OPERATOR STATOIL

WELL NO. 6610/7-1

MATERIAL CONSUMPTION & COST ANALYSIS

26" HOLE DRILLED TO 815 Meters ~~Feet~~ 20" CASING SET AT 801 Meters ~~Feet~~

ACTUAL AMOUNT OF HOLE DRILLED 460 Meters ~~Feet~~ DAYS ON INTERVAL 7

DRILLING FLUID SYSTEM SPUD MUD

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	US$ COST
BENTONITE BULK	M/T	40	20	- 20	7,600.00
BARITE BULK	M/T	0	139	+ 139	20,572.00
BENTONITE	50 KG	0	42	+ 42	756.00
CAUSTIC SODA	25 KG	50	124	+ 74	2,480.00
SODA ASH	50 KG	10	5	- 5	105.00
LIGNSULPHONATE	25 KG	20	24	+ 4	468.00
ANCO DETERGENT	200 LTR	3	0	- 3	0

COST/DAY US$ 4.568.71 TOTAL COST FOR INTERVAL US$ 31,981.00

COST/Mt. ~~or Ft.~~ US$ 69.52 PROG. COST FOR INTERVAL US$ 18,258.00

ENGR. COST US$ 5,775.00 COST VARIANCE FOR INTERVAL US$+13,723.00

OPERATOR STATOIL

WELL NO. 6610/7-1

MATERIAL CONSUMPTION & COST ANALYSIS

17 1/2" HOLE DRILLED TO 1265 Meters ~~Feet~~ 13 3/8" CASING SET AT 1252 Meters ~~Feet~~

ACTUAL AMOUNT OF HOLE DRILLED 450 Meters ~~Feet~~ DAYS ON INTERVAL 7

DRILLING FLUID SYSTEM GYP/LIGNOSULPHONATE

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	US$ COST
BENTONITE	M/T	0	34	+ 34	12,920.00
BARITE BULK	M/T	220	250	+ 30	37,000.00
BENTONITE	50 KG	368	0	- 368	0
CHR. LIGNOSULPHONATE	25 KG	275	199	- 76	3,880.50
CAUSTIC SODA	25 KG	60	91	+ 31	1,820.00
SODA ASH	50 KG	25	4	- 21	84.00
GYPSUM	40 KG	294*	420	+ 126	4,435.20
CMC LOVIS	25 KG	110	94	- 16	6,110.00
CMC HIVIS	25 KG	25	57	+ 32	3,819.00
ANCO DETERGENT	200 LTR	25	7	- 18	3,465.00
DEFOAMER	1 LTR	0	130	+ 130	613.60
MICA F	25 KG	0	23	+ 23	506.00
MICA C	25 KG	0	23	+ 23	506.00

COST/DAY US$10,737.04 TOTAL COST FOR INTERVAL US$75,159.30

COST/Mt ~~Ft~~ US$ 167.02 PROG. COST FOR INTERVAL US$ 70,576.14

ENGR. COST US$ 5.775.00 COST VARIANCE FOR INTERVAL US$ +4,583.16

*294 sxs of 40 kgs, eqv. to 235 sxs of 50 kgs

OPERATOR STATOIL

WELL NO. 6610/7-1

MATERIAL CONSUMPTION & COST ANALYSIS

12 1/4" HOLE DRILLED TO 2115 Meters ~~Feet~~ 9 5/8" CASING SET AT 2097 Meters ~~Feet~~

ACTUAL AMOUNT OF HOLE DRILLED 850 Meters ~~Feet~~ DAYS ON INTERVAL 9

DRILLING FLUID SYSTEM GYP/LIGNOSULPHONATE

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	US$ COST
BARITE BULK	M/T	350	202	-148	29,896.00
WYOMING BENTONITE	50 KG	300	0	-300	-
LIGNOSULPHONATE	25 KG	300	137	-163	2,671.50
CMC LOVIS	25 KG	320	211	-109	13,715.00
CMC HIVIS	25 KG	0	10	+ 10	670.00
GYPSUM	40 KG	219*	258	+ 39	2,724.48
CAUSTIC	25 KG	90	91	+ 1	1,820.00
DRILLING DETERGENT	200 LTR	0	8	+ 8	3,960.00
SODA ASH	50 KG	20	0	- 20	-
SODIUM BICARBONATE	50 KG	22	0	- 22	-

COST/DAY US$ 6,161.89 TOTAL COST FOR INTERVAL US$ 55,456.98

COST/Mt. ~~Ft~~ US$ 65.24 PROG. COST FOR INTERVAL US$ 90,182.00

ENGR. COST US$ 7,425.00 COST VARIANCE FOR INTERVAL US$ -34,752.02

* 219 sxs of 40 kgs, eqv. to 175 sxs of 50 kgs.

OPERATOR STATOIL

WELL NO. 6610/7-1

MATERIAL CONSUMPTION & COST ANALYSIS

8 1/2" HOLE DRILLED TO 3333 Meters ~~Feet~~ CASING SET AT Meters Feet

ACTUAL AMOUNT OF HOLE DRILLED 1218 Meters ~~Feet~~ DAYS ON INTERVAL 23

DRILLING FLUID SYSTEM GEL/LIGNO/LIGNITE

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	US$ COST
BARITE	M/T	165	36	- 129	5,328.00
WYOMING BENTONITE	M/T	0	27	+ 27	10,260.00
WYOMING BENTONITE	50 KG	216	16	- 200	288.00
CHROME LIGNITE	25 KG	120	206	+ 86	6,592.00
SPERCELL C	25 KG	220	235	+ 15	4,582.50
CMC LV	25 KG	200	198	- 2	12,870.00
CMC HV	25 KG	0	66	+ 66	4,422.00
DRISPAC REGULAR	25 KG	0	7	+ 7	1,078.00
DRISPAC SUPERLO	25 KG	0	3	+ 3	495.00
RESINEX		0	83	+ 83	8,005.35
CAUSTIC SODA	25 KG	70	122	+ 52	2,440.00
SODA ASH	50 KG	20	2	- 18	42.00
GYPSUM	40 KG	0	10	+ 10	105.60
MICA FINE	25 KG	0	8	+ 8	176.00
MICA COARSE	25 KG	0	10	+ 10	220.00
$CaCl_2$	50 KG	0	6	+ 6	180.00
LIME	40 KG	0	4	+ 4	26.00

