE 3110-3125M

0.47 0.50 0.53 0.56 0.60 0.60 0.63 0.70 0.71 0.71
0.72 0.75 0.78 0.81 0.81 0.84 0.86 0.86 0.89 0.91
0.91 0.91 0.92 0.94 0.99

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.56-0.63	4	0.60	0.03
LIPTINITE/CAVINGS	0.47-0.53	3	0.50	0.03
INERTINITE/REWORKED	0.70-0.78	6	0.73	0.03
REWORKED	0.81-0.99	12	0.89	0.05

NUMBER OF READINGS

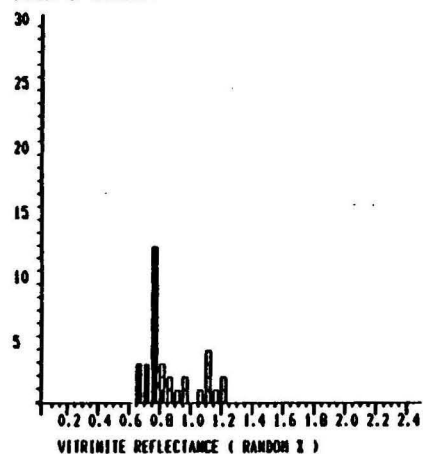


SAMPLE 3150-3165M

0.67 0.68 0.68 0.72 0.74 0.74 0.75 0.75 0.76 0.77
0.77 0.77 0.78 0.78 0.78 0.78 0.79 0.79 0.80 0.83
0.84 0.87 0.87 0.94 0.95 0.95 1.08 1.11 1.11 1.12
1.14 1.18 1.22 1.22

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.67-0.80	19	0.75	0.04
INERTINITE/REWORKED	0.83-0.87	4	0.85	0.02
REWORKED	0.94-1.22	11	1.09	0.10

NUMBER OF READINGS



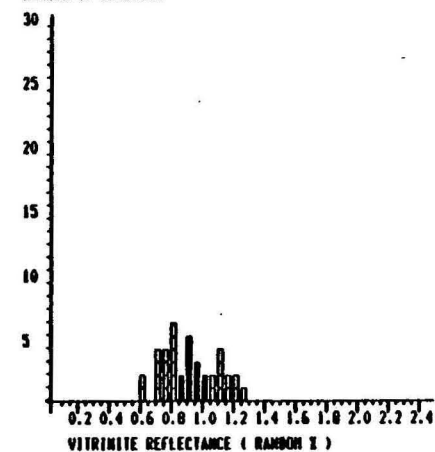
YANP1-1

SAMPLE 3545-3560M

0.61 0.63 0.70 0.73 0.73 0.73 0.75 0.77 0.79 0.79
0.80 0.81 0.82 0.82 0.84 0.84 0.85 0.87 0.90 0.91
0.92 0.92 0.94 0.95 0.97 0.98 1.00 1.02 1.06 1.07
1.10 1.11 1.13 1.14 1.16 1.17 1.20 1.24 1.25

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	0.85-1.02	12	0.94	0.05
LIPTINITE/CAVINGS	0.70-0.84	14	0.78	0.05
INERTINITE/REWORKED	1.06-1.25	11	1.15	0.06

NUMBER OF READINGS

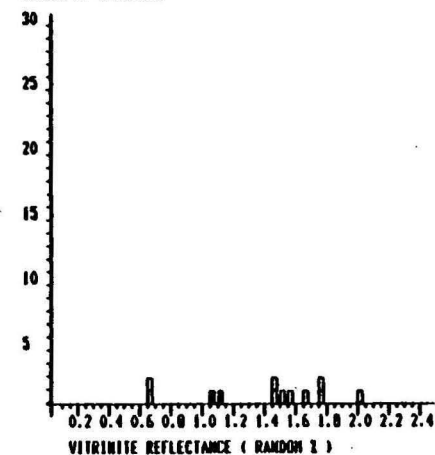


SAMPLE 3710-3725M

0.67 0.67 1.08 1.12 1.45 1.48 1.54 1.58 1.68 1.76
1.79 2.00

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	1.08-1.12	2	1.10	0.03
LIPTINITE/CAVINGS	0.67-0.67	2	0.67	
INERTINITE/REWORKED	1.45-1.58	4	1.51	0.06
REWORKED	1.68-2.00	4	1.81	0.14

