

### 2.8.3 FMT Pressure Interpretation

8 FMT pre tests and one segregated 10 litre & 4 litre sealed sample were taken

All pressure tests were good and the results give a clear water gradient of 0,102 bar/m in the reservoir (fig. 2.8.2).

The pressure tests are listed below.

FMT Formation Pressure Tester Results Worksheet											
Well: 16/10-4			Date: 02-03-08		Well: 16/10-4		Date: 02-03-08		Well: 16/10-4		
Tool Type: FMT			Probe Type: Standard probe / 2500		Pressure (psi): 100		Pressure (psi): 100		Pressure (psi): 100		
TEST	PRESSURE		HYDROSTATIC PRESSURE		FORMATION PRESSURE		HYDROSTATIC AFTER		Mudloss (ml/CP)	Temp (C)	Remarks
	MP Gauge	HP Gauge	MP Gauge	HP Gauge	MP Gauge	HP Gauge	MP Gauge	HP Gauge			
	bar	bar	bar	bar	bar	bar	bar	bar			
1	2481,0	2442,0	355,60	357,40	292,80	294,80	355,70	357,40	0,66	100	Good Test. Tight.
2	2491,0	2452,0	356,70	358,90	293,20	295,40	356,80	358,90	21,2	101	Good Test
3	2495,0	2456,0	357,10	359,40	293,40	295,80	357,10	359,50	20,9	102	Good Test
4	2503,0	2464,0	358,30	360,60	294,10	296,60	358,20	360,60	14,2	102	Good Test
5	2510,0	2471,0	359,00	361,60	294,60	297,30	359,00	361,60	23,2	102	Good Test
6	2485,0	2446,0	355,60	358,10	292,10	294,80	355,40	358,10	18,4	102	Good Test
7	2527,0	2488,0	361,50	364,10	296,40	299,10	361,40	364,00	17,6	102	Good test
8	2491,0	2452,0	356,30	358,90	292,70	295,40	356,40	359,00	2,4	102	Good Test. Sample

### *Logging/Casing/ Cementing*

There were 4 logging runs through the 8 1/2 inch hole section. Log #1 was composed of the following arrangement: HDIL-MAC-DSL-SP-GR. The logging depth reached to 2585.5 meters or 5 1/2 meters more then the drillers depth. The BHT equaled 108 degrees C, 24 hours after the last circulation. The second logging run consisted of the following tools: HDIP-GR. Since the hole was in very good condition, it was decided to run the FMT log without a wiper trip. The FMT (log run #3) was run in the hole to log from the upper zone to the lower zone. The maximum pore pressure was at 2474 meters with a value of 1.20 sg. A sample was taken before coming out of the hole to run the VSP log. The sample showed to be a mixture of mud filtrate and formation water. Log run #4 (VSP) was run into the hole with one shot every 20 meters through the open hole section.



# Mud Summary Report

Legal Well Name: 16/10-4	Spud Date: 11.07.98
Common Well Name: 16/10-4	End: 08.08.98
Event Name: ORIG DRILLING	Start: 24.06.98
Contractor Name: TRANSOCEAN	Rig Release: 10.08.98
Rig Name: TO NORDIC	Rig Number: 9

Day	TMD (m)	Hole Sz. (in.)	Mud Type	MW (g/cm³)	Visc. (s/L)	PV (mPa*s)	YP (Pa)	Gels 10s/10m/30m (Pa)	API WL (mL)	HTHP WL (mL)	HTHP T (°C)	pH	Cl- (mg/L)	Sand (%)	TS (%)	LGS (kg/m³)	MBT (kg/m³)	Oil (%)	Tot. Hard. (mg/L)	Tot. Vol. (m³)	
17			Spud Mud	1,13	100	70	80													242,0	
18	206,00	36,000	Spud Mud	1,05	100	70	80													379,0	
19	206,00	12,250	Spud Mud	1,05	100	70	80													289,0	
20	380,00	26,000	Spud Mud	115,00	65	7	17	12/22/0	8,4			8,20	4 200						300	506,0	
21	380,00	26,000	Spud Mud	1,20	53	8	12	15/20/0	9,0			8,00	5 800						420	643,0	
22	380,00	26,000	KCL / PAC	1,20	100	36	23	4/6/0	2,5			7,50	53 000						1 500	420,0	
23	380,00	17,500	KCL / PAC	1,20	100	32	24	4/6/0	2,5			7,50	53 000						1 500	276,0	
24	648,00	17,500	KCL / PAC	1,21	68	24	10	1/2/0	2,3			8,30	60 000	0,50	8,2	17	15,5		1 500	405,0	
25	915,00	17,500	KCL / PAC	1,27	62	23	8	2/8/0	4,2			7,80	58 500	1,20	11,4	90	60,0		1 665	353,0	
26	1 230,00	17,500	KCL / PAC	1,34	63	22	13	7/22/0	3,8			7,40	63 000	1,80	15,6	194	57,0		1 610	396,0	
27	1 230,00	17,500	KCL / PAC	1,34	82	21	12	8/18/0	4,0			7,40	63 000	0,80	15,0	162	80,0		2 010	492,0	
28	1 230,00	17,500	KCL / PAC	1,36		21	8	3/8/0	3,8			7,40	63 800	1,00	15,0	129	45,0		1 480	336,0	
29	1 230,00	17,500	KCL / PAC	1,36	65	21	9	4/8/0	3,6			7,40	63 500	1,00	14,8	135	46,5		1 410	336,0	
30	1 500,00	12,250	KCL / PAC	1,40	55	35	13	2/5/0	3,0			8,90	65 000	1,00	18,0	297	60,0		1 550	496,0	
31	1 867,00	12,250	Kcl -PAC	1,46	72	42	14	1/4/0	2,8			8,30	66 000	0,50	20,0	223	65,0		1 500	629,0	
32	2 110,00	12,250	Kcl -PAC	1,50	66	44	11	3/8/0	2,5	6,8		8,20	63 000	0,40	19,0	123	50,0		2 200	414,0	
33	2 110,00	12,250	Kcl -PAC	1,50	58	31	8	1/5/0	2,6	7,2		7,80	63 000		19,5	134	46,0		2 240	378,0	
34	2 110,00	12,250	Kcl -PAC	1,50	66	33	8	1/5/0	2,7	8,8	250	7,80	61 000		19,5	135	45,0		2 080	317,0	
35	2 110,00	8,500	Kcl -PAC	1,40	50	21	5	2/6/0	2,4	8,2	185	8,10	60 000		16,8	155	35,0		1 100	394,0	
36	2 257,00	8,500		1,35	56	24	7	1/2/0	2,5	9,0	183		61 000		15,5	169	35,0		2 060	425,0	
37	2 477,00	8,500		1,35	59	31	9	2/4/0	2,6	9,6	183		60 500		17,0	255	42,0		1 840	319,0	
38	2 504,00	8,500	KCL / PAC	1,46	67	35	9	2/5/0	2,8	10,2	185	8,10	61 000		21,0	226	49,0		1 980	323,0	
39	2 580,00	8,500	KCL / PAC	1,45	63	35	9	2/4/0	2,8	10,2	120	7,90	66 000		20,5	206	45,0		2 400	325,0	
40	2 580,00	8,500	KCL / PAC	1,45	66	36	8	2/4/0	2,8	10,8	120	8,00	65 500		20,5	206	45,0		2 420	342,0	
41	2 580,00	8,500	KCL / PAC	146,00	65	35	10	2/4/0	32,0		120	8,30	65 500		21,0	216	45,0		2 420	338,0	
42	2 580,00	8,500	KCL / PAC	1,61	59	41	11	2/4/0	3,2		120	8,30	71 500		24,5	148	40,0			363,0	
43	2 580,00	8,500	KCL / PAC	1,61	61	43	10	2/4/0	3,4		120	9,00	71 000		24,5	149	40,0			378,0	
44	2 580,00		KCL / PAC	1,61	61	43	10	2/4/0	3,4		120	9,00	71 000		24,5	149	40,0			379,0	
45	2 580,00		KCL / PAC																		291,0

