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GEOCHEMICAL INVESTIGATION OF TWO CORE SAMPLES
FROM THE KIMMERIDGE CLAY FM. IN WELL 205/21-1A,
UNITED KINGDOM

by

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1.0. INTRODUCTION

A geochemical investigation has been carried out a two core samples (4397.5 and 4408.5 ft) from the Kimmeridge Clay fm. in well 205/21-1A. The results are shown in Tables 1-2 and in Figures 1-7.

2.0. RESULTS

The shape of the gas chromatograms of the original samples (Figs. 1, 3), the C₂₉ DOM values, the maceral descriptions (Fig. 7) and the sterane/triterpane distributions (Figs. 5-6) indicate that both samples are immature. Both samples have been heated for further typing. However, the maturation experiment for sample 4408.5 ft failed due to leakage of the bombe. Maturation of sample 4397.5 ft indicated a good generation and expulsion capacity. The type of organic matter in both samples is predominantly structureless organic matter (SOM) of bacterially reworked phytoplanktonic origin although slight facies variations cannot be excluded (sterane/triterpane fragmentograms, Figs. 5-6; C₁₅ and C₃₀ ringdistributions, Fig.4). The vanadium predominance indicates a deep marine environment of deposition.

Geochemically, the immature source rock extracts are similar to the more mature crude 206/11-1 and an impregnation in 206/5-1, and slightly different from the 206/8-1 Clair-field crudes.

3.0. CONCLUSIONS

Two core samples from 4397.5 and 4408.5 ft in well 205/21-1A are immature and contain predominantly SOM of bacterially reworked phytoplanktonic origin. Both samples were deposited in a deep marine environment. Maturation of sample 4397.5 ft indicated a good generation and expulsion capacity for oil. Geochemically, the immature source rock extracts are similar to the more mature crude 206/11-1 and an impregnation in 206/5-1 and slightly different to the 206/8-1 Clair field crudes.

TABLE 1 GEOCHEMICAL DATA OF EXTRACTS

205/21-1A 4397.5 ft core Kimmeridge Clay fm (JU)		
Sample	original sample	heated
% ethyl acetate extract	0.8	2.5
% organic carbon after ethyl acetate extraction	7.7	5.4
extract/original carbon (after extraction)	0.10	0.32
% sulphur	5.9	2.3
ppm V as metals	350	60
ppm Ni as metals	272	26
pristane/phytane	1.5	2.1
pristane/nC17	0.9	0.9
phytane/nC18	1.1	0.5
C ₁₅ -distribution		
1-ring	49	54
2-ring	33	29
3-ring	18	17
C ₃₀ -distribution		
3-ring	8	25
4-ring	66	42
5-ring	20	33
C ₂₉ VR/E	0.55	--
% saturates *	19	11
% aromatics	23	27
% heterocompounds	55	57
% aphaltenes	3.3	5
$\delta^{13}\text{C}^{\text{o}}/\text{oo}$	-28.7	-28.2

