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**GEOCHEMICAL ANALYSIS OF  
SAMPLES FROM**

**PRAWN-1A  
WHELK-1**

**OTWAY BASIN,  
OFFSHORE VICTORIA, AUSTRALIA**

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SWC #30, 3030 ft.

## INTRODUCTION

A sampling programme was undertaken by BHP Petroleum Pty. Ltd. on December 11, 1991 at the BMR Core Library in Fyshwick, Canberra, ACT. This programme consisted of obtaining cuttings samples from various stratigraphic intervals intersected in the Prawn-1A and Whelk-1 wells in the offshore Otway Basin, Victoria, for the purposes of geochemical analysis.

This report provides a summary of the samples obtained, the range of geochemical analyses performed on them, and the results obtained from these analyses.

## **SAMPLING PROGRAMME**

Cuttings samples from the Prawn-1A and Whelk-1 wells from the offshore Otway Basin, Victoria were acquired by BHP Petroleum during a sampling programme at the BMR Core Library, Fyshwick, ACT, in December 1991.

A total of 48 samples (46 cuttings, 2 sidewall cores) were acquired from the Prawn-1A well, and 6 cuttings samples from the Whelk-1 well, their respective depths being shown in Tables 1 and 4.

The samples were submitted to Geotechnical Services (Geotech) Pty. Ltd., Perth, for analysis in January 1992.

## ORGANIC GEOCHEMICAL ANALYSIS

### Prawn-1A

As Table 1 indicates, 47 samples (46 cuttings and one SWC) from between 5110-10410 feet (1558-3173 metres) in the Prawn-1A well were submitted for the determination of total organic carbon (TOC) content, and for the pyrolysis of appropriate samples (those containing over 1.0% TOC) by the Rock-Eval technique. In all, 44 samples were submitted for Rock-Eval pyrolysis, only three containing insufficient TOC to justify this work.

In addition, one SWC sample from 3030 feet (924 metres) in Prawn-1A was extracted and analysed by whole-extract gas chromatography (WEGC).

The results of the TOC determinations and Rock-Eval pyrolysis are listed in Table 1. Results of the whole-extract GC analysis are included in this report as Figure 1 (whole extract gas chromatogram), and Tables 2 and 3.