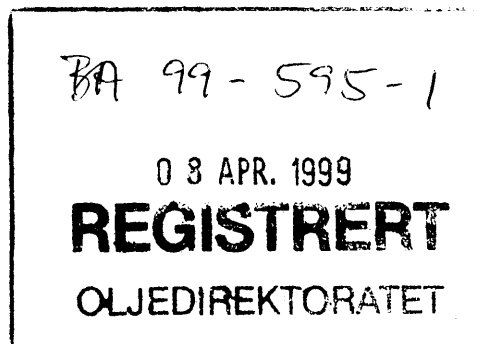
Eni S.p.A.  
Agip Division



**WELL : 16/10-4 (NORWAY)**

**Reservoir Geochemistry Study**

Edited by R.Galimberti



S.Donato Mil.se, 7/1/99

Geochemistry

M.A.Chiaromonte

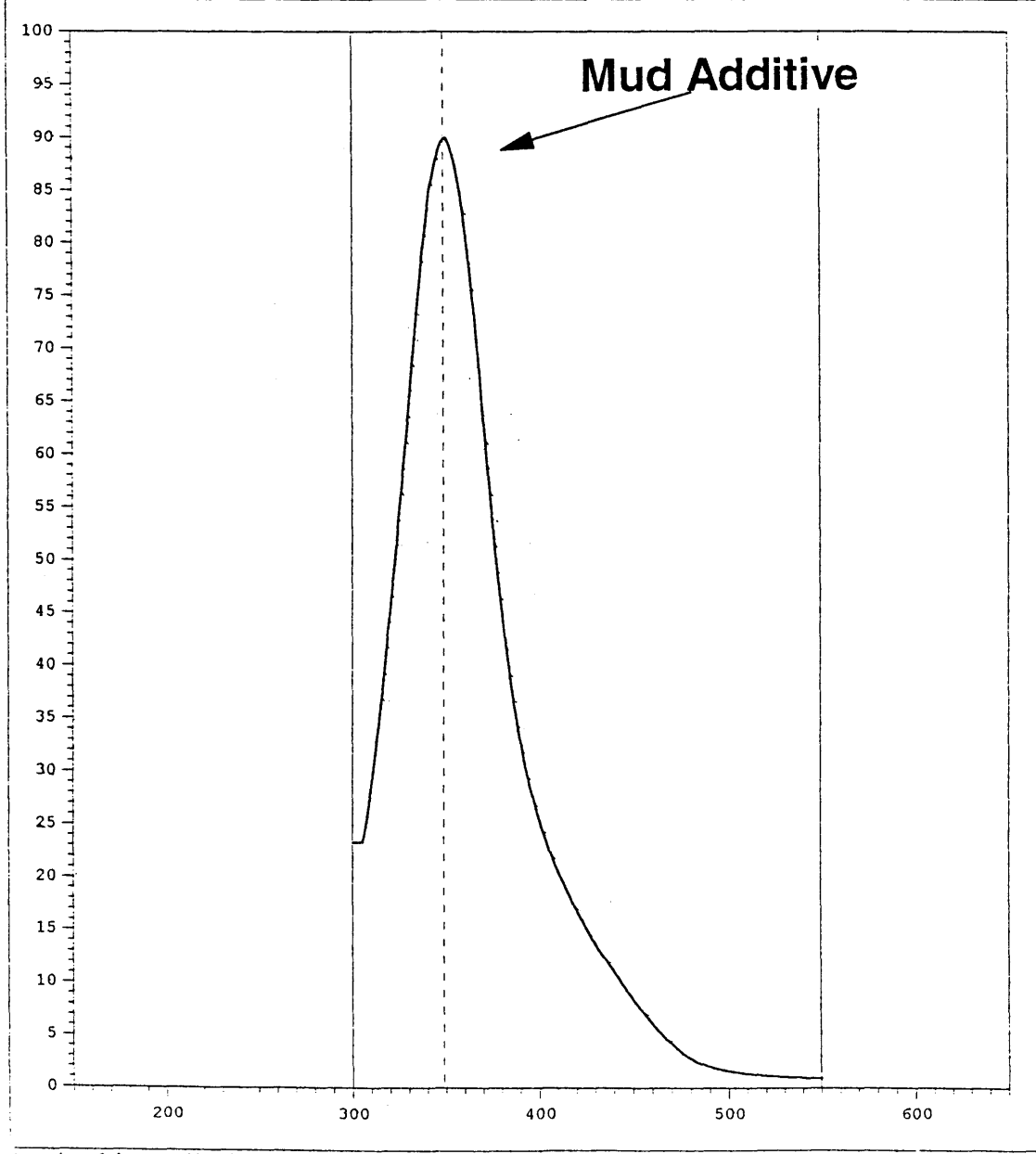
# 16/10-4 (NORWAY)

## S2 PYROGRAM - 1780 m

Job NORVEG2 (RE2)

S2 update : Pyrolysis 1780\_TQ2

Parameter	Initial	Corrected
Lower limit	300.00	
Upper limit	550.00	
S2 lower	0.00	
S2	2.54	
S2 upper	0.00	
Total S2	2.54	
Tpeak	348.99	
Tmax	344.99	



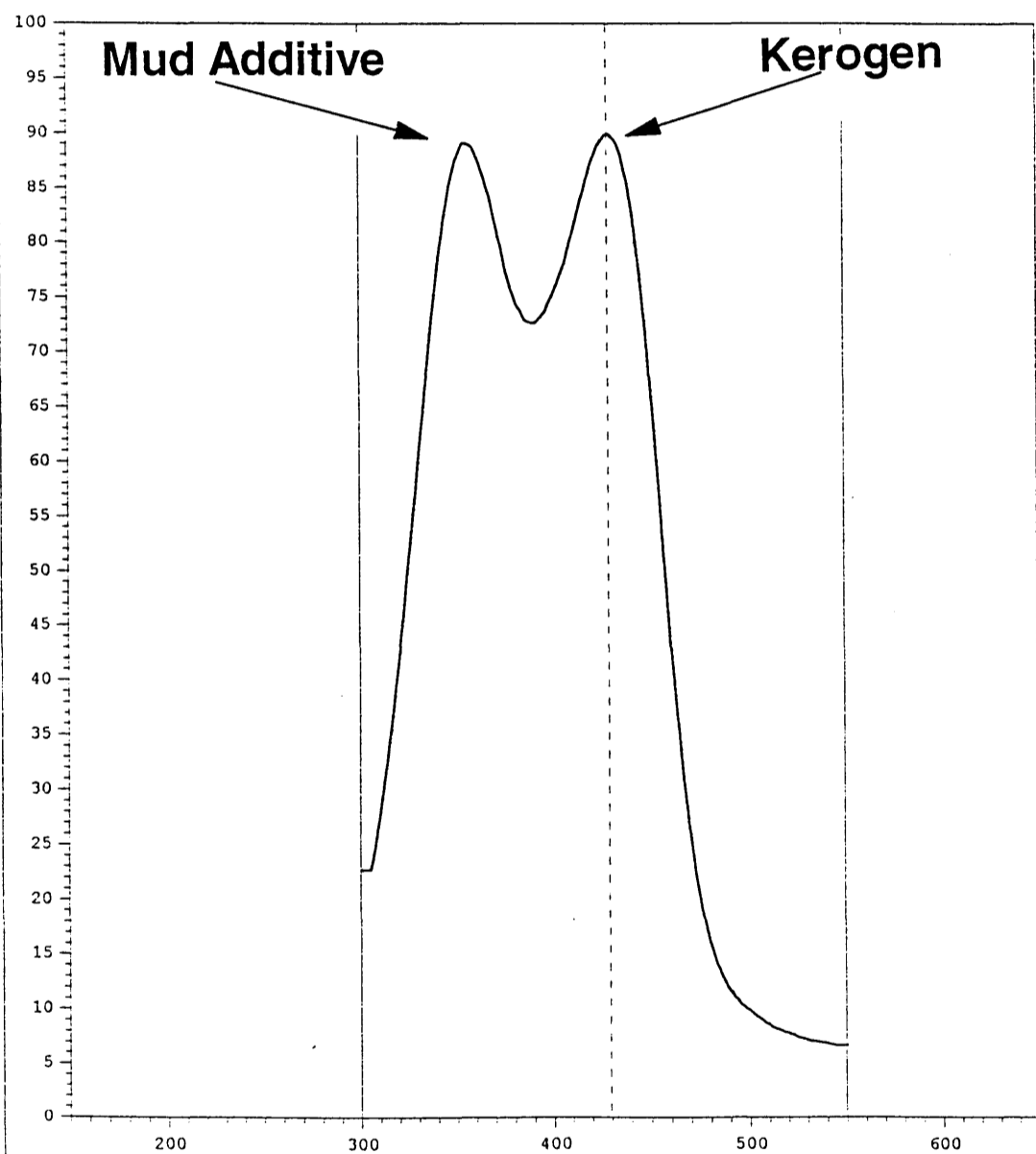
# 16/10-4 (NORWAY)

## S2 PYROGRAM - 1810 m

Job NORVEG\_3 (RE2)

S2 update : Pyrolysis 1810\_TQ

Parameter	Initial	Corrected
Lower limit	300.00	300.00
Upper limit	550.00	550.00
S2 lower	0.00	0.00
S2	1.43	1.43
S2 upper	0.00	0.00
Total S2	1.43	1.43
Tpeak	392.96	429.40
Tmax	388.96	425.40



