

MUD RECAP FOR WELL 36/1-2

CASING INTERVAL		TOTAL	30"	20"	13 3/8"	9 5/8"	OPEN HOLE	
MATERIAL	UNIT WEIGHT	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	REMARKS
MILBEN	50 kg	1000	370	270	360			Lost 1800-2000 Bbls of mud through leak in riser. The riser was not pulled immediately when leak was detected due to the bad weather conditions. Attempts were made to cure leak by loss circulation material.
MILGEL	50 kg	1136			100	303	733	
CAUSTIC SODA	50 kg	295	22	23		138	112	
CAUSTIC SODA	25 kg	150			122	28		
SALT WATER GEL	50 kg	510	310	200				
LIME	40 kg	39	10	3		12	14	
FLOSAL	50 kg	126	40	70			16	
DRISPAC	50 kg	123		19	6	37	61	
BARITE	50 kg	1000		100	130	551	219	
BARITE	M/T	690		56	40	132	462	
GYP	100 lbs	385			377		8	
LIGNOSULFONATE	50 lbs	790			161	423	206	
M.D.	55 gal	15			4	6	5	
L.D.-8	5 gal	18			2	10	6	
CMC	25 kg	235			45	118	72	
DESCO	25 lbs	63				43	20	
LIGCON	50 lbs	246				83	163	
SODA ASH	50 kg	20				14	6	
NUT PLUG FINE	25 kg	38				21	17	
NUT PLUG COARSE	24 kg	5				5		
MILFIBER	40 lbs	23					23	
MILMICA FINE	25 kg	16					16	
MILMICA COARSE	25 kg	18					13	
KWICK SEAL	40 lbs	15					15	

MEMORANDUM

FROM:- B. S. Cooper/P. C. Barnard

DATE 18th November, 1975

TO:- Mr. J. W. Church

ATTENTION OF:-

OIL STAIN - SAGA NORWAY 36/1-2 WELL

A sample of drill cuttings with mud and oil has been analysed for its oil content. The oil was removed from its wet mineral matrix by slurring with water and shaking with pentane to give a pale brown solution. Upon evaporation of the solution, the oil was seen to be a light free flowing liquid. Chromatographic fractionation of the oil over silica gel with pentane followed by toluene (10%) in pentane gave separation into saturate (29%) and aromatic fractions (18%). Further analysis of the saturate fraction by capillary gas chromatography showed that the saturates were of oil showing no prolonged effects of water washing or biodegradation although the gasoline range saturates were depleted. The range of saturates was from decane (C-10) to pentacosane (C-25) with n-alkanes being dominant of which pentadecane (C-15) was the most abundant. The acyclic isoprenoids including phytane (C-20) and pristane (C-19) and farnesane (C-15) were present in distinctive amounts, the ratio of pristane to phytane being 1.3.

Our conclusions are that the oil is dead oil which has lost its gas and gasoline components by water washing. Its composition suggests that it has been generated from marine shale which has reached the later stages of maturation.