TABLE 1

## ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = PRAWN 1A

DATE OF JOB = JANUARY 1992

DEPTH(ft)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
5110.0 - 5120.0	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
6470.0 - 6480.0	429	0.33	2.75	1.13	3.08	2.43	0.11	0.26	2.62	105	43	
6480.0 - 6490.0	419	0.82	12.10	1.86	12.92	6.51	0.06	1.07	7.57	160	25	
6490.0 - 6500.0	430	0.32	2.57	1.19	2.89	2.16	0.11	0.24	2.22	116	54	
6500.0 - 6510.0	424	0.52	16.46	2.60	16.98	6.33	0.03	1.41	10.60	155	25	
6510.0 - 6520.0	430	0.14	1.60	1.10	1.74	1.45	0.08	0.14	1.84	87	60	
6520.0 - 6530.0	427	0.19	2.25	1.50	2.44	1.50	0.08	0.20	2.16	104	69	
6530.0 - 6540.0	427	0.20	1.57	1.32	1.77	1.19	0.11	0.15	1.59	99	83	
6540.0 - 6550.0	430	0.16	1.18	1.29	1.34	0.91	0.12	0.11	1.72	69	75	
6550.0 - 6560.0	428	0.16	0.82	1.12	0.98	0.73	0.16	0.08	1.25	66	90	
6560.0 - 6570.0	427	0.37	2.27	1.67	2.64	1.36	0.14	0.22	2.76	82	61	
6570.0 - 6580.0	430	0.13	1.04	1.87	1.17	0.56	0.11	0.10	1.59	65	118	
6580.0 - 6590.0	425	0.18	0.91	1.32	1.09	0.69	0.17	0.09	1.28	71	103	
6590.0 - 6600.0	426	0.34	3.79	1.54	4.13	2.46	0.08	0.34	3.42	111	45	
6600.0 - 6610.0	428	0.21	2.40	1.48	2.61	1.62	0.08	0.22	2.44	98	61	
6610.0 - 6620.0	428	0.22	2.18	2.54	2.40	0.86	0.09	0.20	1.83	119	139	
6620.0 - 6630.0	426	0.16	1.82	1.89	1.98	0.96	0.08	0.16	2.47	74	77	
6630.0 - 6640.0	426	0.20	3.24	1.42	3.44	2.28	0.06	0.29	2.90	112	49	
6690.0 - 6700.0	429	0.28	2.98	1.09	3.26	2.73	0.09	0.27	3.02	99	36	
6790.0 - 6800.0	424	0.12	1.16	0.94	1.28	1.23	0.09	0.11	1.36	85	69	
7030.0 - 7040.0	419	0.35	4.95	1.13	5.30	4.38	0.07	0.44	4.23	117	27	
7040.0 - 7050.0	423	0.21	3.42	1.54	3.63	2.22	0.06	0.30	4.37	78	35	
7056.0	SWC	435	0.12	0.93	1.04	1.05	0.89	0.11	0.09	2.95	32	35
7170.0 - 7180.0	nd	nd	nd	nd	nd	nd	nd	nd	0.72	nd	nd	
7230.0 - 7240.0	432	0.32	3.65	1.18	3.97	3.09	0.08	0.33	3.64	100	32	
7240.0 - 7250.0	± nd	0.08	0.08	1.04	0.16	0.08	0.50	0.01	1.02	8	102	
7250.0 - 7260.0	nd	nd	nd	nd	nd	nd	nd	nd	0.88	nd	nd	
7350.0 - 7360.0	420	6.03	5.58	1.97	11.61	2.83	0.52	0.96	2.29	244	86	
7550.0 - 7580.0	422	0.56	8.72	1.96	9.28	4.45	0.06	0.77	7.08	123	28	
7580.0 - 7610.0	425	0.38	5.81	2.74	6.19	2.12	0.06	0.51	7.12	82	38	
7610.0 - 7640.0	432	0.38	1.88	1.66	2.26	1.13	0.17	0.19	4.53	42	37	
7640.0 - 7670.0	433	0.39	1.98	0.84	2.37	2.36	0.16	0.20	2.94	67	29	
7810.0 - 7820.0	± 437	0.92	2.06	10.00	2.98	0.21	0.31	0.25	14.90	14	67	
8030.0 - 8070.0	431	0.16	0.81	0.81	0.97	1.00	0.16	0.08	1.71	47	47	
8280.0 - 8300.0	430	11.38	200.18	5.64	211.56	35.49	0.05	17.56	80.20	250	7	
8640.0 - 8690.0	427	5.16	83.95	5.49	89.11	15.29	0.06	7.40	39.90	210	14	
8930.0 - 8960.0	± 437	3.47	36.18	5.25	39.65	6.89	0.09	3.29	31.90	113	16	
9050.0 - 9080.0	428	0.86	9.36	1.72	10.22	5.44	0.08	0.85	8.64	108	20	
9130.0 - 9160.0	425	2.80	48.84	3.46	51.64	14.12	0.05	4.29	24.10	203	14	
9300.0 - 9330.0	426	0.64	8.16	1.18	8.80	6.92	0.07	0.73	6.57	124	18	
9480.0 - 9510.0	428	1.54	15.52	2.30	17.06	6.75	0.09	1.42	12.50	124	18	
9675.0 - 9690.0	433	0.18	1.79	0.80	1.97	2.24	0.09	0.16	1.90	94	42	
9780.0 - 9790.0	433	0.33	2.88	0.56	3.21	5.14	0.10	0.27	2.42	119	23	
9900.0 - 9930.0	432	0.27	5.93	0.81	6.20	7.32	0.04	0.51	3.14	189	26	
10080.0 - 10110.0	± 436	0.31	3.89	1.32	4.20	2.95	0.07	0.35	4.24	92	31	
10260.0 - 10290.0	433	0.15	1.70	0.42	1.85	4.05	0.08	0.15	1.64	104	26	
10380.0 - 10410.0	436	0.21	2.21	0.69	2.42	3.20	0.09	0.20	2.75	80	25	

± = preliminary data

TMAX = Max. temperature S2  
 S1+S2 = Potential yield  
 PC = Pyrolysable carbon  
 OI = Oxygen Index

