U-553

MEN-LOE/ 1279 - 137 C

Mobil Research and Development Corporation

June 27, 1988

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TECHNICAL SERVICE JOB NO. 506-8014,
EVALUATION OF 35/11-2 CONDENSATES

Dear Gene:

Enclosed is a copy of a report entitled "Evaluation of 35/11-2 condensates/oils" written by J. R. Gormly. This report covers the four fluid samples from well 35/11-2 and is intended for distribution to MENI'S partners on the well, as per your request. A report on these fluids and those from the Huldra and Troll Fields, addressing the questions that you asked, is being prepared for MENI at the present time. The two fluid samples sent in early June from well 30/6-19 arrived today. Analyses will begin as soon as possible, and the results will be reported as they become available.

If you have questions, do not hesitate to call Jim Gormly (Big MAT 381-8430).

Best regards,

Dick

R. J. Moiola
Manager
Geological and Geochemical Research
and Technical Service

JRG
JRGormly/it

Enclosures

cc: E. L. Jones
N. J. Guinzy
M. A. Northam
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T. B. Christiansen, MENI
R. L. Whitney, MENI

bc: Technical Information
Records Center

TECHNICAL SERVICE JOB NO. 506-8014

EVALUATION OF 35/11-2 CONDENSATES/OILS

by

James R. Gormly

June 1988

EVALUATION OF 35/11-2 CONDENSATES/OILS

SUMMARY

Four DST samples of oils/condensates from four different Middle Jurassic reservoir intervals from well 35/11-2 were subjected to organic geochemical analysis.

EVALUATION OF 35/11-2 CONDENSATES/OILS

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INTRODUCTION

Four samples of oils/condensates (DST's 2B, 3, 4, and 5) from well 35/11-2 (Figure 1) were submitted to our laboratory for analysis. These hydrocarbons are produced from four different intervals. We were asked to determine if the reservoirs are in communication and if the hydrocarbons are derived from the same source.

METHODS

API gravity values were determined using a Mettler/Paar DMA45 density meter. Sulfur was analyzed on a Leco Sulfur Determinator SC32.

Whole-oil gas chromatography (GC) was performed on a Varian 6000 GC with split injection on a methyl silicone-coated capillary column (25m x 0.25mm); conditions: starting temperature of -10°C, 4°C/min, final temperature of 310°C, hold at final temperature for 1 min.

Composition of the oils/condensates was determined using columns packed with silica gel. Solvents used for making the separation includes hexane, benzene and methanol, in that order, to recover the saturates, aromatics, and NSO compounds, respectively. The solvents were removed by evaporation, and the amounts of the fractions ($n\text{-}C_{15+}$) were weighed.

Gas chromatography of the $n\text{-}C_{15+}$ saturate fraction was performed on a HP-5790 gas chromatograph equipped with split injection and a methyl silicone-coated column (25m x 0.25mm); conditions: starting temperature of 50°C, rate of 6°C/min, final temperature of 300°C.

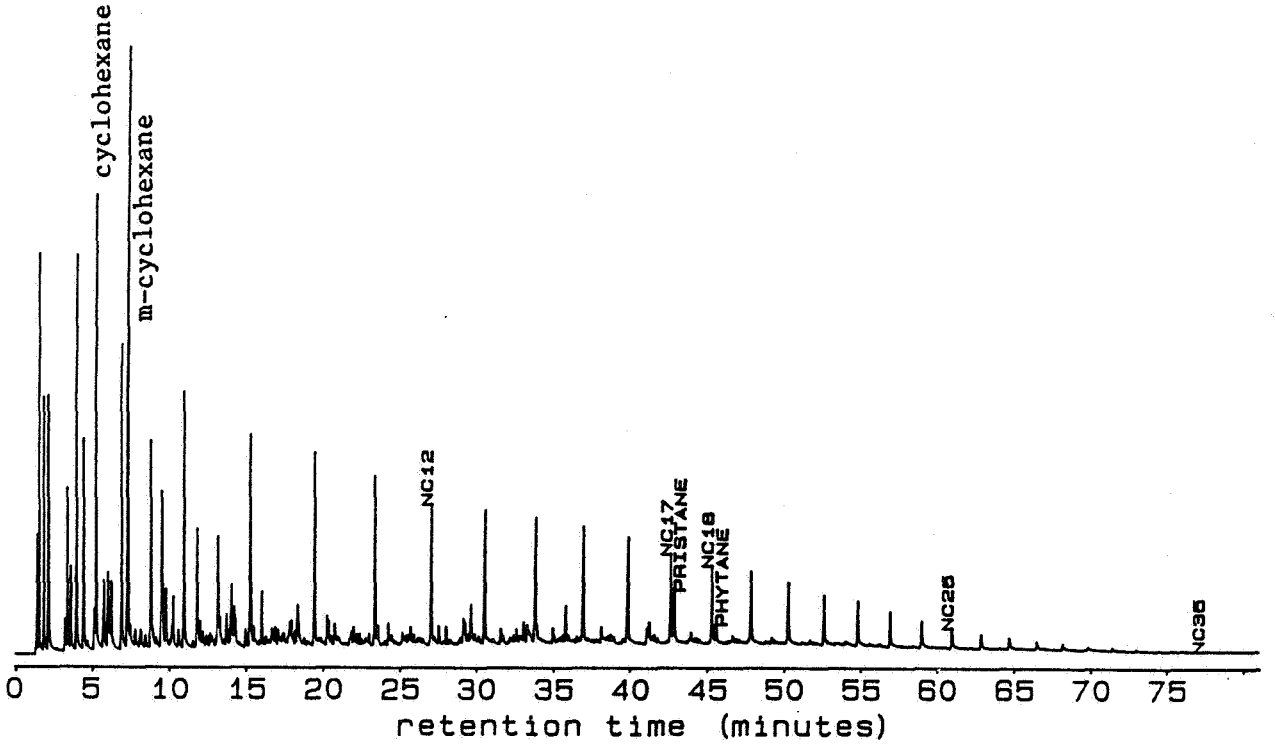
Gas chromatography/mass spectrometry (GC/MS) was performed on the saturate fraction of the samples. The ions 191 (terpanes) and 217 (steranes) were analyzed.

Carbon isotopic values were measured on the whole oils, and the saturate, aromatic, and NSO fractions. In addition, carbon-isotope profiles were measured on each of the fluid samples. Carbon-isotope profiles are generated by measuring the isotope value for each 25-degree distillation cut from 25°C to 300°C, plus that for the residuum, and plotting them as a function of temperature. The molecular-weight range that distills is

approximately n-C_5 to n-C_{17}, and the residuum is that which would distill above 300°C. Figure 2 shows profiles typical of different types of oils. Oils sourced from carbonate have a positive slope in which the values increase with increasing temperature of distillation. Oils sourced from marine organic matter in siliciclastic rocks have gentle negative slopes, while oils sourced from terrestrial organic matter in siliciclastic rocks have steeper negative slopes. Although absolute values of profiles for oils of the same type but different sources may vary, the general shape is reasonably constant (H. M. Chung, personal communication; Northam, 1985).

35/11-2 WELL, DST #5
FRL 08482

1463-1 88/00362 RU0245
abundance = 83555.



I MOBIL R & D GEOCHEMISTRY LIMS I
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SAMPLE	FRL 08482
LOCATION	NORWAY
DEPTH	3374-3378 M
GLC'N	RU0245
S'INFORM	35/11-2 WELL, DST #5, TARBERT FM., M. JURASSIC

FILE'NO 1463-1
SAMP'ID 88/00362
SAMPLE TYPE Oil

ALKANE SUMMARY DATA

PRISTANE/PHYTANE -W.Oil	2.68	CPI FOR W.Oil	1.13
PRISTANE/WNC17-W.Oil	.59		
PHYTANE/WNC18-W.Oil	.25		

	% of Total		% of Total
WNC3	1.375		
WNC4	4.721		
WNC5	3.006	WC9IP	1.402
WNC6	4.691	WC10IP	.206
WNC7	3.619	WC11IP	.289
WNC8	3.026	WC13IP	.216
WNC9	2.485	WC14IP	.461
WNC10	2.270	WC15IP	.239
WNC11	1.997	WC16IP	.438
WNC12	1.666	WC18IP	.254
WNC13	1.558	WPRISTANE	.625
WNC14	1.440	WPHYTANE	.233
WNC15	1.364		
WNC16	1.250		
WNC17	1.053	ISO'C4	.950
WNC18	.920	ISO'C5	2.991
WNC19	.853		
WNC20	.715	2'3DMB	.208
WNC21	.587	ISO'C6	1.924
WNC22	.513	3M'C5	.992
WNC23	.414	ISO'C7	.795
WNC24	.312	3M'C6	.894
WNC25	.245		
WNC26	.172		
WNC27	.130	CYC'C5	.388
WNC28	.087	MCP	2.478
WNC29	.070	CYC'C6	5.409
WNC30	.043	MCH	7.146
WNC31	.037		
WNC32	.020		
WNC33	.014	BENZENE	.478
WNC34	.012	TOLUENE	2.441
WNC35	.005	oXYLENE	.730
WNC36	.005	pmXYLENE	1.298

Fig. 3. GC of whole oil, DST #5, 3374-3378m

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SAMPLE	FRL 08481	FILE'NO	1463-1
LOCATION	NORWAY	SAMP'ID	88/00361
DEPTH	3427-3432 M	SAMPTYPE	Oil
GLC'W	RU0244		
S'INFORM	35/11-2 WELL, DST #4, NESS FM., M. JURASSIC		

ALKANE SUMMARY DATA

PRISTANE/PHYTANE -W.Oil	2.97	CPI FOR W.Oil	1.13
PRISTANE/WNC17-W.Oil	.46		
PHYTANE/WNC18-W.Oil	.18		

	% of Total		% of Total
WNC3	1.694		
WNC4	4.864		
WNC5	3.372	WC9IP	1.228
WNC6	4.810	WC10IP	.142
WNC7	3.485	WC11IP	.378
WNC8	2.868	WC13IP	.166
WNC9	2.496	WC14IP	.139
WNC10	2.218	WC15IP	.193
WNC11	1.944	WC16IP	.362
WNC12	1.630	WC18IP	.195
WNC13	1.513	WPRISTANE	.490
WNC14	1.376	WPHYTANE	.165
WNC15	1.285		
WNC16	1.163		
WNC17	1.057	ISO'C4	1.303
WNC18	.916	ISO'C5	3.477
WNC19	.830		
WNC20	.716	2'3DMB	.254
WNC21	.604	ISO'C6	1.989
WNC22	.492	3M'C5	1.004
WNC23	.436	ISO'C7	.833
WNC24	.326	3M'C6	.879
WNC25	.252		
WNC26	.180		
WNC27	.135	CYC'C5	.389
WNC28	.091	MCP	2.383
WNC29	.069	CYC'C6	5.904
WNC30	.041	MCH	7.031
WNC31	.034		
WNC32	.018		
WNC33	.015	BENZENE	.519
WNC34	.008	TOLUENE	2.250
WNC35	.004	oXYLENE	.598
WNC36	2.810	pmXYLENE	1.086

