OPERATOR STATOIL

WELL NO. 7119/12-2

MATERIAL CONSUMPTION & COST ANALYSIS

36" HOLE DRILLED TO 257 Meters ~~Feet~~ 30" CASING SET AT 256 Meters ~~Feet~~

ACTUAL AMOUNT OF HOLE DRILLED 51 Meters ~~Feet~~ DAYS ON INTERVAL 7

DRILLING FLUID SYSTEM SPUD MUD

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	COST US$
BARITE BULK	MT	27	90	+ 63	12.060,-
BENTONITE BULK	MT	27	79	+ 52	25.912.-
BENTONITE sxs	50 kg	-	435	+435	7.699,50
CAUSTIC	25 kg	27	72	+ 45	1.368,-
SODA ASH	50 kg	6	26	+ 20	481,-
CMC H V	25 kg	-	1	+ 1	61,-
XC POLY	50 lb	-	1	+ 1	332,-
LIME	50 kg	3	1	- 2	5,-
BARITE sxs	50 kg	-	114	+114	718,20
$CaCl_2$	50 kg	-	5	+ 5	115,-

COST/DAY US$ 6.964,53

TOTAL COST FOR INTERVAL US$ 48.751,70

COST/Mt. ~~Foot~~ US$ 955,92

PROG. COST FOR INTERVAL US$ 12.681,-

ENGR. COST US$ 5.250,-

COST VARIANCE FOR INTERVAL US$ 36.070,70

OPERATOR STATOIL

WELL NO. 7119/12-2

MATERIAL CONSUMPTION & COST ANALYSIS

26" HOLE DRILLED TO 394 Meters ~~Feet~~ 20" CASING SET AT 384,5 Meters ~~Feet~~

ACTUAL AMOUNT OF HOLE DRILLED 137 Meters ~~Feet~~ DAYS ON INTERVAL 5

DRILLING FLUID SYSTEM PREHYDRATED BENTONITE/SEAWATER

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	COST US$
BARITE	MT	130	137	+ 7	18.358,-
BENTONITE ~~sxs~~	50 kg	-	613	+613	10.850,10
BENTONITE	MT	30	27	- 3	8.856,-
CAUSTIC	25 kg	40	43	+ 3	817,-
SODA ASH	50 kg	7	9	+ 2	166,50
ANCO DET.	200 l	14	14	0	4.900,-
AL. STEARATE	25 kg	3	4	+ 1	320,-
CHR. LIGNO	25 kg	-	25	+ 25	430,-
BICARB	50 kg	-	18	+ 18	346,50
CMC H V	25 kg	-	6	+ 6	366,-
$CaCl_2$	50 kg	-	16	+ 16	368,-

COST/DAY $ 9.155,62 TOTAL COST FOR INTERVAL $ 45.778,10

COST/Mt. or ~~Ft~~ $ 334.15 PROG. COST FOR INTERVAL $ 31.209,50

ENGR. COST $ 3.750,- COST VARIANCE FOR INTERVAL $ 14.568,60

OPERATOR STATOIL

WELL NO. 7119/12-2

MATERIAL CONSUMPTION & COST ANALYSIS

22" HOLE DRILLED TO 590 Meters ~~Feet~~ 16" LINER SET AT 590 Meters ~~Feet~~

ACTUAL AMOUNT OF HOLE DRILLED 196 Meters ~~Feet~~ DAYS ON INTERVAL 9

DRILLING FLUID SYSTEM GEL/LIGNO/SEAWATER

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	COSTUS$
BARITE	M/T	0	89	+ 89	11.926,-
BENTONITE sxs	50 kg	0	216	+ 216	3.823,20
CAUSTIC	25 kg	0	108	+ 108	2.052,-
SODA ASH	50 kg	0	11	+ 11	203,50
CMC L V	25 kg	0	37	+ 37	2.183,-
CMC H V	25 kg	0	24	+ 24	1.464,-
BICARB	50 kg	0	19	+ 19	365,75
CHR.LIGNO	25 kg	0	182	+ 182	3.130,40
DRILLING DET.	200 l	0	9	+ 9	3.150,-
AL. STEARATE	25 kg	0	2	+ 2	160,-

COST/DAY $ 3.161,98 TOTAL COST FOR INTERVAL $ 28.457,85

COST/Mt. or ~~Ft~~ $ 145,19 PROG. COST FOR INTERVAL $ 0

ENGR. COST $ 6.750,- COST VARIANCE FOR INTERVAL $ 28.457,87

OPERATOR STATOIL

WELL NO. 7119/12-2

MATERIAL CONSUMPTION & COST ANALYSIS

17½" HOLE DRILLED TO 1252 Meters ~~Feet~~ 13 3/8" CASING SET AT 1204 Meters ~~Feet~~

ACTUAL AMOUNT OF HOLE DRILLED 662 Meters ~~Feet~~ DAYS ON INTERVAL 16

DRILLING FLUID SYSTEM GEL/LIGNO/SEAWATER

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	COST US$
BARITE	M/T	230	476	+ 246	63.784,-
BENTONITE sxs	50 kg	630	151	- 479	2.672,70
CHR. LIGNO	25 kg	381	547	+ 166	9.408,40
CAUSTIC	25 kg	200	129	- 70	2.451,00
CMC H V	25 kg	0	98	+ 98	5.978,00
CMC L V	25 kg	120	24	- 96	1.416,00
DRILLING DET.	200 l	17	20	+ 3	7.000,00
SODA ASH	50 kg	8	18	+ 10	333,00
BICARB	50 KG	4	34	+ 30	654,50
XC- POLYMER	50 lbs	17	32	+ 15	10.624,00
AL. STEARATE	25 kg	6	3	- 3	240,00

COST/DAY $ 6.535,10 TOTAL COST FOR INTERVAL $ 104.561,60

COST/Mt. or ~~Ft~~ $ 157,95 PROG. COST FOR INTERVAL $ 68.023,20

ENGR. COST $ 12.000,- COST VARIANCE FOR INTERVAL $ 36.538,40

OPERATOR STATOIL

WELL NO. 7119/12-2

MATERIAL CONSUMPTION & COST ANALYSIS

12 1/4" HOLE DRILLED TO 1902 Meters ~~Feet~~ 9 5/8" CASING SET AT 1885 Meters ~~Feet~~

ACTUAL AMOUNT OF HOLE DRILLED 650 Meters ~~Feet~~ DAYS ON INTERVAL 22/34

DRILLING FLUID SYSTEM GEL/LIGNO/SEAWATER

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	COST US$
BARITE	M/T	310	337	+ 27	45.158,-
BENTONITE	M/T	0	48	+ 48	15.744,-
BENTONITE sxs	50 kg	420	550	+ 130	9.735,-
CHR. LIGNO	25 kg	250	343	- 7	5.899,60
CAUSTIC	25 kg	209	98	- 111	1.862,-
CMC H V	25 kg	0	39	+ 39	2.379,-
CMC L V	25 kg	125	201	+ 76	11.859,-
DRISPAC REG.	25 kg	0	6	+ 6	1.015,80
DRISPAC S L	25 kg	0	14	+ 14	2.527,-
SODA ASH	50 kg	5	20	+ 15	370,-
LIGNITE	25 kg	0	158	+ 158	4.740,-
AL. STEARATE	25 kg	1	2	+ 1	160,-
BICARB	50 kg	5	36	+ 31	693,-
DRILLING DET.	200 l	0	6	+ 6	2.100,-
$CaCl_2$		0	10	+ 10	230,00

COST/DAY $ 4.748,75 TOTAL COST FOR INTERVAL $ 104.472,40

COST/Mt. or ~~Ft~~ $ 160.73 PROG. COST FOR INTERVAL $ 64.909,-

ENGR. COST $ 20.950,- COST VARIANCE FOR INTERVAL $ 9.563,40

OPERATOR STATOIL

WELL NO. 7119/12-2

MATERIAL CONSUMPTION & COST ANALYSIS

TESTING, PLUG AND ABANDON

HOLE DRILLED TO _____ Meters / Feet

CASING SET AT _____ Meters / Feet

ACTUAL AMOUNT OF HOLE DRILLED NIL Meters / Feet

DAYS ON INTERVAL 10

DRILLING FLUID SYSTEM GEL/LIGNO/SEAWATER

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	COST US$
BARITE	M/T	NIL	51	+ 51	683,40
BENTONITE sxs	50 kg	"	63	+ 63	1.115,10
CHROME LIGNOSULFON.	25 kg	"	3	+ 3	51,60
BICARBONATE	50 kg	"	8	+ 8	154,-
$CaCl_2$	50 kg	"	14	+ 14	322,-
CAUSTIC SODA	25 kg	"	4	+ 4	76,-
SODA ASH	50 kg	"	1	+ 1	18,50