NUMBER OF READINGS

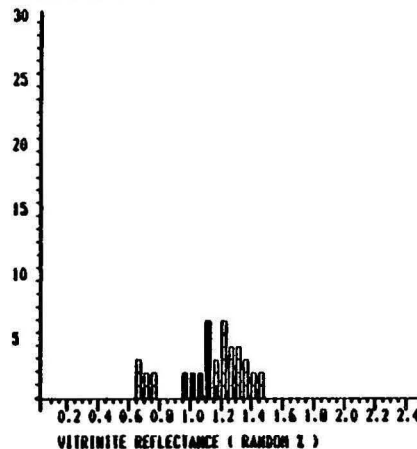


SAMPLE 3715-3730M

0.67 0.68 0.69 0.73 0.73 0.76 0.79 0.99 0.99 1.01
1.02 1.05 1.07 1.10 1.11 1.12 1.12 1.13 1.14 1.15
1.18 1.19 1.20 1.21 1.22 1.23 1.23 1.24 1.25 1.25
1.26 1.26 1.31 1.32 1.32 1.34 1.36 1.37 1.38 1.42
1.44 1.46 1.49

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	0.99-1.15	13	1.08	0.06
LIPTINITE/CAVINGS	0.67-0.79	7	0.72	0.04
INERTINITE/REWORKED	1.18-1.49	23	1.30	0.09

NUMBER OF READINGS

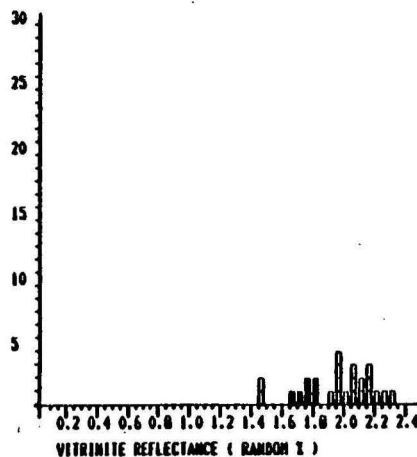


SAMPLE 3830-3845M

1.46 1.49 1.68 1.71 1.78 1.78 1.80 1.80 1.93 1.96
1.97 1.97 1.99 2.01 2.05 2.09 2.09 2.12 2.14 2.15
2.16 2.17 2.21 2.25 2.31

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.68-1.80	6	1.76	0.05
LIPTINITE/CAVINGS	1.46-1.49	2	1.48	0.02
INERTINITE/REWORKED	1.93-2.01	6	1.97	0.03
REWORKED	2.05-2.31	11	2.16	0.08

NUMBER OF READINGS

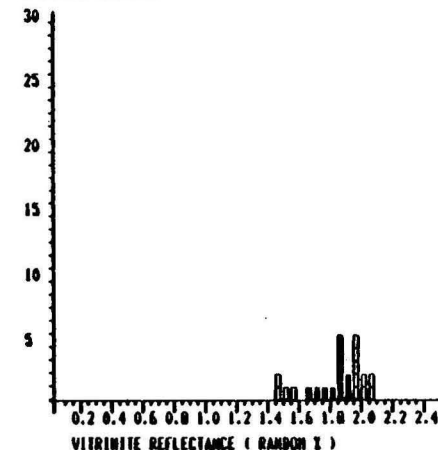


SAMPLE 3940-3955M

1.46 1.49 1.51 1.59 1.66 1.74 1.78 1.80 1.85 1.85
1.88 1.89 1.89 1.90 1.90 1.96 1.96 1.97 1.97 1.99
2.00 2.00 2.05 2.05

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.66-1.90	11	1.83	0.08
LIPTINITE/CAVINGS	1.46-1.59	4	1.51	0.06
INERTINITE/REWORKED	1.96-2.05	9	1.99	0.04