*) determined by thin layer chromatography

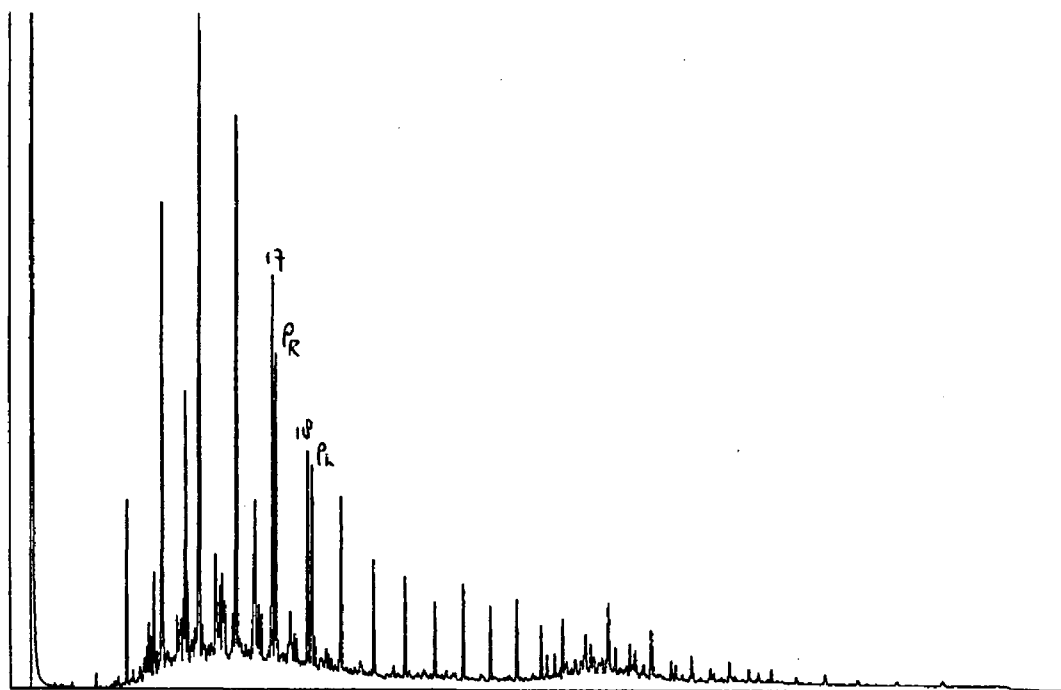
ND = not detectable

TABLE 2 GEOCHEMICAL DATA OF EXTRACTS

	205/21-1A 4408.5 ft core Kimmeridge Clay fm (JU)
Sample	original sample
% ethyl acetate extract	1.0
% organic carbon after ethyl acetate extraction	8.8
extract/original carbon (after extraction)	0.11
% sulphur	22.5
ppm V as metals	2017
ppm Ni as metals	106
pristane/phytane	1.2
pristane/nC17	1.4
phytane/nC18	1.5
C ₁₅ -distribution	
1-ring	35
2-ring	42
3-ring	23
C ₃₀ -distribution	
3-ring	7
4-ring	44
5-ring	49
C ₂₉ VR/E	0.47
% saturates *	22
% aromatics	49
% heterocompounds	25
% asphaltenes	3.8
$\delta^{13}\text{C}$ ‰	-28.5

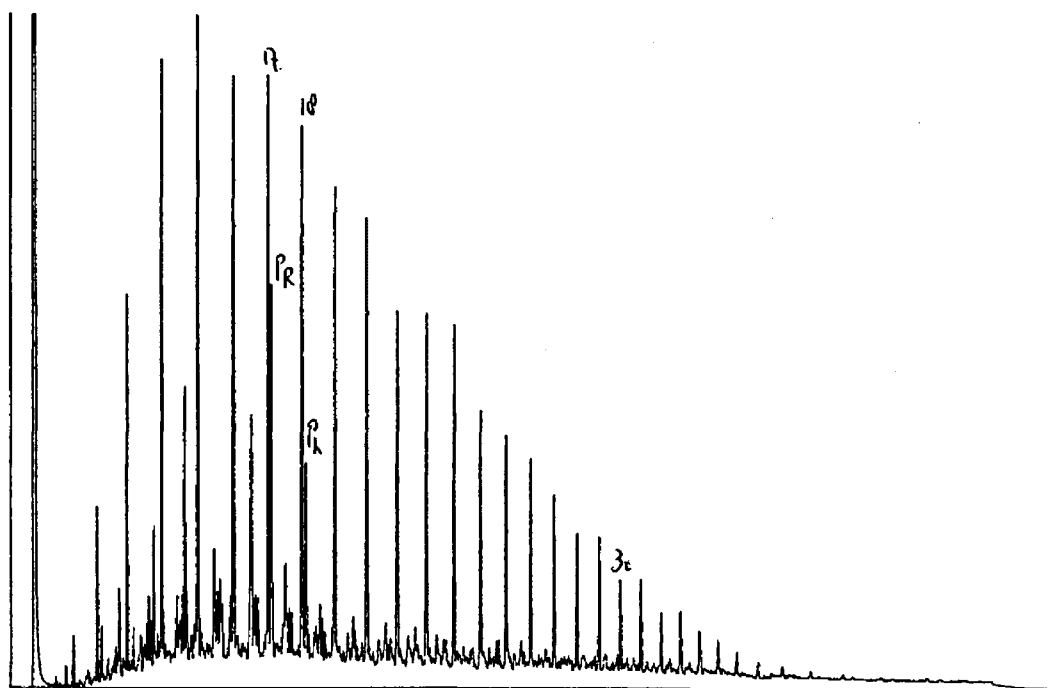
*) determined by thin layer chromatography

