A/S Norske Shell
LETE- OG UTVINNINGSAVDELINGEN
(EXPLORATION AND PRODUCTION)

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P. O. Box 10, N-4033 Forus
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AMOCO
P.O. Box 388

4001 STAVANGER.

Attn: F. Stumm

received - 20.12.83.
(WELL FILE)

Your ref:	Our ref:	Date:
	044103 EPXE/1/mr	19.12.83

Dear Sir,

Subject: Geochemical analysis of core samples, well 2/11-1

We refer to telephone conversation in January 1983 in which Norske Shell was granted permission to sample the core from 2/11-1 for geochemical studies.

We have now completed our analysis and we have the pleasure to send you copies of the following 3 reports:

- RKER 83.073 3863,6 m - 3874,3 m
  source rock analysis of cores from intervals 12676 to 12711 ft of Kimmeridge Clay Fm of well 2/11-1, Norway

- RKER 83.061 Geochemical extract analysis of six core samples of the Kimmeridge Clay Formation from interval 12676.5 - 12711.8 ft in well 2/11-1, Norway

- Robertson Research. Rock Eval. Pyrolysis data sheets.

We regret our delay in reporting which was caused by instrumental problems in our research laboratory.

Yours faithfully,
A/S NORSKE SHELL

B.M. Thomas.

B.M. Thomas
Team Leader
Exploration and Production

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B.M. Thomas
Team Leader
Exploration and Production

May 1983

RKER 83.073

SOURCE ROCK ANALYSIS OF CORES FROM INTERVAL 12676 TO 12711 FT OF KIMMERIDGE CLAY FM. OF WELL 2/11-1, NORWAY

by
J.M.J.Terken and F.M.van der Veen

code: 774.103

in co-operation with

J.E.A.M.Dielwart

R.F.M.Hofland

P.J.van der Vet

Investigation

9.5.4094

KONINKLIJKE/SHELL EXPLORATIE EN PRODUKTIE LABORATORIUM

RIJSWIJK, THE NETHERLANDS

(Shell Research B.V.)

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1.0	Introduction	1
2.0	Results	3
3.0	Discussion	3
4.0	Conclusion	3

Figure 1 Location map

Table I Source rock properties

Table II Maceral description, comment lines

Enclosure 1 Geochemical log

1.0 INTRODUCTION

A source rock evaluation has been carried out on cores from well 2/11-1, NORWAY. The approximate location is shown in Figure 1. The samples are taken from interval 12676 to 12711 ft of the Kimmeridge Clay Fm.
Total depth was reached at 15392 ft b.d.f..

The purpose of the investigation was:

1. to detect the presence (or absence) of source rocks in the samples
2. to determine the quality of the organic matter, as well as its distribution.
3. to establish the degree of organic metamorphism (level of maturity).

A source rock is identified by measuring the amount of temperature reactive ("live") organic matter present, i.e. the amount of organic matter that yields hydrocarbons upon pyrolysis. The method excludes any ("dead") organic matter such as inertinites.

In addition, the total organic carbon content can be determined which gives the sum of "live" and "dead" organic carbon. Rocks containing less than 0.5%wt organic carbon are not considered to have a potential for commercial oil accumulations.

The source rock indications (SRI), which are a measure of the amount of pyrolysable organic matter, are determined on the original samples and in certain cases also after extraction with organic solvents. A systematically lower value after extraction is due to the presence of extractable hydrocarbons. These may consist of trapped oil, oil generated in situ by a source rock, or e.g. gasoil used in the drilling fluid.

In general, samples with source rock indications of 30 or less do not represent (immature or mature) source rocks. Values between 30 and 100 generally indicate marginal source rocks, while values above 100 commonly indicate good source rocks.

Intervals or samples with high source rock indications are investigated under a microscope to ensure that the high values indicate genuine source rock properties and are not due to contaminants of an organic nature such as lost circulation material.

The quality of a source rock for oil/gas generation depends on the type of organic matter present. Five categories of organic matter can be distinguished, viz.: humic, mainly humic, mixed, mainly kerogenous , kerogenous. This classification is based on the hydrogen content of the organic matter.

Source rocks with organic matter of kerogenous, mainly kerogenous and/or mixed type generate predominantly oil. Organic matter of humic type generates gas only. Strata with organic matter of mainly humic quality generate either gas, or gas and oil.

In addition to the type and the concentration of the organic matter , the source rock quality is also characterised by the distribution of the typical organic constituents, or macerals(1), in the sediments. The maceral distribution can be used to further qualify the source rock, especially when mainly humic quality is found. For this purpose a microscopic investigation on polished rock fragments is carried out.

The "maturity" of source rocks is expressed in terms of degree of organic metamorphism. With increasing degree of organic metamorphism the organic matter is gradually carbonised while generating hydrocarbons. With increasing carbonification the light reflectance of vitrinite, one of the coal macerals, increases. The degree of organic metamorphism can be assessed by measuring this reflectance.

1)maceral: an organic constituent which can be recognised with the microscope (with objectives 25x to 50x)

2.0 RESULTS

The results are listed in Table I (source rock indications values, total organic carbon content ,type of organic matter) and Table II (maceral description , comment lines). All chemically obtained results are summarised in Enclosure 1 (Geochemical log).

3.0 DISCUSSION

3.1 Interval 12676 - 12711 ft (Kimmeridge Clay Fm.)

All samples from this interval show good to predominantly excellent source rock indication (SRI) values together with high total organic carbon contents in the range of 4,1 - 12.3 %wt.

The maceral descriptions show as main constituent sapropelic organic matter (SOM) and smaller amounts of sporinite, liptodetrinite, tasmanites, microplankton , fusinite and micrinite. The SOM is most abundant in the middle of the interval, (12689 - 12704 ft). In the samples from this interval botryococcus and other algae were found, which are probably derived from an external source. Microscopic analysis of the same samples revealed a higher amount of pyrite and a darker fluorescence colour, which probably indicate more bacterial activity. The slight variations observed in the type of organic matter ("kerogenous to mainly kerogenous") may have been caused by the differences in bacterial reworking of the SOM.

Consequently it is concluded that this interval 12676 - 12711 ft can be regarded as a good to excellent source rock for oil.

4.0 CONCLUSION

Interval 12676 - 12711 ft can be regarded as a good to excellent source rock for oil and gas.