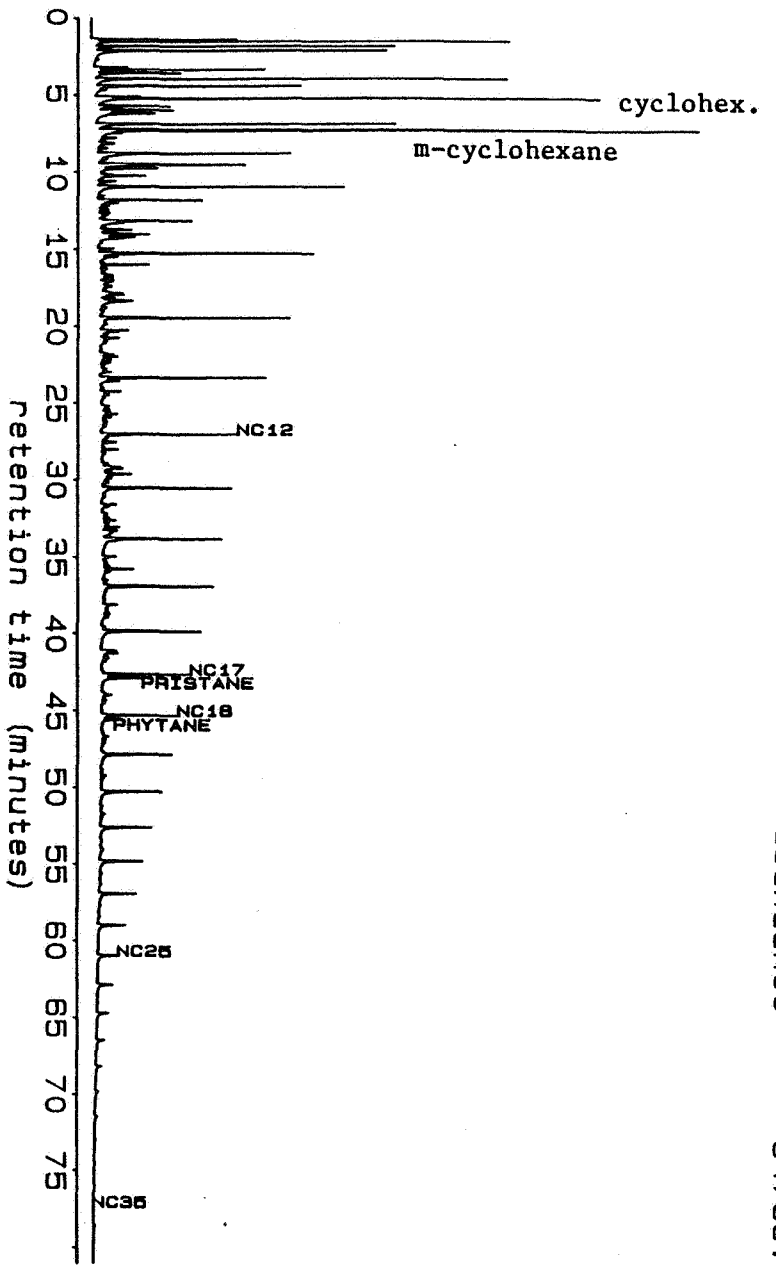
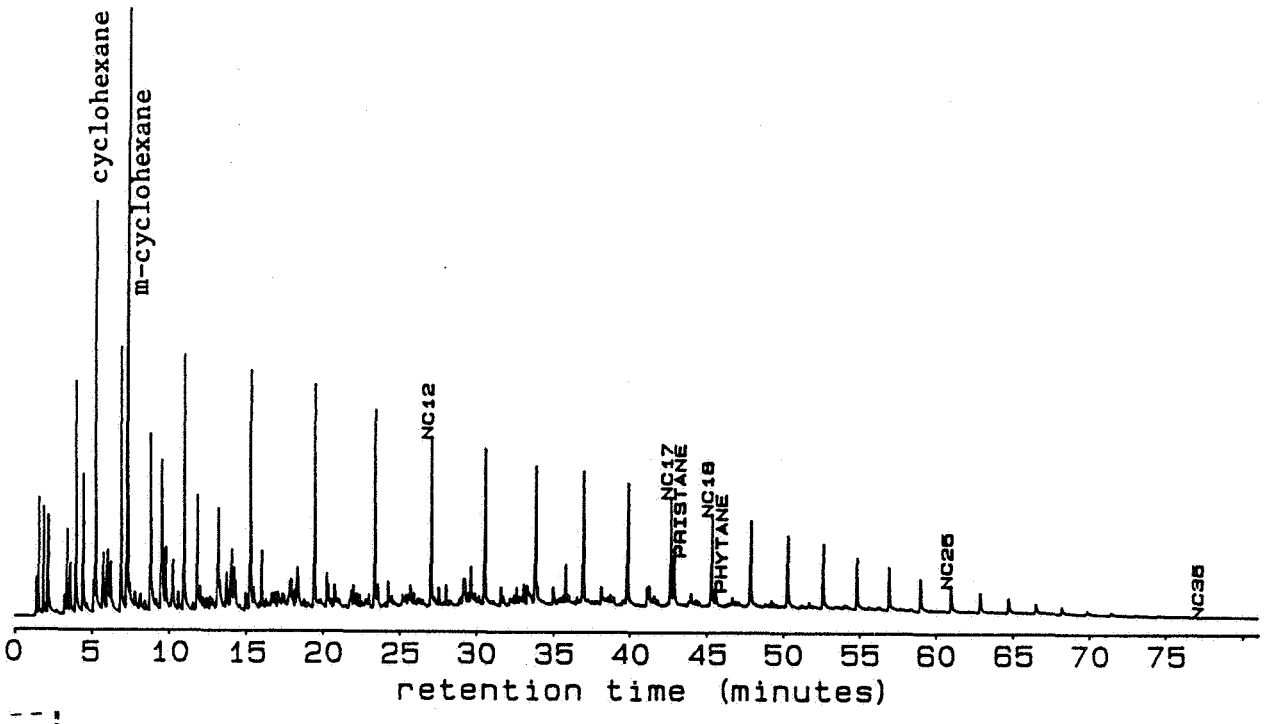


Fig. 4. GC of whole oil, DST #4, 3427-3432m well 35/11-2.

35/11-2 WELL, DST #3,
FRL 08480

1463-1 88/00360 RU0243
abundance = 80329.



1 MOBIL R & D GEOCHEMISTRY LIMS 1
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SAMPLE FRL 08480 FILE'NO 1463-1
LOCATION NORWAY SAMP'ID 88/00360
DEPTH 3477-3486 M SAMPTYPE Oil
GLC'W RU0243
S'INFORM 35/11-2 WELL, DST #3, ETIVE FM., M. JURASSIC

ALKANE SUMMARY DATA

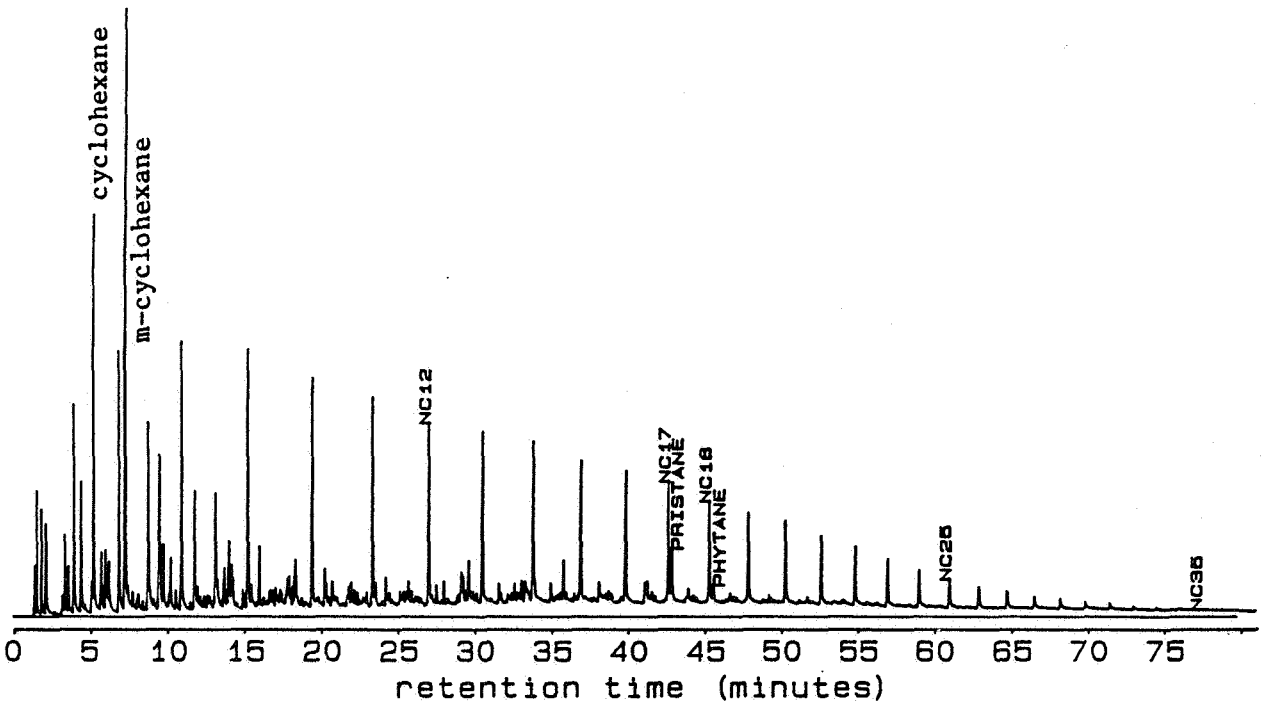
PRISTANE/PHYTANE -W.Oil	3.10	CPI FOR W.Oil	1.14
PRISTANE/WNC17-W.Oil	.46		
PHYTANE/WNC18-W.Oil	.18		

	% of Total		% of Total		% of Total
WNC3	.480				
WNC4	1.542				
WNC5	1.292	WC9IP	1.517		
WNC6	3.054	WC10IP	.195		
WNC7	3.511	WC11IP	.455		
WNC8	3.378	WC13IP	.234		
WNC9	3.150	WC14IP	.500		
WNC10	2.958	WC15IP	.256		
WNC11	2.617	WC16IP	.521		
WNC12	2.247	WC18IP	.262		
WNC13	2.050	WPRISTANE	.664		
WNC14	1.796	WPHYTANE	.214		
WNC15	1.743				
WNC16	1.621				
WNC17	1.437	ISO'C4	.393		
WNC18	1.212	ISO'C5	1.409		
WNC19	1.128				
WNC20	.935	2'3DMB	.167		
WNC21	.847	ISO'C6	1.115		
WNC22	.656	3M'C5	.649		
WNC23	.564	ISO'C7	.731		
WNC24	.422	3M'C6	.778		
WNC25	.344				
WNC26	.248				
WNC27	.190	CYC'C5	.245		
WNC28	.120	MCP	1.808		
WNC29	.090	CYC'C6	5.470		
WNC30	.056	MCH	8.011		
WNC31	.044				
WNC32	.023				
WNC33	.017	BENZENE	.413		
WNC34	.012	TOLUENE	2.337		
WNC35	.007	oXYLENE	.787		
WNC36	.005	pmXYLENE	1.326		

Fig. 5. GC of whole oil, DST #3, 3477-3486m well 35/11-2.