COST/DAY US$ 2,438.06 TOTAL COST FOR INTERVAL US$ 57,110.45

COST/Mt. or ~~Ft~~ US$ 46.89 PROG. COST FOR INTERVAL US$ 51,258.00

ENGR. COST US$ 17,600.00 COST VARIANCE FOR INTERVAL US$ +5,852.45

OPERATOR STATOIL

WELL NO. 6610/7-1

TOTAL CONSUMPTION & COST ANALYSIS

TOTAL DEPTH 3333 Meters

TOTAL HOLE DRILLED 3045 Meters

TOTAL DAYS 51

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	US$ COST
BARITE BULK	M/T	735	627	- 108	92,796.00
WYOMING BENTONITE BULK	M/T	68	114	+ 46	43,320.00
WYOMING BENTONITE	50 KG	884	58	- 826	1,044.00
SPERCELL C	25 KG	815	595	- 220	11,602.50
LIGNITE	25 KG	120	206	+ 86	6,592.00
CMC LV	25 KG	630	503	- 127	32,695.00
CMC HV	25 KG	45	133	+ 88	8,911.00
DRISPAC SUPERLO	50 LBS	0	3	+ 3	495.00
DRISPAC REGULAR	50 LBS	0	7	+ 7	1,078.00
RESINEX		0	83	+ 83	8,005.35
CAUSTIC SODA	25 KG	299	449	+ 150	8,980.00
SODA ASH	50 KG	80	18	- 62	378.00
GYPSUM	40 KG	410	688	+ 278	7,265.28
MICA FINE	25 KG	0	33	+ 33	726.00
MICA COARSE	25 KG	0	31	+ 31	682.00
$CaCl_2$	50 KG	0	6	+ 6	180.00
LIME	50 KG	0	4	+ 4	26.00
DRILLING DETERGENT	200 L	28	15	- 13	7,425.00
DEFOAMER	1 L	0	130	+ 130	613.60

COST/DAY US$ 4,565.00

TOTAL COST FOR INTERVAL US$ 232.814.73

COST/Mt. US$ 76.46

PROG. COST FOR INTERVAL US$ 241.623.50

ENGR. COST US$ 40,700.00

COST VARIANCE FOR INTERVAL US$ -8,808.77

ANCHOR DRILLING FLUIDS AS

OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

WELL NAME 6610/7-1 AREA TRAENABANKEN

OPERATOR STATOIL RIG. NEPTUNO NORDRAUG

MUD SYSTEM SPUD MUD ENGINEERS

Day No.	DATE 1983	ESTIMATED DAILY MUD VOLUMES: LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BULK MATERIALS: M/T BARITE	M/T BENTONITE	SACK MATERIALS: BENTONITE	MATERIALS ADDED TO CONTROL PROPERTIES — THINNERS: LIGNO	LIGNITE	BICARB.	POLYMERS: CMC LV	CMC HV	DRISPAC REGULAR	DRISPAC SUPERLO	RESINEX	FILTERS: CAUSTIC	SODA ASH	GYPSUM	DEFOAMER	DRILLING DETERGENT	MICA F	MICA C	CaCl2	LIME
1	15.04					NO USAGE																		
2	16.04																							
3	17.04			1570		26										17	6							
4	18.04	36				NO USAGE																		
5	19.04	740		550		7										4	1							
6	20.04					NO USAGE																		
7	21.04		450	834		13		4								19	2							
8	22.04	3	405	400	11			8								18								
9	23.04		755	1200				2								34								
10	24.04		949	1500	48			5								38								
11	25.04		401	300	57			5								8								
12	26.04	* 1800	308	600	23	7	42									7	3							
13	27.04			849	1	14		30								28	3	89	20					
14	28.04		259	450	45	2		26			70	31				7	1	87						
FORWARD																								
ESTIMATED TOTALS		2607	3527	8253	185	69	42	80			70	31				180	16	176	20					

REMARKS:

*Lost in hole when circulating casing and during CMT job.

ANCHOR DRILLING FLUIDS AS

OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

WELL NAME 6610/7-1 AREA TRAENABANKEN

OPERATOR STATOIL RIG. NEPTUNO NORDRAUG

MUD SYSTEM SPUD MUD ENGINEERS VASTVEIT/ FOLKVORD

Day No.	DATE 1983	ESTIMATED DAILY MUD VOLUMES: LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BULK MATERIALS: M/T BARITE	M/T BENTONITE	SACK MATERIALS: BENTONITE		MATERIALS ADDED TO CONTROL PROPERTIES — THINNERS: LIGNO	LIGNITE	BICARB.	POLYMERS: CMC LV	CMC HV	DRISPAC REGULAR	DRISPAC SUPERLO	RESINEX	CAUSTIC	SODA ASH	GYPSUM	DEFOAMER	DRILLING DETERGENT	MICA F	MICA C	$CaCl_2$	LIME	
15	29.04		765	1150		11			1			14	25				14		36						
16	30.04		506	480	86	7			77								14		92	80	1000				
17	01.05		430	530	106				39								19		81	30	200				
18	02.05		67	60	3				20			4					5		25						
19	03.05	305	230	121	9				6			6	1				4		10		200	23	23		
20	04.05		358	260	32				20			55	10						42						
21	05.05	20	413	480	61				19			31					13		71		800				
22	06.05		529	530	38				5			24					23		58						
23	07.05		232	355	24				14			48					20		19		400				
24	08.05		80	130	14				22			29					14		22						
25	09.05		60	84	21				40			16					10		36		200				
26	10.05		25	80	12				15			8					7		10		200				
27	11.05		63						2								2								
28	12.05	120*	439	140													2								
FORWARD		2607	3527	8253	185	69	42		80			70	31				180	16	176	20					
ESTIMATED TOTALS		3052	7724	12653	591	87	42		360			305	67				327	16	678	130	3000	23	23		

REMARKS:

ANCHOR DRILLING FLUIDS AS

OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

MUD SYSTEM: SPUD MUD

WELL NAME: 6610/7-1 AREA: TRAENABANKEN

OPERATOR: STATOIL RIG: NEPTUNO NORDRAUG

ENGINEERS: TORGERSEN/PARSONS/VASTVEIT

Day No.	DATE 1983	ESTIMATED DAILY MUD VOLUMES: LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BULK MATERIALS: M/T BARITE	M/T BENTONITE	SACK MATERIALS: BENTONITE		MATERIALS ADDED TO CONTROL PROPERTIES: THINNERS: LIGNO	LIGNITE	BICARB.		POLYMERS: CMC LV	CMC HV	DRISPAC REGULAR	DRISPAC SUPERLO	RESINEX		CAUSTIC	SODA ASH	GYPSUM	DEFOAMER	DRILLING DETERGENT	OTHERS: MICA F	MICA C	CaCl2	LIME	
29	13.05		750	700		5			3				4	7	1				6	1								
30	14.05		73	150		1			11	8			34	21	1				10	1								
31	15.05		17	140		2			17	5			8	2					6	1								
32	16.05		60	60	14				16	16			23	10					1									
33	17.05		159	50					14	15			2						8									
34	18.05		121	120	3	4			18	16			8						9									
35	19.05		55			4			15	12			12						7	1								
36	20.05		256	160					15	15			10	5					4									
37	21.05		85	30					14	14			14				16		6									
38	22.05		32	150					14	14			13				13		8									
39	23.05		110	50	12	2			18	18			16				18		8									
40	24.06		162	220		2			27	17			11				15		11	1								
41	25.05		45						7				3	2			7		5									
42	26.05		210	130	2	2			14	9			16				14		8									
FORWARD		3052	7724	12653	591	87	42		360				305	67					327	16	678	130	3000	23	23			
ESTIMATED TOTALS		3052	9859	14613	622	109	42		563	159			479	114	2		83		424	21	678	130	3000	23	23			