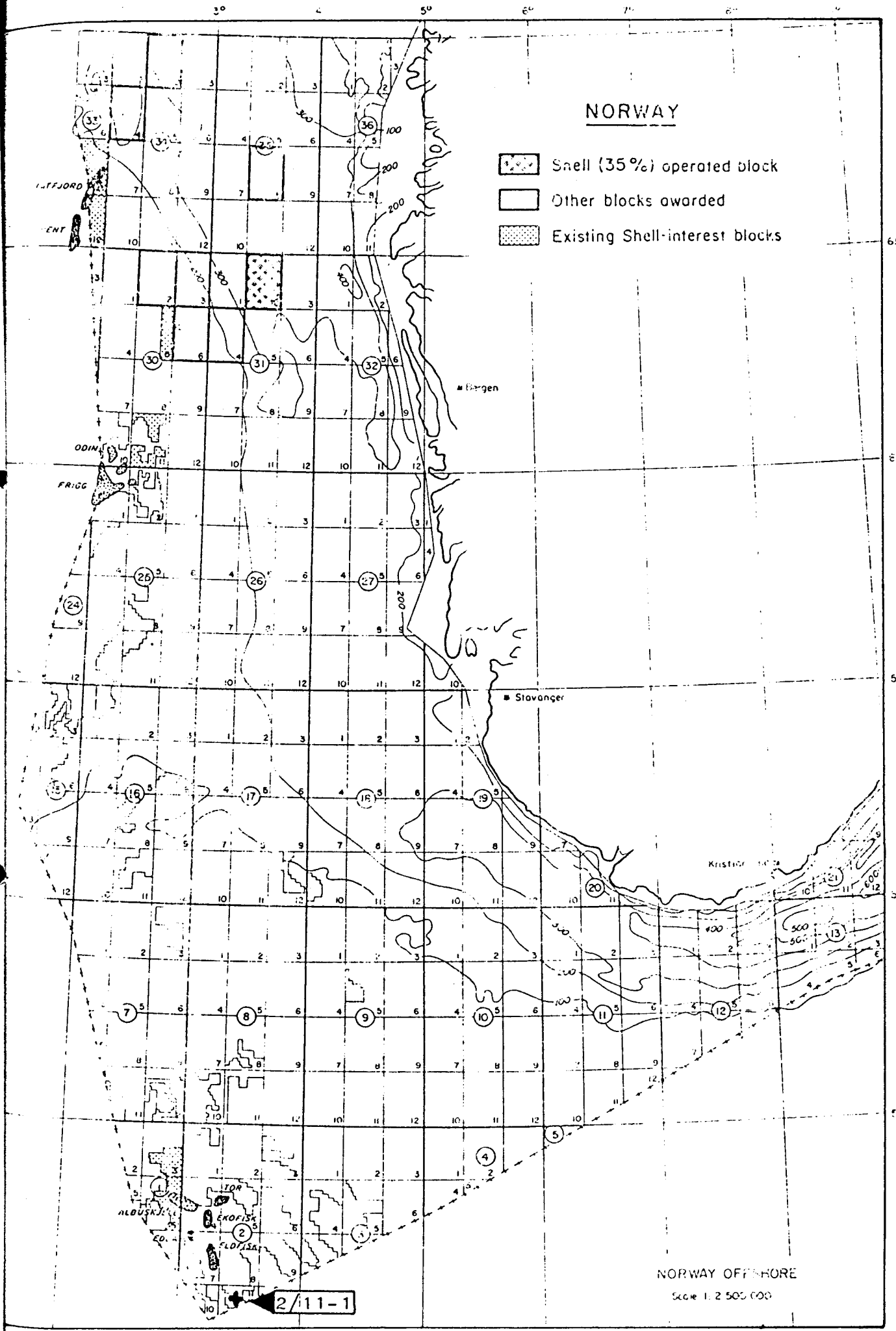

FIGURE: 1:LOCATION MAP

GEOCHEMICAL LOG

WELL 2/11-1

SCALE 1:150

LOCATION

REGEO IDENTIFIER

DEPTH IN F | LITHOLOGY | DOM(VR)

SOURCE ROCK INDICATION OF ORIGINAL SAMPLE
100 200 300 400 500 600

TYPE OF SAMPLE

SOURCE ROCK INDICATION OF SAMPLE AFTER EXTRACTION WITH CHLOROFORM
100 200 300 400 500 600

CONTAMINATION

VALUES SMALLER THAN 30 ARE CONSIDERED NOT TO BE OF SIGNIFICANCE

INTERVAL 12676 TO 12711 FT CONTAINS GOOD TO EXCELLENT SOURCE ROCKS FOR OIL AND GAS.

DEPTH IN F	ORG.CARBON (PCT. WT)	TYPE OF ORGANIC MATTER
12650		
12660		
12670		
	6.6	KEROGENOUS
	5.3	KEROGENOUS
12680	6.3	KEROGENOUS
	6.0	KEROGENOUS
	5.3	KEROGENOUS
	6.3	MAINLY KEROGENOUS
12690	7.4	KEROGENOUS
	12.3	KEROGENOUS
	6.3	KEROGENOUS
	7.1 7.0	KEROGENOUS
12700	11.8	KEROGENOUS
	8.5	KEROGENOUS TO MK
	4.1	MAINLY KEROGENOUS
	7.6	MAINLY KEROGENOUS TO KEROGENOUS
	4.7	KEROGENOUS
12710	4.6	KEROGENOUS
12720		
12730		
12740		
12750		

NUMBER OF SAMPLES ANALYSED 17

NUMBER OF SAMPLES ANALYSED 17

LEGEND

TYPE OF SAMPLE ⊖ = CORE
▶ = SIDEWALL SAMPLE

CONTAMINATION
C = UNSPECIFIED
W = WALNUTS
E = CELLOPHANE
F = FIBRES
P = PLASTIC OR PAINT

KONINKLYKE/SHELL
EXPLORATIE EN PRODUKTIE LABORATORIUM

GEOCHEMICAL LOG

COUNTRY : NORWAY
WELL : 2/11-1
INTERVAL : 12650 - 12750 F.
SCALE 1:150

AUTHOR: TERKEN | DATE: MAY 1983
REP: 83.086.073 | ENCL: 1 | DRAW.NO: I

GEOCHEMICAL SOURCE ROCK DATA

TABLE I WELL: 2/11-1

DEPTH F	TYPE OF SAMPLE	SOURCE ROCK INDICATION BEFORE EXTR.	SOURCE ROCK INDICATION AFTER EXTR.	TYPE OF ORGANIC MATTER	ORGANIC CARBON CONTENT %W
12676	R	825	800	K	6.6
12679	R	590	565	K	5.3
12682	R	760	740	K	6.3
12685	R	640	625	K	6.0
12688	R	555	520	K	5.3
12689	R	485	455	MK	6.3
12691	R	765	730	K	7.4
12694	R	785	750	K	12.3
12695	R	635	625	K	6.3
12697	R	810	775	K	7.1
12697	R	810	775	K	7.0
12700	R	690	670	K	11.8
12702	R	590	575	K/MK	8.5
12704	R	285	275	MK	4.1
12706	P	585	580	MK/K	7.6
12709	R	490	475	K	4.7
12711	R	440	425	K	4.6

TYPE OF SAMPLE C = CUTTINGS, R = CORE, S = SIDEWALL SAMPLE

CONTAMINATION : W = WALNUT FRAGMENTS OR SOME SIMILAR PRODUCT, E = CELLOPHANE SHREDS, F = FIBRES, P = PLASTIC OR PAINT AND C = CONTAMINATED BUT KIND NOT SPECIFIED

A DASH (-) INDICATES TEST NOT MADE, ASTERISKS INDICATE THE ORGANIC CARBON CONTENT IS THE AVERAGE FOR THE SAMPLES CONCERNED

MACERAL DESCRIPTION OF 16 SAMPLES FROM WELL 2/11-1

DEPTH IN FT	SAMPLE TYPE
12676.0	CORE
12679.0	CORE
12682.0	CORE
12685.0	CORE
12688.0	CORE
12689.0	CORE
12691.0	CORE
12694.0	CORE
12695.0	CORE
12697.0	CORE
12700.0	CORE
12702.0	CORE
12704.0	CORE
12706.0	CORE
12709.0	CORE
12711.0	CORE

ORGANIC																		INORG.			
	VITR.			LIPTINITE				ALGAE						INERT.							
SAPROPELIC ORG. MATTER	TELOCOLLINITE	TELINITE	DESMOCOLLINITE	SPORINITE	CUTINITE	RESINITE	LIPTODETRINITE	BOTRYOCOCCUS	TASMANITES	OTHER ALGAE	MICROPLANKTON	EXSUDATINITE	SCLEROTINITE	FUSINITE	MACRINITE	MICRINITE	UNDEFINED MINERALS	FRAMBOIDAL PYRITE	AGGREGATES OF PYRITE	CRYSTALS OF PYRITE
+			-	/			+		/		/			-		+	*	/	-	/
+			-	/			+		/		/			/		+	*	/	-	/
+			-	/			+		/		/			/		+	*	/	-	/
+			-	/			+	-	/		/			/		+	*	/	-	-
+			-	/			+		/		/			/		+	*	/	/	/
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+			-	/			+	/	/	+	/			-		+	*	+	+	/
+			-	/			+		/		/			/		+	*	/	-	-
+			-	/			+		/		/			/		+	*	/	-	-