Brian Cooper

B. S. COOPER

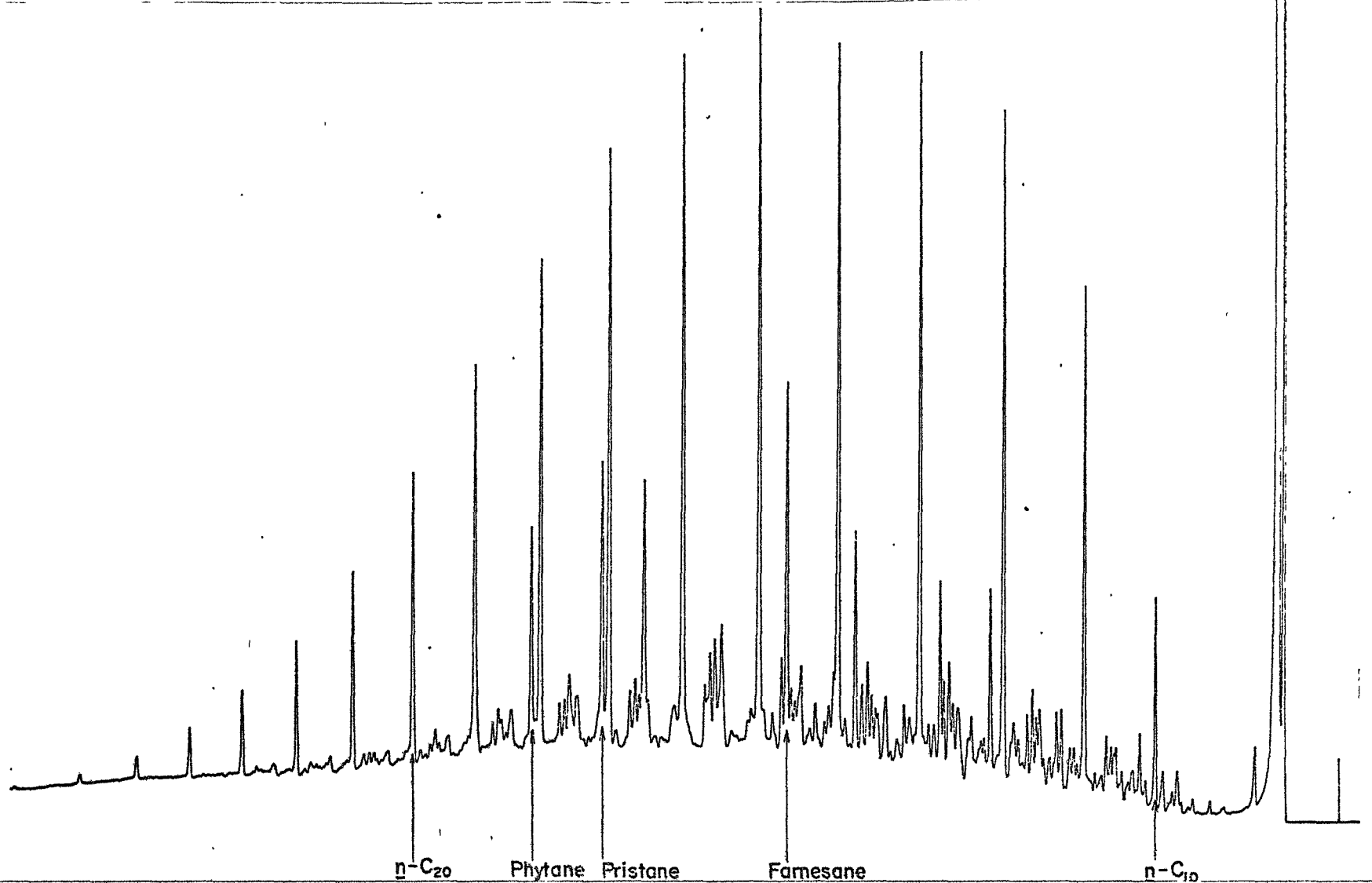
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SAGA 3671-2 WELL

EXTRACTED OIL

GAS CHROMATOGRAM

SATURATED HYDROCARBONS

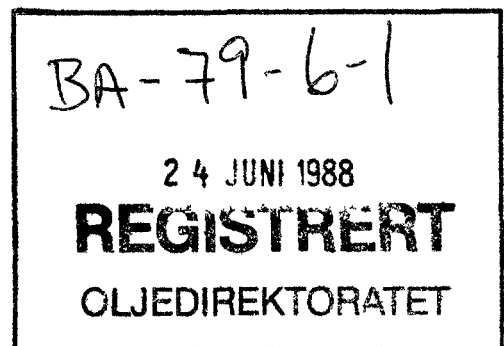


EXPLORATION AND PRODUCTION RESEARCH DIVISION

BP RESEARCH CENTRE

Chertsey Road, Sunbury-on-Thames, Middlesex.

GEOCHEMISTRY BRANCH



U-138

Report
EPR/R7028

GEOCHEMICAL STUDIES ON NOCS

WELL 36/1-2

by

G.C. Speers and D.B. Swift

Work by:

D.B. Swift
Palynology Branch
Geoconsultants Ltd.

April 1976

TABLE 1

NOCS WELL 36/1-2

VITRINITE REFLECTANCE DATA - SWC SAMPLES

DEPTH (m)	MEAN VITRINITE REFLECTIVITY R _o (max) %	
	AUTOCHTHONOUS	ALLOCHTHONOUS
2815	0.40 (3)	0.68 (10) 1.02 (7)
2827	0.41 (1)	0.59 (10) 0.91 (9)
2836.5	0.36 (2)	1.13 (18)
2848	0.47 (7)	0.69 (11) 1.06 (2)
2862	0.42 (19)	
2866	0.50 (7)	0.77 (10) 1.59 (3)
2870	0.41 (20)	
2874	0.46 (20)	
2876	0.34 (20)	
2894	0.34 (20)	
2930	0.48 (13)	0.67 (6)
2962.5	0.41 (20)	
3040	0.43 (20)	
3080	0.45 (22)	
3120	0.36 (20)	
3147.5		0.62 (2)
3168	0.39 (1)	0.54 (2)
3191		0.60 (4)
3195	0.44 (20)	
3206	0.46 (20)	
3224	0.58 (20)	
3232	0.53 (20)	
3234	0.46 (20)	
3240	N.D.	