COST/DAY US$ 857,12

TOTAL COST FOR INTERVAL US$ 8.571,20

COST/Mt. or Ft. -

PROG. COST FOR INTERVAL NIL

ENGR. COST US$ 5.000,-

COST VARIANCE FOR INTERVAL +US$ 8.571,20

OPERATOR STATOIL

WELL NO. 7119/12-2

TOTAL CONSUMPTION & COST ANALYSIS

TOTAL DEPTH 1902 Meters ~~Feet~~ ~~xxx~~

TOTAL HOLE DRILLED 1696 Meters ~~Feet~~ ~~xxx~~

TOTAL DAYS 70

MATERIAL	UNIT SIZE	PROG.	USED	VARIANCE ±	COST US$
BARITE BULK	M/T		1180		158.120,-
BARITE sxs	50 kg		114		718,20
BENTONITE BULK	M/T		154		50.512,-
BENTONITE sxs	50 kg		2028		35.895,60
CHROME LIGNO.	25 kg		1100		18.920,00
CAUSTIC	25 kg		454		8.626,-
SODA ASH	50 kg		85		1.572,50
BICARB.	50 kg		115		2.213,75
CMC L V	25 kg		262		15.458,-
CMC H V	25 kg		168		10.248,-
LIGNITE	25 kg		158		4.740,-
DRILLING DETERGENT	200 l		35		12.250,-
DRISPAC REG.	25 kg		6		1.015,80
DRISPAC S/L	25 kg		14		2.527,-
AL. STEARATE	25 kg		11		880,-
XC-POLYMER	50 lb		33		10.956,-
LIME	50 kg		1		5,-
$CaCl_2$	50 kg		45		1.035,-

COST/DAY $ 4.795,61

TOTAL COST FOR INTERVAL $ 335.692,85

COST/Mt. or ~~Ft~~ $ 197,93

PROG. COST FOR INTERVAL $ 176.822,70

ENGR. COST $ 48.700,-

COST VARIANCE FOR INTERVAL $ 158.870,55

ANCHOR DRILLING FLUIDS AS

OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

WELL NAME 7119/12-2 AREA TROMS I

OPERATOR STATOIL RIG. ROSS RIG

MUD SYSTEM SPUD MUD / GEL PREMIX ENGINEERS LUND/JACK/BJØRHEIM/ALISON

Day No.	DATE 1981	ESTIMATED DAILY MUD VOLUMES: LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BULK MATERIALS: BARITE	BENTONITE	SACK MATERIALS: SXS BENTONITE	BARITE	MATERIALS ADDED TO CONTROL PROPERTIES — THINNERS			POLYMERS: CMC H V	CMC L V	XC-POL.			OTHERS: CAUSTIC SODA-ASH		LIME	$CaCl_2$	DETERGENT	AL. STEARATE	BICARB.		
1	15/4			1380	15	11	32										15	3							
2	16/4	280		400	2												3	1							
3	17/4	950		750	10	19	37										12	8							
4	18/4	2885		2250	16	29	67										16	6							
5	19/4	1060		950	16	10	9										11	2							
6	20/4	1745		1750	31	10	290	114				1		1			15	6	1						
7	21/4	580		1480		9	83										13	6		5					
8	22/4	50	210	517		11	3										5	2			6	2			
9	23/4		492	650	47	7	10										8				4	2	4		
10	24/4		1240	794	20		261		16								6	1		16	4		9		
11	25/4		100	601	50		81					6					7						3		
12	26/4		1364	435	20		175		9								4						2		
13	27/4			298	12		103		20			8					7	2			1	1			
14	28/4		406	770	63		113		25				5				10	3			3		16		
FORWARD																									
XXXXXXXX TOTALS		7550	3812	13025	302	106	1264	114	70			15	5	1			132	40	1	21	18	5	34		

REMARKS:

ANCHOR DRILLING FLUIDS AS

OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

WELL NAME 7119/12-2 AREA TROMS I

OPERATOR STATOIL RIG. ROSS RIG

MUD SYSTEM GEL/LIGNO/SEAWATER ENGINEERS BJØRHEIM/ALISON/AKSNES

Day No	DATE 1981	ESTIMATED DAILY MUD VOLUMES: LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BULK MATERIALS: BARITE	BENTONITE	SACK MATERIALS: BENTONITE SXS	BARITE SXS	CHR. LIGNO	THINNERS			POLYMERS: CMC HV	CMC LV	XC POLY.			OTHERS: CAUSTIC	SODA ASH	BICARB	DRLG DETERGENT	AL STEARATE	LIME	CaCl2			
15	29/4		117	275	2				39					10				23	4		2	1					
16	30/4		120	126					6									9									
17	1/5		262	260	12				26					11				21	2		2						
18	2/5		170	150					15				3	11				13									
19	3/5		96	204					30				13					15			1						
20	4/5		80	65					14									10									
21	5/5		174						7											3							
22	6/5		360	60	13		22		40				6	5				4	1	9							
23	7/5			150	62				22				21	13					1	2	4	1					
24	8/5		214	500	38				71				12	8					6	12	5						
25	9/5		367	450	61				61				16					4	8	11	2	1					
26	10/5		297	450	59				42				11					15			2						
27	11/5		180	140	21				28				2					8			1						
28	12/5		75		8				3																		
CARRIED FORWARD		7550	3812	13025	302	106	1264	114	70				15	5	1			132	40	34	18	5	1	21			
TOTALS		7550	6324	15855	578	106	1286		474				99	53	1			254	62	71	37	8	1	21			

REMARKS: BYGGET VOLUME - LOSSES - TOTAL VOLUME 12/5 = 0

ANCHOR DRILLING FLUIDS AS

OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

WELL NAME 7119/12-2 AREA TROMS II

OPERATOR STATOIL RIG. ROSS RIG

MUD SYSTEM GEL/LIGNO/SEAWATER ENGINEERS LUND/AKSNES/TORGERSEN/BJØRHEIM

Day No	DATE 1981	ESTIMATED DAILY MUD VOLUMES: LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BULK MATERIALS: BARITE	BENTONITE	SACK MATERIALS: BENTONITE SXS	BARITE	CHROME LIGNO	THINNERS			POLYMERS: CMC H V	CMC L V	XC-POLYMER	DRISPAC SL/REG		OTHERS: CAUSTIC	SODA ASH	BICARB	DRLG DETERGENT	AL. STEARATE	LIME	$CaCl_2$			
29	13/5		213	330	21				40				17					12			2						
30	14/5		193	340	29		38		21				2	7	6			11	1		1						
31	15/5		457	440	40		39		46					1	9			19			1						
32	16/5		128	290	40		40		28						9			14	1								
33	17/5		100	155	11				35				6		3			11			2	1					
34	18/5		194	85	12				30									8									
35	19/5		56	80	3				19									7									
36	20/5		296	250	23				45				4		4			12									
37	21/5			174	35		12		16				1		1			4									
38	22/5	975			11				3					4						1							
39	23/5		99	25	10				22					10						7							
40	24/5		84	48	7				8					19		2/-				3							
41	25/5		34	45	15				46					31		5/-			2	4	2	1					
42	26/5		47		14				72					22		1/-			3	1	4						
CARRIED FORWARD		7550	6324	15855	578	106	1286	114	474				99	53	1			254	62	71	37	8	1	21			
TOTALS		8525	8125	18117	849	106	1415	114	905				129	147	33	8/-		352	69	87	49	10	1	21			

REMARKS:

ANCHOR DRILLING FLUIDS AS

OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

WELL NAME 7119/12-2 AREA TROMS I

OPERATOR STATOIL RIG. ROSS RIG

MUD SYSTEM BENTONITE/LIGNO/SEAWATER ENGINEERS LUND/AKSNES/TORGERSEN/BJØRHEIM

Day No	DATE	ESTIMATED DAILY MUD VOLUMES			BULK MATERIALS		SACK MATERIALS			MATERIALS ADDED TO CONTROL PROPERTIES																		
										THINNERS			POLYMERS					OTHERS											
		LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BARITE	BENTONITE	bentonite SXS	BARITE	CHROME LIGNO				CMC HV	CMC LV	XC POLYMER	DRISPAC SL/REG		CAUSTIC	SODA ASH	BICARB	DRILLING DETERGENT AL	STEARATE	LIME	$CaCl_2$	LIGNITE			
43	27/5		287		8				16					2				1	3	10								
44	28/5		20	43	5		21		2									1	1									
45	29/5		63	60			31		6				3	4				3	1	2								
46	30/5		15	30	18				1									4										
47	31/5		21		7													4										
48	1/6		51		34		21		4				5	2				5							36			
49	2/6		46	30	33		35		19					18				5							34			
50	3/6		57		21		26		48					17				13	1						30			
51	4/6		50	40	23		24		19									10										
52	5/6		40	50	20		50		6									1	1						4			
53	6/6		50	30	21		30		8									2							6			
54	7/6		20	248	7		92		7				3					8	2						2			
55	8/6		90	123	13								19	11		1/-		1							28			
56	9/6		110	30	3								9	11		5/6		9							14			
CARRIED FORWARD		8525	8125	18117	849	106	1415	114	905				129	147	33	8/-		352	69	87	49	10	1	21	0			
TOTALS		8525	9045	18801	1062	106	1745	114	1041				168	212	33	14/6		419	78	99	49	10	1	21	154			

REMARKS:

ANCHOR DRILLING FLUIDS AS

OSLO — STAVANGER

Drilling Fluid & Material Consumption Report

WELL NAME 7119/12-2 AREA TROMS I

OPERATOR STATOIL RIG. ROSS RIG

MUD SYSTEM BENTONITE/LIGNO/SEAWATER ENGINEERS LUND/AKSNES/TORGERSEN

Day No.	DATE	ESTIMATED DAILY MUD VOLUMES			BULK MATERIALS		SACK MATERIALS			MATERIALS ADDED TO CONTROL PROPERTIES																		
										THINNERS			POLYMERS						OTHERS										
		LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BARITE	BENTONITE	BENTONITE SXS	BARITE	CHROME LIGNO				CMC HV	CMC LV	XC POLYMER	DRISPAC SL/REG		CAUSTIC SODA	ASH	BICARB	DRLG DETERG.	AL STEARATE	LIME	$CaCl_2$	LIGNITE				
57	10/6		74	200	11		117		19					19				19	3						4			
58	11/6		45	105	3		13		17					18				7	1			1						
59	12/6		10	55					11					11														
60	13/6																											
61	14/6		10	5																								
62	15/6		40	160			90		6					2				3	2									
63	16/6		88																									
64	17/6		54		2																							
65	18/6																											
66	19/6																											
67	20/6		79		22				3											3								
68	21/6				29																			10				
69	22/6																											
70	23/6		340			48												2	1	5								
CARRIED FORWARD		8525	9045	18801	1062	106	1745	114	1041				168	212	33	14/6		419	78	99	49	10	1	21	154			
TOTALS		8525	9366	19326	1129	154	1965	114	1097				168	262	33	14/6		450	84	107	49	11	1	31	158			

REMARKS:

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

WELL NAME 7119/12-2 AREA TROMS I

OPERATOR STATOIL RIG. ROSS RIG

MUD SYSTEM SPUD MUD / GEL PREMIX ENGINEERS LUND/JACK/BJØRHEIM/ALISON

Day No.	DATE 1981	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	Ca ++ ppm	Pf	RETORT: % OIL	% SOLIDS	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
1	15/4		1.04 / 1.20	>120																				made up spud mud
2	16/4	248	1.04 / 1.20	>120																				
3	17/4	256	1.04 / 1.20	>120																				
4	18/4	256	1.04 / 1.20	>120																				
5	19/4	256	1.04 / 1.20	>120																				
6	20/4		1.04 / 1.32	>120																				
7	21/4	259	1.06	50	22.5	5	35	24/25																
8	22/4	336	1.06	46	17	4	26	16/18																
9	23/4	469	1.20	39	22	6	32	25/27				9.8	14000	600	.15		7	3/4	15					
10	24/4	394	1.10	35	10	5	10	8/9				10.2	10000	-	0.1		7	0.5	17.5					
11	25/4	394	1.20	54	23	8	30	25/30				10.1	9800	580	0.1		9	0.25	20					
12	26/4	394	1.19	44	15	6	18	14/31				9.8	10000	540	0.15		9	Tr	25					run and cont 20" csg
13	27/4	394	1.15	58	26	14	24	18/35	10.0	2		10.3	9000	680	0.15		8	Tr	25					mixing
14	28/4	499	1.27	50	18.5	12	13	12/29	9.4	2		10.2	13500	120	0.4		12	0.5	27.5					Drlg.cement + 17½" ho

REMARKS,

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

WELL NAME 7119/12-2 AREA TROMS I

OPERATOR STATOIL RIG. ROSS RIG

MUD SYSTEM GEL/LIGNO/SEAWATER ENGINEERS BJØRHEIM/ALISON/AKSNES

Day No.	DATE 1981	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	Ca. ++ ppm	Pf	RETORT: % OIL	% SOLIDS	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
15	29/4	515	1.27	42	15.5	10	11	6/24	9.6	2	–	10.2	17 K	120	0.5	0	13	0.25	30	–	–	–	–	sticky raised mud wt. hole
16	30/4	590	1.27	44	15	10	10	7/40	10.2	2	–	9.8	17.5K	360	0.3	0	12	Tr	30	–	–	–	–	pilot D.lg. 12 1/4" hole
17	1/5	590	1.27	43	19	12	14	7/26	10.4	2	–	10.2	18 K	160	0.4	0	13	Tr	32.5	–	–	–	–	open hole to 17½"
18	2/5	590	1.27	45	13.5	8	11	4/22	9.0	2	–	10.4	19 K	280	0.3	0	12	Tr	32.5	–	–	–	–	u/r at 431 meters
19	3/5	590	1.27	46	17	12	10	5/22	8.4	2	–	10.2	19500	300	0.3	0	13	Tr	32.5					
20	4/5	590	1.27	47	16	11	10	4/20	9.2	2	–	9.8	19000	240	0.35	0	12	Tr	32.5					
21	5/5	590	1.27	45	13.5	8	11	7/35	9.0	2	–	10.4	18000	400	0.3	0	12	Tr	30					
22	6/5	590	1.27	40	16	10	12	10/32	10.0	2	–	10.8	20000	450	0.3	0	13	Tr	27.5					
23	7/5	688	1.37	43	20.5	15	11	3/31	9.0	2	–	10.7	21000	300	.6/1.5	0	14	Tr	25					raised mud wt.
24	8/5	950	1.45	44	20.5	15	11	3/35	7	2	–	11.0	19000	480	.3/1.0	0	17	3/4	27.5					treat high Ca^{2+} raised mud wt
25	9/5	1065	1.55	57	22	15	14	4/34	7.3	2	–	10.5	20000	320	.25/.6	0	19	½	27.5					sample flowline
26	10/5	1212	1.55	47	22	16	12	5/34	7.0	2	–	10.3	19500	320	.25/.6	0	20	1/4	27.5					
27	11/5	1275	1.55	46	20	15	10	3/28	7.2	2	–	10.8	19000	280	.35/.65	0	19	Tr	25					
28	12/5	1275	1.55	47	19	14	10	3/26	7.3	2	–	10.5	19000	320	.3/.6	0	19	1/4	25					