35/11-2 WELL, DST #2B,
FRL 08479

1463-1 88/00359 RU0242
abundance = 78120.



1 MOBIL R & D GEOCHEMISTRY LIMS 1
1 05/23/88 Geochemistry Whole Oil GLC REPORT 1

SAMPLE FRL 08479 FILE'NO 1463-1
LOCATION FAIRWAY SAMP'ID 88/00359
DEPTH 3524-3542 M SAMPTYPE Oil
GLC'W RU0242
S'INFORM 35/11-2 WELL, DST #2B, OSEBERG FM., M. JURASSIC

ALKANE SUMMARY DATA

PRISTANE/PHYTANE -W.Oil	2.92	CPI FOR W.Oil	1.14
PRISTANE/WNC17-W.Oil	.44		
PHYTANE/WNC18-W.Oil	.18		

	% of Total		% of Total		% of Total
WNC3	.596				
WNC4	1.531				
WNC5	1.117	WC9IP	1.489		
WNC6	2.608	WC10IP	.195		
WNC7	3.263	WC11IP	.462		
WNC8	3.368	WC13IP	.242		
WNC9	3.232	WC14IP	.524		
WNC10	2.866	WC15IP	.260		
WNC11	2.622	WC16IP	.522		
WNC12	2.299	WC18IP	.268		
WNC13	2.138	WPRISTANE	.669		
WNC14	1.978	WPHYTANE	.229		
WNC15	1.742				
WNC16	1.647				
WNC17	1.519	ISO'C4	.391		
WNC18	1.277	ISO'C5	1.305		
WNC19	1.112				
WNC20	1.022	2'3DMB	.157		
WNC21	.848	ISO'C6	.992		
WNC22	.707	3M'C5	.583		
WNC23	.587	ISO'C7	.715		
WNC24	.460	3M'C6	.748		
WNC25	.367				
WNC26	.263				
WNC27	.210	CYC'C5	.227		
WNC28	.142	MCP	1.623		
WNC29	.120	CYC'C6	5.010		
WNC30	.079	MCH	7.553		
WNC31	.075				
WNC32	.044				
WNC33	.036	BENZENE	.393		
WNC34	.024	TOLUENE	2.355		
WNC35	.015	oXYLENE	.846		
WNC36	.007	pmXYLENE	1.433		

Fig. 6. GC of whole oil, DST #2B, 3524-3542m well 35/11-2.

TABLE 1

ORGANIC GEOCHEMICAL DATA OF FLUIDS FROM WELL 35/11-2, NORWAY

DRL NO.	DST	DEPTH (METERS)	API GRAV	SULFUR (%)	COMPOSITION (%) SAT	ARO	NSO	PRI/ PHY	PRI/ nC17	PHY/ nC18	CARBON ISOTOPE COMPOSITION WH. OIL	SAT	ARO	NSO
8482	DST 5	3374-3378	40.8	0.03	63.1	29.6	7.3	2.47	0.69	0.33	-27.25	-28.13	-26.89	-26.72
8481	DST 4	3427-3432	42.7	0.02	69.2	26.5	4.3	2.88	0.54	0.22	-26.95	-27.63	-26.63	-26.58
8480	DST 3	3477-3486	40.4	0.03	68.8	26.4	4.8	2.84	0.57	0.23	-27.03	-27.61	-26.66	-26.55
8479	DST 2B	3524-3542	40.2	0.02	71.2	25.4	3.4	2.92	0.46	0.18	-26.74	-27.42	-26.49	-26.35

File:NOR35/11-2

TABLE 2

CALCULATED VALUES FOR BIOMARKERS OF FLUID SAMPLES FROM WELL 35/11-2

VALUES FOR M/Z 217 (STERANE)

SAMPLE NO.	DEPTH METERS	%C27	%C28	%C29	%20S	%BB	20S/20R	BB/aa	%21	27d/R
8482	3374-3378	36.9	19.2	43.9	52.0	63.3	1.09	2.01	34.0	3.96
8481	3427-3432	35.1	17.7	47.2	52.8	61.9	1.12	1.91	33.9	4.93
8480	3477-3486	33.1	17.0	49.9	52.3	60.8	1.09	1.82	31.8	5.01
8479	3524-3542	33.4	18.3	48.3	54.0	61.2	1.17	1.96	29.8	4.61

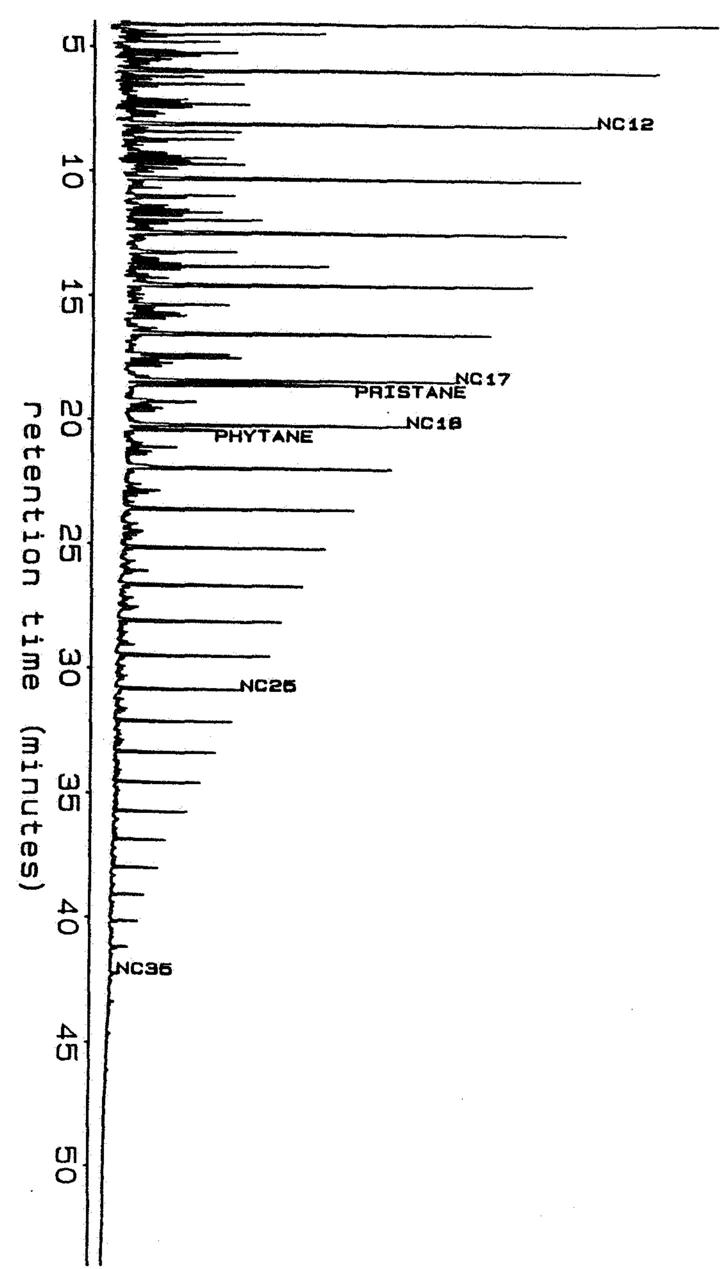
VALUES FOR M/Z 191 (TERPANE)

SAMPLE NO.	DEPTH METERS	%Ts	%29neo	%Tri/3	%30M	%22S
8482	3374-3378	73.2	46.4	20.3	8.3	60.2
8481	3427-3432	73.1	48.8	14.6	8.4	59.7
8480	3477-3486	72.4	45.9	14.5	8.6	60.1
8479	3524-3542	72.4	46.1	12.4	8.6	60.8

APPENDIX

35/11-2 WELL, DST #5,
FRL 08482

1463-1 88/00362 RA4013
abundance = 104033.



I MOBIL R & D		GEOCHEMISTRY LIMS I
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SAMPLE	FRL 08482	FILE'NO	1463-1
LOCATION	NORWAY	SAMP'ID	88/00362
DEPTH	3324-3328 M	SAMPTYPE	OIL
GLC'F	RA4013		
S'INFORM	35/11-2 WELL, DST #5, TARBERT FM., M. JURASSIC		

ALKANE SUMMARY DATA

RATIO PRISTANE/PHYTANE	2.47	CARBON PREFERENCE INDEX	1.03
RATIO PRISTANE/NC17	.69		
RATIO PHYTANE/NC18	.33		

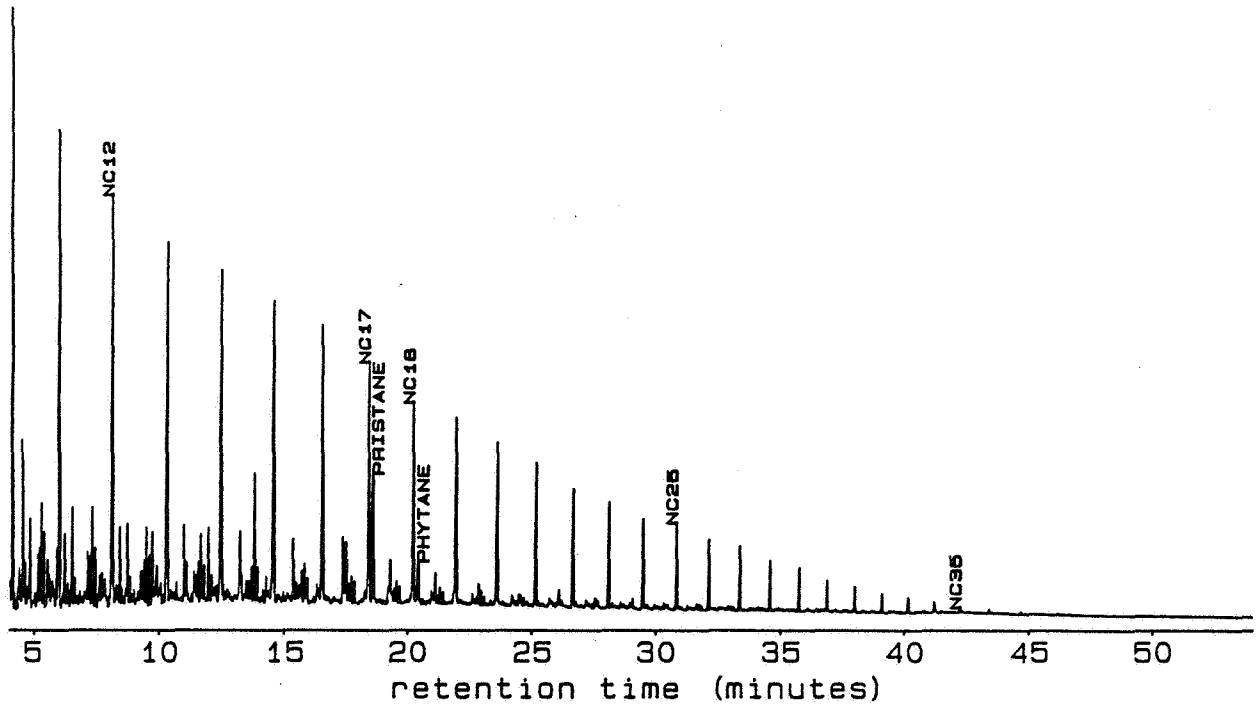
% of Total		% of Total	
NC10	4.295	NC24	1.078
NC11	3.827	NC25	.893
NC12	3.430	NC26	.826
NC13	3.239	NC27	.713
NC14	3.119	NC28	.614
NC15	2.868	NC29	.522
NC16	2.551	NC30	.325
NC17	2.339	NC31	.322
NC18	2.016	NC32	.233
NC19	1.874	NC33	.192
NC20	1.638	NC34	.123
NC21	1.440	NC35	.071
NC22	1.286	NC36	.039
NC23	1.139		