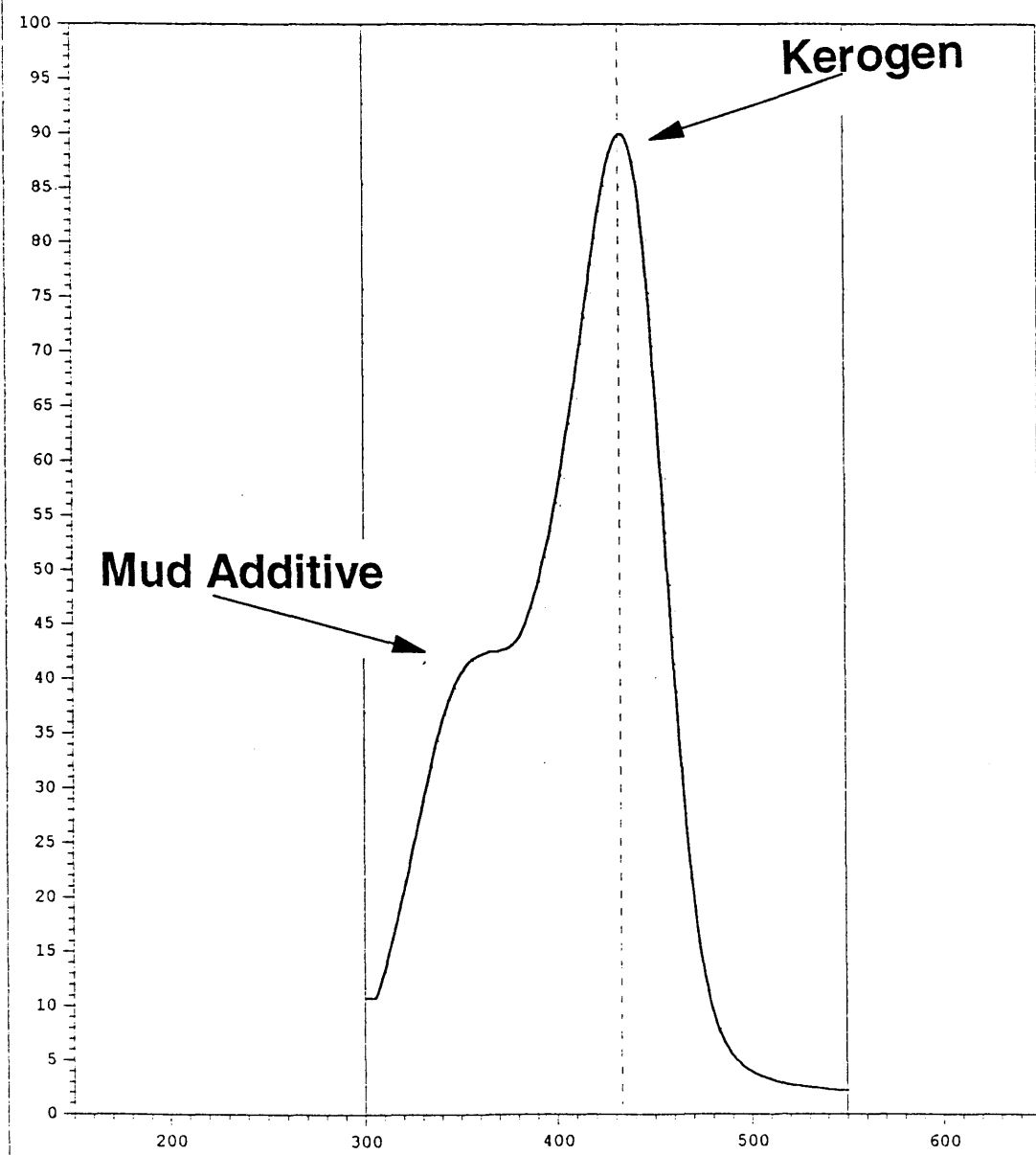
# 16/10-4 (NORWAY)

## S2 PYROGRAM - 1820 m

Job NORVEG\_3 (RE2)

S2 update : Pyrolysis 1820\_TQ

Parameter	Initial	Corrected
Lower limit	300.00	
Upper limit	550.00	
S2 lower	0.00	
S2	1.91	
S2 upper	0.00	
Total S2	1.91	
Tpeak	433.17	
Tmax	429.17	





## 16/10-4 (NORWAY) GEOCHEMICAL STUDY

### T.O.C and PYROLYSIS ROCK-EVAL

Depth m	Sample Type	TOC %	S1 mg/g	S2 mg/g	(S1+S2) ex mg/g	Tmax °C	PI
1780,00	CU	0,85	0,87	2,54		345	0,26
1780,00	CU-WS		0,85	2,58	-0,02	347	0,25
1790,00	CU	0,8	0,76	2,06		344	0,27
1790,00	CU-WS		0,79	2,23	-0,20	346	0,26
1800,00	CU	1,5	1,11	3,35		428	0,25
1800,00	CU-WS		1,05	3,29	0,12	424	0,24
1810,00	CU	0,75	0,38	1,43		424	0,21
1810,00	CU-WS		0,33	1,57	-0,09	424	0,17
1820,00	CU	1,48	0,40	1,91		429	0,17
1820,00	CU-WS		0,29	1,88	0,14	428	0,13
1830,00	CU	1,55	0,76	3,52		426	0,18
1830,00	CU-WS		0,63	3,39	0,26	425	0,16
1840,00	CU	1,22	0,95	2,71		420	0,26
1840,00	CU-WS		0,85	2,57	0,24	418	0,25
1850,00	CU	1,14	0,80	2,09		351	0,28
1850,00	CU-WS		0,72	1,96	0,21	355	0,27
1860,00	CU	0,55	0,48	1,29		348	0,27
1860,00	CU-WS		0,52	1,29	-0,04	349	0,29
1870,00	CU	1,54	0,55	3,63		366	0,13
1870,00	CU-WS		0,51	3,58	0,09	367	0,12
1880,00	CU	0,75	0,35	1,54		357	0,19
1880,00	CU-WS		0,34	1,55	0,00	357	0,18
1890,00	CU	0,83	0,31	1,29		356	0,19
1890,00	CU-WS		0,37	1,35	-0,12	356	0,22
1900,00	CU	0,5	0,27	1,23		368	0,18
1900,00	CU-WS		0,34	1,33	-0,17	369	0,20
2400,00	CU	0,15	0,09	0,19		363	0,32
2400,00	CU-WS		0,07	0,21	0,00	354	0,25
2410,00	CU	0,15	0,07	0,23		381	0,23
2410,00	CU-WS		0,07	0,26	-0,03	385	0,21
2420,00	CU	0,31	0,08	0,24		418	0,25
2420,00	CU-WS		0,07	0,22	0,03	401	0,24
2430,00	CU	0,31	0,09	0,25		410	0,26
2430,00	CU-WS		0,08	0,24	0,02	402	0,25
2440,00	CU	0,09	0,10	0,11		383	0,48





## 16/10-4 (NORWAY) GEOCHEMICAL STUDY

### T.O.C and PYROLYSIS ROCK-EVAL

Depth m	Sample Type	TOC %	S1 mg/g	S2 mg/g	(S1+S2) ex mg/g	Tmax °C	PI
2440,00	CU-WS		0,09	0,10	0,02	376	0,47
2450,00	CU	4,12	1,03	20,88		421	0,05
2460,00	CU	6,91	2,34	34,82		421	0,06
2470,00	CU	12	5,49	64,60		417	0,08
2477,00	CU	1,45	0,33	4,38		423	0,07
2478,00	CORE	0,22	0,60	0,64		431	0,48
2478,00	CORE-WS		0,22	0,44	0,58	426	0,33
2479,00	CORE	0,1	0,27	0,27		349	0,50
2479,00	CORE-WS		0,20	0,22	0,12	366	0,48
2480,00	CORE	0,27	0,88	0,73		437	0,55
2480,00	CORE-WS		0,11	0,24	1,26	424	0,31
2481,00	CORE	0,08	0,30	0,26		339	0,54
2481,00	CORE-WS		0,23	0,22	0,11	345	0,51
2482,00	CORE	0,11	0,32	0,28		384	0,53
2482,00	CORE-WS		0,21	0,24	0,15	382	0,47
2483,00	CORE	0,14	0,36	0,36		431	0,50
2483,00	CORE-WS		0,10	0,24	0,38	430	0,29
2484,00	CORE	0,22	0,45	0,67		433	0,40
2484,00	CORE-WS		0,16	0,43	0,53	426	0,27
2485,00	CORE	0,14	0,39	0,55		430	0,41
2485,00	CORE-WS		0,10	0,27	0,57	386	0,27
2486,00	CORE	0,15	0,37	0,59		383	0,39
2486,00	CORE-WS		0,23	0,42	0,31	355	0,35
2487,00	CORE	0,11	0,42	0,55		394	0,43
2487,00	CORE-WS		0,14	0,30	0,53	376	0,32
2488,00	CORE	0,23	0,60	0,72		438	0,45
2488,00	CORE-WS		0,17	0,49	0,66	446	0,26
2489,00	CORE	0,14	0,24	0,43		415	0,36
2489,00	CORE-WS		0,15	0,31	0,21	379	0,33
2490,00	CORE	0,04	0,19	0,13		354	0,59
2490,00	CORE-WS		0,15	0,11	0,06	353	0,58
2491,00	CORE	0,11	0,16	0,39		402	0,29
2491,00	CORE-WS		0,15	0,33	0,07	365	0,31
2492,00	CORE	0,3	0,34	0,60		421	0,36
2492,00	CORE-WS		0,27	0,39	0,28	373	0,41
2493,00	CORE	0,18	0,25	0,76		416	0,25
2493,00	CORE-WS		0,18	0,65	0,18	414	0,22
2494,00	CORE	0,34	0,68	1,09		430	0,38
2494,00	CORE-WS		0,16	0,65	0,96	418	0,20
2495,00	CORE	0,35	0,28	0,78		426	0,26
2495,00	CORE-WS		0,17	0,60	0,29	427	0,22