REMARKS

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

WELL NAME 7119/12-2 AREA TROMS I

OPERATOR STATOIL RIG. ROSS RIG

MUD SYSTEM BENTONITE/LIGNOSULFONATE/SEAWATER ENGINEERS LUND/AKSNES/TORGERSEN/BJØRHEIM

Day No.	DATE 1981	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	Ca. ++ ppm	Pf	RETORT: % OIL	% SOLIDS	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
29	13/5	784	1.55	45	22.5	16	13	4/33	7.4	2	-	-	19000	280	.3/.65	-	20	½	25			.63	.56	reaming 17½" hole
30	14/5	923	1.55	46	25.5	17	17	4/27	6.8	2	-	-	18500	240	.25/.6	-	21	½	25			.59	.89	increase YP w. XC-Polymer as pr. order
31	15/5	1025	1.55	45	26.5	18	17	4/22	7.1	2	-	-	19000	240	.3/.55	-	20	1/4	22.5					
32	16/5	1120	1.55	45	20.5	17	17	4/18	7.2	2	-	-	18500	180	.35/.6	-	20	½	22.5			.58	.89	
33	17/5	1221	1.55	54	21	17	18	4/20	6.9	2	-	-	18500	160	.25/.5	-	20	½	22.5			.57	.99	sample flow line
34	18/5	1232	1.55	46	26	18	16	4/21	7.0	2	-	-	18000	160	.25/.55	-	20+	1/4	22.5			.61	.74	sample pit
~~35~~	~~19/5~~	~~ream.~~	~~1.55~~	~~47~~	~~24~~	~~16~~	~~16~~	~~3/20~~	~~6.8~~	~~2~~	~~-~~	~~-~~	~~18000~~	~~140~~	~~.3/.55~~	~~-~~	~~20~~	~~1/4~~	~~25~~			~~.58~~	~~.83~~	
36	20/5	ream.	1.55	46	24	16	16	3/18	6.7	2	-	-	18500	160	.25/.5	-	20	½	22.5			.58	.83	
37	21/5	ream.	1.60	58	22.5	16	13	3/15	7.3	2	-	10.4	18000	160	.25/.55	-	20	½	25					re-reaming 17½" hole
38	22/5	1183	1.60	48	24.5	16	17	4/26	7.1	2	-	11.0	18000	240	05/085	-	20	1/4	22.5					csg. run & cement 13 3/8"
39	23/5	1197	1.60	57	24	17	14	4/31	6.8	2	-	11.2	18500	280	0.7/1.9	-	20	1/4	22.5					Drlg. cmt.
40	24/5	1255	1.60	50	29	20	18	4/37	6.5	2	-	11.3	18500	300	0.9/1.7	-	22	½	25					
41	25/5	1318	1.60	48	27	20	14	3/25	5.2	1	-	11.0	19000	300	0:55/1.35	-	22	½	22.5					Drlg. 12 1/4" hole
42	26/5	1382.5	1.60	50	26.5	20	13	3/19	4.6	1	-	10.8	19000	520	0.4/1.1	-	22	½	22.5					start coring Ca++ from formation

REMARKS,

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

WELL NAME 7119/12-2 AREA TROMS I

OPERATOR STATOIL RIG ROSS RIG

MUD SYSTEM BENTONITE/LIGNO/SEAWATER ENGINEERS LUND/AKSNES/TORGERSEN/BJØRHEIM

Day No.	DATE 1981	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	Ca. ++ ppm	Pf	RETORT: % OIL	% SOLIDS	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
43	27/5	1413	1.60	50	24.5	19	11	3/16	4.5	1	–	10.6	19500	300	.4	–	22	½	22.5						cut core no. 1 to 3
44	28/5	1433	1.60	48	22	17	10	3/16	4.9	1	–	10.2	18500	320	.35	–	21	½	22.5						cut core no. 4 to 6
45	29/5	1460	1.60	48	26	20	12	3/20	4.5	1	–	10.5	19000	330	.4	–	22	½	22.5						
46	30/5	1491	1.60	47	26	20	12	3/20	4.5	1	–	10.3	19000	320	.3	–	22	½	22.5						cut core no. 7
47	31/5	1519	1.60	48	22	17	10	3/18	4.5	1	16	10.2	19000	330	.3	–	22	½	22.5						cut core no. 8 to 10
48	1/6	1536	1.60	50	27.5	22	11	3/18	4.6	1	15	10.5	19000	240	.3	–	22	½	22.5						cut core no. 11 to 1
49	2/6	1553	1.60	50	24	19	10	3/18	4.0	1	14.5	10.5	18500	240	.3	–	22	½	22.5						cut core no. 14
50	3/6	1596	1.60	55	24	19	10	3/18	4.0	1	12	10.3	18500	180	.3	–	22	½	22.5						cut core no. 15 to 1
51	4/6	1618	1.60	52	24	19	10	3/18	4.1	1	12	10.4	18000	160	.4	–	23	½	22.5						cut core no. 17
52	5/6	1658	1.60	50	23.5	19	9	3/16	4.0	1	11.0	11.0	18500	120	.6	–	22.5	½	22.5						cut core no. 18 to 1
53	6/6	1691	1.60	51	24	19	10	3/15	4.0	1	11.2	10.8	18000	140	.46	–	22	½	22.5						cut core no. 20
54	7/6	1425	1.45	41	23.5	18	11	3/16	4.9	1.0	12.6	10.4	18000	140	.30	–	20	1/4	20.5						cut mud wt to 1.45
55	8/6	1538	1.35	45	17.5	12	11	3/15	4.3	1.0	12.0	10.3	16000	180	.3	–	18	Tr	24.0						opening up 8½" hole Reduced mud wt to 1.
56	9/6	1689	1.35	48	22.5	16	13	3/16	4.9	1.0	12.0	10.9	17000	120	.41	–	16	Tr	20						opening up 8½" hole to 12 1/4"

REMARKS

ANCHOR DRILLING FLUIDS AS
OSLO — STAVANGER

Drilling Mud Properties Record

WELL NAME 7119/12-2 AREA TROMS I
OPERATOR STATOIL RIG. ROSS RIG
MUD SYSTEM BENTONITE/LIGNO/SEAWATER ENGINEERS LUND/AKSNES/TROGERSEN/BJØRHEIM

Day No.	DATE 1981	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	Ca. ++ ppm	Pf	RETORT: % OIL	% SOLIDS	% SAND	BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"	"K"	OPERATION REMARKS
57	10/6	1788	1.35	48	22	19	13	3/16	4.8	1	12.1	10.9	16000	140	.46	-	16	Tr	23.0					Drlg. 12 1/4" hole
58	11/6	1874	1.35	48	22	16	12	3/18	4.6	1	12.0	10.6	16000	160	.3	-	15	Tr	22.5					" "
59	12/6	1903	1.35	48	23	17	12	2/14	4.0	1	12.1	10.6	16000	160	.38	-	16	Tr	23.0					Drilled to 1903 (TI
60	13/6	1903	1.35	52	23	18	12	2/15	4.0	1	12.4	10.6	16000	160	.38	-	14	Tr	24.0					Running logs
61	14/6	1903	1.35	52	24	18	11	2/14	4.0	1	12.4	10.7	16000	160	.41	-	15	Tr	23.0					Running 9 5/8" casi
62	15/6	1885	1.27	45	16.5	12	9	2/13	4.8	1	12.6	10.8	14000	120	.48	-	10	Tr	21.5					Cut mud wt to 1.27
63	16/6	1885	1.27	46	16.5	12	9	2/14	4.8	1	12.6	10.7	14000	120	.42	-	10	Tr	21.0					cs Run & cement 9 5/8"
64	17/6	1885	1.27	45	16.5	12	9	2/14	4.8	1	12.6	10.8	14000	120	.41	-	10	Tr	21.0					Well
65	18/6	1885	1.27	47	16	12	8	2/13	4.9	1	12.7	10.8	14000	120	.44	-	10	Tr	21.0					Testing.

REMARKS

VI RFT AND TEST SUMMARY

Summary of RFT runs:

RFT no.1

The first run was made 07.06.81. 10 pretest pressure points were obtained from a total of 13 attempts, the three failures being attributed to seal failures.

RFT no.2

The second run was made 12.06.81. 25 pretest pressure points were obtained from a total of 30 attempts, attempts at 1529 m and 1547 m failing due to supercharge effects. Three pretest attempts were made above the top sand but the formation proved to be too tight and no pressures were obtained.