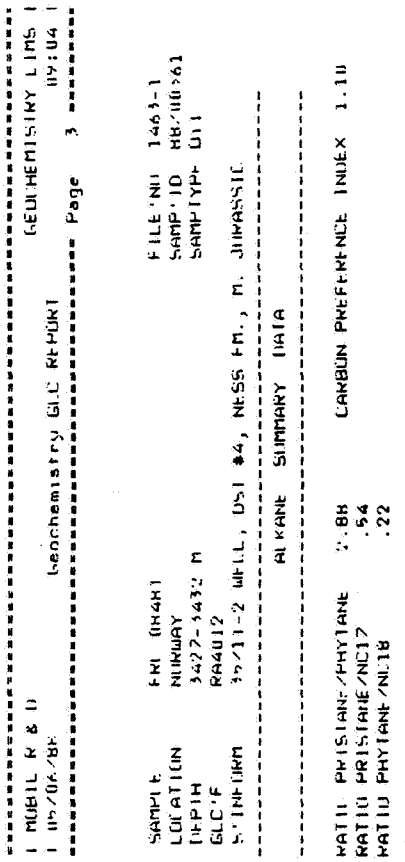
Isoprenoids	
C15IP	.962
C16IP	1.418
C18IP	.802
PRISTANE	1.670
PHYTANE	.656

GC of saturated fraction of DST #5.

35/11-2 WELL, DST #4
FRL 08481

1463-1 88/00361 RA4012
abundance = 108731.

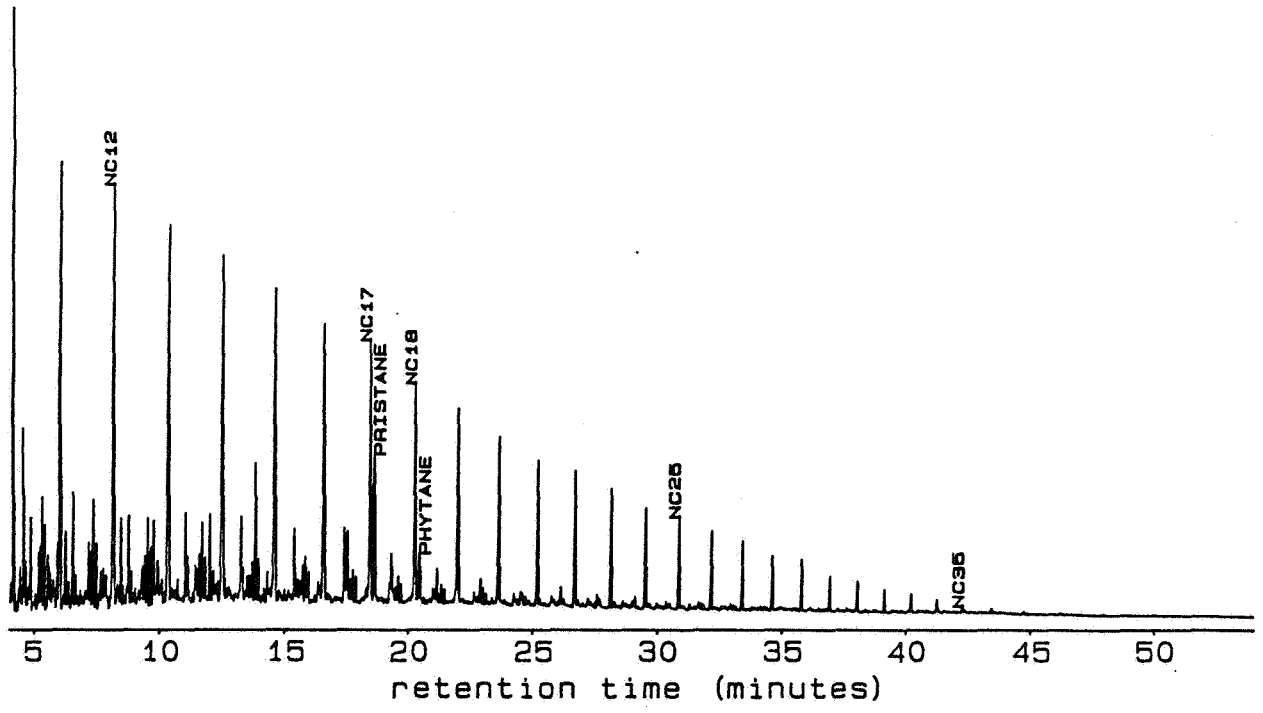


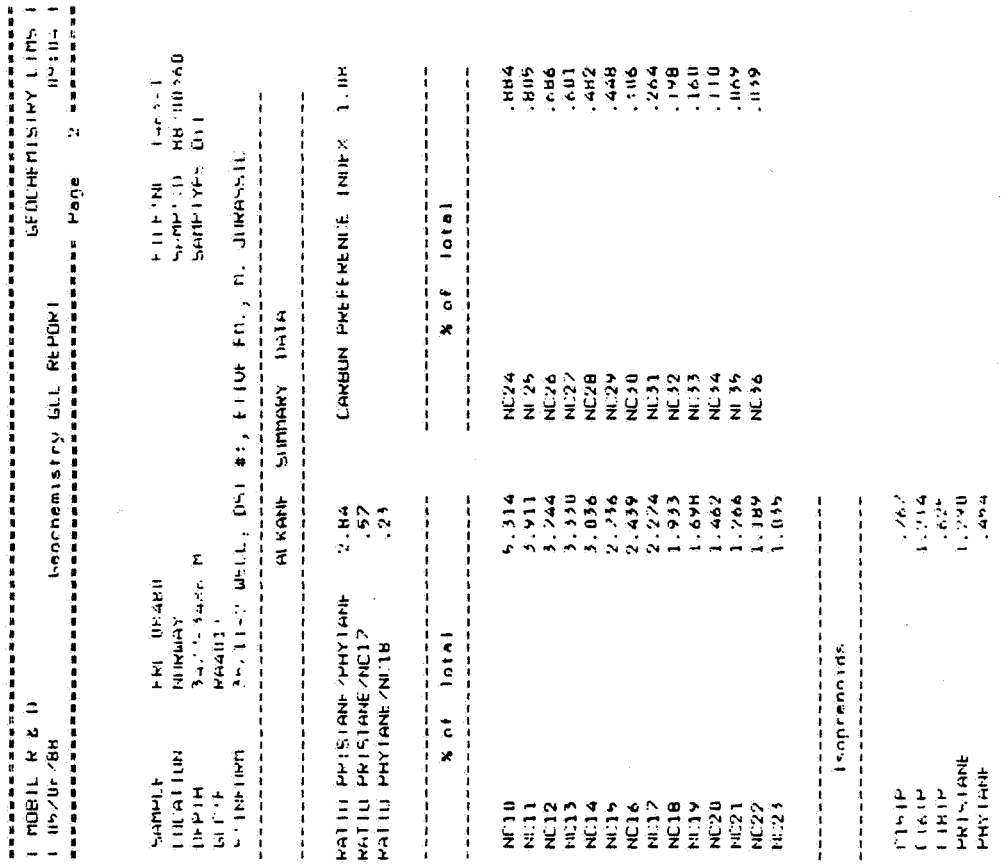


GC of saturated fraction of DST #4.

35/11-2 WELL, DST #3
FRL 08480

1463-1 88/00360 RA4011
abundance = 130902.

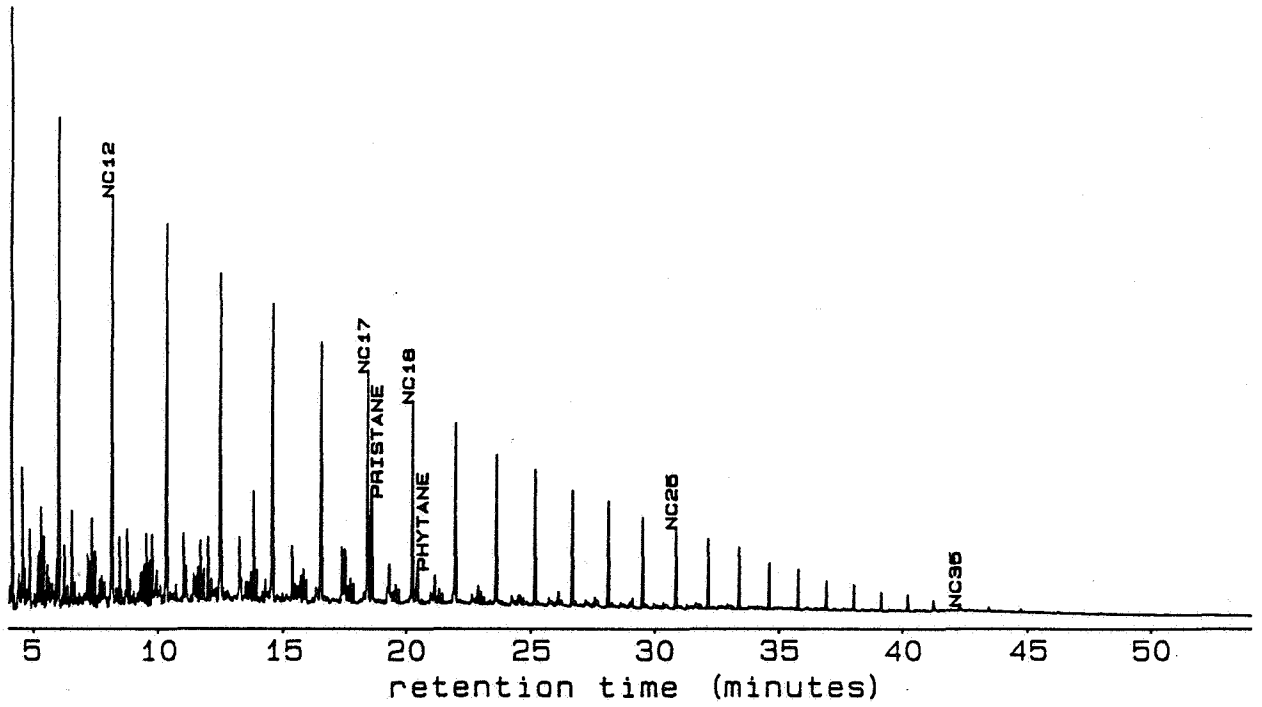


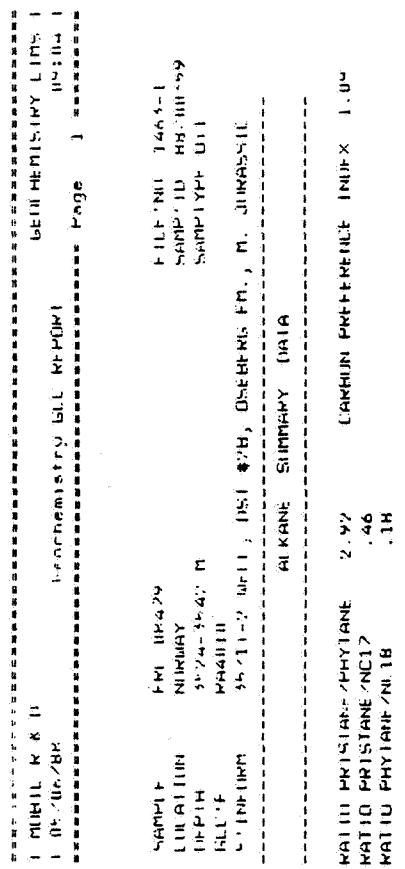


GC of saturated fraction of DST #3.