## 16/10-4 (NORWAY) GEOCHEMICAL STUDY

### T.O.C and PYROLYSIS ROCK-EVAL

Depth m	Sample Type	TOC %	S1 mg/g	S2 mg/g	(S1+S2) ex mg/g	Tmax °C	PI
2496,00	CORE	0,24	0,84	0,84		440	0,50
2496,00	CORE-WS		0,23	0,36	1,09	387	0,39
2497,00	CORE	0,2	0,23	0,74		545	0,24
2497,00	CORE-WS		0,11	0,55	0,31	545	0,17
2498,00	CORE	0,58	0,62	1,15		425	0,35
2498,00	CORE-WS		0,18	0,61	0,98	422	0,23
2499,50	CORE	0,1	0,20	0,22		346	0,48
2499,50	CORE-WS		0,10	0,13	0,19	365	0,43
2500,00	CU	1,22	0,23	4,34		423	0,05
2510,00	CU	1,03	0,27	3,07		427	0,08
2520,00	CU	0,45	0,07	1,05		425	0,06
2530,00	CU	0,47	0,07	1,01		429	0,06
2545,00	CU	0,4	0,06	0,75		429	0,07
2550,00	CU	0,41	0,09	0,74		428	0,11

(S1+S2)ex = (original S1+S2) - (S1+S2 after washing by organic solvent) = hydrocarbons extractable by organic solvent

CU = Cutting

WS = Samples washed by organic solvent

**Annex 2**  
**GC-MS Analysis**  
**(Biomarker Characterisation)**

## LEGENDA

### GC-MS PARAMETERS

#### Terpanes (m/z 191.2)

1.	Tri	(C23-Tricyclic Terpene) / (Hopane)
2.	Tet	(C24- Tetracyclic Terpene) / (Hopane)
3.	Trit	(C23-Tricyclic Terpene) / (C24- Tetracyclic Terpene)
4.	TsTm	(18 $\alpha$ ,22,29,30- Trisnorhopane) / (17 $\alpha$ ,22,29,30- Trisnorhopane)
5.	29/30	(C29-Norhopane) / (Hopane)
6.	29Ts	(18 $\alpha$ (H)-30-Norhopane) / (Hopane)
7.	C30*	(17 $\alpha$ (H)-Diahopane) / (Hopane)
8.	Ole	(Oleanane) / (Hopane)
9.	29Ts/C30*	(18 $\alpha$ (H)-30-Norhopane) / (17 $\alpha$ (H)-Diahopane)
10.	Lin	(30-Norhopane) / (Hopane)
11.	Bac	(Baccharane) / (Hopane)
12.	Gam	(Gammacerane) / (Hopane)
13.	S/S+R	(C31-22(S)-Hopanes) / (C31-22(S+R)-Hopanes)
14.	31/30	(C31-22(S+R)-Hopanes) / (Hopane)
15.	34/33	(C34-22(S+R)-Hopanes) / (C33-22(S+R)-Hopanes)
16.	35/34	(C35-22(S+R)-Hopanes) / (C34-22(S+R)-Hopanes)
17.	26/25Tri	(C26- Tricyclic Terpene)/( C25- Tricyclic Terpene)
18.	28,30-BNH	28,30-Bisnorhopane/ (Hopane)
19.	TNH	25,28,30-Trisnorhopane (Present/Absent)

#### Steranes (m/z 217.2 and 218.2)

1.	Dia	(C27-Diasteranes) / (C27-Diasteranes + C27-Steranes)
2.	S/S+R	(C29- $\alpha\alpha\alpha$ -20(S)-Sterane) / (C29- $\alpha\alpha\alpha$ -20(S+R)-Steranes)
3.	BB/aa	(C29- $\alpha\beta\beta$ -20(S+R)- Steranes) / (C29- $\alpha\beta\beta$ -20(S+R)- Steranes) + (C29- $\alpha\alpha\alpha$ -20(S+R)- Steranes)
4.	%27	(C27- $\alpha\beta\beta$ -20(S+R)- Steranes) / (C27+C28+C29) $\alpha\beta\beta$ -20(S+R)- Steranes
5.	%28	(C28- $\alpha\beta\beta$ -20(S+R)- Steranes) / (C27+C28+C29) $\alpha\beta\beta$ -20(S+R)- Steranes
6.	%29	(C29- $\alpha\beta\beta$ -20(S+R)- Steranes) / (C27+C28+C29) $\alpha\beta\beta$ -20(S+R)- Steranes
7.	27/29	(C27- $\alpha\beta\beta$ -20(S+R)- Steranes) / (C29- $\alpha\beta\beta$ -20(S+R)- Steranes)
8.	ST/TT	Steranes / Terpanes
9.	C30Ster	C30 Steranes (Present/Absent)
10.	Methylsteranes	Present/Absent

#### Aromatic Biomarkers

1.	MPI	Methylphenanthrene Index1= (1.5(2-MP + 3-MP) / (P+1-MP+9MP)
2.	T/TM	Sterane Aromatization = (20R-Triaromatic) / (20R-Monoaromatic)

### BULK AND GC PARAMETERS

1.	%SAT	Percent Composition
2.	%ARO	Percent Composition
3.	%NSO	Percent Composition
4.	PrC17	Pristane / n-C17
5.	PhC18	Phytane / n-C18
6.	PrPh	Pristane / Phytane
7.	OEP	Odd Even Predominance

**WELL 16/10-4 (NORWAY)**  
**GEOCHEMICAL STUDY - MOLECULAR PARAMETERS**

	Well	16/10-4	16/10-4	16/10-4
	Depth (m)	2470,0	2480,0	2496,0
	Type	Cuttings	Core	Core
GC parameters	Pr/C17	1,35	n.d.	n.d.
	Ph/C18	1,34	n.d.	n.d.
	PrPh	1,06	n.d.	n.d.
Terpanes	Tri	0,00	0,00	0,00
	Tet	0,00	0,00	0,00
	Trit	0,00	0,00	0,00
	TsTm	0,14	0,55	0,50
	28,30-BNH	1,30	0,11	0,08
	TNH	n.d.	Yes	Yes
	29/30	0,32	0,60	0,77
	29Ts	0,09	0,14	0,16
	C30*	0,05	0,04	0,07
	29Ts/C30*	1,89	3,40	2,29
	Bac	0,00	0,00	0,00
	Lin	0,00	0.11 (?)	0.15 (?)
	Gam	0,00	0,00	0,00
	Ole	0,00	0,00	0,00
	S/S+R	0,55	0,64	0,59
	31/30	0,56	0,82	0,78
Steranes	Dia	0,84	0.39 (?)	0.53 (?)
	S/S+R	0,27	0,45	0,45
	BB/aa	0,33	0,60	0,58
	%27	36	29	30
	%28	36	33	32
	%29	28	38	38
	27/29	1,28	0,75	0,78
	Methylste	Yes	Yes	Yes
	C30Ster	Yes	Yes	Yes
Aromatics	MPI	0,46	n.c.	n.c.
	T/TM	0,42	n.c.	n.c.
	Notes:		Paraffin contamination	Paraffin contamination

**Annex 3**  
**Head Space Analysis**



Bulletin N. 111/98

CHEMICAL ANALYSIS OF HEAD SPACE

WELL :16/10-4 (Norway)