LEGEND	
*	ABUNDANT
+	COMMON
/	FEW
-	RARE

TABLE : II
(part 1)

TABLE II (part 2)
COMMENT LINES FROM WELL/OUTCROP : 2/11-1

12676.0 F : INITIAL CONVERSION S.O.M.

12679.0 F : INITIAL CONVERSION S.O.M.

12682.0 F : INITIAL CONVERSION S.O.M.

12685.0 F : INITIAL CONVERSION S.O.M.
RARE BOTRYOCOCCUS ALGAE

12688.0 F : INITIAL CONVERSION S.O.M.

12689.0 F : S.O.M. PARTLY CONVERTED
MICRINITE = OXY-MICRINITE ?
SAMPLE SLIGHTLY OXIDISED

12691.0 F : INITIAL CONVERSION S.O.M.

12694.0 F : INITIAL CONVERSION S.O.M.
RARE BOTRYOCOCCUS-LIKE ALGAE

12695.0 F : INITIAL CONVERSION S.O.M.
FOSSIL REMAINS
RARE BOTRYOCOCCUS-LIKE ALGAE

12697.0 F : INITIAL CONVERSION S.O.M.

12700.0 F : INITIAL CONVERSION S.O.M.
FOSSIL REMAINS
LAMINATED (ALGAL) S.O.M. PARTLY BACTERIALLY TRANSFORMED
RARE BOTRYOCOCCUS-LIKE ALGAE

12702.0 F : INITIAL CONVERSION S.O.M.
LAMINATED (ALGAL) S.O.M. PARTLY BACTERIALLY TRANSFORMED
RARE BOTRYOCOCCUS-LIKE ALGAE

12704.0 F : INITIAL CONVERSION S.O.M.
FEW BOTRYOCOCCUS-LIKE ALGAE

12706.0 F : INITIAL CONVERSION S.O.M.
LAMINATED (ALGAL) S.O.M. PARTLY BACTERIALLY TRANSFORMED
FOSSIL REMAINS
FEW BOTRYOCOCCUS-LIKE ALGAE

12709.0 F : INITIAL CONVERSION S.O.M.

12711.0 F : FOSSIL REMAINS
INITIAL CONVERSION S.O.M.

June 1983

RKER.83.061

GEOCHEMICAL EXTRACT ANALYSIS OF SIX CORE SAMPLES OF THE KIMMERIDGE CLAY FORMATION FROM INTERNAL 12676.5-12711.8 FT IN WELL 2/11-1, NORWAY

by

P.J. Grantham & J.M.A. Buiskool-Toxopeus

Investigation 9.5.4096

With co-operation from P. Lohbeck and R. Lieffering

KONINKLIJKE/SHELL EXPLORATIE EN PRODUKTIE LABORATORIUM

RIJSWIJK, THE NETHERLANDS

(Shell Research B.V.)

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Table(s) 1-3 Geochemical data of rock extracts

Figures 1-6 Gas chromatograms of saturated hydrocarbons
7 C-15 and C-30 ring distributions
8-10 Sterane and triterpane fragmentograms

GEOCHEMICAL EXTRACT ANALYSIS OF SIX CORE SAMPLES OF THE KIMMERIDGE CLAY FORMATION FROM INTERVAL 12676.5 - 12711.8 FT IN WELL 2/11-1, NORWAY

1. RESULTS AND DISCUSSION

Geochemical analysis of the following six core samples from the Upper Jurassic Kimmeridge Clay formation of well 2/11-1, Norway, has been carried out:

12676.5 ft
12688.0 ft
12694.0 ft
12694.3 ft
12706.9 ft
12711.8 ft

The results are shown in Tables 1-3 and in Figs 1-10.
The results indicate the following:

1.1.

All six selected samples are source rocks for oil (organic carbon contents; extract/carbon ratios; source rock indication values between 425 and 800 units; maceral compositions).

1.2.

The extracts of the samples are nearly to just-mature (relatively high phytane/n-C_{18} ratios; C_{30} region of the gas chromatograms, Figs 1-6; distribution of C_{29} steranes, Figs. 8-10).

1.3.

These source rocks contain predominantly sapropelic organic matter (maceral analysis, Fig. 12). This is in agreement with the general shape of the gas chromatograms, Figs. 1-6.

The sapropelic organic matter is of bacterially reworked phytoplantonic orgin (C_{27}-C_{29} distribution of the sterane fragmentograms, Figs. 8-10).

1.4.

The extracts are similar to an average North Sea crude oil with respect to their gas chromatograms and sterane and triterpane distributions. The carbon isotope values however are somewhat lighter (appoximately -30 °/oo) compared to the mean of many North Sea crude oils (-28.9 °/oo).

2. CONCLUSIONS

Six core samples from the Upper Jurassic Kimmeridge Clay formation of well 2/11-1, Norway (12676.5-12711.8 ft) are source rocks for oil. The extracts of these samples are nearly to just-mature and are derived from predominantly sapropelic organic matter (bacterially reworked phytoplankton).

The extracts are of the same broad type of organic matter compared as to that of an average North Sea crude oil. The carbon isotope values however are slightly lighter (approximately 1 °/oo) compared to those of many North Sea crude oils.

Table 1 - GEOCHEMICAL DATA OF EXTRACTS

Sample	Norway 2/11-1 12676.5 ft core	2/11-1 12688.0 ft core
% ethyl acetate extract	0.68	0.57
% organic carbon after ethyl acetate extraction	6.8	5.5
% sulphur	1.2	1.1
ppm V as metals	64	73
ppm Ni as metals	24	36
pristane/phytane	1.5	1.5
pristane/nC17	0.8	0.7
phytane/nC18	0.6	0.6
C_{15} distribution		
1-ring	50	47
2-ring	33	39
3-ring	17	14
C_{30} distribution		
3-ring	12	14
4-ring	59	53
5-ring	29	33
C_{29} DOM	61	61
% saturates*	37	38
% aromatics	38	37
% heterocompounds	25	25
$\delta^{13}C^{o}/oo$	-29.8	-30.4
extract/carbon	0.10	0.10