REMARKS:

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

MUD SYSTEM: SPUD MUD

WELL NAME: 6610/7-1 AREA: TRAENABANKEN
OPERATOR: STATOIL RIG: NEPTUNO NORDRAUG
ENGINEERS: VASTVEIT/ FOLKVORD

Day No.	DATE 1983	ESTIMATED DAILY MUD VOLUMES: Losses Sub Surface	Losses Surface	Volume Mud Built	BULK MATERIALS: M/T Barite	M/T Bentonite	SACK MATERIALS: Bentonite		MATERIALS ADDED TO CONTROL PROPERTIES — THINNERS: Ligno	Lignite	Bicarb.		POLYMERS: CMC LV	CMC HV	Drispac Regular	Drispac Superlo	Resinex	CAUSTIC	Soda Ash	Gypsum	DEFOAMER	DRILLING DETERGENT	WEIGHTERS: Mica F	Mica C	CaCl2	Lime	
43	27.05		192	150		2			1	17			3					4										
44	28.05		108	140	2	1			1	11				5				3										
45	29.05		204	40					16	9			4	6				4										
46	30.05		206	110	3	2			23	11			11					13										
47	31.05		30	10					3	1			1					1										
48	01.06		13																									
49	02.06						16		+ 18	+ 2			5	8	5	3			+ 3	10			10	8	6	4		
50	03.05	325	185	250					6		4																	
51	04.05	360	84																									
FORWARD		3052	9859	14619	622	109	42		563	159			479	114	2		83	424	21	678	130	3000	23	23				
ESTIMATED TOTALS		3809	11850	15319	627	114	58		595	206	4		503	133	7	3	83	449	18	688	130	3000	33	32	6	5		

REMARKS:

All consumption at day no 49 is from inventory check. Correction w+ is excess.

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

WELL NAME 6610/7-1 AREA TRAENABANKEN
OPERATOR STATOIL RIG. NEPTUNO NORDRAUG
MUD SYSTEM SPUD MUD ENGINEERS TORGERSEN/PARSONS/VASTVEIT

Day No.	DATE 1983	DEPTH FEET ☐ METERS ☐ METER	MUD PROPERTIES: DENSITY PPG ☐ SG ☐ SG	VISCOSITY sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.	GELS 0 / 10	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	pH	Filtrate Analysis Cl⁻ ppm X 1000	Ca. ++ ppm T.H.	Pf	RETORT % OIL	% SOLIDS CORR.	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
1	15/ 4																							
2	16/ 4																							
3	17/ 4		1.04	120																				
4	18/ 4	318	1.04	120																				
5	19/ 4	355	1.04	120																				
6	20/ 4	355	1.04	120																				
7	21/ 4	658	1.09	50	35.5	11.0	49.0	21/26				10.2										.24	15.03	
8	22/ 4	815	1.10	56	41.0	5.0	72.0	19/19				10.5										.09	45.90	
9	23/ 4	360	1.11	49	36.0	12.0	48.0	19/20				10.5										.26	13.40	
10	24/ 4	800	1.11	46	32.0	10.0	44.0	16/18				10.4										.24	13.35	
11	25/ 4		1.30	47	25.0	7.0	36.0	16/17				10.4										.22	12.44	
12	26/ 4	815	1.30	42	24.0	9.0	30.0	15/16				10.1										.30	7.07	
13	27/ 4	900	1.10	34	10.5	6.0	9.0	6/9				10.8	15	170	.30		6.00		12.50			.49	.94	
14	28/ 4	900	1.13	46	12.0	6.0	12.0	4/9	19.0	2		11.8	11	1600	1.35		9.00	.75	13.00			.41	1.69	

REMARKS

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

MUD SYSTEM GYP/LIGNOSULPHONATE

WELL NAME 6610/7-1 AREA TRAENABANKEN

OPERATOR STATOIL RIG. NEPTUNO NORDRAUG

ENGINEERS VASTVEIT/FOLKVORD/TORGERSEN

Day No.	DATE	DEPTH (FEET ☐ METERS ☐)	MUD PROPERTIES																						
					VISCOSITY				GELS							Filtrate Analysis			RETORT						
	1983	METER	DENSITY SG / PPG	sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.	0 / 10	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	pH	Cl⁻ ppm X 1000	Ca. ++ ppm T.H.	Pf	% OIL	% SOLIDS CORR.	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
15	29/ 4	1018	1.14	46	18.0	12.0	12.0	4 / 40	12.0	2		11.5	7	1280	.30		7.00		19.00			.58	.86	
16	30/ 4	1200	1.29	58	20.5	12.0	17.0	13 / 70	13.0	2		10.1	10	1800	.15		12.00		25.00			.50	1.68	
17	1/ 5	1260	1.45	50	20.0	13.0	14.0	10 / 58	16.0	2		9.5	12	2040	.15		18.00		25.00			.57	1.07	
18	2/ 5	1265	1.45	48	20.0	15.0	11.0	8 / 60	15.0	2		9.6	13	2160	.10		18.00		25.00			.66	.61	
19	3/ 5	1265	1.45	54	24.5	17.0	15.0	14 / 70	15.0	2		10.2	12	2200	.20		18.00		25.00			.61	.96	
20	4/ 5	1450	1.40	48	23.0	17.0	12.0	9 / 60	9.0	2		10.2	13	2400	.20		17.00	.25	23.00			.67	.65	
21	5/ 5	1642	1.50	49	25.0	18.0	14.0	7 / 50	10.0	2		10.2	15	2440	.20		18.00		3.20			.64	.82	
22	6/ 5	1795	1.50	49	23.5	15.0	17.0	15 / 42	10.0	2		10.4	16	2000	.15	0.0	18.00	.25	22.00			.55	1.36	
23	7/ 5	1896	1.50	45	21.5	15.0	13.0	9 / 48	9.2	2		10.7	15	1960	.20	0.0	17.00		21.00			.62	.82	
24	8/ 5	2006	1.50	45	20.0	14.0	12.0	6 / 46	8.2	1		10.6	15	1880	.20		18.00		20.00			.62	.75	
25	9/ 5	2089	1.50	46	23.0	17.0	12.0	5 / 36	7.8	1		10.4	15	2100	.15		18.00		20.00			.67	.65	
26	10/ 5	2115	1.50	48	24.0	18.0	12.0	5 / 40	7.6	1	16.0	10.5	15	1960	.15		18.00		20.00			.68	.63	
27	11/ 5	2115	1.50	51	23.0	17.0	12.0	4 / 38	7.6	1		10.3	15	1920	.15		18.00		20.00			.67	.65	
28	12/ 5	2115	1.50	54	25.5	18.0	15.0	8 / 60	7.5	1	15.0	10.8	15	1920	.15		18.00		2.90			.63	.92	