Samples from m 1400 to m 2580

Depth (m)	C1	C2	C3	i-C4	n-C4	i-C5	n-C5	C6+	%CH <sub>4</sub>	ppb	i/n-C4
	%	%	%	%	%	%	%	%	Tot. vol.	CH <sub>4</sub>	
1400	66.94	20.20	10.51	0.99	0.57	0.47	0.32		0.36	623.61	1.74
1500	34.00	13.40	30.09	7.99	9.98	2.86	1.68		0.05	105.53	0.80
1600	21.29	14.37	35.50	7.44	13.36	4.07	3.36	0.61	0.04	68.54	0.56
1700	8.43	9.47	28.79	8.82	23.10	7.86	9.92	3.61	0.12	305.29	0.38
1800	7.70	3.27	14.94	7.91	23.87	15.21	15.04	12.06	0.23	534.25	0.33
1900	36.27	8.77	16.82	5.02	13.22	6.01	8.05	5.84	0.17	370.65	0.38
2000	48.65	7.95	13.33	3.95	10.09	4.56	6.28	5.19	0.11	143.44	0.39
2100	49.14	9.88	14.02	3.57	9.50	4.09	5.54	4.26	0.13	187.83	0.38
2200	69.28	3.87	7.65	2.18	5.91	3.24	4.54	3.33	0.04	46.78	0.37
2300	29.59	4.44	14.17	5.46	16.58	8.71	12.41	8.64	0.01	8.41	0.33
2400	86.61	4.01	3.39	0.98	1.91	1.08	2.02		0.01	17.51	0.51
2405	81.79	5.20	4.62	1.05	2.73	2.06	2.55		0.02	26.35	0.38
2410	45.57	8.79	9.15	11.16	11.00	7.16	5.65	1.52	0.03	48.17	1.01
2415	55.33	5.73	8.89	6.94	10.33	6.35	4.99	1.44	0.03	51.1	0.67
2420	45.57	13.13	18.99	4.75	10.40	3.82	2.52	0.82	0.35	646.4	0.46
2425	59.43	10.65	13.12	3.36	7.32	3.14	2.12	0.86	0.50	777.2	0.46
2430	65.92	4.48	6.49	3.87	7.32	5.23	4.62	2.07	0.03	34.9	0.53
2435	59.64	5.57	8.03	5.09	9.11	5.73	5.03	1.80	0.03	26.9	0.56
2440	52.65	4.67	8.77	4.83	10.82	6.83	7.56	3.87	0.02	27.8	0.45
2445	54.96	7.00	10.04	3.77	9.78	5.31	5.91	3.23	0.04	45.5	0.39
2450	41.87	11.43	19.46	4.93	10.93	5.33	3.28	2.77	0.32	494.5	0.45
2455	48.56	11.80	18.27	4.01	9.07	4.01	2.54	1.74	0.56	1068.9	0.44
2460	49.50	11.27	17.68	3.80	9.11	3.95	2.83	1.86	1.23	2528.5	0.42
2465	45.83	11.42	19.37	4.23	9.86	4.21	3.07	2.01	1.22	2150.5	0.43
2470	64.46	8.55	11.88	2.61	6.06	2.77	2.18	1.49	4.57	4989.3	0.43
2475	30.69	8.45	21.69	5.77	14.70	7.82	5.63	5.25	0.24	1170.0	0.39
2485	17.85	4.21	18.19	7.95	20.89	12.99	9.35	8.57	0.04	104.7	0.38
2490	31.06	4.06	14.25	6.33	17.27	11.43	8.20	7.40	0.04	41.6	0.37
2495	25.38	3.69	15.64	7.48	19.95	12.27	8.65	6.94	0.04	27.2	0.37
2500	15.33	3.41	15.51	7.85	21.27	15.19	11.09	10.35	0.01	9.7	0.37
2505	62.51	8.67	13.03	2.82	6.64	2.94	2.02	1.37	1.29	1196.1	0.42
2510	50.27	9.35	16.60	3.81	9.48	4.56	3.15	2.78	0.27	452.1	0.40
2520	31.27	7.37	19.59	5.79	15.55	8.64	6.06	5.73	0.04	39.2	0.37
2525	29.41	6.46	18.30	6.51	16.64	9.69	7.15	5.84	0.05	21.9	0.39
2530	43.12	7.77	16.60	4.96	12.62	6.78	4.93	3.22	0.21	69.7	0.39
2535	38.14	7.35	17.04	5.13	13.99	7.80	5.75	4.80	0.07	93.1	0.37
2545	41.81	8.46	17.86	4.83	12.60	6.44	4.75	3.25	0.17	154.1	0.38
2550	41.85	6.14	14.64	4.91	13.30	8.24	6.69	4.23	0.06	29.0	0.37
2555	21.26	10.32	27.37	6.96	16.79	8.12	5.57	3.61	0.17	98.4	0.41
2560	22.53	8.53	25.42	8.31	17.44	8.94	5.47	3.36	0.10	94.9	0.48



Bulletin N. 111/98

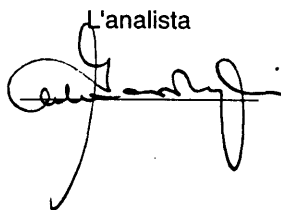
CHEMICAL ANALYSIS OF HEAD SPACE

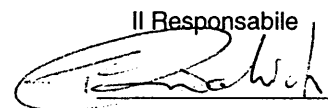
WELL :16/10-4 (Norway)

Samples from m 1400 to m 2580

Depth (m)	C1	C2	C3	i-C4	n-C4	i-C5	n-C5	C6+	%CH <sub>4</sub>	ppb	i/n-C4
	%	%	%	%	%	%	%	%	Tot. vol.	CH <sub>4</sub>	
2565	31.75	8.05	21.03	6.95	15.88	8.12	5.34	2.88	0.11	77.2	0.44
2570	39.59	7.28	17.52	6.03	13.29	7.67	4.95	3.67	0.06	42.1	0.45
2575	41.43	8.20	17.66	5.11	12.66	6.77	4.64	3.53	0.07	50.7	0.40
2580	41.98	8.71	18.17	5.21	12.66	6.38	4.27	2.62	0.19	130.5	0.41

Note: n.d. = not determinable  
n.m. = not measured

L'analista  


Il Responsabile  






ENI S.p.A.  
Divisione Agip

S.Donato Milanese, 24.11.1998

Bulletin N. 111/ISO

ISOTOPIC ANALYSIS

WELL :16/10-4 (Norway) Head-space

samples from m 1400 to m 2580

Depth (m)	$\delta^{13}\text{C}$ C1	$\delta^{13}\text{C}$ C2	$\delta^{13}\text{C}$ C3	$\delta^{13}\text{C}$ i-C4	$\delta^{13}\text{C}$ n-C4	$\delta^{13}\text{C}$ i-C5	$\delta^{13}\text{C}$ n-C5	$\delta^{13}\text{C}$ CO2
1400	-49.63	-27.13	-28.33	-30.60		-33.78		-4.51
1800	-45.02	-25.67	-26.94	-27.37	-29.04	-27.19	-29.35	-14.41
2420	-55.73	-30.14	-31.60	-30.55	-34.54	-28.33	-33.14	-10.32
2450	-60.13	-34.15	-35.63	-33.17	-34.93	-30.07	-34.70	
2460	-58.98	-37.19	-36.45	-33.93	-34.53	-30.28	-34.38	
2470	-59.27	-37.21	-35.48	-33.42	-33.37	-29.39		-9.67
2505	-59.43	-36.98	-35.60	-33.41	-33.77	-29.75	-33.72	-9.72
2530	-59.97	-34.98	-33.87	-33.69	-29.81			-13.77
2555	-60.61	-37.05	-35.62	-32.58	-33.56	-28.87	-33.23	
2580	-60.98	-37.06	-35.63	-33.23	-34.28	-29.92	-35.47	-17.50

Data expressed in per mil vs. PDB Standard.

L'analista

Il Responsabile

## Technical Note

PL101 - Norway

Geochemical analysis of two water samples

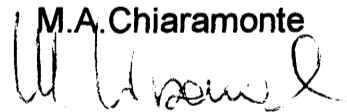
16/10-3 . 8 16/7-6

Edited by R.Galimberti and T.Ricchiuto

S.Donato Mil.se, 31/8/99

Geochemistry

M.A.Chiamonte



## Introduction

Two water samples coming from the wells 16/10-3 and 16/7-6 have been analysed to verify the possible presence of phenol: an indicator of oil-water interaction.

A genetic characterisation of the traces of dispersed hydrocarbons (HC) has been achieved through an extraction/concentration procedure.

The isotopic analysis of Oxygen and Hydrogen/Deuterium has been performed with the aim of defining the origin of the water (formation or meteoric water).

The new data have been integrated with the results obtained from the analysis of two water samples coming from the well 16/10-4 (Well 16/10-4 Norway - Reservoir Geochemistry Study; S.Donato Mil.se, 7/1/99).

## Hydrogen and Oxygen Isotopic Analysis

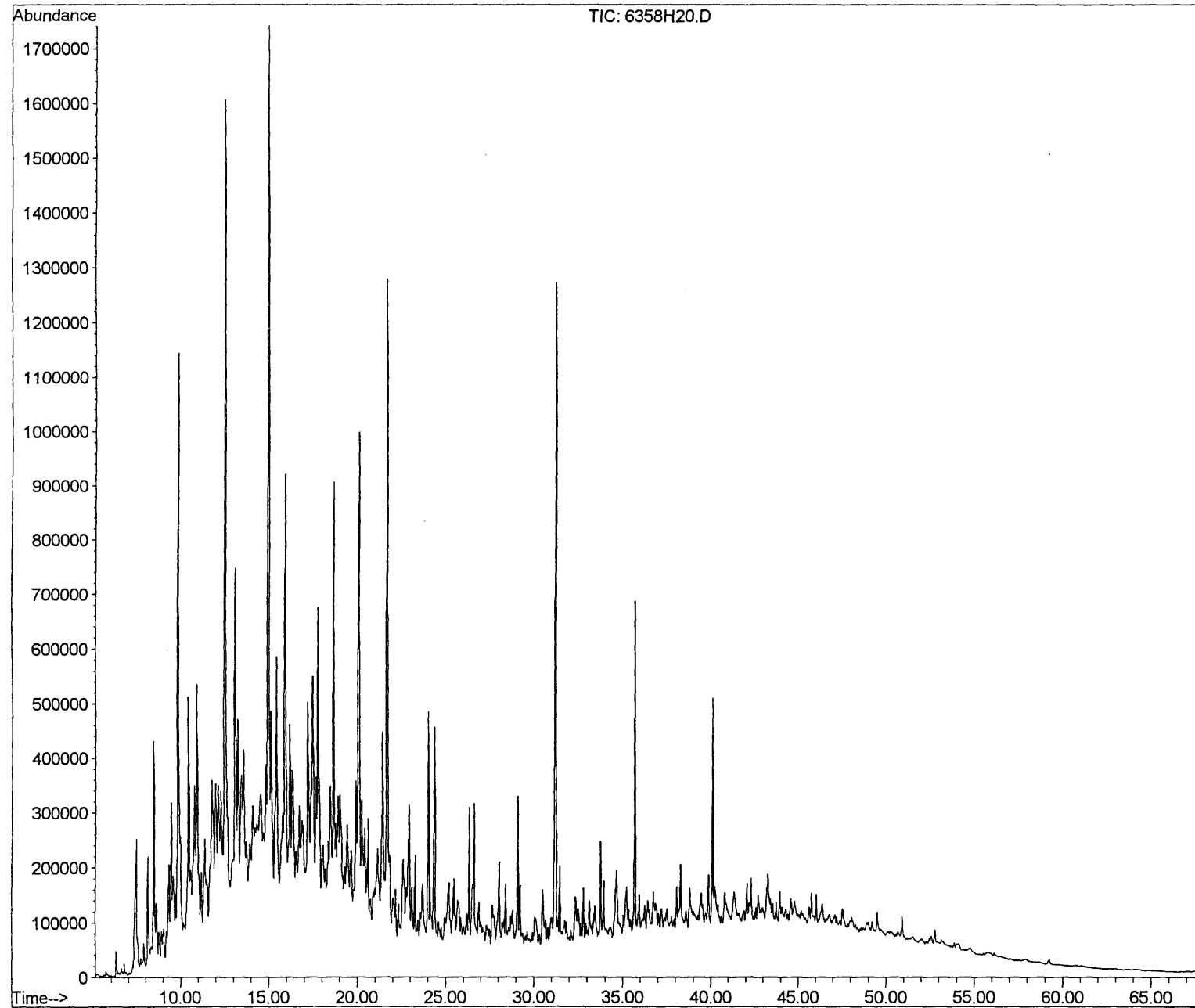
The analysed water samples have the following isotopic values:

Well sample	$\delta^{18}\text{O}$	$\delta \text{D}$
16/10-3	-3.13	***
16/7-6	0.28	-29.20
16/10-4 (FMT m 2491)	0.91	-7.57

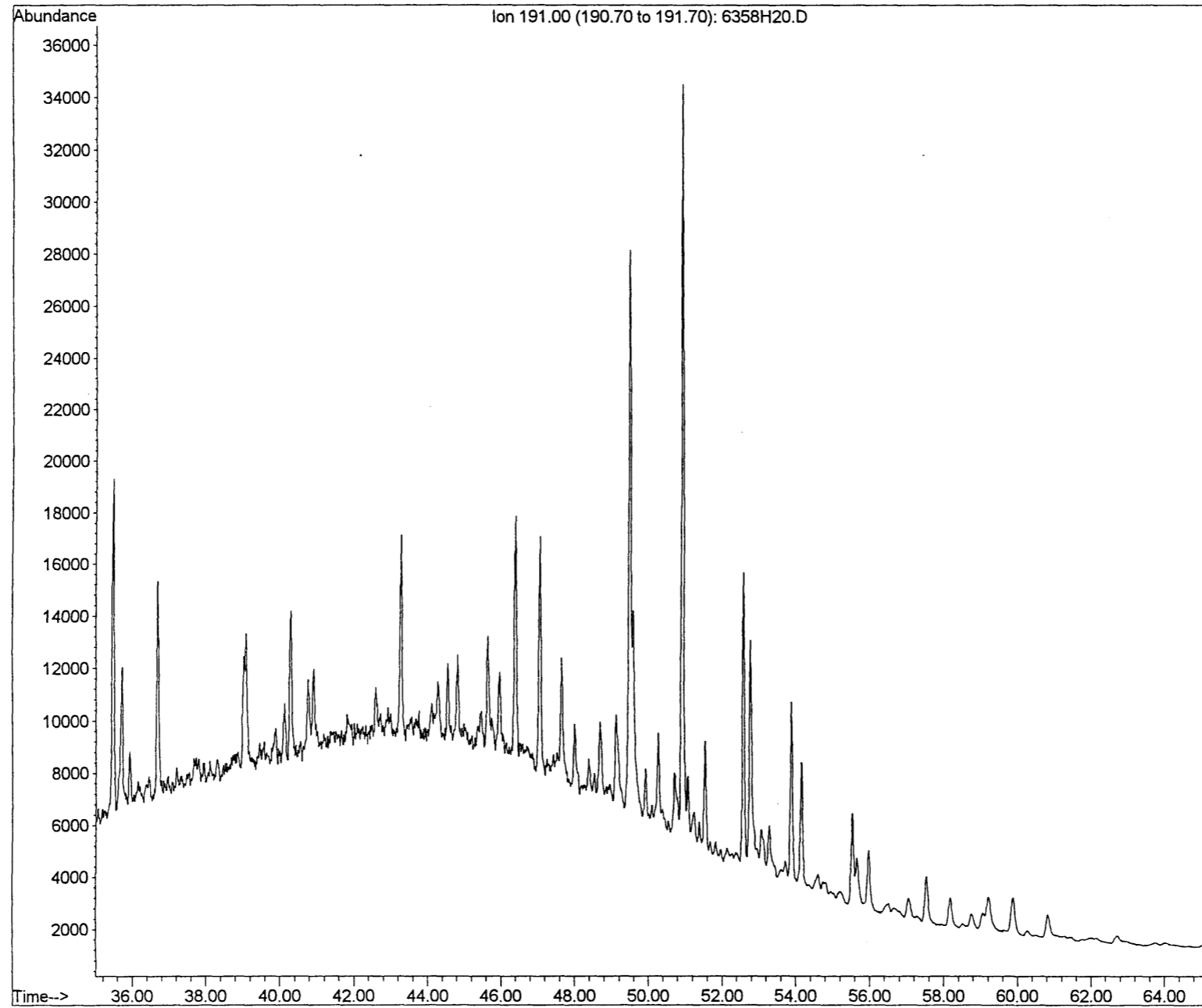
### Phenol concentration

The concentration of phenol in the water samples is reported in the following table; an additional sample of pure (distilled) water has been analysed to define the possible artefact formation during the procedure:

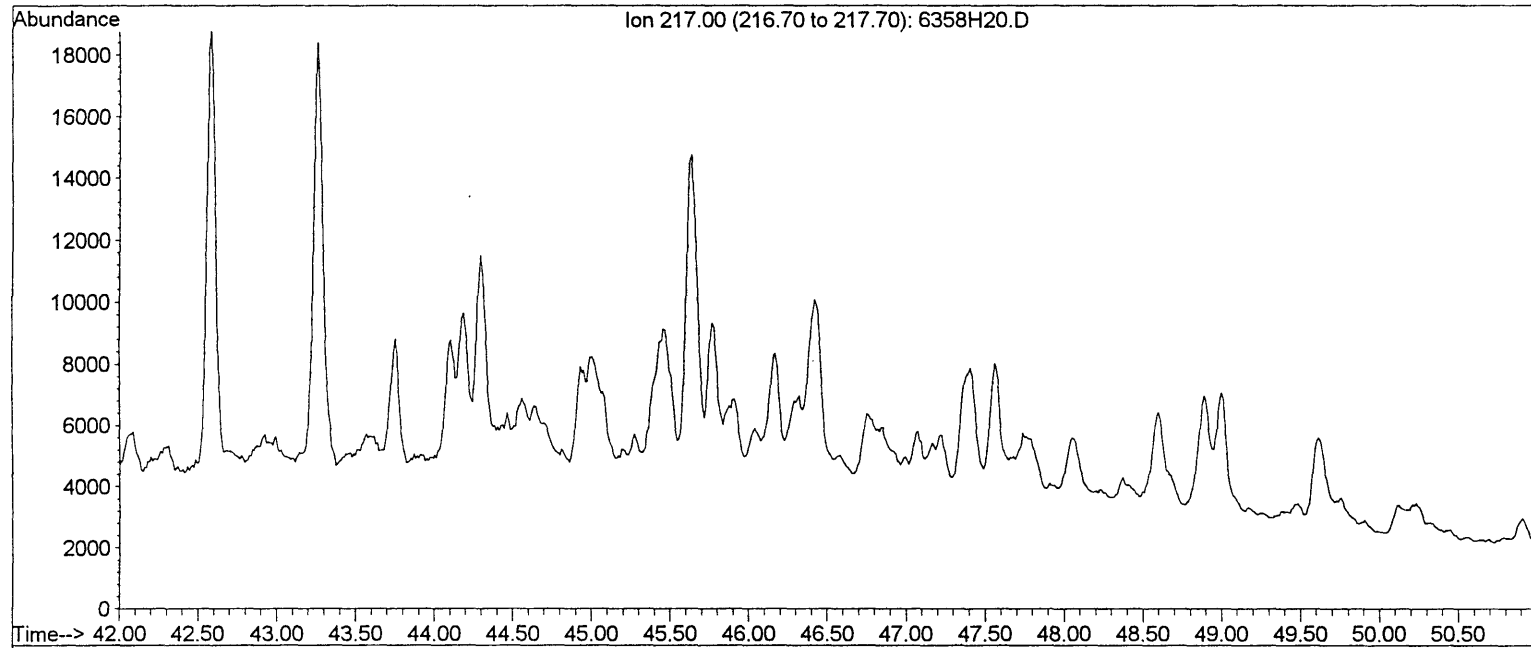
Well sample	Phenol (ppm)
16/10-3	1.49
16/7-6	0.14
16/10-4 (FMT m2491) "a"	0.70
16/10-4 (FMT m2491) "b"	2.30
Blank	0.02