TABLE 2

NOCS WELL 36/1-2

SOURCE ROCK POTENTIAL - SWC SAMPLES

TOC

SWC No.	Depth m	Lithology	Carbonate Content % wt.	Total Organic Carbon % wt.	C_R/C_T	Total Soluble Extract % wt.	$\frac{TSE}{TOC}$ %
25	2815	Calc. Mudstone	34.9	0.90	0.57	0.143	159
24	2817	Siltstone	25.7	0.60	0.36	0.070	117
23	2823.5	Mudstone	19.8	0.92	0.41	0.154	167
22	2827	Calc. Mudstone	27.0	0.97	0.42	0.081	83
20	2836.5	Calc. Mudstone	39.0	0.65	0.43	0.164	252
19	2840	Calc. Mudstone	37.0	0.79	0.53	0.204	258
18	2848	Calc. Mudstone	38.9	0.83	0.56	0.159	191
15	2862	Calc. Mudstone	29.1	1.41	0.58	0.059	42
11	2870	Mudstone	6.1	2.63	0.50	0.216	82
3	2876	Silty Mudstone	6.1	4.60	0.52	0.245	53
30	2894	Mudstone	9.8	4.63	0.60	0.244	53
26	2962.5	Calc. Mudstone	46.8	1.24	0.46	0.143	116
24	3040	Mudstone	4.3	2.29	0.50	0.210	92
22	3080	Mudstone	14.1	1.59	0.55	0.105	66
20	3120	Mudstone	7.9	1.97	0.48	0.113	57
6	3206	Mudstone	9.6	3.22	0.71	0.179	56
4	3224	Mudstone	17.6	2.73	0.43	0.206	75

TABLE 3

NOCS WELL 36/1-2

SWC SOLUBLE EXTRACT DATA - SELECTED INTERVALS

AGE	SAMPLE DEPTH m.	TSE TOC %	SOLUBLE EXTRACT		
			TOTAL ALKANE % wt.	CPI nC ₂₀ -nC ₃₂	PRISTANE/ PHYTANE
Late Albian	2848	191	56.3	1.06	1.22
Oxfordian/ early Kimmeridgian	2894	53	34.1	1.19	1.65
Bajocian	3224	75	33.7	1.12	0.53

TABLE 4

NOCS WELL 36/1-2OILS RECOVERED FROM WET CUTTINGS FROM INTERVAL 2800-2840m

<u>HEAVY OIL</u>		
Asphaltenes Content	% wt.	17
Sulphur Content of de-asphaltened Oil	% wt.	1.6
Sulphur Content of Asphaltenes	% wt.	3.8
Calculated Sulphur Content of Total Heavy Oil	% wt.	2
Silica Gel Chromatography		
N+P Fraction	% wt.	78.5
A+H Fraction	% wt.	6.2
Residue Fraction	% wt.	15.3
N+P Fraction		
CPI nC ₂₀ -nC ₃₂		1.15
Pristane/Phytane		0.96
<u>MUD OIL</u>		
Asphaltenes Content	% wt.	ND
N+P Fraction		
CPI nC ₂₀ -nC ₃₂		1.03
Pristane/Phytane		~1.9

TABLE 5

NOCS WELL 36/1-2

VISUAL KEROGEN STUDIES

Sidewall Core No. 30

Depth: 2894m

Age: Oxfordian/E. Kimmeridgian

Palynomorph colour/maturation (DOD) 2/3 on Batten scale.

Organic debris comprises amorphous matter with granular texture, mainly aggregated together with finely divided organic fragments. A few, mainly black unstructured wood fragments (vitrain/fusain) present. Some aggregations appear to be of cellular organic matter in an advanced state of degradation.

Sidewall Core No. 6

Depth: 3206m

Age: Bajocian

Palynomorph colour/maturation (DOD) 2/3 on Batten scale.[†]

Organic debris comprises amorphous organic matter, granular in texture, aggregated and dispersed, approx. 60% with wood fragments, mainly dark brown to black, angular and unstructured and of variable size, approx. 40%

[†] Internal BP system based upon expanded version of original Correia scale. 2/3 indicates organic matter still quite immature.