*) determined by thin - layer chromatography

Table 2 - GEOCHEMICAL DATA OF EXTRACTS

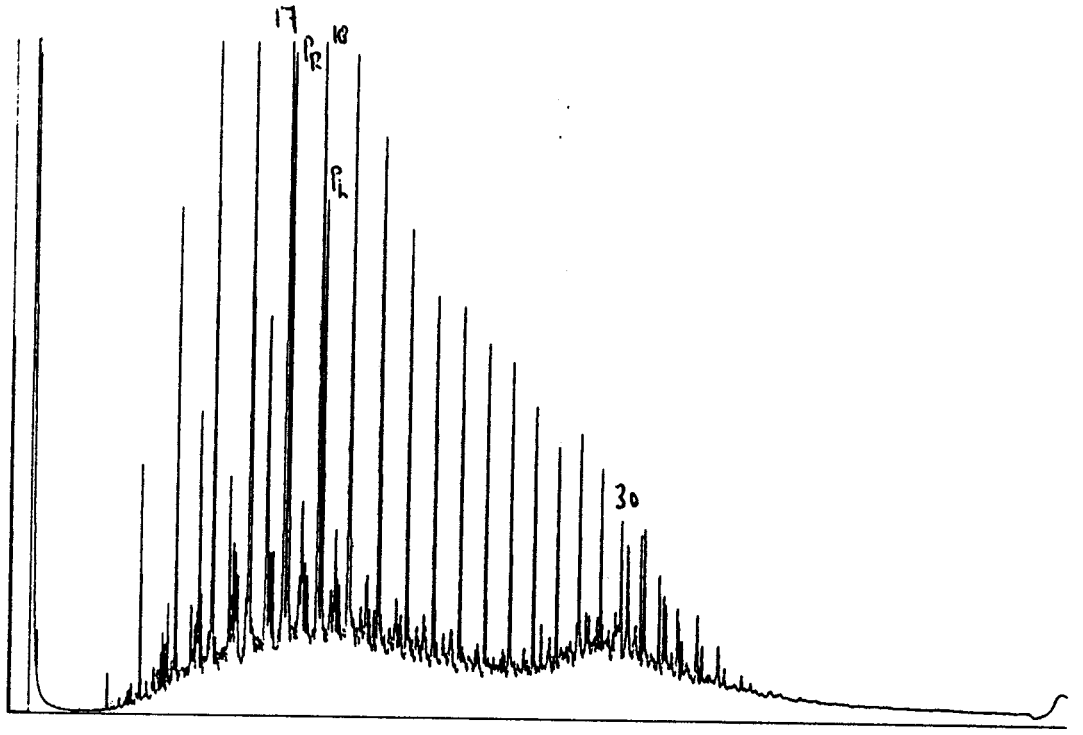
Sample	Norway 2/11-1 12694.0 ft core	2/11-1 12694.3 ft core
% ethyl acetate extract	0.80	0.78
% organic carbon after ethyl acetate extraction	12.3	6.5
% sulphur	2.3	1.9
ppm V as metals	47	69
ppm Ni as metals	8	23
pristane/phytane	1.5	1.4
pristane/nC17	0.8	0.8
phytane/nC18	0.6	0.6
C_{15} distribution		
1-ring	46	50
2-ring	35	34
3-ring	19	16
C_{30} distribution		
3-ring	14	15
4-ring	60	58
5-ring	26	27
C_{29} DOM	62	62
% saturates*	41	43
% aromatics	46	31
% heterocompounds	13	26
$\delta^{13}C^{o}/oo$	-30.4	-30.2
extract/carbon	0.07	0.12

*) determined by thin - layer chromatography

Table 3 - GEOCHEMICAL DATA OF EXTRACTS

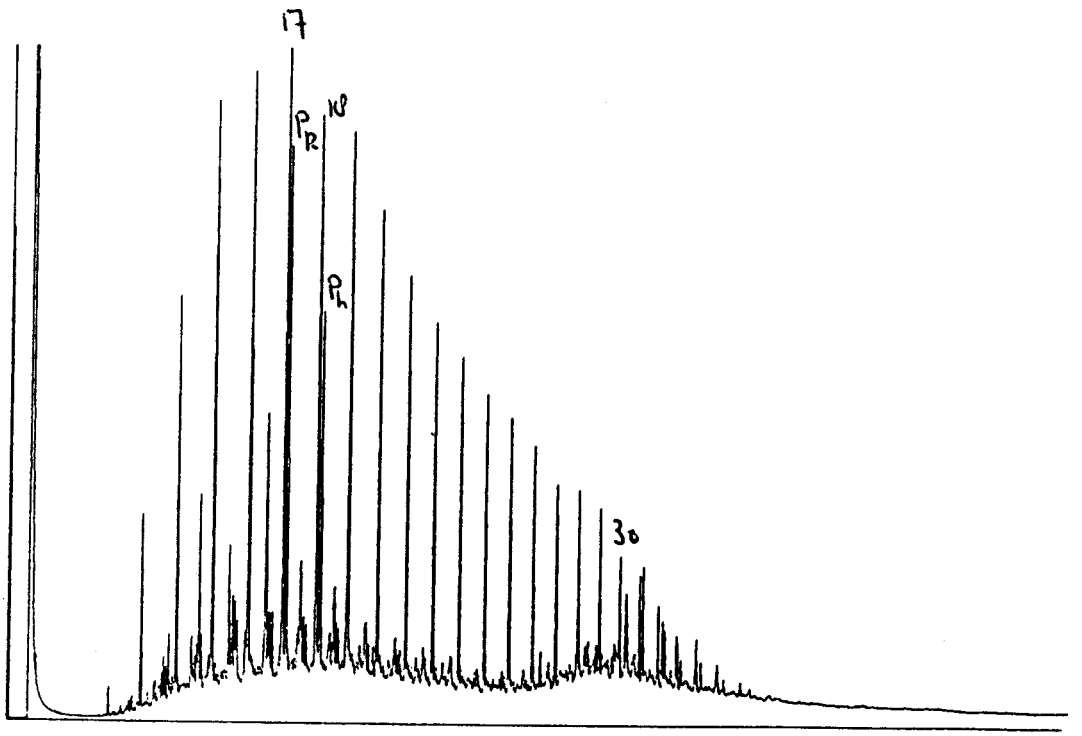
Sample	Norway 2/11-1 12706.9 ft core	2/11-1 12711.8 ft core
% ethyl acetate extract	0.74	0.48
% organic carbon after ethyl acetate extraction	7.6	4.7
% sulphur	7.9	1.1
ppm V as metals	15	n.d
ppm Ni as metals	10	n.d
pristane/phytane	1.5	1.6
pristane/nC17	0.8	0.8
phytane/nC18	0.6	0.6
C_{15} distribution		
1-ring	48	48
2-ring	34	35
3-ring	18	17
C_{30} distribution		
3-ring	10	10
4-ring	61	52
5-ring	29	38
C_{29} DOM	61	62
% saturates	44	37
% aromatics	41	35
% heterocompounds	15	28
$\delta^{13}C^{o}/oo$	-31.1	-29.9
extract/carbon	0.10	0.10

*) determined by thin - layer chromatography
n.d. = not enough material for the determination



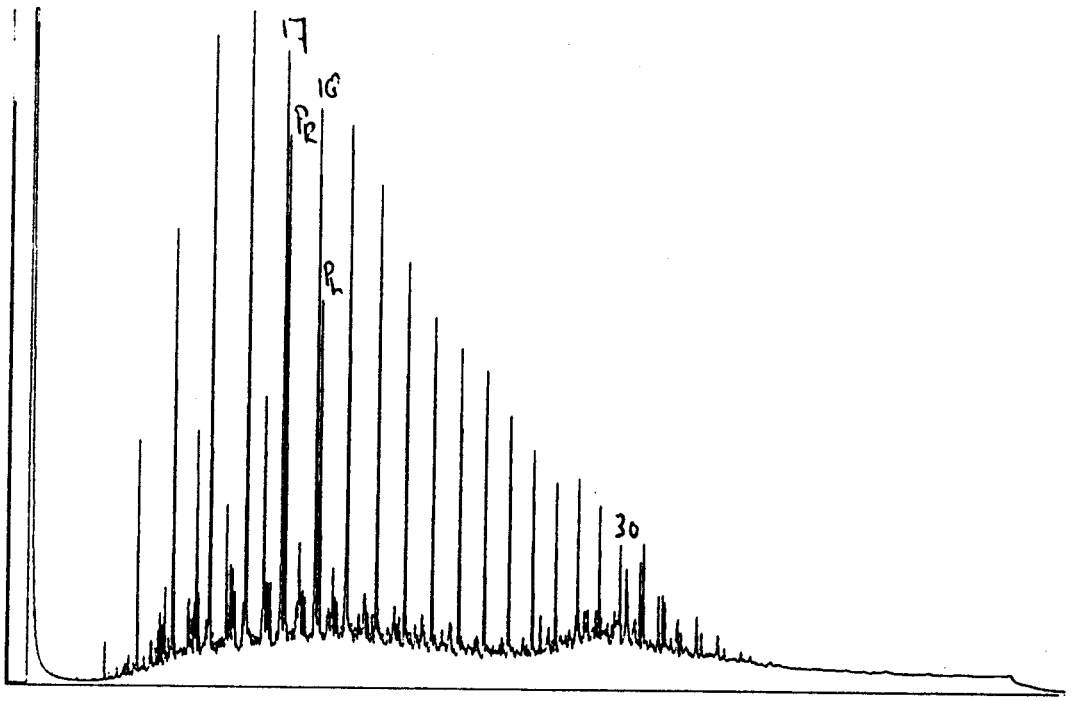
GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 1. NORWAY. 2/11-1 12676.5 FT