REMARKS

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

WELL NAME 6610/7-1 AREA TRAENABANKEN

OPERATOR STATOIL RIG. NEPTUNO NORDRAUG

MUD SYSTEM LIGNO/LIGNITE ENGINEERS TORGERSEN/PARSONS/VASTVEIT

Day No.	DATE 1983	DEPTH FEET ☐ METERS ☐ METER	MUD PROPERTIES: DENSITY PPG ☐ SG ☐ SG	VISCOSITY sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.	GELS 0 / 10	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	pH	Filtrate Analysis Cl⁻ ppm X 1000	Ca ++ ppm T.H.	Pf	RETORT % OIL	% SOLIDS CORR.	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
30	14/ 5	2174	1.23	42	16.5	11.0	11.0	3/15	6.8	1	20.0	11.0	15	1280	.50		9.00		18.00			.58	.78	
31	15/ 5	2240	1.23	47	19.0	14.0	10.0	3/11	5.4	1	16.0	11.0	15	1200	.40		9.00		18.00			.66	.55	
32	16/ 5	2334	1.24	52	22.0	16.0	12.0	3/11	5.2	1	16.0	10.4	14	1320	.20		9.00		18.00			.65	.68	
33	17/ 5	2432	1.24	52	21.0	16.0	10.0	2/13	4.8	1	16.0	10.6	15	1080	.20		9.00		19.00			.69	.50	
34	18/ 5	2558	1.23	51	22.0	16.0	12.0	3/12	4.8	1	16.0	10.8	14	800	.20		9.00		20.00			.65	.68	
35	19/ 5		1.23	52	20.5	16.0	11.0	2/11	4.8	2	16.0	10.8	14	680	.20		9.00		20.00			.67	.59	
36	20/ 5	2663	1.23	51	19.0	14.0	10.0	3/15	4.8	1	16.0	10.6	14	760	.20		9.00		20.00			.66	.55	
37	21/ 5	2687	1.23	54	22.5	16.0	13.0	3/17	4.6	1	14.0	10.5	15	760	.20		9.00		20.00			.63	.78	
38	22/ 5	2717	1.27	55	21.0	15.0	12.0	3/14	4.5	1	13.5	10.5	13	680	.15		10.00		19.00			.64	.71	
39	23/ 5	2780	1.23	57	23.5	17.0	13.0	3/14	4.5	1	13.0	10.9	13	600	.25		10.00		20.00			.65	.75	
40	24/ 5	2924	1.23	53	20.5	15.0	11.0	2/11	4.5	1	13.5	10.6	12	480	.25		10.00		20.00			.66	.61	
41	25/ 5	2949	1.23	51	19.0	14.0	10.0	2/9	4.4	1	14.0	10.6	12	400	.20		10.00		20.00			.66	.55	
42	26/ 5	3022	1.23	54	19.5		11.0	2/10	4.4	1	14.0	10.8	12	280	.30		10.00	.25	20.00					
43	27/ 5		1.23	52	21.0	16.0	10.0	3/9	4.6	1	12.0	10.5	11	220	.25		11.00		19.00			.69	.50	

REMARKS

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

MUD SYSTEM LIGNO/LIGNITE

WELL NAME 6610/7-1 AREA TRAENABANKEN

OPERATOR STATOIL RIG. NEPTUNO NORDRAUG

ENGINEERS TORGERSEN/PARSONS/VASTVEIT

Day No.	DATE 1983	DEPTH FEET ☐ METERS ☐ METER	MUD PROPERTIES: DENSITY PPG ☐ SG ☐ SG	VISCOSITY sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.	GELS 0/10	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	pH	Filtrate Analysis Cl⁻ ppm X 1000	Ca. ++ ppm T.H.	Pf	RETORT % OIL	% SOLIDS CORR.	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
29	13/ 5	2119	1.23	43	16.5	11.0	11.0	6/42	10.4	2		10.4	16	1520	.15		10.00		18.00			.58	.78	
30	14/ 5	2174	1.23	42	16.5	11.0	11.0	3/15	6.8	1	20.0	11.0	15	1280	.50		9.00		18.00			.58	.78	
31	15/ 5	2240	1.23	47	19.0	14.0	10.0	3/11	5.4	1	16.0	11.0	15	1200	.40		9.00		18.00			.66	.55	
32	16/ 5	2334	1.24	52	22.0	16.0	12.0	3/11	5.2	1	16.0	10.4	14	1320	.20		9.00		18.00			.65	.68	
33	17/ 5	2432	1.24	52	21.0	16.0	10.0	2/13	4.8	1	16.0	10.6	15	1080	.20		9.00		19.00			.69	.50	
34	18/ 5	2558	1.23	51	22.0	16.0	12.0	3/12	4.8	1	16.0	10.8	14	800	.20		9.00		20.00			.65	.68	
35	19/ 5		1.23	52	20.5	16.0	11.0	2/11	4.8	2	16.0	10.8	14	680	.20		9.00		20.00			.67	.59	
36	20/ 5	2663	1.23	51	19.0	14.0	10.0	3/15	4.8	1	16.0	10.6	14	760	.20		9.00		20.00			.66	.55	
37	21/ 5	2687	1.23	54	22.5	16.0	13.0	3/17	4.6	1	14.0	10.5	15	760	.20		9.00		20.00			.63	.78	
38	22/ 5	2717	1.27	55	21.0	15.0	12.0	3/14	4.5	1	13.5	10.5	13	680	.15		10.00		19.00			.64	.71	
39	23/ 5	2780	1.23	57	23.5	17.0	13.0	3/14	4.5	1	13.0	10.9	13	600	.25		10.00		20.00			.65	.75	
40	24/ 5	2924	1.23	53	20.5	15.0	11.0	2/11	4.5	1	13.5	10.6	12	480	.25		10.00		20.00			.66	.61	
41	25/ 5	2949	1.23	51	19.0	14.0	10.0	2/9	4.4	1	14.0	10.6	12	400	.20		10.00		20.00			.66	.55	
42	26/ 5	3022	1.23	54	19.5		11.0	2/10	4.4	1	14.0	10.8	12	280	.30		10.00	.25	20.00					

REMARKS

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

WELL NAME 6610/7-1 AREA TRAENABANKEN
OPERATOR STATOIL RIG. NEPTUNO NORDRAUG
MUD SYSTEM LIGNO/LIGNOSULPHONATE ENGINEERS VASTVEIT/FOLKVORD