Amoco Production Company

Amoco Norway

3 11 1976

TO	AMOC
FROM	
SUBJECT	
FILE	

Tulsa, Oklahoma
February 12, 1976

File: Technical Service 9499CC
Job 9010

Mr. R. M. Ridley
Amoco Norway Oil company
Box 100
4056 Tanager, Norway

Dear Sir:

Subject: M. Jurassic (Calloviaian) Shale from Core No. 1,
2987-3005 m, Saga 36/1-2, Offshore Norway

Very truly yours,

James A. Momper

James A. Momper

JAM:el
5258

Attachments

cc: K. A. Shepard
W. E. Humphrey, Attention: H. P. Fuchs
W. R. Walton
R. R. Thompson

AMOCO PRODUCTION COMPANY
RESEARCH CENTER

Source Rock Evaluation

M. Jurassic Shale, 2987-3005 m.
Saga 36/1-2, Offshore Norway

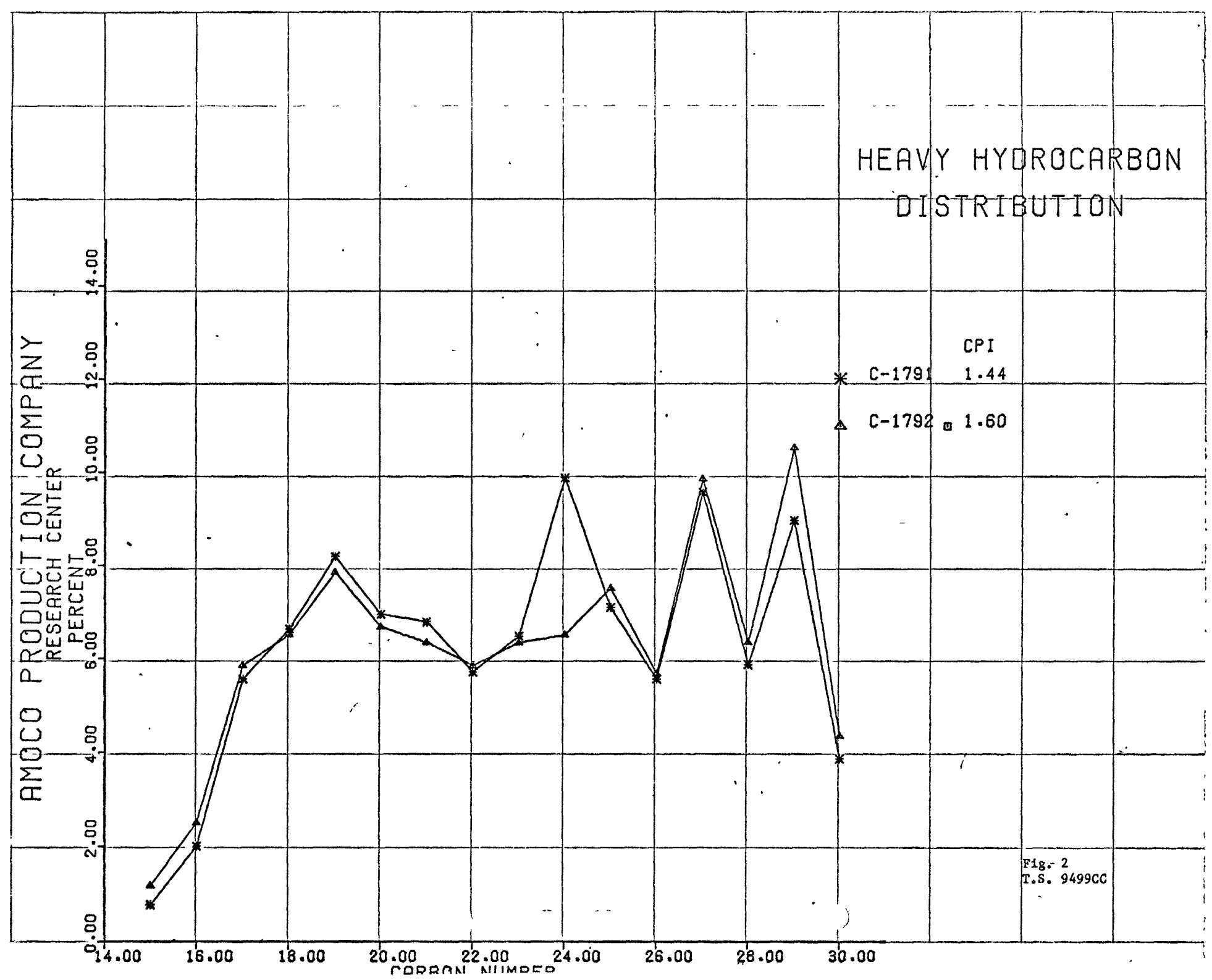
Geochemistry Group
Mary E. Brownlee

Distribution: R. M. Ridley, Amoco Norway
K. A. Shepard, Chicago
W. E. Humphrey, Attention: H. P. Fuchs, Chicago
W. R. Walton, Chicago
R. R. Thompson/J. A. Momper