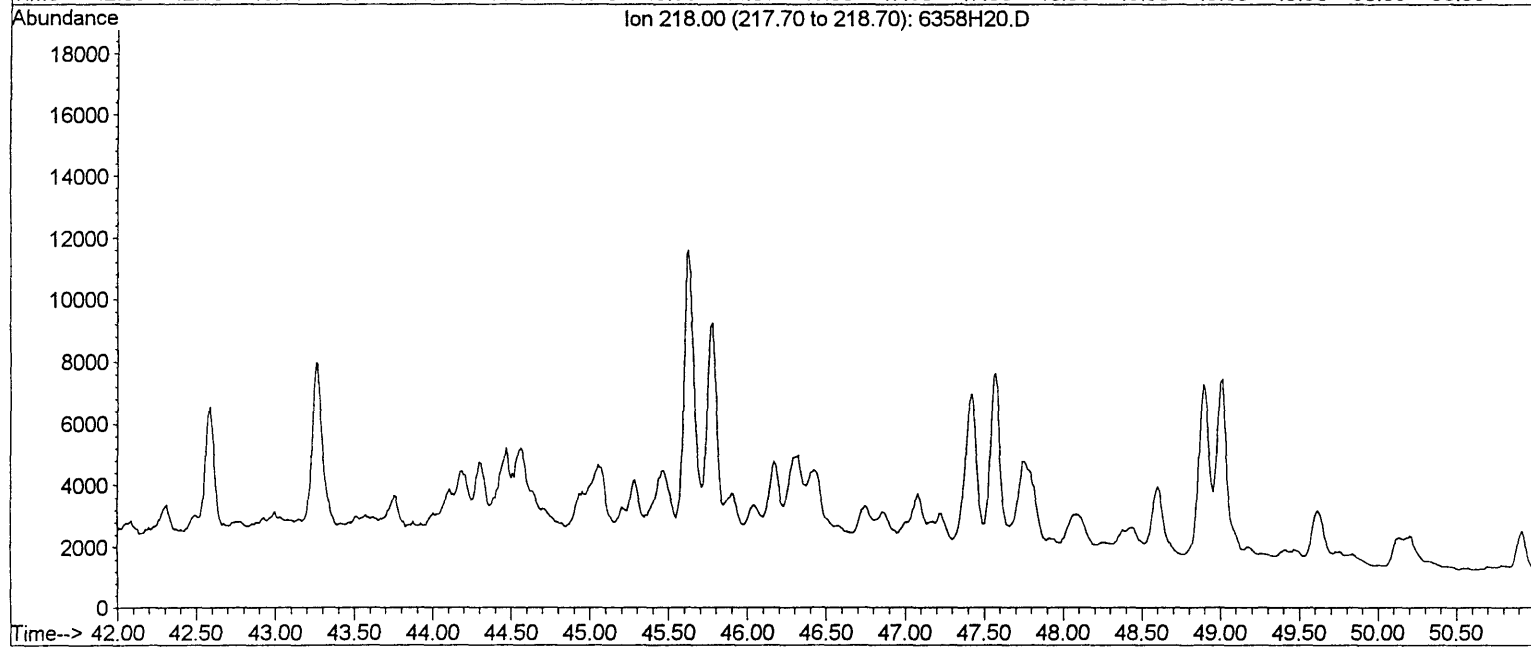
**WELL** 16\10-3  
**TYPE** HC extracted  
from water  
**DEPTH** m 2522