Day No.	DATE	DEPTH FEET ☐ METERS ☐	MUD PROPERTIES: DENSITY PPG ☐ SG ☐	VISCOSITY: sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.	GELS 0 / 10	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	pH	Filtrate Analysis: Cl⁻ ppm X 1000	Ca. ++ ppm T.H.	Pf	RETORT: % OIL	% SOLIDS CORR.	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
	1983	METER	SG																					
43	27/ 5		1.23	52	21.0	16.0	10.0	3 / 9	4.6	1	12.0	10.5	11	220	.25		11.00		19.00			.69	.50	
44	28/ 5	3202	1.23	54	24.0	18.0	12.0	3 / 14	4.8	1	11.0	10.4	12	240	.15		11.00		20.00			.68	.63	
45	29/ 5		1.23	54	25.0	19.0	12.0	3 / 17	4.5	1	13.0	10.1	12	320	.15		11.00		22.00			.69	.61	
46	30/ 5	3333	1.23	54	24.5	19.0	11.0	3 / 17	4.8	1	14.0	10.2	13	320	.20		11.00		21.00			.71	.53	
47	31/ 5		1.23	58	24.0	18.0	12.0	2 / 17	4.6	1	14.0	10.5	12	260	.25		11.00		21.00			.68	.63	
48	1/ 6		1.23	52	22.0	17.0	10.0	2 / 15	4.8	1	14.0	10.1	12	280	.20		11.00		21.00			.70	.49	
49	2/ 6		1.23	58	21.0	17.0	10.0	3 / 17	4.7	1	15.0	9.8	12	260	.15				20.00			.70	.49	
50	3/ 6		1.23	59	24.5	19.0	11.0	3 / 20	4.8	1	15.0	10.5	12	260	.35		10.00		20.00			.71	.53	
51	4/ 6		1.23	61	25.0	19.0	12.0	3 / 24	5.0	1	15.0	10.4	12	280	.25		10.00		19.00			.69	.61	
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REMARKS

RFT - SUMMARY

21 pressure readings were measured from 2672.5 to 3110 m RKB. One segregated sample was taken at 2748 m. No pressures was measured below 3110 m due to operational problems of the tool. The sand from 2652 - 2675 m was very tight, hence the sample was taken lower.

The sample consisted of mud filtrate:

	2 3/4 gal	1 gal	mudfiltrate
cl-, ppm :	11000	10500	13000
ca+, ppm :	160		260
density, gm/cc :		1.015	
ph :		7.8	10.5

1 l sample of 1 gal chamber was saved for analysis together with samples of mud and mudfiltrate.

statoil

ORGANIC GEOCHEMISTRY OF 6610/7-1

TRÆNABANKEN

Den norske stats oljeselskap a.s

ORGANIC GEOCHEMISTRY OF 6610/7-1

TRÆNABANKEN

POTENTIAL SOURCE ROCKS

PRE-JURASSIC — Poor potential for hydrocarbons.

TOC <1.5%; HI <50; type IV kerogen.

JURASSIC

a) UPPER JURASSIC HOT SHALE — Good-rich potential for oil.
(2271 - 2315m)

TOC 4.2 -14.4%; HI 207 - 564; type II/III - II kerogen.

Source rock potential decreases fairly steadily down this zone. The organic matter consists of a considerable proportion of herbaceous and cuticular material along with amorphous sapropel pollen and spores.
The original source potential of these rocks is high and about 2% of this potential has already been realised. Pyrolysis - GC shows these shales should produce moderate amounts of gas with light oil up to about C25.

6610/7-1
SOURCE ROCK POTENTIAL
UPPER JURASSIC HOT SHALE

TOC	RANGE	4.19-14.4 %	
	AVE	8.0 %	
S1+S2	RANGE	9.19-86.82	(kg HC/TON ROCK)
	AVE	32.34	
HI	RANGE	207-564	(i.e. 33.3 % OF REMAINING
	AVE	333	KEROGEN WILL GENERATE HC
GEN.POT	AVE	35.6 %	(I.E.35.6 % OF KEROGEN ORIGINALLY COULD GENERATE HC)
OVERALL	2.3 % OF ORIGINAL HC POTENTIAL HAS BEEN REALISED.		

HOT SHALES

	TOC	HI	S_1+S_2	ORIG GEN POT	POT USED	KEROGEN TYPE
A6463	14.4	564	86.82	60.4	4.0	II
A6424	6.17	387	26.64	43.5	4.8	II/III
A5841	11.29	376	46.65	41.6	4.0	II/III
A6425	6.17	277	18.12	29.0	1.3	II/III
A6426	9.11	330	31.03	34.0	1.0	II/III
A5846	4.19	207	9.19	21.9	1.2	II/III
A5848	6.35	248	16.88	26.6	1.8	II/III
A5850	6.41	273	18.35	28.1	0.8	II/III
AVERAGE	8.0	333	32.43	35.6		II/III

b) UPPER JURASSIC COLD SHALE — Poor potential for oil
(2315 - 2675m)

TOC 0.93 - 3.57%; HI 62 - 168; type IV/III-III kerogen.

HEATHER EQUIVALENT

	TOC	HI	S_1+S_2	ORIG GEN POT	POT USED	KEROGEN TYPE
A5846	1.03	112	1.31	13%	1.8%	IV/III
A5848	1.01	66	0.77	8%	1.4%	IV/III
A5850	0.93	70	0.73	7%	0	IV
A5853	1.04	85	1.05	10%	1.5%	IV/III
A5855	1.21	97	1.38	11%	1.3%	IV/III
A5857	1.38	101	1.61	12%	1.9%	IV/III
A5859	1.09	62	0.76	6%	0.2%	IV
A5869	3.57	168	6.26	18%	1.2%	IV/III
A5861	0.99	89	0.98	10%	1.1%	IV
A5864	2.17	112	2.61	12%	1.8%	IV/III
A5866	1.28	110	1.54	12%	1.0%	IV/III
A6427	4.65	48	2.44	5%	0.2%	IV
A6428	2.30	42	1.05	4%	0.2%	IV
AVERAGE	1.7	89	1.73	AVE9.90		IV/III

c) LOWER JURASSIC SHALE — Poor potential for hydrocarbons.
(2679 - 2746m)

TOC 0.94 - 1.05%; HI 76 - 96; type IV/III kerogen.

d) LOWER JURASSIC COAL UNIT — Fair good potential for oil and gas
(2854 - 3194m)

TOC 0.89 - 5.96%; HI 100 - 293; type III-III/II kerogen.

Pyrolysis - GC shows the shale and coals would generate waxy oil and large volumes of methane. Per unit volume the shales and coals have rich hydrocarbon potential but the overall potential is dependent on the frequency and thickness of these interbeds.

LOWER JURASSIC
COAL UNIT

	TOC	HI	S_1+S_2	Orig.Gen. Potential	Potential Used
Cuttings	0.94 %	85	0.89	9.5 %	1
	1.13 %	125	1.54	13.6 %	1.1
	5.96 %	293	18.56	31.1 %	.8
	0.89 %	100	0.98	11.0 %	1
SWC	37.38 %	198	76.32	20.4 %	0.6
SWC	5.60 %	189	11.24	20.0 %	1.1

LEVEL OF MATURATION

Vitrinite Reflectance.

There is a sparsity of true vitrinite; bitumen staining is ubiquitous leading to low values; a few samples are caved, and much material is reworked. Therefore there is a large spread of data points. The best measurement is on coal. Taking these facts into account the following estimate of maturity was made:

Early oil	(Ro% 0.5)	2300m
Oil window	(Ro% 0.7)	3100m
Peak generation	(Ro% 0.75)	3400 - 3500m.