35/11-2 WELL, DST #2B
FRL 08479

1463-1 88/00359 RA4010
abundance = 94451.





GC of saturated fraction of DST #2B.

Terpane Descriptions

C23t	23 carbon atom tricyclic, detected by m/z 191
C24t	24 carbon atom tricyclic
C25t	25 carbon atom tricyclic
C24tet	24 carbon atom tetracyclic
C26tA	26 carbon atom tricyclic "A"
C26tB	26 carbon atom tricyclic "B"
C28tA	28 carbon atom tricyclic "A"
C28tB	28 carbon atom tricyclic "B"
C29tA	29 carbon atom tricyclic "A"
C29tB	29 carbon atom tricyclic "B"
Ts	18α(H)-22,29,30-trisnorhopane II
Tm	17α-22,29,30-trisnorhopane
C28H	17α,18α(H)-28,30-bisnorhopane
C29H	17α-30-norhopane
C29N	unidentified 29 carbon pentacyclic
C29M	30-normoretane
C30H	17α-hopane
C30M	moretane
C31S	(22S)-17α-30-homopane
C31R	(22R)-17α-30-homopane
C32S	(22S)-17α-30,31-bishomohopane
C32R	(22R)-17α-30,31-bishomohopane
C33S	(22S)-17α-30,31,32-trishomohopane
C33R	(22R)-17α-30,31,32-trishomohopane
C34S	(22S)-17α-30,31,32,33-tetrakishomohopane
C34R	(22R)-17α-30,31,32,33-tetrakishomohopane
C35S	(22S)-17α-30,31,32,33,34-pentakishomohopane
C35R	(22R)-17α-30,31,32,33,34-pentakishomohopane

Sterane Description

C21	5α,14α,17α(H)-pregnane, coeluting with 5α,14β,17β(H)-pregnane
C27dS	(20S)-10α(H),13β(H),17α(H)-diacholestane
C27dR	(20R)-10α(H),13β(H),17α(H)-diacholestane
C27S	(20S)-5α,14α,17α(H)-cholestane
C27B29d	(20R)-5α,14β,17β(H)-cholestane, coeluting with 24-ethyl-(20S)-10α(H),13β(H),17α(H)-diacholestane
C27R	(20R)-5α,14α,17α(H)-cholestane
C29dR	24-ethyl-(20R)-10α(H),13β(H),17α(H)-diacholestane
C28R	24-methyl-(20R)-5α,14α,17α(H)-cholestane
C29S	24-ethyl-(20S)-5α,14α,17α(H)-cholestane
C29BR	24-ethyl-(20R)-5α,14β,17β(H)-cholestane
C29BS	24-ethyl-(20S)-5α,14β,17β(H)-cholestane
C29R	24-ethyl-(20R)-5α,14α,17α(H)-cholestane
C30	sterane or steranes with thirty carbon atoms

Formulas

$$\%C27 = \frac{C27R * 100}{C27R + C28R + C29R}$$

$$\%C28 = \frac{C28R * 100}{C27R + C28R + C29R}$$

$$\%C29 = \frac{C29R * 100}{C27R + C28R + C29R}$$

$$\%20S = \frac{C29S * 100}{C29S + C29R}$$

$$\%BB = \frac{(C29BR+C29BS) * 100}{C29R + C29S + C29BR + C29BS}$$

$$20S/20R = \frac{C29S}{C29R}$$

$$BB/aa = \frac{C29BR}{C29R}$$

$$\%C21 = \frac{C21 * 100}{C29R + C29S + C21}$$

$$27d/R = \frac{C27dS}{C27R}$$

Formulas

$$\% \text{ Ts} = \frac{\text{Ts} * 100}{\text{Ts} + \text{Tm}}$$

$$\%29\text{neo} = \frac{\text{C29N} * 100}{\text{C29N} + \text{C29H}}$$

$$\%\text{Tri}/30 = \frac{(\text{Sum of all identified tricyclics}) * 100}{(\text{Sum of all identified tricyclics}) + \text{C30H}}$$

$$28/30 = \frac{\text{C28H}}{\text{C30H}}$$

$$\%30\text{M} = \frac{\text{C30M} * 100}{\text{C30M} + \text{C30H}}$$

$$\%22\text{S} = \frac{\text{C31S} * 100}{\text{C31S} + \text{C31R}}$$

ASSIGNMENTS

$$\%C27 = \frac{C27R * 100}{C27R + C28R + C29R}$$

$$\%C28 = \frac{C28R * 100}{C27R + C28R + C29R}$$

$$\%C29 = \frac{C29R * 100}{C27R + C28R + C29R}$$

$$\%20S = \frac{C29S * 100}{C29S + C29R}$$

$$\%BB = \frac{(C29BR+C29BS) * 100}{C29R + C29S + C29BR + C29BS}$$

$$20S/20R = \frac{C29S}{C29R}$$

$$BB/aa = \frac{C29BR}{C29R}$$

$$\%C21 = \frac{C21 * 100}{C29R + C29S + C21}$$

$$27d/R = \frac{C27dS}{C27R}$$

ASSIGNMENTS

$$\% \text{ Ts} = \frac{\text{Ts} * 100}{\text{Ts} + \text{Tm}}$$

$$\%29\text{neo} = \frac{\text{C29N} * 100}{\text{C29N} + \text{C29H}}$$

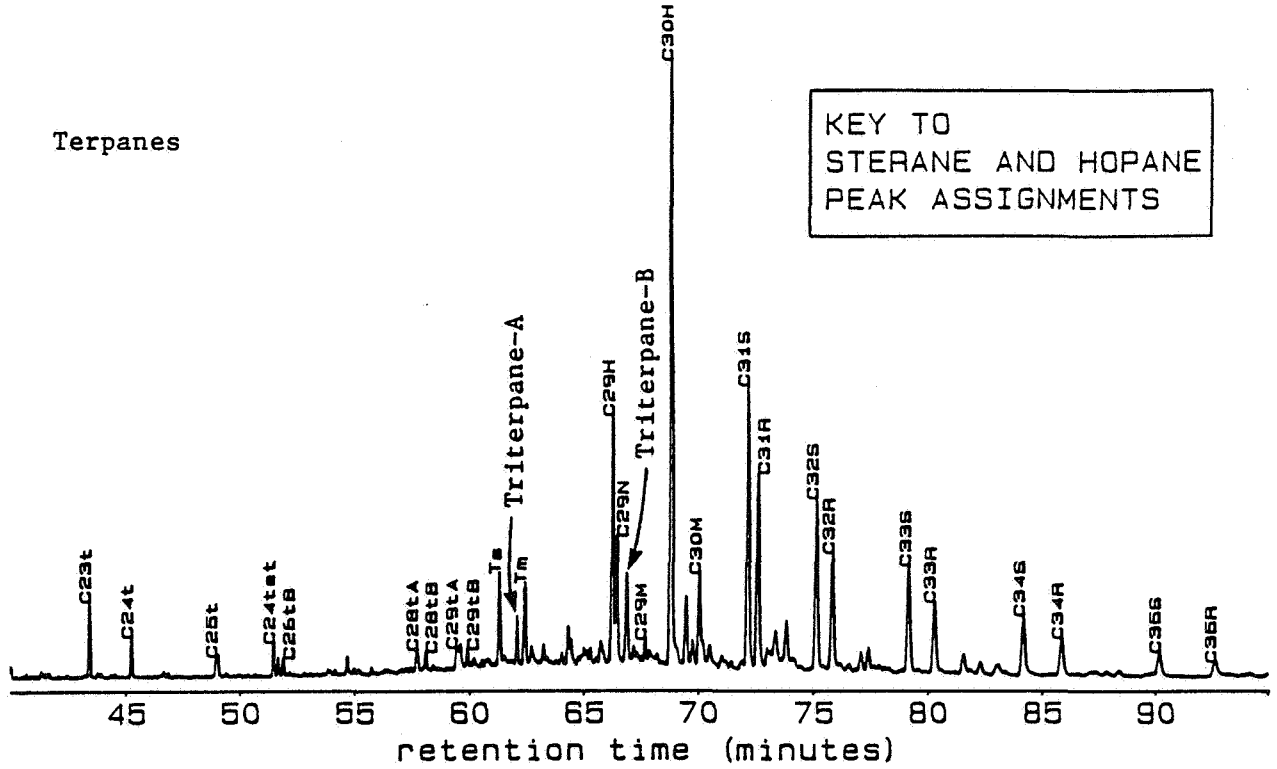
$$\%\text{Tri}/30 = \frac{(\text{Sum of all identified tricyclics}) * 100}{(\text{Sum of all identified tricyclics}) + \text{C30H}}$$