Technical Service 9499CC
Job 9010
Requested by K. D. Soule
Amoco Norway

Royce, Linnas (2-13-76)
RRJ

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and other wholly owned subsidiaries of Standard Oil Company (Indiana)."



OFFICE AMOCO NORWAY
 AUTHORIZED BY K D SOULE
 TECHNICAL SERVICE NUMBER 9499
 STATE NORWAY COUNTY OFFSHORE
 WELL NAME SAGA PETROLEUM

DATE 01/02/76

AMOCO PRODUCTION COMPANY
 RESEARCH CENTER

WELL LOCATION 61°53'02.462"N
 LEASE 36/1-2 04°00'53.432"E

SOURCE ROCK EVALUATION

SAMPLE NUMBER	TYPE	FORMATION	AGE	LITHOLOGY	DEPTH TOP***BASE	INSOL RESID %	ORG CRB WT%	EXT-ORG BBL/AC FT.	EXT HYD BBL/AC FT.	EXT HYD/EXT ORG	EXT ORG TOT ORG	HYD CRB GEN CPBLTY

METERS												
C-1791 *	CR	CALLOVIAN	MJUR	SH	2987- 3005	90.0	2.7	18.2	7.0	.38	.02	VERY GOOD
C-1792 *	CR	CALLOVIAN	MJUR	SH	2987- 3005	84.0	3.1	25.2	9.6	.38	.03	VERY GOOD

*Samples are duplicates

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OFFICE AMOCO NORWAY

AUTHORIZED BY K-D SOULE DATE 01/27/76

TECHNICAL SERVICE NUMBER 949975

STATE NORWAY COUNTY OFFSHORE

WELL NAME SAGA PETROLEUM

LEASE 36/1-2 WELL LOCATION 61°53'02.462"N
04°00'53.432"E

AMOCO PRODUCTION COMPANY
RESEARCH CENTER
ORGANIC DIAGENESIS DATA

SAMPLE NUMBER	SAMPLE TYPE	FORMATION	AGE	LITHOLOGY	DEPTH		ELEMENTAL ANALYSIS, PERCENT				RATIO H/C	STATE OF DIAGENESIS	HYDROCARBON BY VISUAL ANALYSIS	VISUAL KEROGEN SCALE
					TOP	BOTTOM	CARBON	HYDROGEN	OXYGEN	NITROGEN				
C-1791	CR	CALLOVIAN	MJUR	SH	METERS 2987 3005		81.9	6.9	9.1	2.2	1.01	* Early (Gas), Early Peak	Wet Gas/Oil	4
C-1792	CR	CALLOVIAN	MJUR	SH	2987 3005		83.0	7.5	7.5	2.1	1.08	* Early (Gas), Early Peak	Gas/Wet Gas	4

*Hydrocarbon type based on visual analysis, see text.

MICROSCOPIC KEROGEN ANALYSIS

Division: Amoco Norway

Well Name: Saga 36/1-2

Location: 61°53'02.462"N; 04°00'53.432"E

State or Country: Offshore Norway

<u>SRA No.</u>	<u>Depth (M)</u>	<u>Color</u>	<u>Scale</u>	<u>Kerogen Type</u>	<u>Description - Remarks</u>
C-1791	2987-3005	Med Br	4	Wet gas/gas	40% Wood and cuticle 10% Charcoal frag 50% Amorphous mtl Common palyno
C-1792	2987-3005	Med Br	4	Gas/wet gas	50% Wood and cuticle 10% Charcoal frag 40% Amorphous mtl Common palyno

COLOR	CATAPHECTIC SCALE	WEIGHT % CARBON
LIGHT YELLOW	1	~65%
YELLOW	2	~70%
LIGHT BROWN	3	~75%
MED BROWN	4	~78%
DARK BROWN	5	~81%
BLACK	6	~84% ~86%
ALL ORGANIC		~90%

Table 3
TS 9499CC