TAI and fluoresence estimates of maturity are in fair agreement with this. Projection of the trend indicates the base of the oil window - condensate zone would be encountered at 4100 - 4200m.

Consideration of the generation potential, hydrogen index and Tmax shows that significant hydrocarbon generation has begun in the Jurassic shales at 2270m and below.
The estimates above apply to type II kerogen; type III kerogen will begin to mature at a deeper level where Ro = 0.7%.

MIGRANT HYDROCARBONS

PRE JURASSIC SEQUENCE

The high production indices and moderate extractablilities are believed to be due to contaminants from mud rather than from migrant hydrocarbons.

UPPER JURASSIC SHALES

Most of the hydrocarbons were generated in-situ. Contamination from mud and mud addititves is visible when TOC and hydrocarbon potential is low.

LOWER JURASSIC SANDSTONE.

Hydrocarbons extracted from the potential reservoir interval were of waxy oil from a dominantly terrestrial type source rock. There is a smooth hydrocarbon envelope from C_{13} - C_{35}, peaking at C_{17}, with an odd over even carbon preference. The pristane/phytane ratio is fairly high. There is a fairly high proportion of nonhydrocarbons probably indicating the residual nature of the oil.

FIGURES

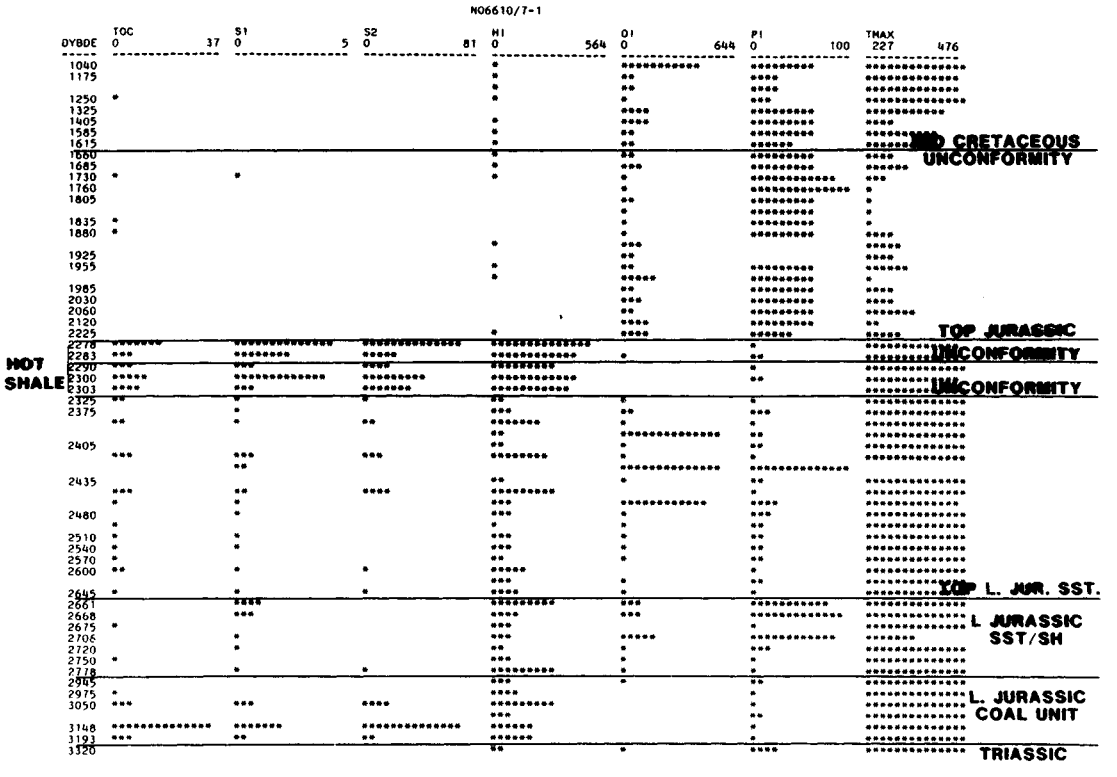

Figure 1
The low TMAX and high production indices in the Lower Cretaceous are due to low amounts of organic matter and contamination from mud additives.

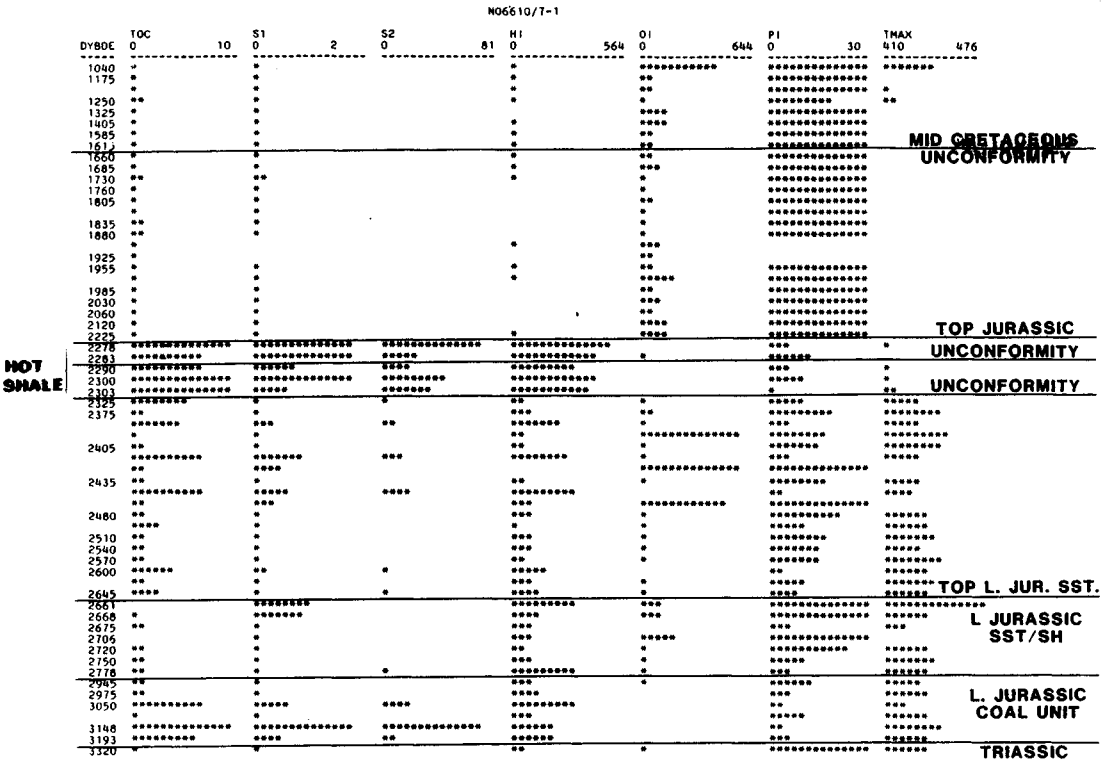

Figure 2

The good potential source rocks are in the Upper Jurassic "hot" shales and the Lower Jurassic coal unit. The good source rocks are characterised by high TOC, high HI and moderate TMAX. Contamination by migrant hydrocarbons in the Lower Jurassic sandstone and shale is characterised by high production indices.