NUMBER OF READINGS

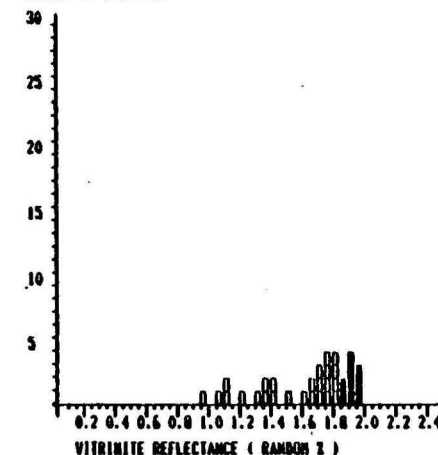


SAMPLE 4020-4040M

0.95 1.09 1.11 1.13 1.23 1.32 1.36 1.38 1.41 1.41
1.52 1.62 1.67 1.67 1.70 1.70 1.74 1.75 1.77 1.78
1.79 1.81 1.81 1.83 1.83 1.85 1.86 1.90 1.91 1.93
1.94 1.95 1.95 1.96

SELECTED CLASS	RANGE (X)	COUNT	AV(X)	ST.DEV
IN SITU VITRINITE	1.85-1.96	9	1.92	0.04
LIPTINITE/CAVINGS	1.62-1.83	14	1.75	0.07

NUMBER OF READINGS



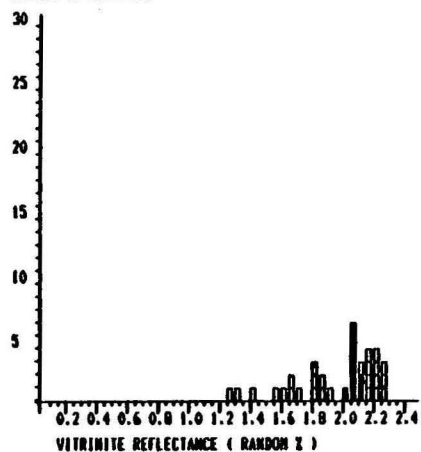
YANP1-1

SAMPLE 4055-4070M

1.27 1.32 1.44 1.56 1.63 1.69 1.70 1.82 1.83
1.84 1.85 1.88 1.92 2.04 2.05 2.06 2.07 2.08
2.09 2.10 2.11 2.14 2.15 2.16 2.16 2.20 2.22
2.22 2.23 2.25 2.26 2.26

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	2.04-2.11	9	2.07	0.02
LIPITINITE/CAVINGS	1.82-1.92	6	1.86	0.04
INERTINITE/REWORKED	2.14-2.26	12	2.20	0.05

NUMBER OF READINGS

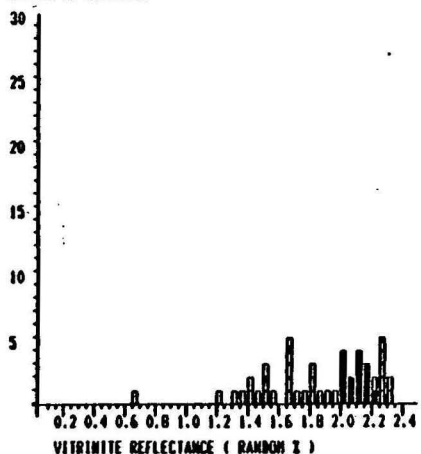


SAMPLE 4145-4160M

0.69 1.23 1.34 1.35 1.43 1.43 1.49 1.50 1.52 1.54
1.56 1.65 1.65 1.65 1.68 1.69 1.74 1.78 1.83 1.83
1.84 1.85 1.94 1.96 2.00 2.01 2.02 2.02 2.05 2.09
2.10 2.11 2.12 2.12 2.15 2.17 2.17 2.20 2.24 2.25
2.27 2.27 2.27 2.29 2.31 2.31

SELECTED CLASS	RANGE (%)	COUNT	AV(X)	ST. DEV
IN SITU VITRINITE	2.00-2.20	14	2.10	0.07
LIPITINITE/CAVINGS	1.74-1.96	8	1.83	0.07
INERTINITE/REWORKED	2.24-2.31	8	2.28	0.03

NUMBER OF READINGS



SECTION I

PETROLEUM GEOCHEMISTRY

WELL REPORTS

BONAPARTE BASIN