$$28/30 = \frac{\text{C28H}}{\text{C30H}}$$

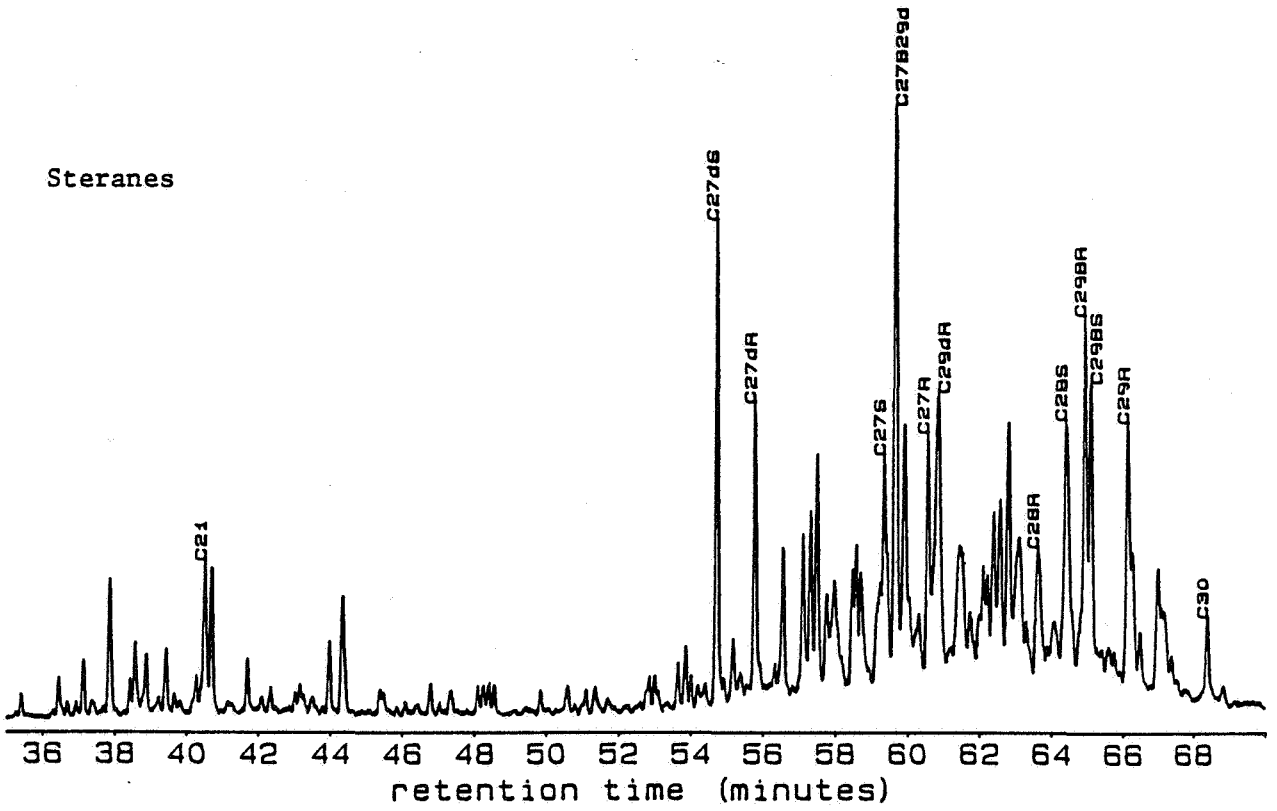
$$\%30\text{M} = \frac{\text{C30M} * 100}{\text{C30M} + \text{C30H}}$$

$$\%22\text{S} = \frac{\text{C31S} * 100}{\text{C31S} + \text{C31R}}$$

m/z 191]ON467 abundance = 21505.

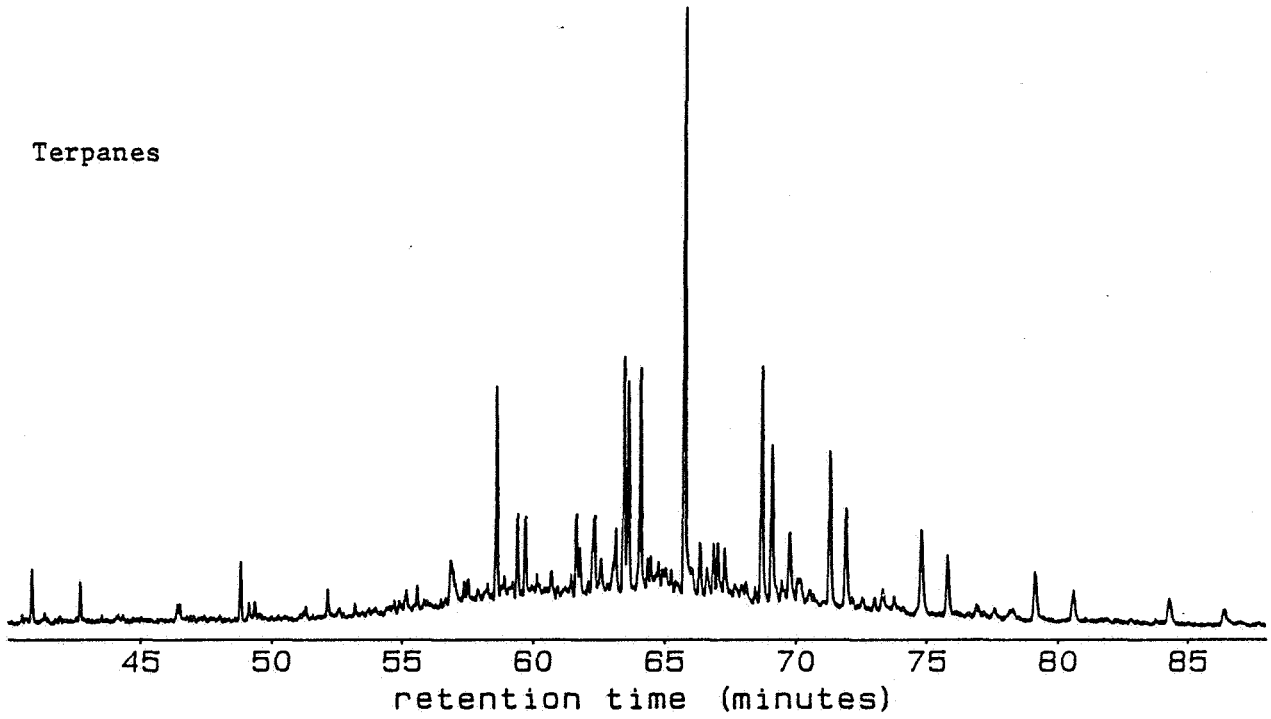


m/z 217)ON467 abundance = 5192.



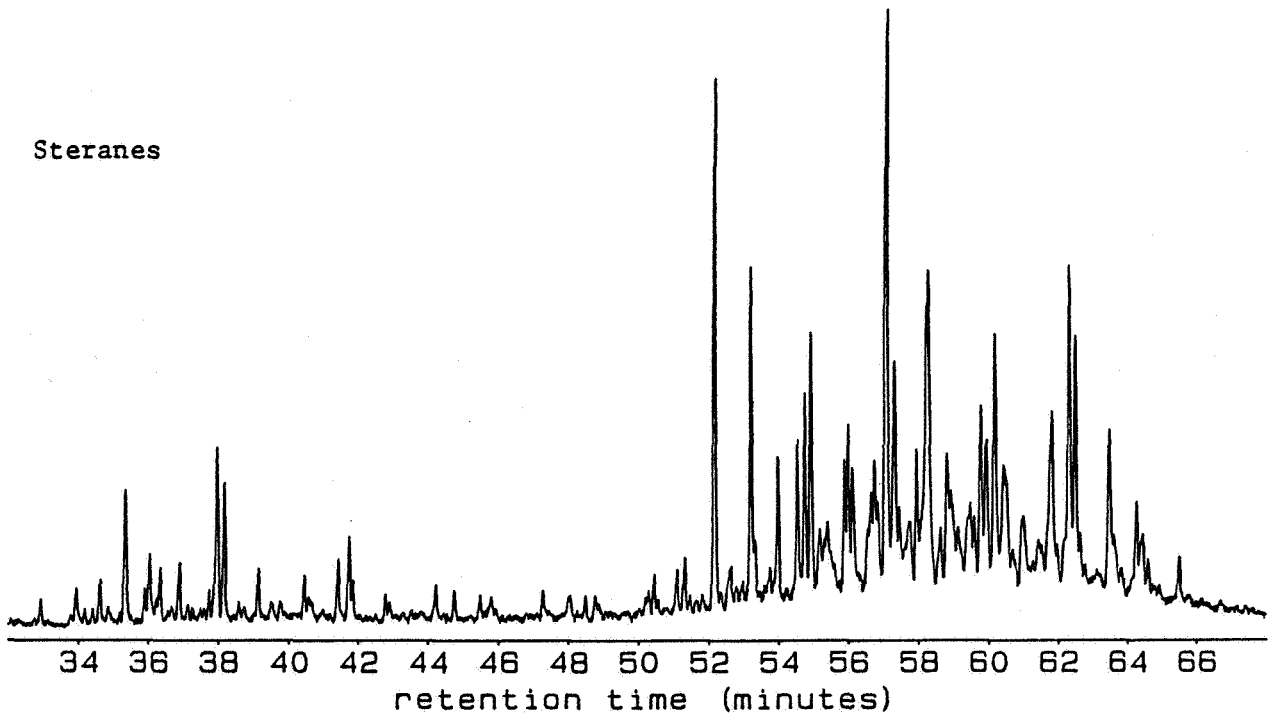
FRL8482 1463-1 F1B m/z 191]ON525 abundance = 6981.

Oil from the 35/11-2 wildcat well in the Norway sector of the North Sea



FRL8482 1463-1 F1B m/z 217)ON525 abundance = 3053.

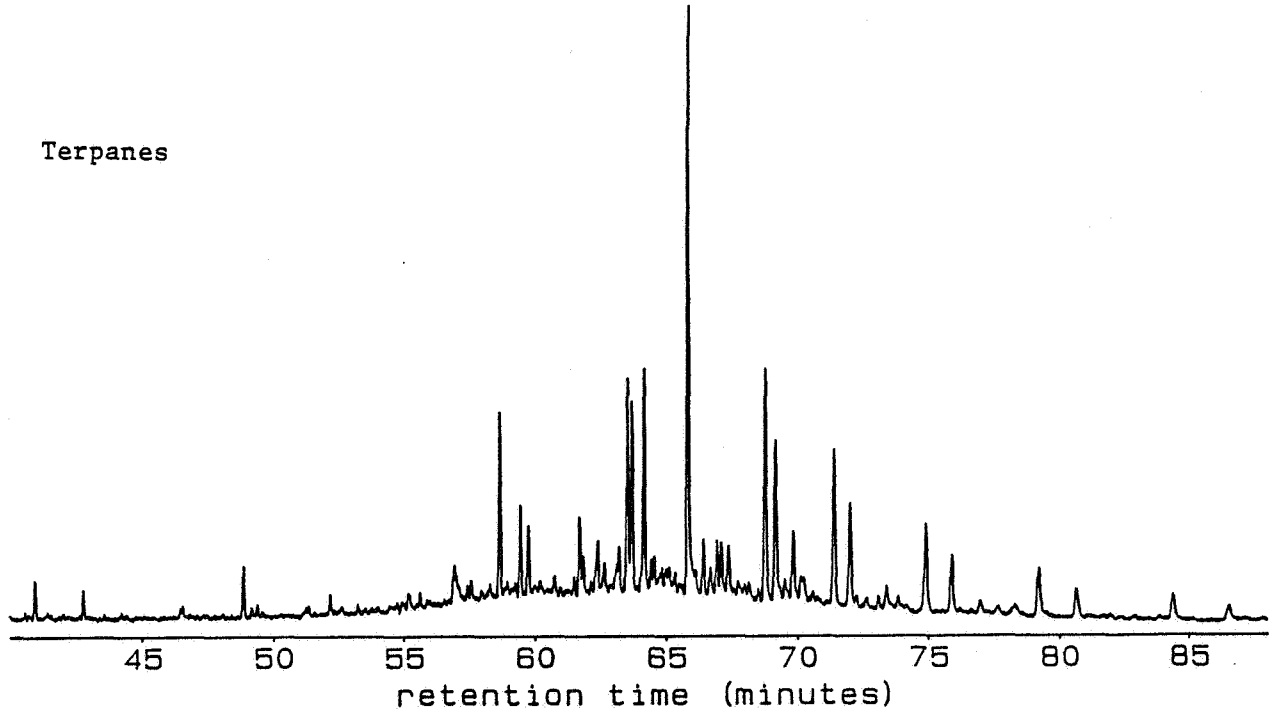
Oil from the 35/11-2 wildcat well in the Norway sector of the North Sea