Sampling:

A segregated sample was taken at 1617.5 m RKB during run 2. Both chambers were checked at surface and found to contain formation water contaminated by mud filtrate. The 2 3/4 gallon chamber had an opening pressure of 200 psig, less than 1 cuft of gas was bled off. The 1 gallon chamber had an opening pressure just slightly above zero and no gas was bled off.

PRETEST RECORDED DATA

WELL: 7119/1-22

DATE: 6.6.81

RUN NO.: 1

Max. rec. temp.: 124°F

Test	Depth	Log hydr.pr. before/after test		Cor. hydr.pr. before test		Draw down	Fill up time	Log pretest pressure	Cor.pretest pressure		Cor.hydr.pr. after test		Remarks
No	mRKB	psi		psi, gm/cc		psi	sec.	psi	psi/gm/cc		psi, gm/cc		
1	1212.0	2791	2791	2793	1.621						2793	1.621	Seal failure
2	1220.0	2808	2808	2810	1.620						2810	1.620	"
3	1376.0	3159	3159	3162	1.616						3162	1.616	"
4	1380	3170	3170	3174	1.617	3	22	2121	2122	1.081	3174	1.617	
5	1402.5	3222	3222	3226	1.618	-	-	2155	2156	1.081	3226	1.618	
6	1415.0	3250	3250	3254	1.617	2	24	2173	2174	1.080	3254	1.617	
7	1440.0	3309	3309	3311	1.617	4	24	2213	2214	1.081	3311	1.617	
8	1477.5	3394	3394	3399	1.618	6	22	2268	2269	1.080	3399	1.618	
9	1503.0	3452	3452	3457	1.618	3	24	2306	2307	1.079	3457	1.618	
10	1514.5	3480	3480	3485	1.618	2	24	2325	2326	1.080	3485	1.618	
11	1551.0	3562	3562	3568	1.618	30	24	2380	2381	1.080	3568	1.618	
12	1625.0	3732	3732	3739	1.618	16	24	2491	2492	1.078	3739	1.618	
13	1679.5	3855	3855	3863	1.618	500	24	2572	2574	1.078	3863	1.618	

PRETEST RECORDED DATA

WELL: 7119/12-2

DATE: 12.6.81

RUN NO.: 2

Max. rec. temp.: 118°F

Test	Depth	Log hydr.pr. before/after test		Cor. hydr.pr. before test		Draw down	Fill up time	Log pretest pressure	Cor.pretest pressure		Cor.hydr.pr. after test		Remarks
No	mRKB	psi		psi, gm/cc		psi	sec.	psi	psi/gm/cc		psi, gm/cc		
1	1269.5	2482	2482	2483	1.375	-	-	-	-	-	2483	1.375	Tight
2	1280.0	2502	2502	2504	1.375	-	-	-	-	-	2504	1.375	Tight
3	1356.5	2650	2651	2652	1.375	-	-	-	-	-	2653	1.375	Tight
4	1373.0	2684	2684	2686	1.376	9	18	2110	2111	1.081	2686	1.376	
5	1385.0	2707	2707	2709	1.376	5	24	2128	2129	1.081	2709	1.376	
6	1410.0	2754	2755	2756	1.375	50	24	2133	2164	1.079	2757	1.375	
7	1420.0	2774	2775	2776	1.375	1	24	2179	2180	1.080	2777	1.375	
8	1441.0	2817	2817	2819	1.376	142	24	2211	2212	1.080	2819	1.376	
9	1453.5	2840	2841	2842	1.375	2233	96	2233	2234	1.081	2842	1.375	Low Perm
10	1460.5	2853	2854	2855	1.375	59	24	2240	2241	1.079	2856	1.375	
11	1480.0	2893	2993	2895	1.376	3	18	2271	2272	1.080	2895	1.375	
12	1490.0	2912	2912	2914	1.375	5	24	2286	2287	1.079	2914	1.375	
13	1505.0	2941.	2941	2943	1.375	3	24	2308	2309	1.079	2943	1.375	
14	1529.0	2988	2988	2990	1.375						2990	1.375	Supercharg
15	1547.0	3023	3023	3026	1.376						3026	1.376	"
16	1556.0	3041	3041	3044	1.376	109	24	2387	2388	1.079	3044	1.376	
17	1574.0	3075	3075	3078	1.375	5	24	2414	2415	1.079	3078	1.375	
18	1650.0	3224	3224	3228	1.376	2060	24	2529	2531	1.079	3228	1.376	
19	1685.0	3292	3292	3293	1.376	310	18	2583	2585	1.079	3296	1.376	
20	1708.0	3335	3336	3339	1.375	200	22	2618	2620	1.079	3340	1.375	

PRETEST RECORDED DATA

WELL: 7119/12-2

DATE: 12.6.81

RUN NO.: 2

Max. rec. temp.: 118°F

Test	Depth	Log hydr.pr. before/after test		Cor. hydr.pr. before test		Draw down	Fill up time	Log pretest pressure	Cor.pretest pressure		Cor.hydr.pr. after test		Remarks
No	mRKB	psi		psi, gm/cc		psi	sec.	psi	psi/gm/cc		psi, gm/cc		
21	1723.0	3366	3366	3371	1.376	20	24	2641	2643	1.079	3371	1.376	
22	1740.0	3398	3398	3403	1.375	18	24	2667	2669	1.079	3403	1.375	
23	1756.5	3430	3431	3435	1.375	50	24	2694	2696	1.079	3436	1.375	
24	1772.0	3462	3462	3467	1.376	95	24	2716	2718	1.079	3467	1.376	
25	1785.5	3487	3487	3492	1.375	251	24	2736	2738	1.078	3492	1.375	
26	1814.0	3542	3542	3548	1.376	115	24	2778	2780	1.078	3548	1.376	
27	1830.0	3573	3573	3579	1.375	4	24	2802	2804	1.078	3579	1.375	
28	1840.0	3592	3593	3598	1.375	442	24	2817	2819	1.077	3599	1.375	
29	1853.0	3617	3617	3623	1.375	80	22	2838	2840	1.078	3623	1.375	
30	1868.0	3647	3648	3653	1.375	665	24	2861	2863	1.078	3654	1.375	
						SAMPLING (PRE-TEST)							
	1617.5	3157	3159	3160	1.374	35	24	2480	2481	1.079	3162	1.375	

RFT Sampling Data

Well: 7119/12-2
Date: 12.06.81
Run: 2

Segregated sample: 2 3/4 gallon + 1 gallon

Choke size: 8 x 0.020

Depth	m RKB	1617.5
Hydr. pressure before setting	psig	3160
pretest pressure	psig	2481
2 3/4 gallon chamber		
Final flowing pressure	psig	2377
Chamber closed after	min	18
Final shut in pressure	psig	2480
1 gallon chamber		
Final flowing pressure	psig	2385
Chamber closed after	min	6
Final shut in pressure	psig	2480

Well 7119/12-2 DST no. 1

Test Summary

The perforated interval 1395 - 1415 m RKB was tested using standard drill stem test tools.

A cushion consisting of 38 m viscous gel and 238 m fresh water was placed above the APR-N tester valve (total volume 5.5 BBL).

Below the packer, the volume of mud to mid perforation was 10.5 BBL.

The cushion plus rathole gave a differential pressure across the formation of approximately 1675 psi.

After setting the packer and allowing the hydraulic bypass to close, the APR-N valve was opened and the wellhead pressure observed for 5 minutes during which time it rose to 40 psig.

The choke manifold was then opened and the initial flow was strong. In flow was monitored using a bubble hose and after almost two hours flow ceased. The well was observed for a further hour before the APR-M circulating valve was sheared and the sting contents reversed.

Samples of formation water were cought at intervals until mud came to surface, a provisional analysis is attached. The total volume of fluid reversed ahead of the mud was 38 bbl, this being estimated as 16 BBL cushion plus rathole and 22 BBL formation water.

Total production is estimated as being 33 bbl.

Formation water was trapped in the stand of drill collars between the APR-M and APR-N valves. Samples of this water were caught and a provisional analysis is attached.

WATER ANALYSIS.

REVERSAL.