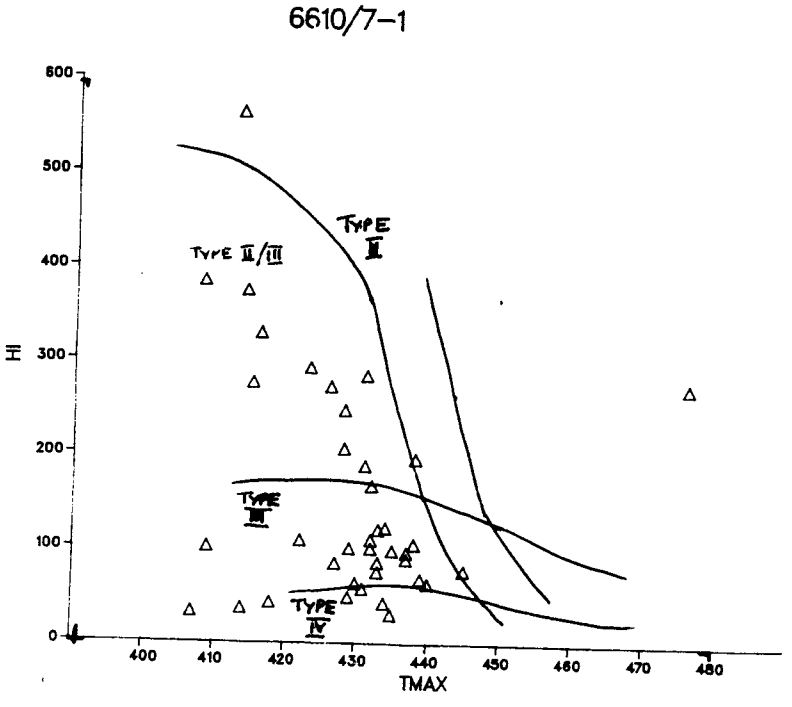

Figure 3

This plot of HI against TMAX shows the different types of kerogen present. The type II and II/III kerogens are from the Upper Jurassic Hot shales and the Lower Jurassic Coal Unit.

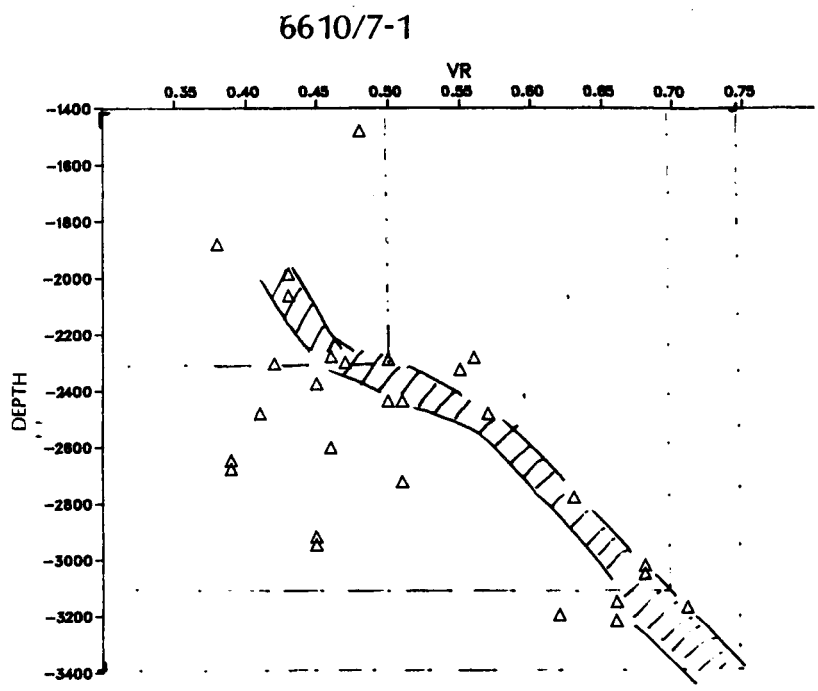

Figure 4
This is a plot of the maturity trend which has been placed through the most reliable data points.

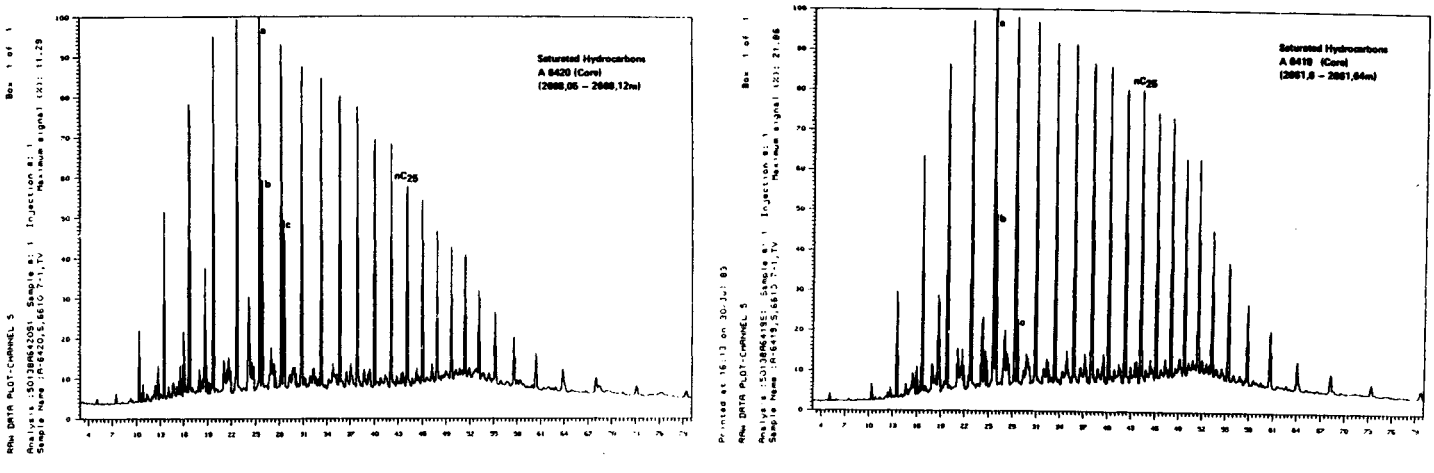

Figure 5 and 6
Chromatograms of saturated hydrocarbons from residual oil in potential reservoir section. The oil is waxy with a low CPI, low pristane/n-C_{17} and variable pristane/phytane ratio.