GC/MS of DST #5, 3374-3378m

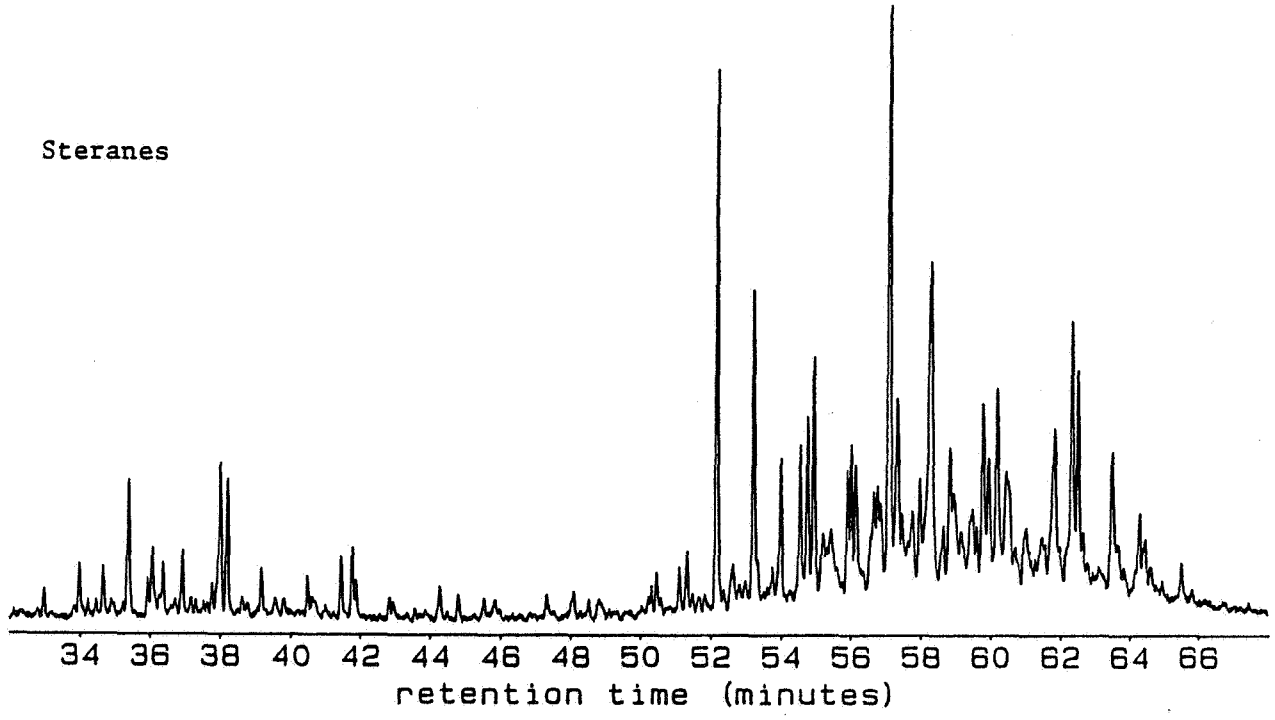
FRL8481 1463-1 F1B m/z 191]ON524 abundance = 11325.

Condensate from the 35/11-2 wildcat well in the Norway sector of the North Sea



FRL8481 1463-1 F1B m/z 217)ON524 abundance = 3840.

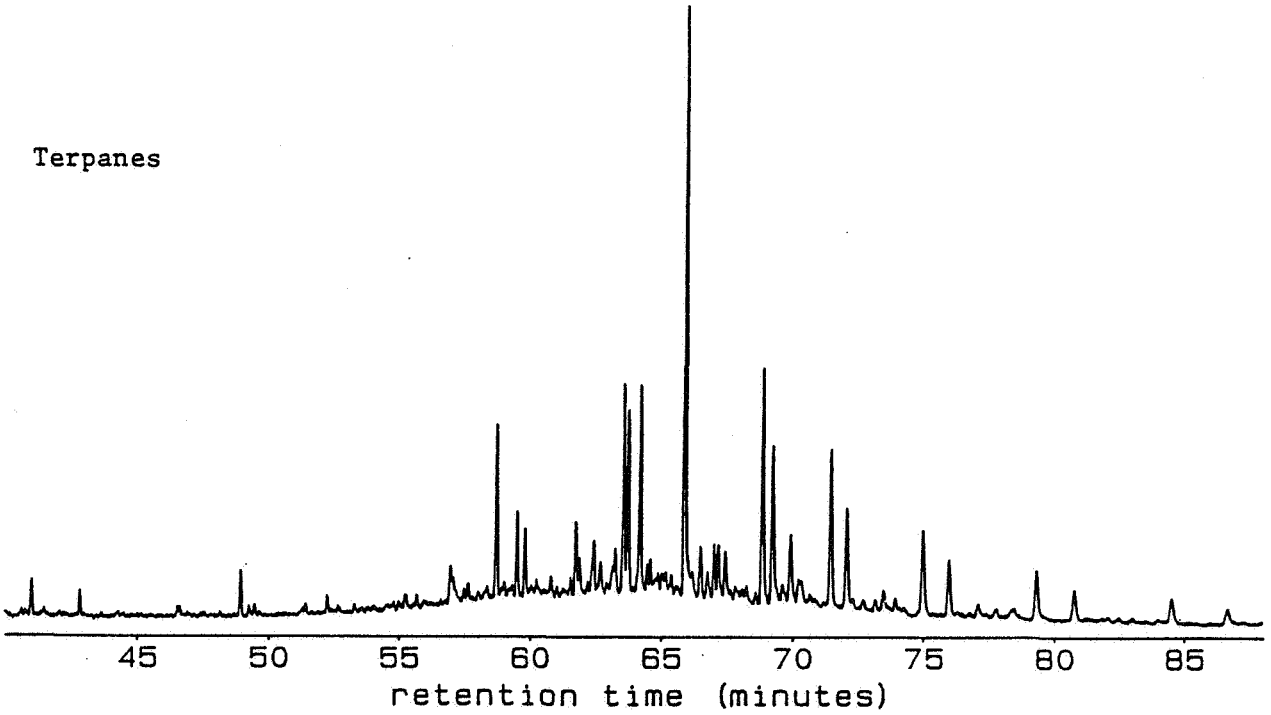
Condensate from the 35/11-2 wildcat well in the Norway sector of the North Sea



GC/MS of DST #4, 3427-3432m

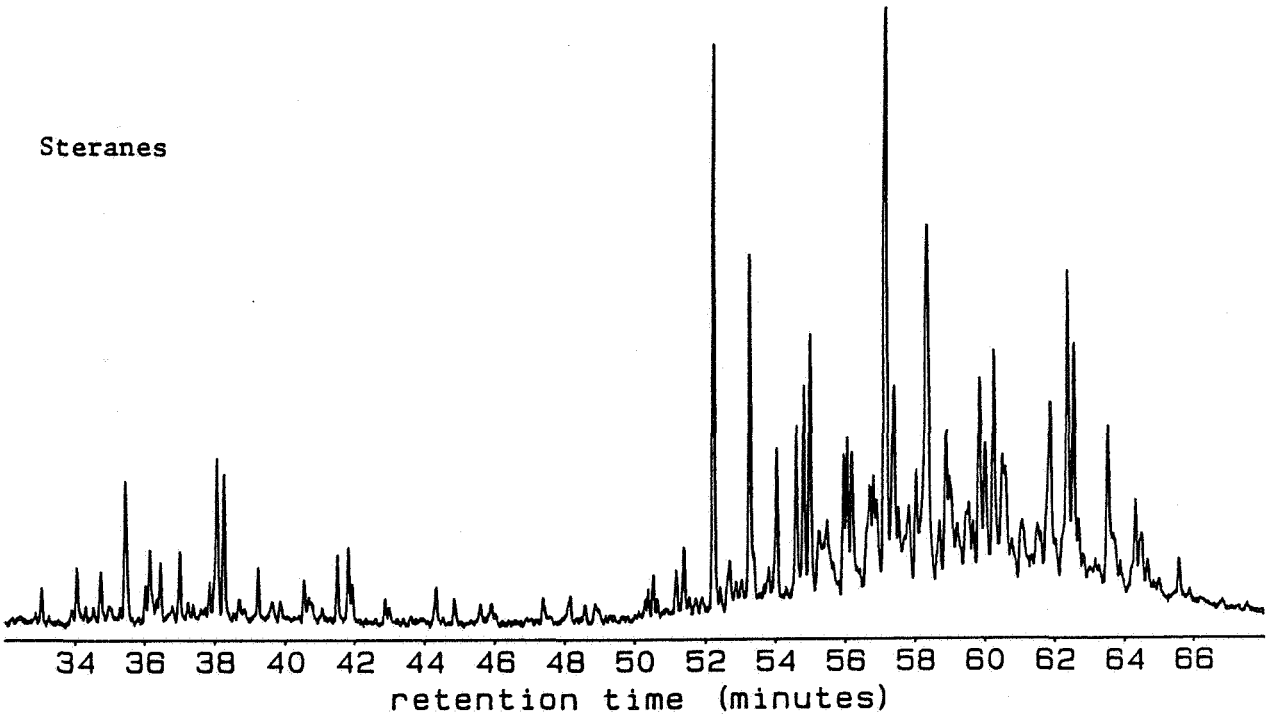
FRL8480 1463-1 F1B m/z 191]ON523 abundance = 15423.

Condensate from the 35/11-2 wildcat well in the Norway sector of the North Sea



FRL8480 1463-1 F1B m/z 217)ON523 abundance = 4436.