Time	ph	Ca2+(ppm)	Cl-(ppm)
16:34	7.2	2880	41000
16:37	7.2	3400	45000
16:39	7.3	4480	53000
16:43	7.2	4800	55000
16:48	7.2	5400	62000
16:49	7.2	5600	58000
16:50	7.2	5280	62000
16:51	7.1	5480	64000
16:54	6.9	5250	56000
16:57	7.0	5200	58000

TRAPPED SAMPLE.

ph	Ca2+(ppm)	Cl-(ppm)
6.1	8800	58000

Maximum recorded temperature was 121^{o}F.

GeoChem Laboratories (U.K.) Limited

3

U-283

GEOCHEMICAL SERVICE REPORT

BA-81-1165

Prepared for

STATOIL GEOLOGICAL LABORATORY

GEOCHEMICAL EVALUATION OF STATOIL'S 7119/12-2 WELL

TROMS CONCESSIONS, OFFSHORE NORWAY

October 1981

CHESTER STREET · CHESTER CH4 8RD · ENGLAND

TABLE 1A

CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-001	260-275	2621	0	0	0	0	2621	0	0.0	0	0.00
556-002	275-290	3971	0	0	0	0	3971	0	0.0	0	0.00
556-003	290-305	4393	0	0	0	0	4393	0	0.0	0	0.00
556-005	320-335	11	0	0	0	0	11	0	0.0	0	0.00
556-006	335-350	858	13	0	0	0	871	13	1.5	0	0.00
556-007	350-365	9517	0	0	0	0	9517	0	0.0	0	0.00
556-008	365-380	8518	0	0	0	0	8518	0	0.0	0	0.00
556-009	380-395	135	0	0	0	0	135	0	0.0	0	0.00
556-010	395-410	11369	0	0	0	0	11369	0	0.0	0	0.00
556-011	410-425	12418	108	9	0	0	12535	117	0.9	0	0.00
556-012	425-440	10824	228	24	6	0	11083	258	2.3	0	0.00
556-013	440-455	7956	358	95	115	27	8551	595	7.0	0	4.28
556-014	455-470	11182	1716	1155	377	1315	15745	4563	29.0	2957	0.29
556-015	470-485	105	19	20	5	14	163	58	35.6	42	0.35
556-016	485-500	6779	1681	3309	685	1856	14310	7531	52.6	4084	0.37
556-017	500-515	674	206	414	132	366	1793	1119	62.4	818	0.36
556-018	515-530	170	56	70	22	76	394	223	56.8	104	0.28
556-019	530-545	335	313	82	68	153	951	616	64.8	668	0.44
556-021	560-575	855	114	111	33	82	1195	340	28.4	159	0.41
556-023	590-605	100	59	178	119	454	910	810	89.0	233	0.26
556-024	605-620	47	28	55	30	135	296	248	84.0	75	0.22
556-025	620-635	321	76	1641	584	2356	4979	4658	93.5	2899	0.25
556-026	635-650	3906	1458	2535	858	2545	11302	7396	65.4	6981	0.34
556-027	650-665	3490	1126	1912	726	2092	9346	5856	62.7	7632	0.35
556-028	665-680	870	230	804	256	868	3028	2158	71.3	8251	0.29
556-029	680-695	2504	952	2357	1160	3893	10865	8361	77.0	27468	0.30
556-030	695-710	83	25	15	0	14	137	54	39.2	1030	0.00

TABLE 1A

CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-031	710-725	3712	1264	1930	589	1939	9434	5722	60.7	6912	0.30
556-032	725-740	906	333	785	260	857	3141	2235	71.2	3533	0.30
556-033	740-755	3673	1316	2138	531	2000	9658	5985	62.0	4914	0.27
556-034	755-770	817	263	328	54	195	1656	839	50.7	929	0.28
556-035	770-785	8563	3152	3312	825	2602	18454	9891	53.6	3337	0.32
556-038	815-830	12324	3392	3320	986	3236	23257	10934	47.0	1613	0.30
556-039	830-845	8678	2141	2067	701	2267	15855	7176	45.3	2320	0.31
556-040	845-860	5662	1192	1064	293	867	9078	3416	37.6	600	0.34
556-042	875-890	4875	1470	1643	564	1713	10264	5389	52.5	2542	0.33
556-043	890-905	1825	515	552	176	592	3660	1835	50.1	782	0.30
556-044	905-920	4811	1267	1302	390	1285	9055	4244	46.9	2330	0.30
556-045	920-935	11914	2157	1688	352	1341	17453	5539	31.7	2550	0.26
556-046	935-950	13546	2893	2503	660	2508	22110	8564	38.7	4174	0.26
556-047	950-965	461	93	87	34	152	828	367	44.3	2250	0.22
556-048	965-980	1600	536	664	243	775	3818	2218	58.1	2745	0.31
556-049	980-995	878	194	176	41	75	1364	486	35.6	511	0.54
556-050	995-1010	1731	445	472	194	598	3439	1709	49.7	2390	0.32
556-051	1010-1025	2238	705	763	298	785	4789	2550	53.3	1561	0.38
556-052	1025-1040	4307	1470	1482	617	757	8633	4326	50.1	3708	0.82
556-054	1055-1070	148	69	124	67	257	664	516	77.7	5433	0.26
556-055	1070-1090	1643	367	310	49	220	2589	946	36.5	699	0.22
556-056	1090-1105	132	41	33	13	25	244	111	45.8	188	0.50
556-057	1105-1120	1848	721	735	257	692	4252	2404	56.5	1283	0.37
556-058	1120-1135	1832	376	338	71	234	2850	1018	35.7	896	0.30
556-059	1135-1150	269	80	53	12	30	444	175	39.5	270	0.40
556-060	1150-1165	42	11	6	1	1	62	20	31.8	2	0.87

TABLE 1A

CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN AIR SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-061	1165-1171	7946	2787	1394	244	416	12787	4841	37.9	1120	0.59
556-062	1183-1195	132	28	9	1	1	171	39	22.9	2	1.03
556-063	1195-1210	142	29	9	1	1	182	40	22.2	2	1.10
556-064	1210-1225	8549	2938	1171	187	295	13139	4590	34.9	643	0.63
556-065	1225-1240	6028	2693	1051	160	209	10141	4113	40.6	267	0.77
556-066	1240-1255	12306	4854	1769	255	366	19550	7244	37.1	1001	0.70
556-067	1255-1270	6275	3360	1205	168	210	11218	4943	44.1	242	0.80
556-068	1256-1270	85	55	2	21	48	212	126	59.8	130	0.45
556-069	1270-1285	4262	2662	1193	164	134	8415	4153	49.4	177	1.22
556-070	1285-1300	12	8	3	0	0	24	12	51.4	0	0.54
556-071	1300-1315	611	389	182	20	20	1221	610	50.0	7	1.02
556-072	1315-1330	17	13	7	0	1	38	21	54.8	0	0.41
556-073	1330-1345	10660	6120	2311	301	301	19693	9034	45.9	40	1.00
556-074	1345-1360	9500	6030	4228	697	1218	21674	12173	56.2	1531	0.57
556-075	1360-1375	7907	4383	3304	655	1228	17478	9570	54.8	3520	0.53
556-076	1430-1445	16831	13834	17865	4823	11060	64412	47582	73.9	29981	0.44
556-077	1445-1460	1356	1474	2419	628	1563	7440	6084	81.8	5573	0.40
556-078	1460-1475	88	4	1	19	52	164	76	46.3	2	0.36
556-079	1690-1705	790	1307	1510	301	687	4595	3805	82.8	1690	0.44
556-080	1705-1720	4092	2606	1697	259	533	9186	5094	55.5	1025	0.49
556-081	1720-1735	323	589	630	148	204	1895	1571	82.9	731	0.72
556-082	1735-1750	5532	3488	1925	299	568	11812	6280	53.2	195	0.53
556-083	1750-1765	18830	7269	1328	183	240	27850	9020	32.4	33	0.76
556-084	1765-1780	28186	18392	7517	1059	1712	56866	28681	50.4	1602	0.62
556-085	1780-1795	19787	11609	4668	629	957	37649	17862	47.4	1091	0.66
556-086	1795-1810	20929	9081	3417	501	678	34606	13676	39.5	552	0.74
556-087	1810-1825	19759	8926	2984	430	583	32683	12923	39.5	608	0.74
556-088	1825-1840	11816	7313	2288	242	279	21938	10122	46.1	184	0.87
556-089	1840-1855	24654	17763	6105	643	549	49714	25060	50.4	226	1.17
556-090	1855-1870	29324	18631	7417	951	810	57133	27809	48.7	560	1.17
556-091	1870-1900	5137	2849	1081	162	140	9369	4231	45.2	102	1.16