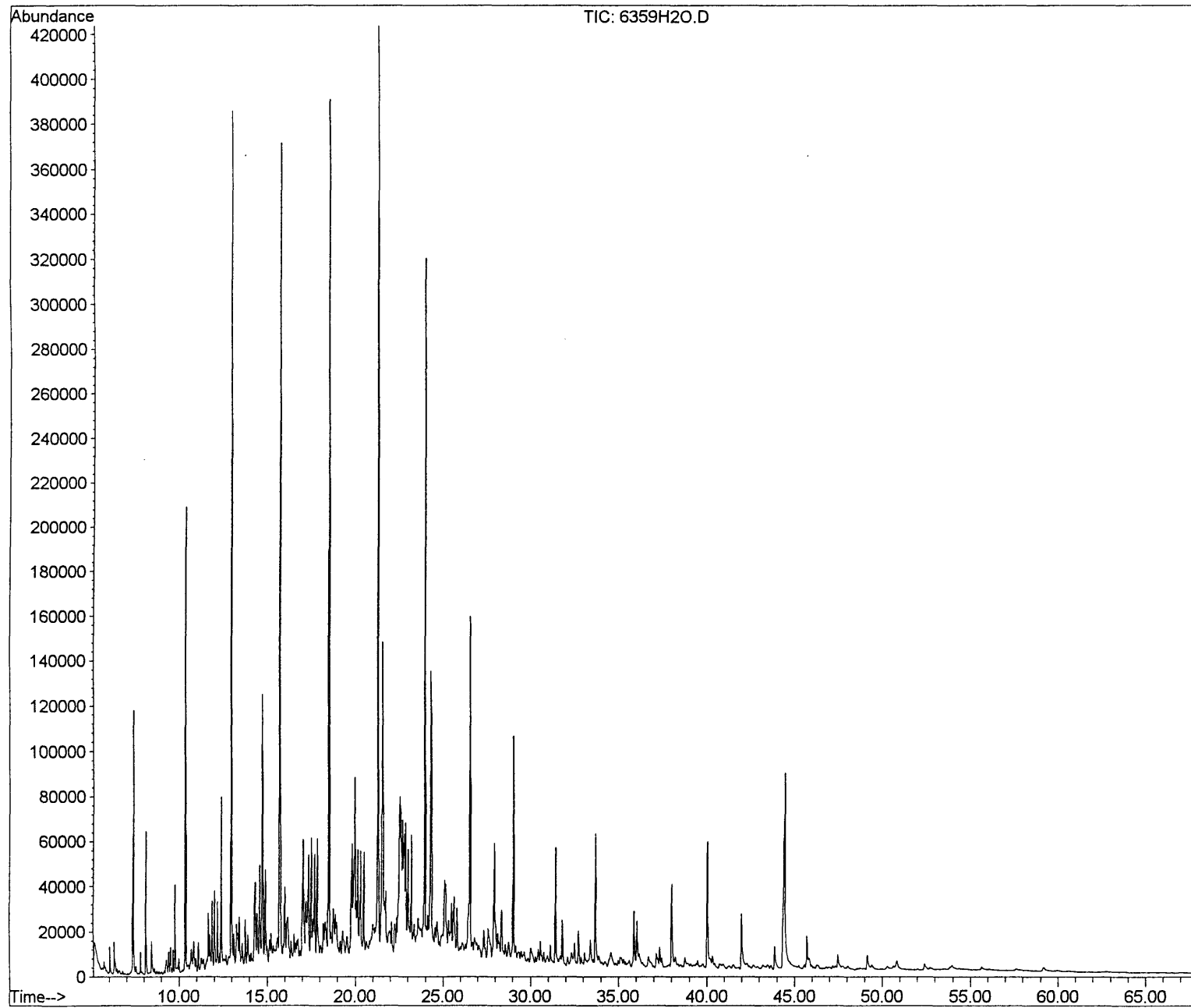


**WELL** 16\10-3  
**TYPE** HC extracted  
from water  
**DEPTH** m 2522



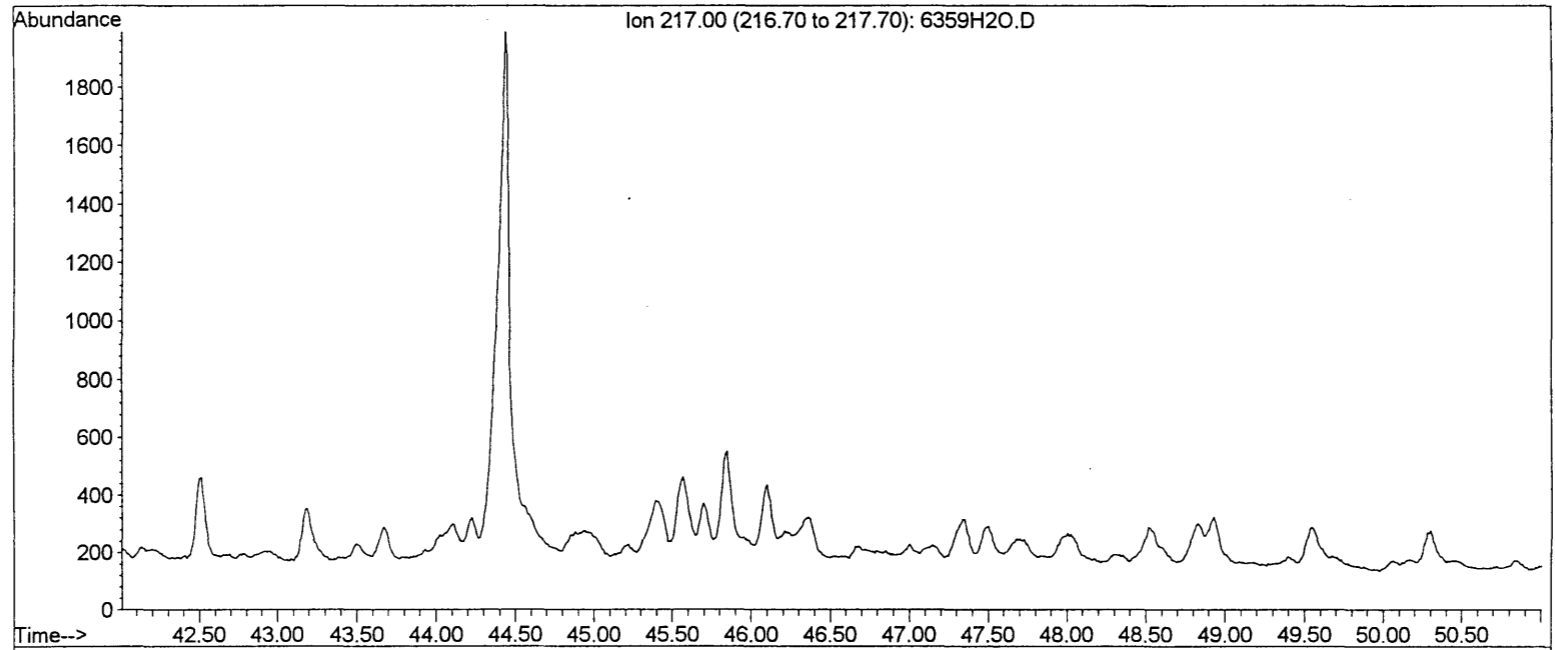
**WELL** 16\10-3  
**TYPE** HC extracted  
from water  
**DEPTH** m 2522



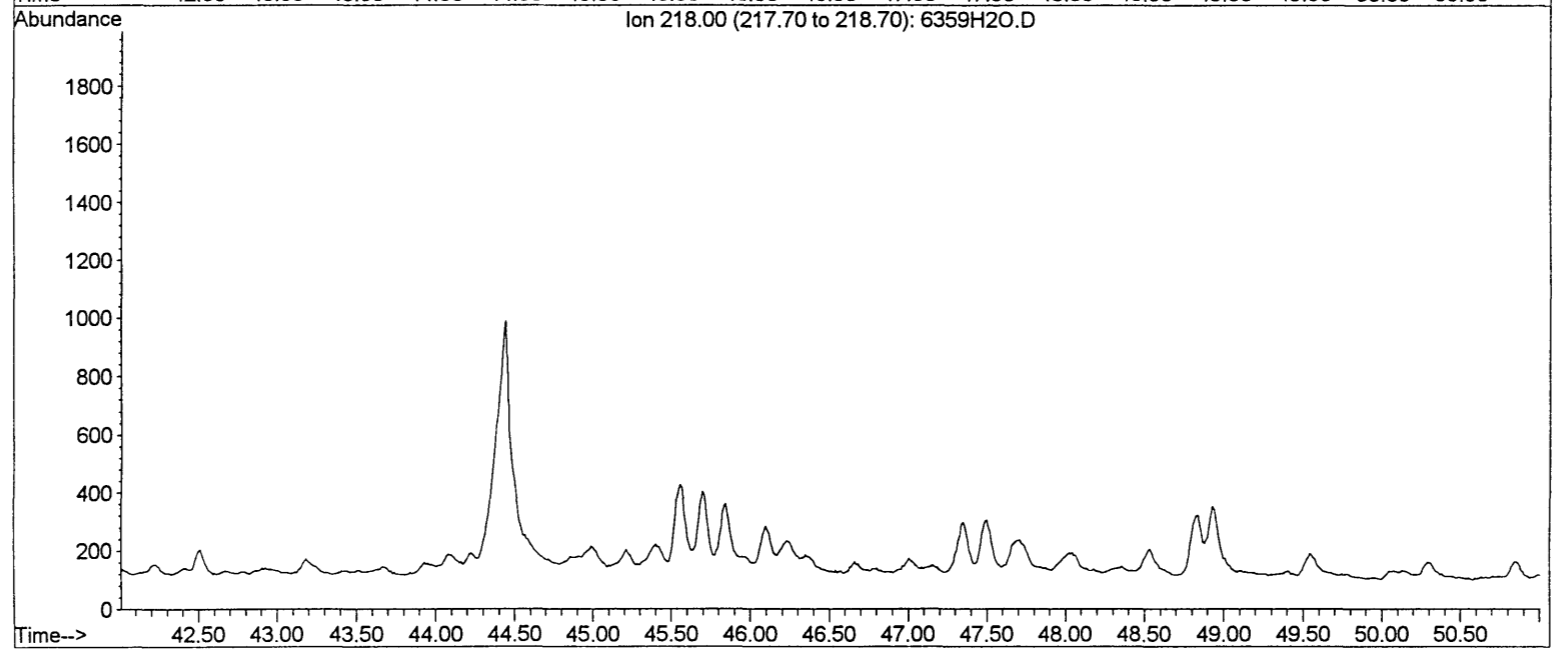


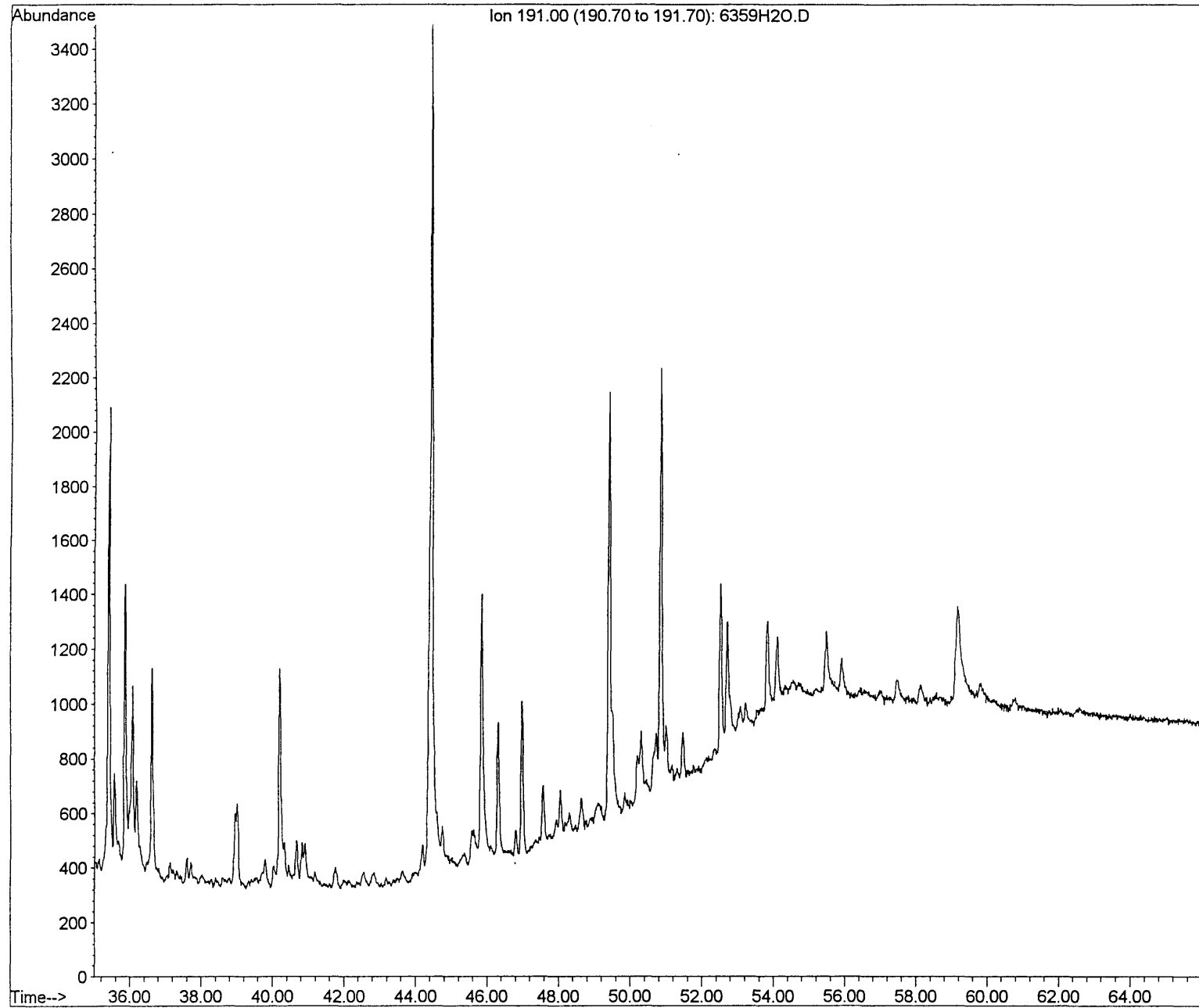
**WELL** 16\7-6  
**TYPE** HC extracted  
from water





**WELL** 16\7-6  
**TYPE** HC extracted from water





**WELL** 1617-6  
**TYPE** HC extracted from water