ND = not detectable



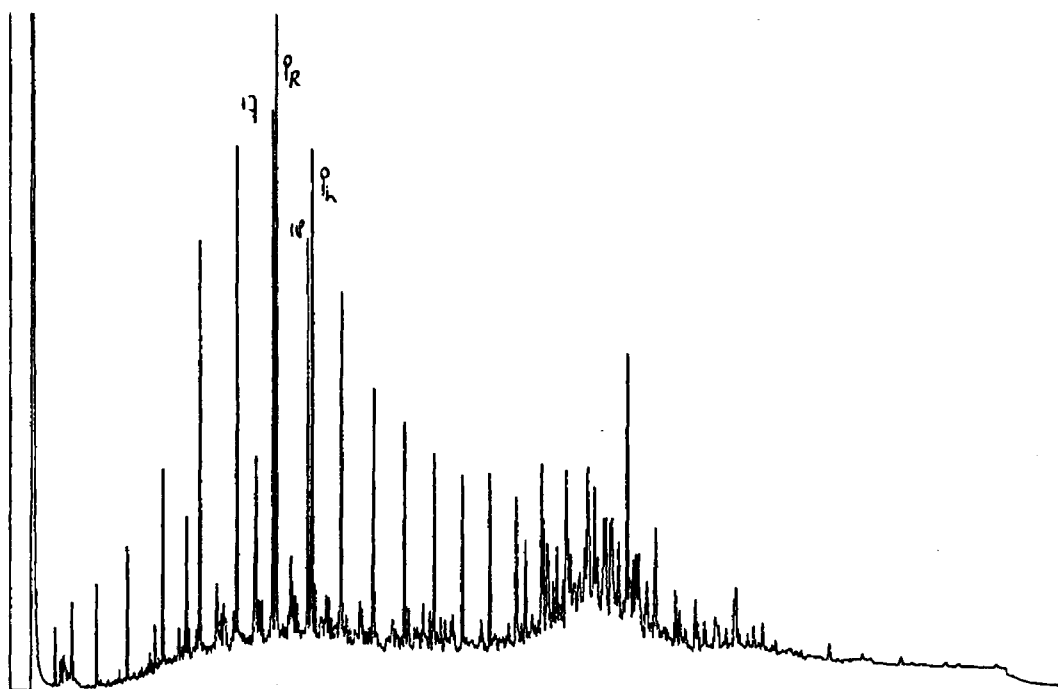
GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 1, U.K 205/21-1A 4397.6 FT



GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

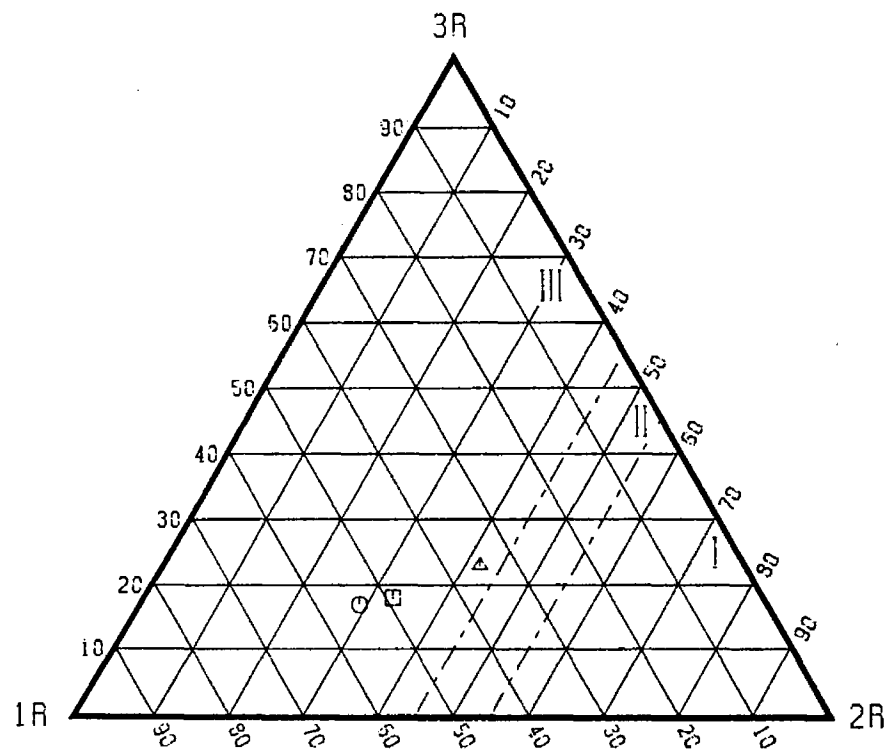
FIG. 2, U.K 205/21-1A 4397.6 FT heated



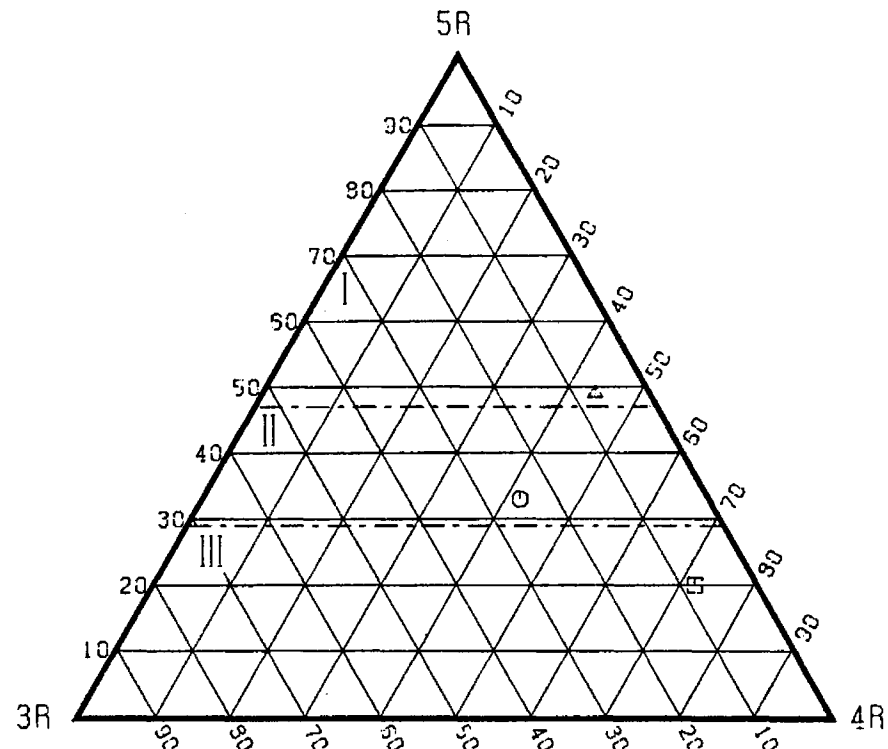
GAS CHROMATOGRAM OF SATURATED HYDROCARBONS

FIG. 3. U.K 205/21-1A 4408.5 FT

C₁₅-RING DISTRIBUTION



C₃₀-RING DISTRIBUTION



- 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	
□	205/21-1A 4397.5 FT
○	205/21-1A, 4397.5 FT HEATED
△	205/21-1A, 4408.5 FT