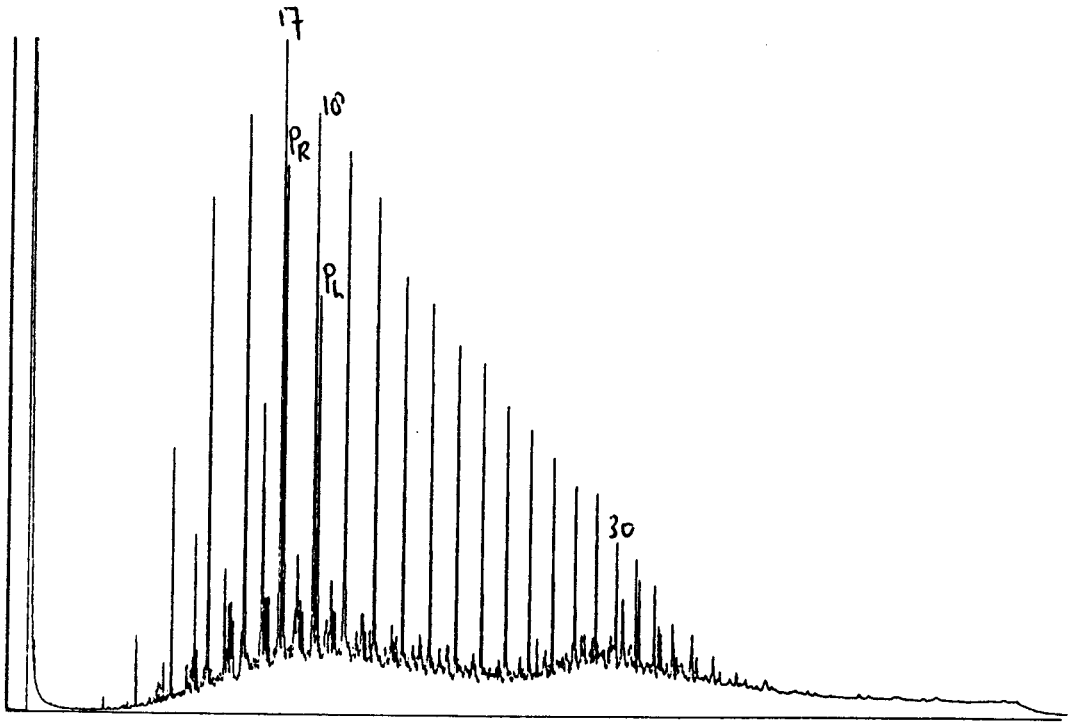
GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 2. NORWAY. 2/11-1 12688.0 FT



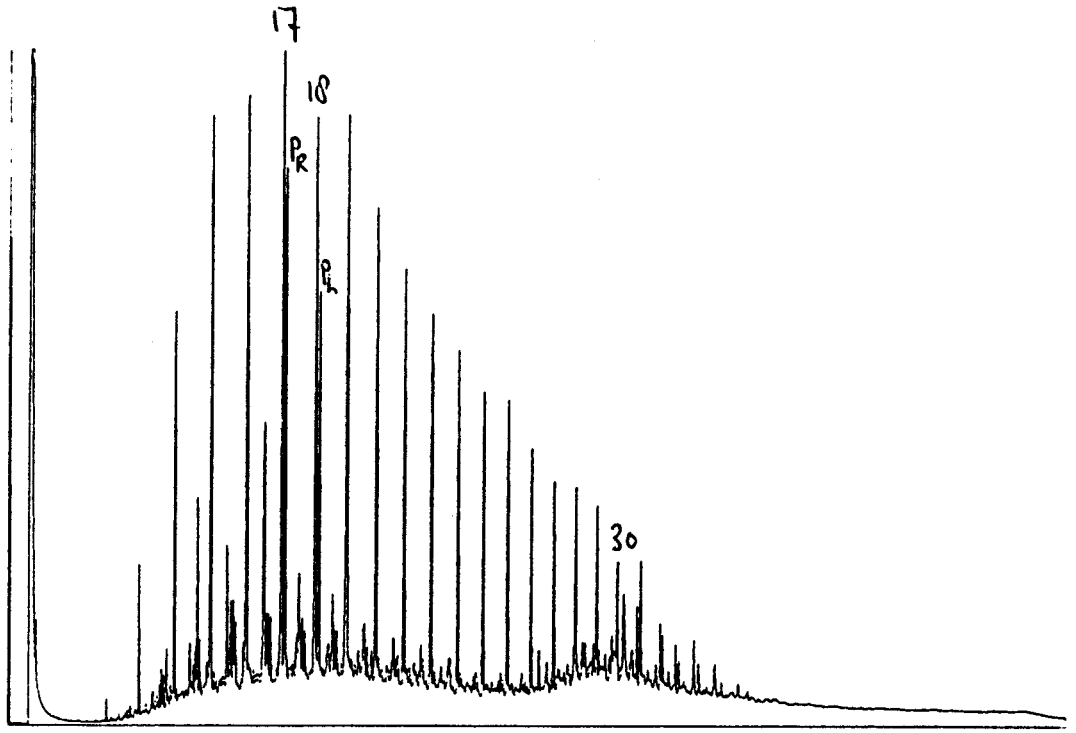
GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 3. NORWAY. 2/11-1 12694.0 FT



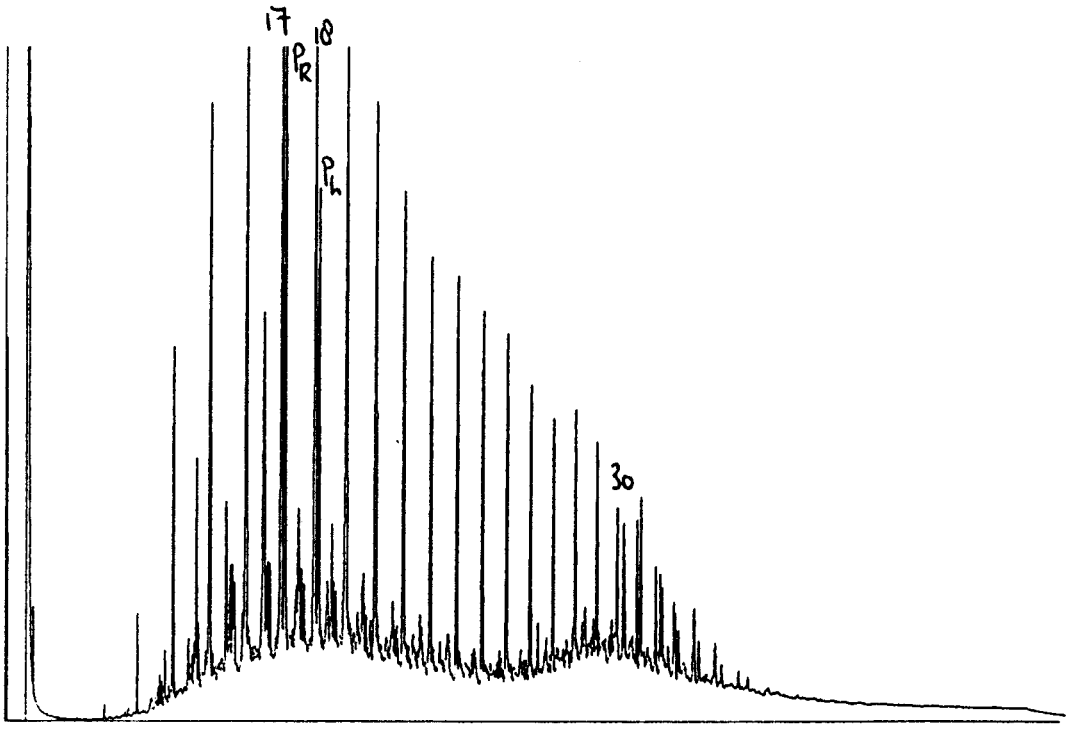
GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 4. NORWAY. 2/11-1 12694.3 FT



GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

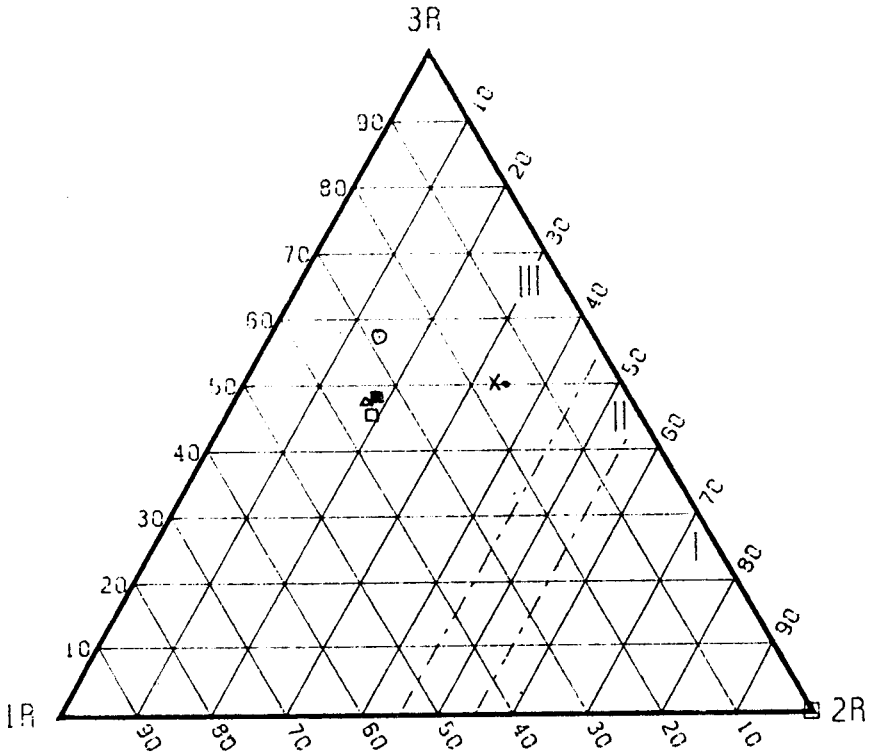
FIG. 5. NORWAY. 2/11-1 12706.9 FT



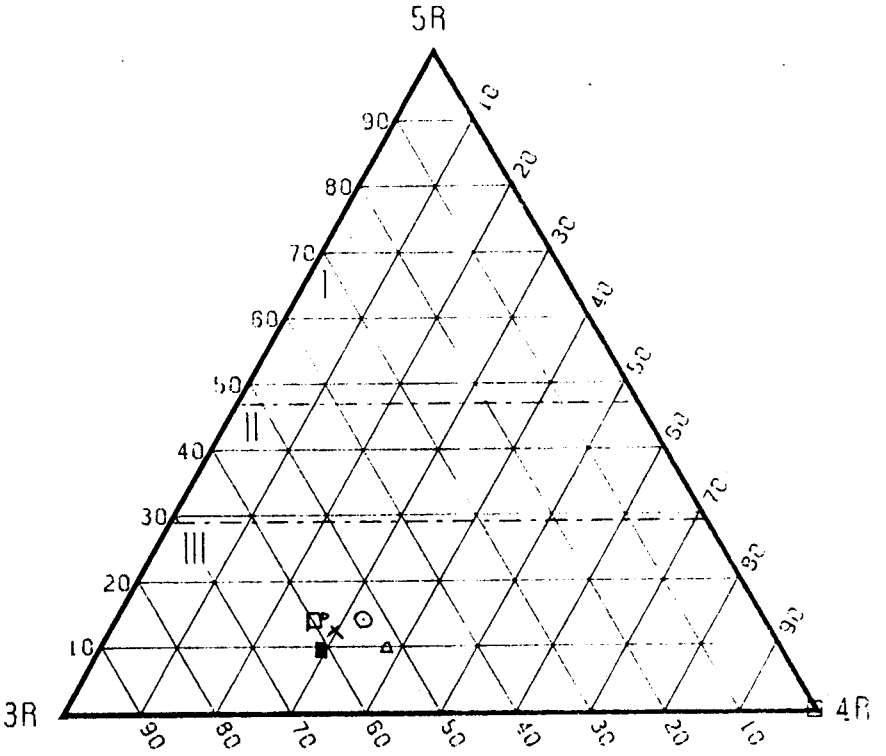
GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 6. NORWAY. 2/11-1 12711.8 FT