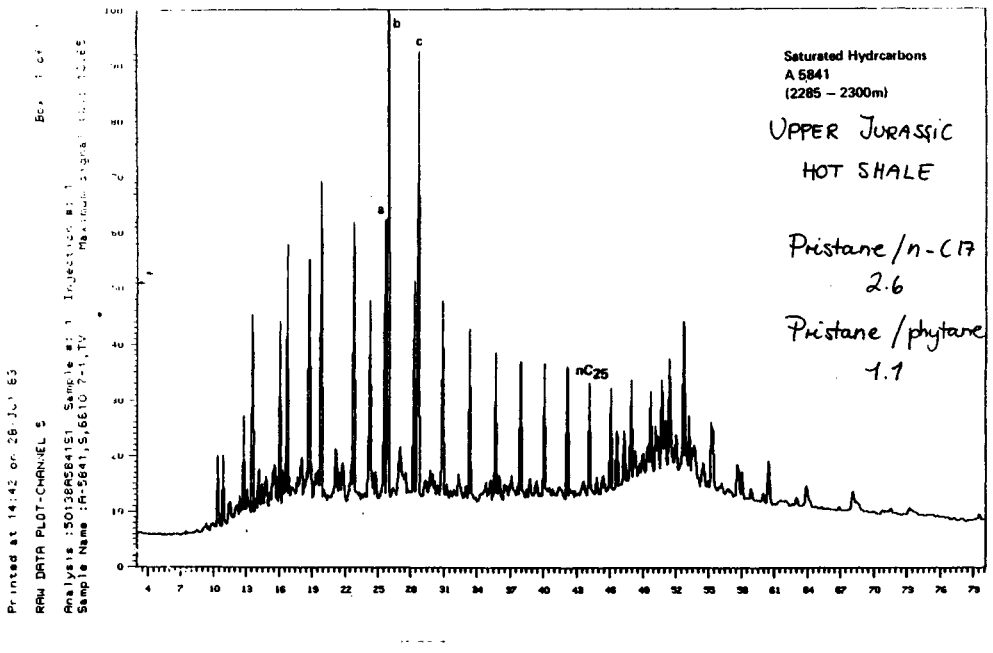

Figure 7
Extract from Upper Jurassic Hot Shale

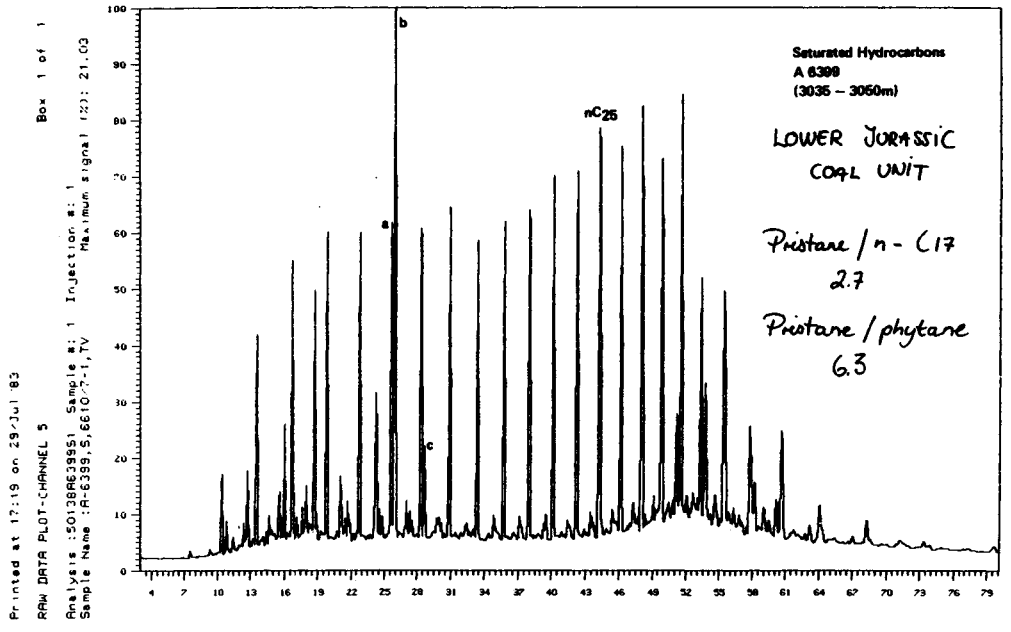

Figure 8
Extract from Lower Jurassic Coal Unit

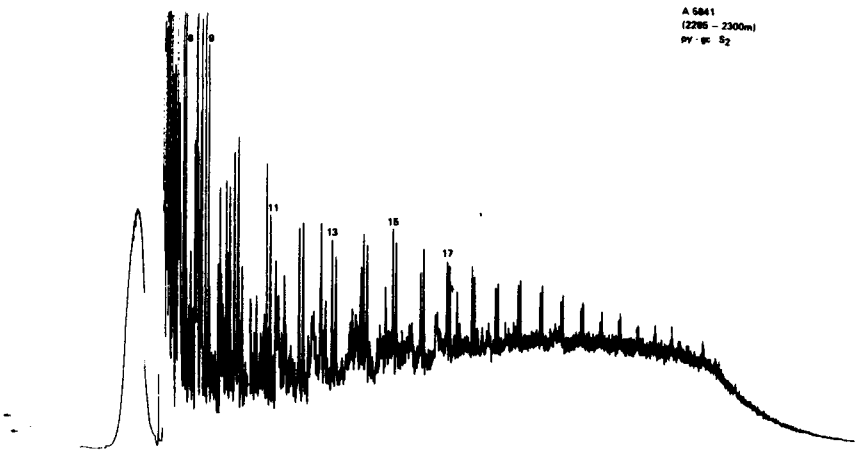

Figure 9
Pyrolysis-GC of Upper Jurassic Hot Shale showing that hydrocarbons are expected only up to C_{25}.

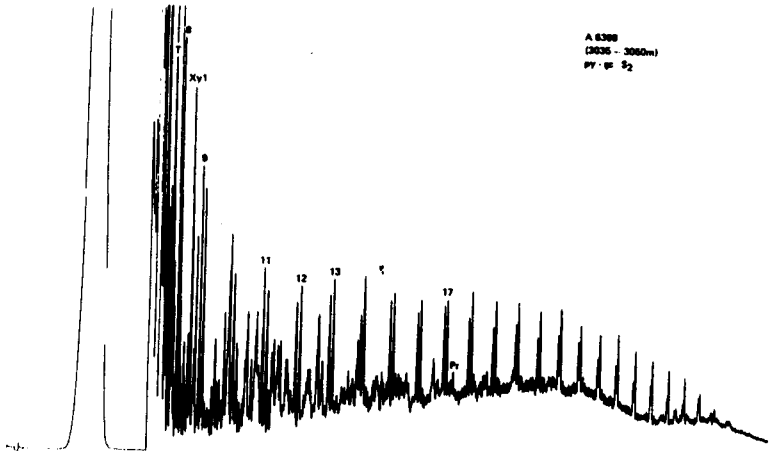

Figure 10
Pyrolysis-GC of shale from Lower Jurassic Coal Unit showing that hydrocarbons could be produced up to C_{30}.