S1 = Volatile hydrocarbons (HC)  
 S3 = Organic carbon dioxide  
 TOC = Total organic carbon  
 nd = no data

S2 = HC generating potential  
 PI = Production index  
 HI = Hydrogen index

TABLE 2

Summary of Extraction and Liquid Chromatography

Wellname: PRAWN 1A

Date of Job: JANUARY 1992

A. Concentrations of Extracted Material

Depth(ft)	Weight of Rock Extd. (grams)	Total Extract (ppm)	Loss on Column (ppm)	-----Hydrocarbons-----			-----Nonhydrocarbons-----		
				Saturates (ppm)	Aromatics (ppm)	HC Total (ppm)	NSO's (ppm)	Asphaltenes (ppm)	NonHC Total (ppm)
3030.0	1.4	729.9	nd	nd	nd	nd	nd	nd	nd

TABLE 2

Summary of Extraction and Liquid Chromatography

Wellname: PRAWN 1A

Date of Job: JANUARY 1992

B. Compositional Data

Depth(ft)	-----Hydrocarbons-----			-----Nonhydrocarbons-----			EOM(mg)	SAT(mg)	SAT	ASPH	HC
	%SAT.	%AROM.	%HC's	%NSO's	%ASPH.	%Non HCs	TOC(g)	TOC(g)	AROM	NSO	Non HC
3030.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

na = not applicable      nd = no data

TABLE 3

## Summary of Gas Chromatography Data

Wellname: PRAWN 1A

Date of Job: JANUARY 1992

## A. Alkane Compositional Data

Depth(ft)	Prist./Phyt.	Prist./n-C17	Phyt./n-C18	CPI(1)	CPI(2)	(C21+C22)/(C28+C29)
3030.0	0.65	0.21	0.70	0.92	0.95	1.01

TABLE 3

## Summary of Gas Chromatography Data

Wellname: PRAWN 1A

Date of Job: JANUARY 1992

## B. n-Alkane Distributions

Depth(ft)	nC12	nC13	nC14	nC15	nC16	nC17	iC19	nC18	iC20	nC19	nC20	nC21	nC22	nC23	nC24	nC25	nC26	nC27	nC28	nC29	nC30	nC31
3030.0	0.5	1.8	6.6	12.6	9.0	12.9	2.7	6.0	4.2	5.2	3.7	3.9	2.8	3.6	2.4	3.1	4.4	4.2	4.1	2.5	2.5	1.4

**Figure 1**

PRAWN 1A, 3030.0ft, SWC30  
Whole Extract  
C12+ GLC

251010

5 cm

12

17

18

Pr

Ph

22

31

**Whelk-1**

Six samples from between 3600-4600 feet (1097-1402 metres) in Whelk-1 were submitted for TOC determinations. Of these six samples, four contained more than 1.0% TOC and were therefore considered suitable for Rock-Eval pyrolysis work.

Results of the TOC/Rock-Eval determinations on the four Whelk-1 samples are listed in Table 4.

Table 4

## ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = WHELK 1

DATE OF JOB = JANUARY 1992

DEPTH(ft)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
3600.0 - 3630.0	nd	nd	nd	nd	nd	nd	nd	nd	0.70	nd	nd
3800.0 - 3830.0	nd	nd	nd	nd	nd	nd	nd	nd	0.96	nd	nd
4010.0 - 4040.0	429	0.13	0.69	1.23	0.82	0.56	0.16	0.07	1.10	63	112
4190.0 - 4220.0	426	0.17	1.15	1.38	1.32	0.83	0.13	0.11	1.81	64	76
4350.0 - 4380.0	424	7.81	58.00	15.63	65.81	3.71	0.12	5.46	19.20	302	81
4570.0 - 4600.0	424	0.20	0.29	0.59	0.49	0.49	0.41	0.04	1.46	20	40

TMAX = Max. temperature  
 S1+S2 = Potential yield  
 PC = Pyrolysable carbon  
 OI = Oxygen Index

S1 = Volatile hydrocarbons (HC)  
 S3 = Organic carbon dioxide  
 TOC = Total organic carbon  
 nd = no data

S2 = HC generating potential  
 PI = Production index  
 HI = Hydrogen index