C_{15}-RINGDISTRIBUTION



C_{30}-RINGDISTRIBUTION



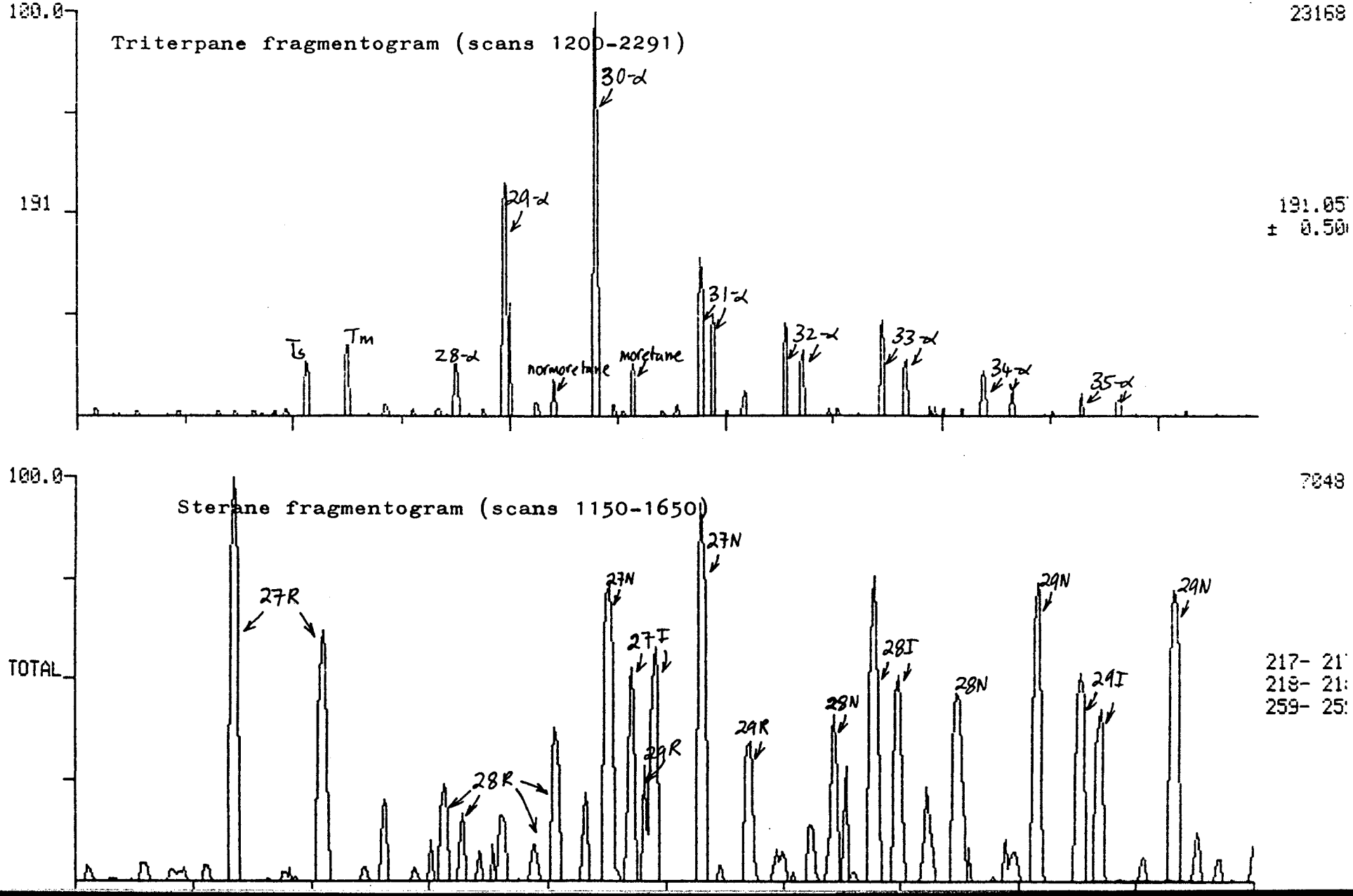
I LANDPLANT-DERIVED CRUDES WITH SUBSTANTIAL RESIN CONTRIBUTION TO SOURCE MATTER

II CRUDES OF MIXED ORIGIN

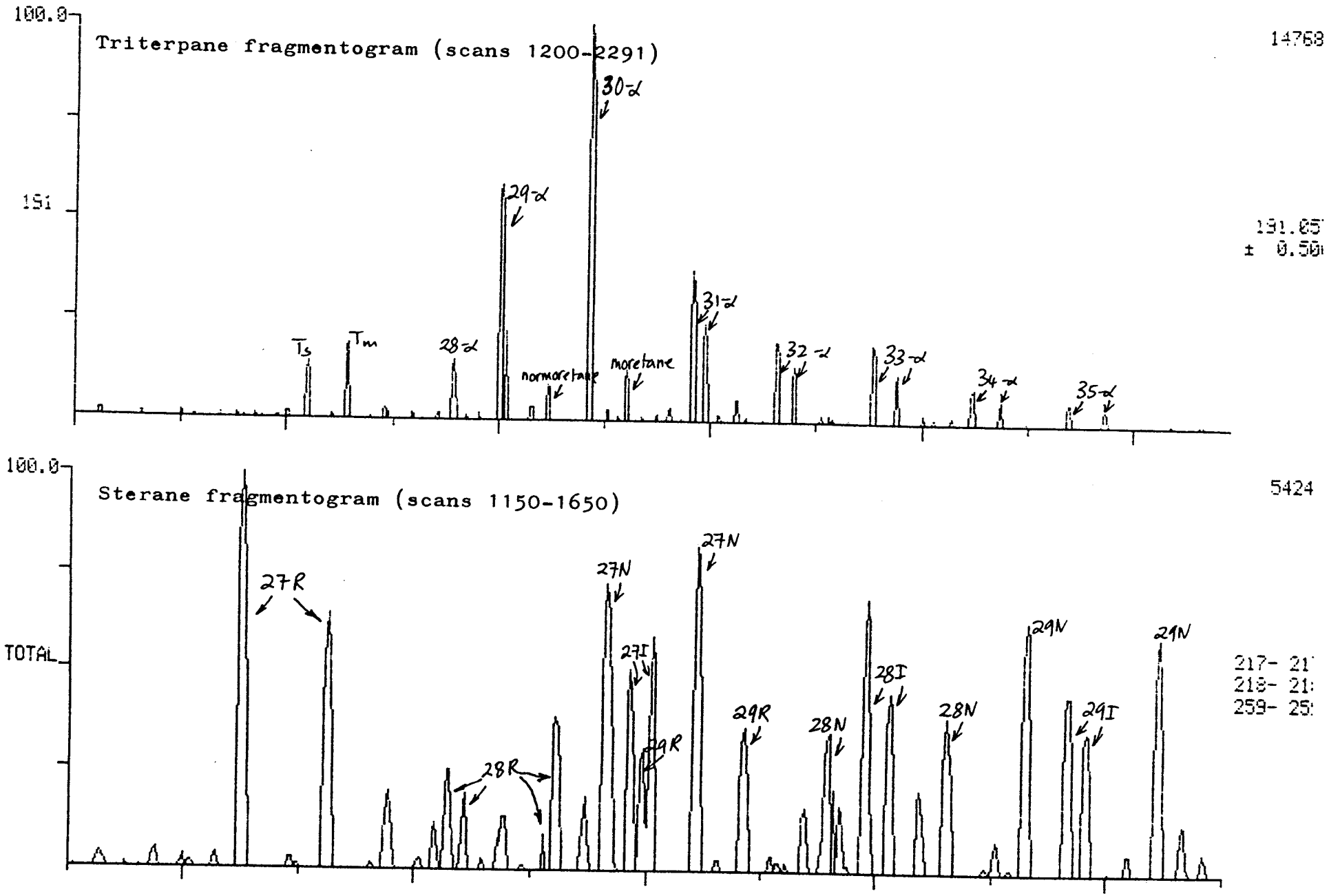
III CRUDES DERIVED FROM SOM AND/OR ALGAL MATTER

LEGEND
□ -

× 12676.5 ft
○ 12688.0 ft
□ 12694.0 ft
• 12694.3 ft
■ 12706.9 ft

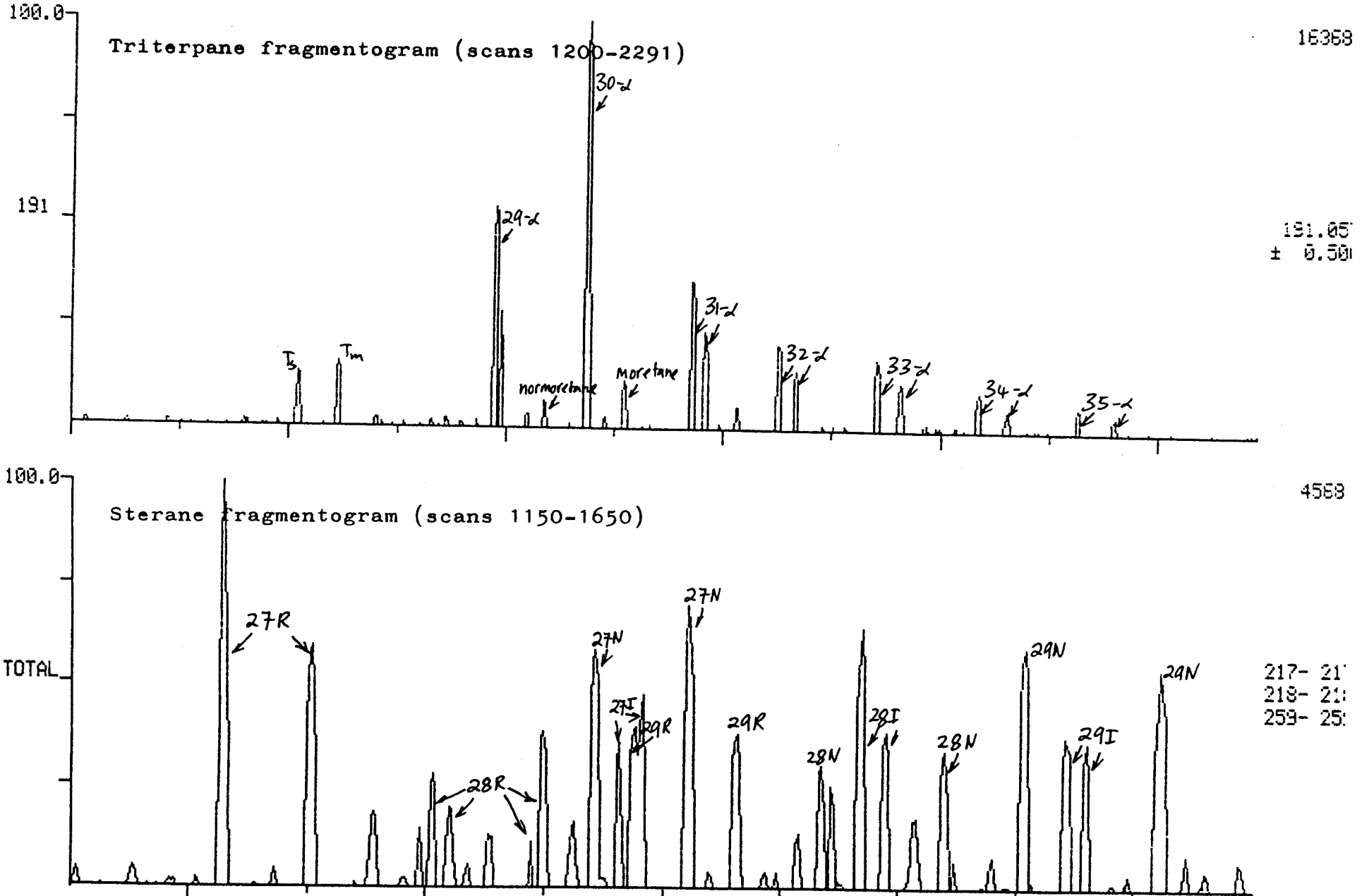


GC-MS analysis 2/11-1 12676.5 ft extract Fig. 8



GC-MS analysis 2/11-1 12694.0 ft extract

Fig. 9



GC-MS analysis 2/11-1 12711.8 ft extract Fig.

COMPANY: NORSKE SHELL **WELL:** 2/11-1 **LOCATION:** NORTH SEA

GENERAL DATA			CHEMICAL ANALYSIS DATA												
				PYROLYSIS					SOLVENT EXTRACTION						
SAMPLE DEPTH (FEET)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	TEMP – ERATURE °C	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (ppm)	TOTAL EXTRACT (ppm)	HYDRO-CARBONS (ppm)	EXTRACT % OF ORGANIC CARBON	HYDROCARBONS mg/g OF ORGANIC CARBON	HYDROCARBONS % OF EXTRACT	ALKANES % OF HYDRO-CARBONS
12676.5	Core	SH, dk gy, calc	6.65	438	603	19	.08	40120						
	"	After extraction	6.04	441	591	28	.00	35720						
	"	After extr & decarb	7.01	444	488	8	.00	34270						
12679.8	"	A/a	5.62	440	547	19	.08	30750						
	"	After extraction	5.35	445	451	8	.00	24180						
	"	After extr & decarb	5.85	443	392	15	.01	22980						
12682.3	"	A/a	6.57	445	572	16	.07	37590						
	"	After extraction	6.19	443	591	15	.00	36630						
	"	After extr & decarb	7.00	443	546	15	.01	38280						
12685.4	"	A/a	6.34	441	618	25	.08	39240						
	"	After extraction	5.99	442	584	14	.00	35010						
	"	After extr & decarb	6.73	444	484	28	.00	32620						
12688	"	A/a	5.76	439	572	28	.07	33000						
	"	After extraction	5.22	444	483	17	.00	25220						
	"	After extr & decarb	5.85	442	421	4	.01	24630						
12689.4	"	A/a	6.97	437	294	23	.17	20500						
	"	After extraction	6.30	436	326	11	.01	20600						
	"	After extr & decarb	7.76	442	511	8	.00	39680						
12691.5	"	A/a	7.85	444	635	25	.08	49880						
	"	After extraction	7.20	444	632	10	.00	45520						
	"	After extr & decarb	8.32	443	585	11	.00	48700						
12694	"	A/a	12.53	439	465	11	.12	58300						
	"	After extraction	11.98	434	496	6	.00	59530						
	"	After extr & decarb	15.25	444	584	3	.00	89130						
12694.3	"	A/a	6.90	442	586	19	.10	40480						
	"	After extraction	6.20	443	578	34	.00	35850						
	"	After extr & decarb	6.98	442	483	15	.00	33720						
12697	"	A/a	7.72	442	597	23	.08	46130						
	"	After extraction	6.83	441	632	18	.00	43190						