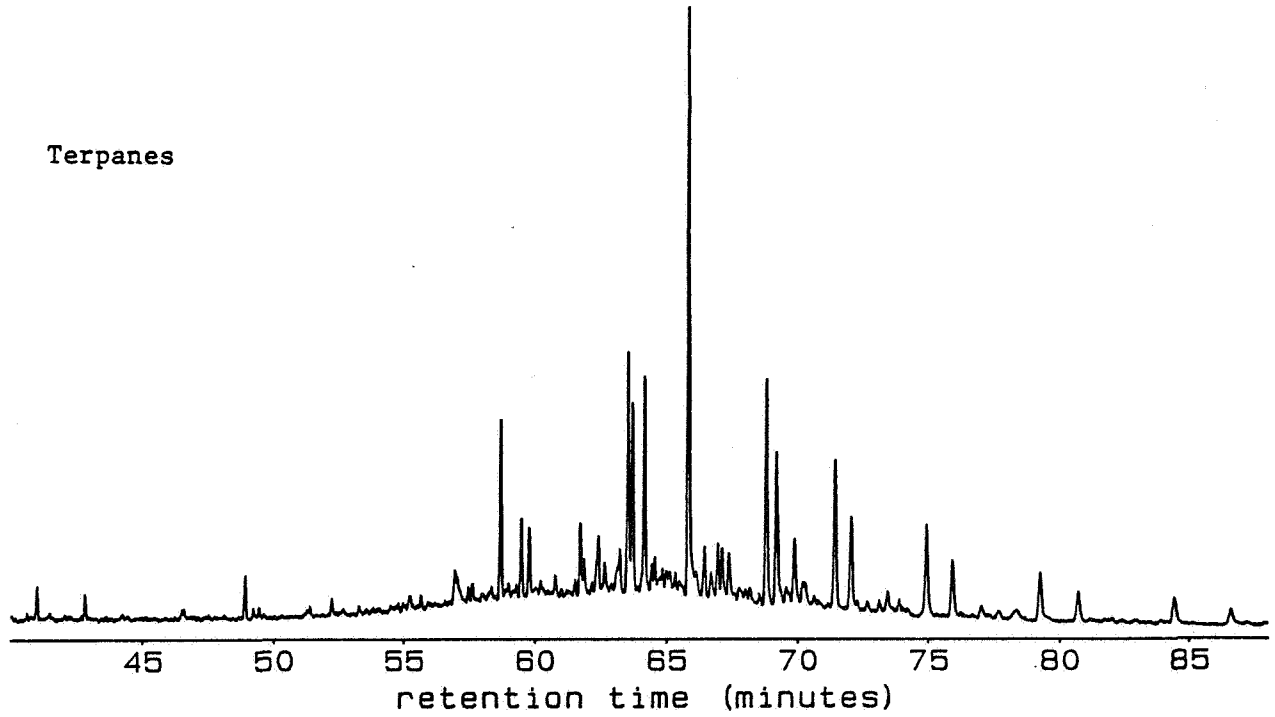
Condensate from the 35/11-2 wildcat well in the Norway sector of the North Sea



GC/MS of DST #3, 3477-3486m.

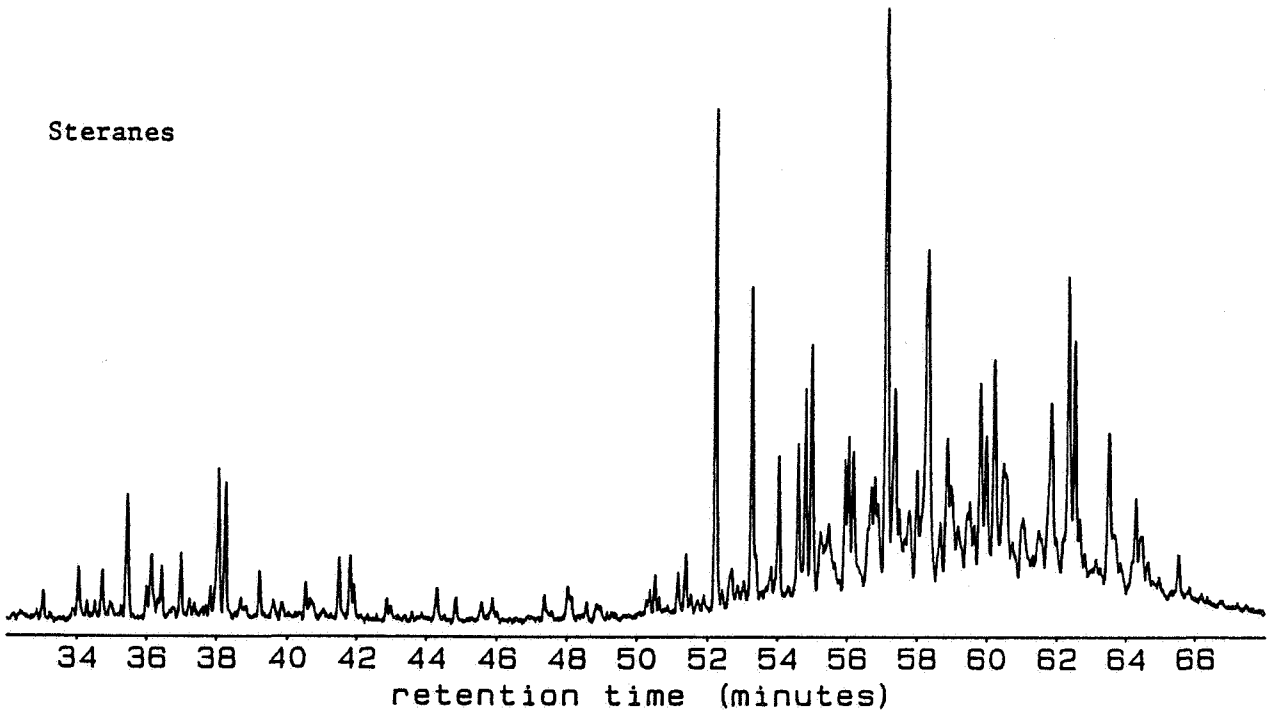
FRL8479 1463-1 F1B m/z 191]ON522 abundance = 17496.

Condensate from the 35/11-2 wildcat well in the Norway sector of the North Sea



FRL8479 1463-1 F1B m/z 217)ON522 abundance = 5153.

Condensate from the 35/11-2 wildcat well in the Norway sector of the North Sea



GC/MS of DST #2B, 3524-3542m

MOBIL R & D
06/07/88 Geochemistry GC-MS REPORT GEOCHEMISTRY LIMS
07:50

FILE'NO 1463-1
SAMP'ID 88/00359
SAMPTYPE Oil

SAMPLE FRL 08479
LOCATION NORWAY
DEPTH 3524-3542 M
GCMS'F >ON522
DATA'I This sample is a condensate.
S'INFORM 35/11-2 WELL, DST #2B

Sterane Summary		Terpane Summary	
%C27	33.4	% Ts	72.4
%C28	18.3	%22S	60.8
%C29	48.3		
%BB	61.2	%TRI/30	12.4
%C21	29.8	%30M	8.6
%20S	54.0	%C29neo	46.1
20S/20R	1.17		
BB/aa	1.96		

% of Total		% of Total	
C21	1.517	C23t	.523
C27dS	5.218	C24t	.401
C27dR	3.425	C25t	.074
C27S	1.166	C24tet	.640
		C26tA	.147
		C26tB	.164
C27B29d	6.073		
C27R	1.133		
C29dR	3.516	Ts	2.811
C28R	.622	Tm	1.072
C29S	1.924		
C29BR	3.215	C29H	3.468
C29BS	2.421	C29N	2.961
C29R	1.642		
C30	.490	C30H	9.280
		C30M	.877
		C31S	3.554
		C31R	2.287
		C32S	2.308
		C32R	1.439
		C33S	1.391
		C33R	.861
		C34S	.742
		C34R	.459
		C35S	.393
		C35R	.238

MOBIL R & D
06/07/88 Geochemistry GC-MS REPORT GEOCHEMISTRY LIMS
07:52

FILE'NO 1463-1
SAMP'ID 88/00361
SAMPTYPE Oil

SAMPLE FRL 08481
LOCATION NORWAY
DEPTH 3427-3432 M
GCMS'F >ON524
DATA'I This sample is a condensate.
S'INFORM 35/11-2 WELL, DST #4

Sterane Summary		Terpane Summary	
%C27	35.1	% Ts	73.1
%C28	17.7	%22S	59.7
%C29	47.2		
%BB	61.9	%TRI/30	14.6
%C21	33.9	%30M	8.4
%20S	52.8	%C29neo	48.8
20S/20R	1.12		
BB/aa	1.91		
% of Total		% of Total	
C21	1.691	C23t	.719
C27dS	5.679	C24t	.504
C27dR	3.559	C25t	.215
C27S	1.082	C24tet	.962
		C26tA	.179
		C26tB	.239
C27B29d	6.455		
C27R	1.153		
C29dR	3.480	Ts	3.495
C28R	.582	Tm	1.287
C29S	1.737		
C29BR	2.967	C29H	3.732
C29BS	2.375	C29N	3.562
C29R	1.554		
C30	.452	C30H	10.846
		C30M	.989
		C31S	4.347
		C31R	2.935
		C32S	2.869
		C32R	1.879
		C33S	1.618
		C33R	1.086
		C34S	.893
		C34R	.521
		C35S	.481
		C35R	.285

MOBIL R & D — GEOCHEMISTRY LIMS
06/07/88 — Geochemistry GC-MS REPORT — 07:51

FILE'NO 1463-1
SAMP'ID 88/00360
SAMPTYPE Oil

SAMPLE	FRL 08480
LOCATION	NORWAY
DEPTH	3477-3486 M
GCMS'F	>ON523
DATA'I	This sample is a condensate.
S'INFORM	35/11-2 WELL, DST #3

Sterane Summary		Terpane Summary	
%C27	33.1	% Ts	72.4
%C28	17.0	%22S	60.1
%C29	49.9		
%BB	60.8	%TRI/30	14.5
%C21	31.8	%30M	8.6
%20S	52.3	%C29neo	45.9
20S/20R	1.09		
BB/aa	1.82		

% of Total		% of Total	
C21	1.634	C23t	.684
C27dS	5.551	C24t	.470
C27dR	3.330	C25t	.162
C27S	1.086	C24tet	.777
		C26tA	.180
		C26tB	.195
C27B29d	5.749		
C27R	1.109		
C29dR	3.616	Ts	3.057
C28R	.569	Tm	1.168
C29S	1.829		
C29BR	3.040	C29H	3.782
C29BS	2.389	C29N	3.215
C29R	1.671		
C30	.431	C30H	9.986
		C30M	.934
		C31S	4.269
		C31R	2.831
		C32S	2.918
		C32R	1.898
		C33S	1.515
		C33R	1.034
		C34S	.867
		C34R	.531
		C35S	.449
		C35R	.287

MOBIL R & D — GEOCHEMISTRY LIMS
06/07/88 — Geochemistry GC-MS REPORT — 07:53

FILE'NO 1463-1
SAMP'ID 88/00362
SAMPTYPE Oil

SAMPLE FRL 08482
LOCATION NORWAY
DEPTH 3374-3378 M
GCMS'F >ON525
S'INFORM 35/11-2 WELL, DST #5

Sterane Summary		Terpane Summary	
%C27	36.9	% Ts	73.2
%C28	19.2	%22S	60.2
%C29	43.9		
%BB	63.3	%TRI/30	20.3
%C21	34.0	%30M	8.3
%20S	52.0	%C29neo	46.4
20S/20R	1.09		
BB/aa	2.01		
% of Total		% of Total	
C21	1.888	C23t	.990
C27dS	5.858	C24t	.705
C27dR	3.495	C25t	.294
C27S	1.357	C24tet	1.060
		C26tA	.326
		C26tB	.320
C27B29d	6.449		
C27R	1.479		
C29dR	3.447	Ts	3.752
C28R	.768	Tm	1.374
C29S	1.911		
C29BR	3.547	C29H	4.164
C29BS	2.789	C29N	3.611
C29R	1.761		
C30	.515	C30H	10.322
		C30M	.936
		C31S	4.236
		C31R	2.796
		C32S	2.757
		C32R	1.776
		C33S	1.549
		C33R	1.062
		C34S	.843
		C34R	.512
		C35S	.440
		C35R	.269