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FIG. 4

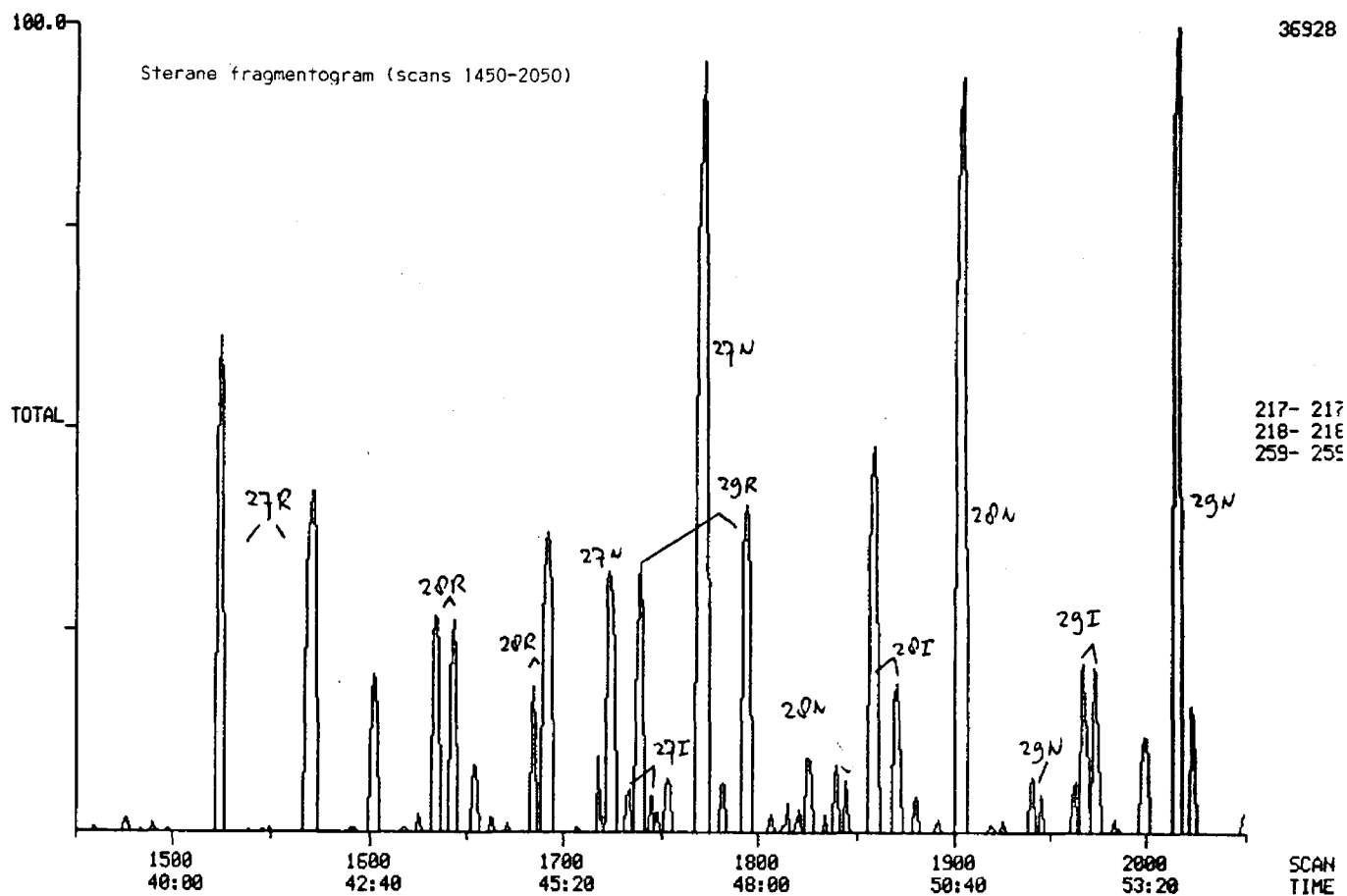