	"	After extr & decarb	7.80	442	495	49	.01	38680						
12700.6	"	SH, blk	10.35	444	337	12	.14	34960						
	"	After extraction	10.39	435	343	13	.00	35710						
	"	After extr & decarb	16.75	445	661	12	.00	110820						
12702.8	"	SH, gy-blk	8.88	429	342	13	.15	30410						
	"	After extraction	8.50	435	366	12	.01	31130						
	"	After extr & decarb	10.85	443	587	15	.00	63740						
12704	"	SH, dk gy	6.06	434	220	18	.22	13350						

TABLE 2A Chemical Analysis Data

COMPANY: NORSKE SHELL **WELL:** 2/11-1 **LOCATION:** NORTH SEA

GENERAL DATA			CHEMICAL ANALYSIS DATA											
				PYROLYSIS					SOLVENT EXTRACTION					
SAMPLE DEPTH (FEET)	SAMPLE TYPE	ANALYSED LITHOLOGY	ORGANIC CARBON % OF ROCK	TEMP – °C ERATURE	HYDROGEN INDEX	OXYGEN INDEX	PRODUCTION INDEX	POTENTIAL YIELD (ppm)	TOTAL EXTRACT (ppm)	HYDRO-CARBONS (ppm)	EXTRACT % OF ORGANIC CARBON	HYDROCARBONS mg/g OF ORGANIC CARBON	HYDROCARBONS % OF EXTRACT	ALKANES % OF HYDRO-CARBONS
12704	Core	After extraction	5.76	434	209	15	.02	12070						
	"	After extr & decarb	7.18	442	533	15	.01	38290						
12706.9	"	SH, dk gy	7.51	429	188	26	.23	14160						
	"	After extraction	7.13	436	201	22	.01	14360						
	"	After extr & decarb	11.83	444	554	11	.00	65570						
12709.3	"	A/a	4.85	442	499	35	.08	24220						
	"	After extraction	4.47	445	467	20	.01	20890						
	"	After extr & decarb	5.25	443	379	15	.00	19930						
12711.8	"	A/a	4.96	438	454	21	.10	22570						
	"	After extraction	4.71	442	410	14	.00	19320						
	"	After extr & decarb	5.11	444	381	16	.01	19500						

TABLE 2B Chemical Analysis Data

COMPANY: NORSKE SHELL **WELL:** 2/11-1 **LOCATION:** NORTH SEA

SAMPLE DEPTH (FEET)	SAMPLE TYPE	GENERALISED LITHOLOGY	SPORE COLOUR INDEX (1-10)	VITRINITE REFLECTIVITY R oil av %	KEROGEN COMPOSITION (%) (by microscopic examination)			KEROGEN COMPOSITION (%) (by calculation from pyrolysis data)			
					INERTINITE	VITRINITE	SAPROPEL	INERTINITE	VITRINITE	ALGAL SAPROPEL	WAXY SAPROPEL
12676.5	Core	SH, dk gy, calc						*	10	15	75
12679.8	"	A/a						*	20	5	75
12682.3	"	A/a						*	15	*	85
12685.4	"	A/a						*	15	*	85
12688	"	A/a						*	25	10	65
12689.4	"	A/a						15	50	10	25
12691.5	"	A/a						*	10	*	90
12694	"	A/a						15	15	10	60
12694.3	"	A/a						*	15	*	85
12697	"	A/a						*	15	*	85
12700.6	"	SH, blk						30	20	*	50
12702.8	"	SH, gy-blk						25	25	5	45
12704	"	SH, dk gy						35	40	10	15
12706.9	"	A/a						25	60	15	*
12709.3	"	A/a						*	30	*	70
12711.8	"	A/a						*	40	10	50

TABLE 1 Maturity and Kerogen Composition Data