TABLE 1B

CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTINGS GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-001	260-275	962	13	23	0	0	998	36	3.6	0	0.00
556-002	275-290	442	0	0	0	0	442	0	0.0	0	0.00
556-003	290-305	182	0	0	0	0	182	0	0.0	0	0.00
556-004	305-320	78	0	0	0	0	78	0	0.0	0	0.00
556-005	320-335	442	0	0	0	0	442	0	0.0	0	0.00
556-006	335-350	130	0	0	0	0	130	0	0.0	0	0.00
556-007	350-365	416	0	0	0	0	416	0	0.0	0	0.00
556-008	365-380	338	0	0	0	0	338	0	0.0	0	0.00
556-009	380-395	234	0	0	0	0	234	0	0.0	0	0.00
556-010	395-410	260	0	0	0	0	260	0	0.0	0	0.00
556-011	410-425	442	0	0	0	0	442	0	0.0	0	0.00
556-012	425-440	442	13	0	0	0	455	13	2.8	0	0.00
556-013	440-455	1144	77	340	18	20	1599	455	28.5	0	0.93
556-014	455-470	2314	695	997	544	1936	6486	4172	64.3	6384	0.28
556-015	470-485	3978	1391	2163	874	3537	11943	7965	66.7	10125	0.25
556-016	485-500	1404	605	2248	898	3143	8299	6895	83.1	9346	0.29
556-017	500-515	520	206	765	361	1673	3525	3005	85.2	6735	0.22
556-018	515-530	1274	489	888	422	1568	4642	3368	72.6	11852	0.27
556-019	530-545	338	348	124	183	302	1294	956	73.9	6890	0.61
556-020	545-560	182	52	131	86	420	870	688	79.1	3357	0.20
556-021	560-575	1768	373	564	202	919	3826	2058	53.8	4021	0.22
556-022	575-590	1456	283	518	202	814	3272	1816	55.5	5993	0.25
556-023	590-605	35	21	37	121	397	610	575	94.3	653	0.31
556-024	605-620	624	247	667	110	338	1987	1363	68.6	1210	0.33
556-025	620-635	451	62	210	187	840	1750	1299	74.2	7480	0.22
556-026	635-650	659	288	1644	1584	4807	8982	8323	92.7	23468	0.33
556-027	650-665	1248	350	1570	1012	3617	7797	6549	84.0	35517	0.28
556-028	665-680	589	185	976	836	2998	5586	4996	89.4	44097	0.28
556-029	680-695	69	21	222	297	350	959	890	92.8	601	0.85
556-030	695-710	347	144	593	473	1948	3505	3159	90.1	19889	0.24

TABLE 1B

CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTINGS GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-031	710-725	381	1442	655	550	1692	4720	4339	91.9	12812	0.33
556-032	725-740	347	124	420	264	1038	2193	1846	84.2	9761	0.25
556-033	740-755	69	41	185	143	560	999	930	93.1	7084	0.26
556-034	755-770	451	185	507	264	980	2387	1936	81.1	8588	0.27
556-035	770-785	1629	659	1384	528	1960	6161	4532	73.6	9072	0.27
556-036	785-800	104	28	73	67	388	660	556	84.2	4983	0.17
556-037	800-815	173	56	208	171	662	1271	1097	86.4	3789	0.26
556-038	815-830	312	122	326	134	1010	1904	1592	83.6	6445	0.13
556-039	830-845	1109	449	1028	629	2609	5825	4716	81.0	9750	0.24
556-040	845-860	399	150	331	183	687	1750	1351	77.2	3524	0.27
556-041	860-875	399	131	275	122	557	1485	1086	73.1	3932	0.22
556-042	875-890	2167	1283	2354	978	3433	10214	8047	78.8	3394	0.28
556-043	890-905	3137	1620	2893	1399	5202	14252	11114	78.0	7171	0.27
556-044	905-920	485	290	927	599	2520	4821	4336	89.9	7273	0.24
556-045	920-935	2097	674	1315	746	2778	7610	5513	72.4	7244	0.27
556-046	935-950	711	328	989	807	3554	6388	5677	88.9	12467	0.23
556-047	950-965	503	197	315	159	614	1787	1284	71.9	2314	0.26
556-048	965-980	537	337	140	843	1809	3667	3130	85.3	4616	0.47
556-049	980-995	1837	871	1281	587	1914	6490	4653	71.7	4343	0.31
556-050	995-1010	312	159	315	263	1228	2276	1964	86.3	10899	0.21
556-051	1010-1025	2877	1367	2157	1143	3990	11535	8657	75.1	19149	0.29
556-052	1025-1040	3761	1985	3360	1858	5953	16917	13155	77.8	22388	0.31
556-053	1040-1055	2825	1348	2399	1656	4927	13156	10330	78.5	20938	0.34
556-054	1055-1070	329	206	517	458	1559	3069	2740	89.3	6674	0.29
556-055	1070-1090	537	281	551	342	961	2672	2135	79.9	1153	0.36
556-056	1090-1105	5183	2950	3837	1674	5121	18765	13582	72.4	8532	0.33
556-057	1105-1120	797	674	1405	770	2367	6013	5215	86.7	5215	0.33
556-058	1120-1135	451	225	584	354	969	2583	2133	82.6	852	0.37
556-059	1135-1150	3536	2041	2180	1014	2657	11429	7893	69.1	4620	0.38
556-060	1150-1165	6805	3679	3214	816	1929	16441	9637	58.6	2673	0.42

TABLE 1B

CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS IN CUTTINGS GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-061	1165-1171	1174	1626	2044	532	945	6320	5146	81.4	507	0.56
556-062	1183-1195	13936	9204	4781	1008	1495	30423	16487	54.2	782	0.67
556-063	1195-1210	14426	9439	5712	1030	1414	32021	17595	54.9	650	0.73
556-064	1210-1225	2303	2913	2825	642	865	9548	7245	75.9	395	0.74
556-065	1225-1240	1976	1994	1850	394	606	6819	4843	71.0	53	0.65
556-066	1240-1255	2451	3274	3231	532	770	10258	7807	76.1	395	0.69
556-067	1255-1270	5349	3767	2640	513	655	12923	7574	58.6	564	0.78
556-068	1256-1270	664	655	401	54	73	1848	1184	64.0	52	0.74
556-069	1270-1285	5846	4779	1806	259	325	13016	7170	55.1	485	0.80
556-070	1285-1300	10354	8574	4745	491	585	24749	14395	58.2	349	0.84
556-071	1300-1315	10282	8738	5211	604	683	25517	15235	59.7	324	0.88
556-072	1315-1330	9791	9558	8257	977	1410	29993	20202	67.4	162	0.69
556-073	1330-1345	9146	8973	8882	1745	2570	31316	22170	70.8	1419	0.68
556-074	1345-1360	840	1305	2171	488	1145	5949	5109	85.9	164	0.43
556-075	1360-1375	595	731	1308	403	851	3887	3292	84.7	1584	0.47
556-076	1430-1445	1058	1359	2912	917	2660	8906	7848	88.1	9338	0.34
556-077	1445-1460	357	333	1843	1510	4041	8083	7726	95.6	18248	0.37
556-078	1460-1475	273	16	15	7	15	326	53	16.3	3	0.43
556-079	1690-1705	94	80	236	82	212	705	610	86.6	895	0.39
556-080	1705-1720	11	20	21	5	7	63	52	82.9	24	0.72
556-081	1720-1735	151	289	578	167	356	1542	1390	90.2	927	0.47
556-082	1735-1750	248	434	558	131	288	1660	1412	85.1	1884	0.46
556-083	1750-1765	8445	8327	4851	557	881	23060	14615	63.4	1068	0.63
556-084	1765-1780	66	141	81	19	39	345	280	81.0	7	0.49
556-085	1780-1795	254	373	243	53	91	1016	761	74.9	167	0.59
556-086	1795-1810	291	325	285	57	102	1061	770	72.5	213	0.55
556-087	1810-1825	374	621	378	63	91	1527	1152	75.5	162	0.70
556-088	1825-1840	639	324	121	27	44	1156	516	44.7	2	0.62
556-089	1840-1855	3001	3391	1105	114	134	7744	4743	61.3	99	0.85
556-090	1855-1870	6660	4343	1420	159	178	12760	6100	47.8	157	0.89
556-091	1870-1900	4687	2961	1210	194	187	9238	4551	49.3	267	1.04