FIG. 5. GC-MS analysis 205/21-1A, 4397.5 ft, core

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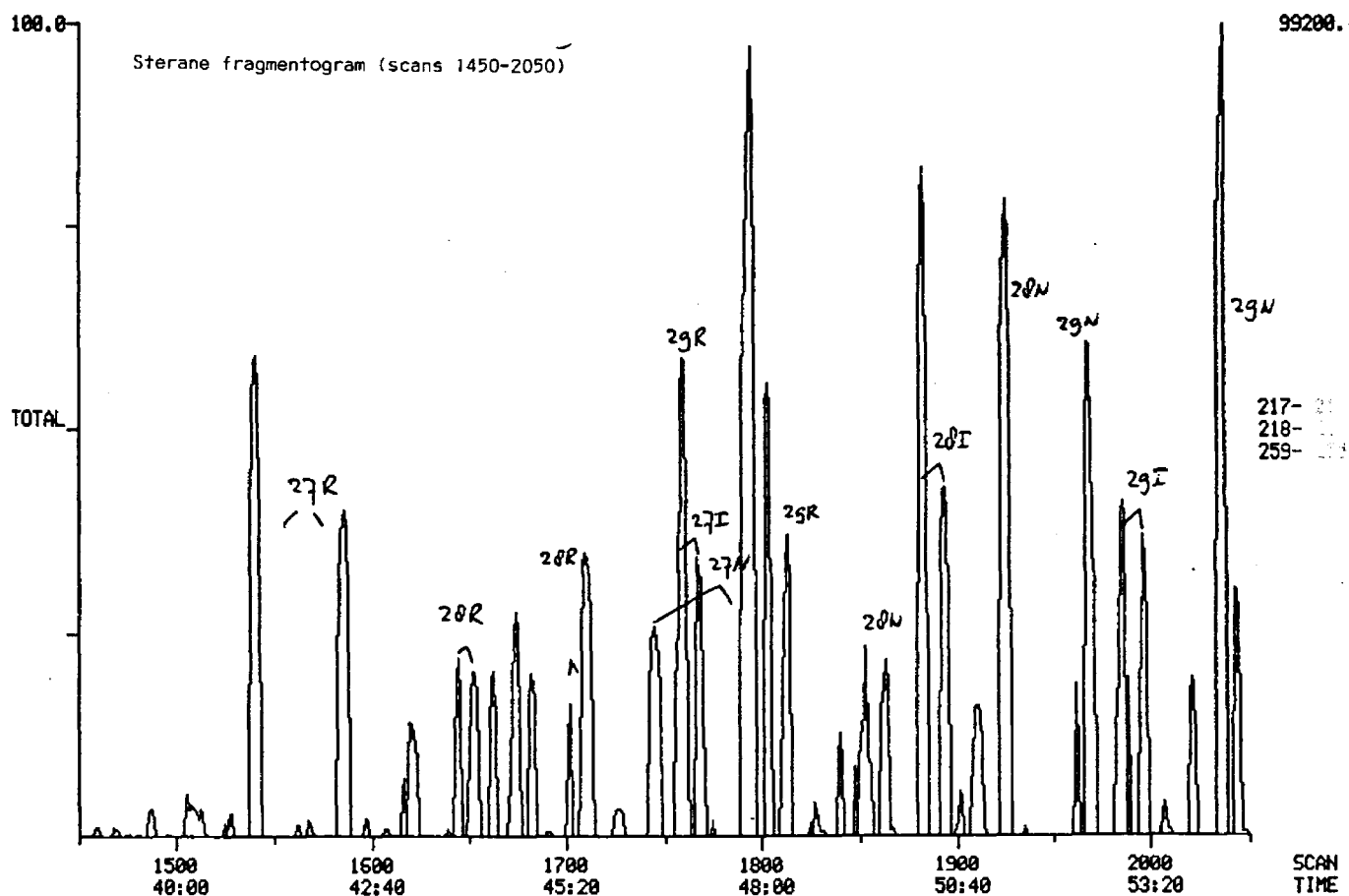
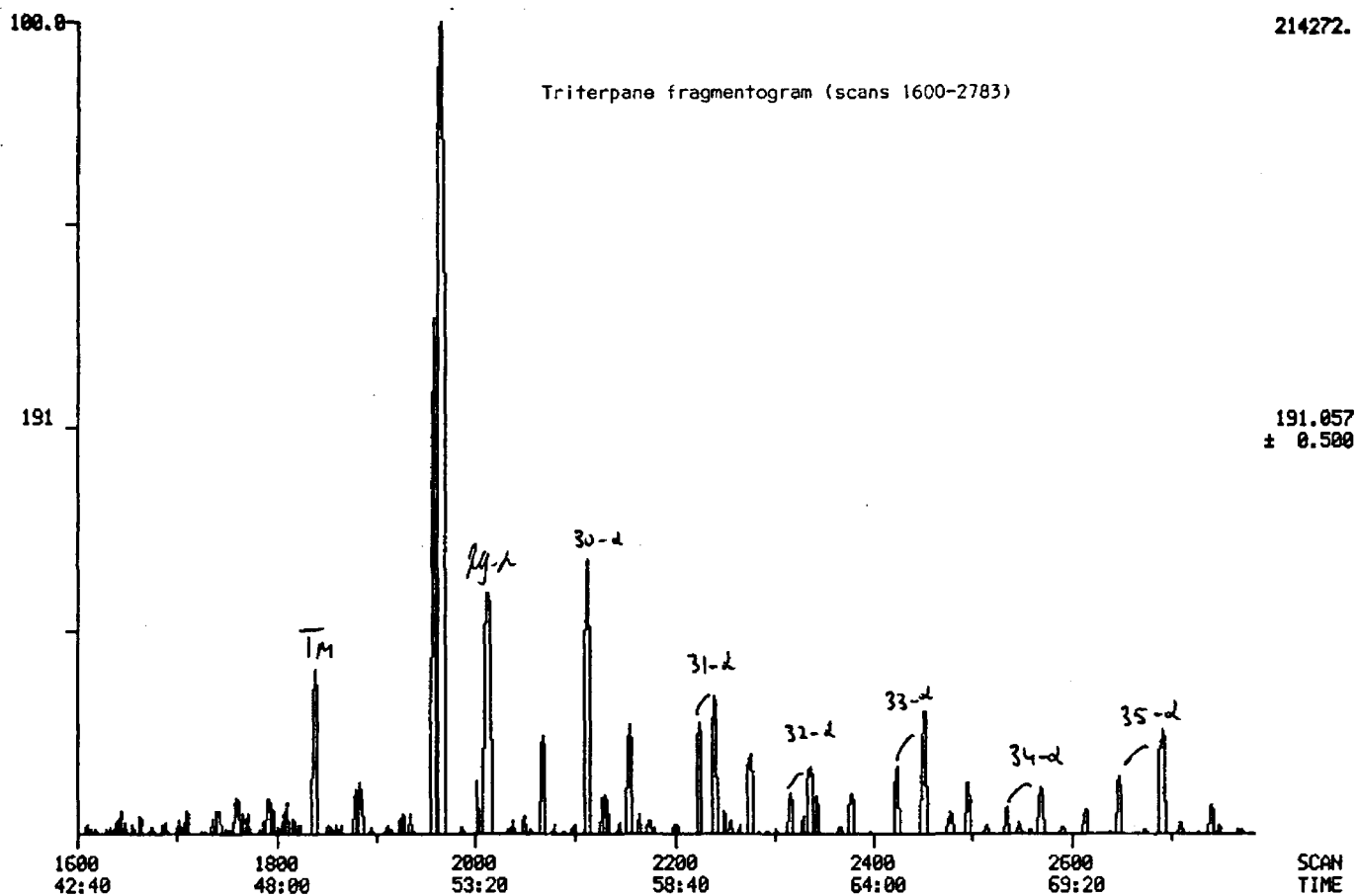


FIG. 6. GC-MS analysis 205/21-1A, 4408.5 ft, core

MACERAL DESCRIPTION OF 8 SAMPLES FROM WELL 205/21-1A

DEPTH IN FT	SAMPLE TYPE
----------------	----------------

ORGANIC																	INORG.
S. O. M.			VITRINITE					LIPTINITE					INERT.				
DENSE S. O. M.	LAYERS OF S. O. M.	LENSES OF S. O. M.	DIFFUSE S. O. M.	INTERGRANULAR S. O. M.	PATCHES OF S. O. M.	LAYERS OF TELLOCOLLINITES	LENSES OF TELLOCOLLINITES	DETITAL TELLOCOLLINITES	LAYERS OF TELINITES	LENSES OF TELINITES	DETITAL TELINITES	LAYERS OF VITRINITE-2	LENSES OF VITRINITE-2	DETITAL VITRINITE-2	SPORINITE	CUTINITE	RESINITE
																	LIPTODETRINITE
																	BOTRYOCOCCLUS
																	TASMANITES
																	OTHER ALGAE
																	MICROPLANKTON
																	EXUDATINITE
																	SCLEROTINITE
																	FUSINITE
																	MACRINITE
																	MICRINITE
																	UNDEFINED MINERALS
																	FRAMBOIDAL PYRITE
																	AGGREGATES OF PYRITE
																	CRYSTALS OF PYRITE

4358.0	CORE	/	+	+	+							-	/			+		+			-	/	*	+	+	-	
4358.3	CORE		+	+	+							-	-			+		-	-	/		-	+	*	/	-	-
4396.4	CORE	+	+	+	+							/	-			+		+			-	+	*	+	-	-	
4397.6	CORE	+	+	+	+							-	-			+		-	+		-	+	*	+	/	/	
4399.0	CORE	/	+	+	+							-	/			+		-	+		-	/	*	+	+	-	
4399.0	CORE		+	+	+							-				+		-	-	+		+	*	/	-	-	
4408.5	CORE	+	+	+	+							-				+		/		+		-	+	*	+	-	-
4427.0	CORE			-	-															+			*			-	

L E G E N D	
*	ABUNDANT
+	COMMON
/	FEW
-	RARE

COMMENT LINES FROM WELL/OUTCROP : 205/21-1A

4358.0 F : SAMPLE SLIGHTLY OXIDISED
INITIAL MICRINISATION S.O.M.
AGE: VA/BE

4358.3 F : FOSSIL REMAINS
S.O.M. PARTLY MICRINISED
AGE: VA/BE

4396.4 F : S.O.M. PARTLY MICRINISED
FOSSIL REMAINS
AGE: VA/BE

4397.6 F : SAMPLE SEVERELY OXIDISED
S.O.M. PARTLY MICRINISED
AGE: VA/BE

4399.0 F : SAMPLE SLIGHTLY OXIDISED
INITIAL MICRINISATION S.O.M.
AGE: VA/BE

4399.0 F : S.O.M. PARTLY MICRINISED
FOSSIL REMAINS
AGE: VA/BE

4408.5 F : FOSSIL REMAINS
S.O.M. PARTLY MICRINISED

4427.0 F : ABUNDANT FLUID INCLUSIONS

INITIAL DISTRIBUTION

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Shell Expro Londen UEE/32/3

3 copies

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