TABLE 1C

TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (1A + 1B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-001	260-275	3583	13	23	0	0	3619	36	1.0	0	0.00
556-002	275-290	4413	0	0	0	0	4413	0	0.0	0	0.00
556-003	290-305	4575	0	0	0	0	4575	0	0.0	0	0.00
556-004	305-320	78	0	0	0	0	78	0	0.0	0	0.00
556-005	320-335	453	0	0	0	0	453	0	0.0	0	0.00
556-006	335-350	988	13	0	0	0	1001	13	1.3	0	0.00
556-007	350-365	9933	0	0	0	0	9933	0	0.0	0	0.00
556-008	365-380	8856	0	0	0	0	8856	0	0.0	0	0.00
556-009	380-395	369	0	0	0	0	369	0	0.0	0	0.00
556-010	395-410	11629	0	0	0	0	11629	0	0.0	0	0.00
556-011	410-425	12860	108	9	0	0	12977	117	0.9	0	0.00
556-012	425-440	11266	241	24	6	0	11538	271	2.4	0	0.00
556-013	440-455	9100	435	435	133	47	10150	1050	10.3	0	2.87
556-014	455-470	13496	2411	2151	921	3251	22231	8735	39.3	9342	0.28
556-015	470-485	4083	1410	2183	879	3551	12106	8023	66.3	10167	0.25
556-016	485-500	8183	2286	5557	1583	4999	22609	14426	63.8	13430	0.32
556-017	500-515	1194	412	1179	493	2040	5318	4124	77.6	7553	0.24
556-018	515-530	1444	545	958	443	1645	5035	3591	71.3	11956	0.27
556-019	530-545	673	661	205	251	455	2245	1572	70.0	7558	0.55
556-020	545-560	182	52	131	86	420	870	688	79.1	3357	0.20
556-021	560-575	2623	488	675	235	1000	5021	2398	47.8	4180	0.23
556-022	575-590	1456	283	518	202	814	3272	1816	55.5	5993	0.25
556-023	590-605	135	80	215	240	851	1520	1386	91.1	885	0.28
556-024	605-620	671	275	722	140	474	2283	1611	70.6	1285	0.30
556-025	620-635	772	138	1851	771	3196	6729	5957	88.5	10379	0.24
556-026	635-650	4564	1746	4179	2442	7351	20283	15719	77.5	30449	0.33
556-027	650-665	4738	1476	3481	1738	5709	17142	12405	72.4	43149	0.30
556-028	665-680	1460	415	1781	1092	3866	8614	7154	83.1	52348	0.28
556-029	680-695	2573	973	2579	1457	4243	11825	9252	78.2	28069	0.34
556-030	695-710	430	169	608	473	1962	3642	3212	88.2	20919	0.24

TABLE 1C

TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (1A + 1B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-031	710-725	4093	2706	2585	1139	3631	14154	10060	71.1	19724	0.31
556-032	725-740	1253	457	1205	524	1895	5334	4081	76.5	13294	0.28
556-033	740-755	3742	1357	2323	674	2560	10657	6914	64.9	11998	0.26
556-034	755-770	1268	448	834	318	1175	4043	2775	68.6	9517	0.27
556-035	770-785	10192	3811	4697	1353	4562	24614	14422	58.6	12409	0.30
556-036	785-800	104	28	73	67	388	660	556	84.2	4983	0.17
556-037	800-815	173	56	208	171	662	1271	1097	86.4	3789	0.26
556-038	815-830	12636	3513	3646	1121	4246	25161	12525	49.8	8058	0.26
556-039	830-845	9788	2591	3096	1330	4876	21680	11892	54.9	12069	0.27
556-040	845-860	6061	1342	1395	477	1553	10828	4767	44.0	4125	0.31
556-041	860-875	399	131	275	122	557	1485	1086	73.1	3932	0.22
556-042	875-890	7042	2752	3997	1542	5146	20478	13437	65.6	5935	0.30
556-043	890-905	4962	2135	3445	1575	5793	17912	12949	72.3	7953	0.27
556-044	905-920	5296	1557	2229	989	3805	13876	8580	61.8	9603	0.26
556-045	920-935	14012	2832	3003	1098	4120	25063	11052	44.1	9794	0.27
556-046	935-950	14257	3221	3492	1467	6062	28498	14241	50.0	16641	0.24
556-047	950-965	964	290	402	193	766	2615	1651	63.1	4564	0.25
556-048	965-980	2137	873	804	1086	2585	7485	5348	71.4	7362	0.42
556-049	980-995	2716	1064	1457	627	1990	7854	5138	65.4	4854	0.32
556-050	995-1010	2043	605	786	457	1825	5716	3673	64.3	13289	0.25
556-051	1010-1025	5116	2072	2920	1441	4775	16323	11207	68.7	20710	0.30
556-052	1025-1040	8069	3455	4842	2475	6709	25550	17481	68.4	26096	0.37
556-053	1040-1055	2825	1348	2399	1656	4927	13156	10330	78.5	20938	0.34
556-054	1055-1070	478	275	640	526	1816	3734	3256	87.2	12106	0.29
556-055	1070-1090	2181	648	861	391	1181	5261	3081	58.6	1852	0.33
556-056	1090-1105	5315	2990	3870	1687	5146	19008	13693	72.0	8720	0.33
556-057	1105-1120	2645	1395	2140	1027	3058	10265	7620	74.2	6498	0.34
556-058	1120-1135	2283	600	922	425	1203	5433	3151	58.0	1747	0.35
556-059	1135-1150	3805	2121	2233	1027	2688	11873	8068	68.0	4890	0.38
556-060	1150-1165	6847	3690	3220	817	1930	16503	9656	58.5	2675	0.42

TABLE 1C

TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C_1 - C_7 HYDROCARBONS (1A + 1B)

GEOCHEM SAMPLE NUMBER	DEPTH	C_1 Methane	C_2 Ethane	C_3 Propane	iC_4 Isobutane	nC_4 Butane	TOTAL C_1 - C_4	TOTAL C_2 - C_4	% GAS WETNESS	TOTAL C_5 - C_7	$\frac{iC_4}{nC_4}$
556-061	1165-1171	9120	4413	3437	776	1361	19108	9987	52.3	1627	0.57
556-062	1183-1195	14068	9232	4789	1010	1496	30594	16526	54.0	784	0.68
556-063	1195-1210	14568	9468	5721	1031	1415	32204	17635	54.8	652	0.73
556-064	1210-1225	10852	5851	3996	828	1159	22687	11835	52.2	1039	0.71
556-065	1225-1240	8004	4686	2901	555	814	16960	8956	52.8	320	0.68
556-066	1240-1255	14757	8128	5001	786	1136	29808	15051	50.5	1396	0.69
556-067	1255-1270	11623	7127	3845	681	864	24141	12517	51.9	807	0.79
556-068	1256-1270	750	710	402	76	121	2060	1310	63.6	181	0.62
556-069	1270-1285	10108	7441	2999	423	460	21431	11323	52.8	662	0.92
556-070	1285-1300	10366	8582	4749	491	585	24773	14408	58.2	349	0.84
556-071	1300-1315	10892	9127	5393	624	702	26738	15846	59.3	332	0.89
556-072	1315-1330	9808	9571	8264	978	1411	30031	20223	67.3	162	0.69
556-073	1330-1345	19806	15093	11193	2046	2871	51009	31203	61.2	1459	0.71
556-074	1345-1360	10340	7335	6399	1185	2363	27622	17282	62.6	1695	0.50
556-075	1360-1375	8502	5115	4612	1058	2078	21365	12863	60.2	5104	0.51
556-076	1430-1445	17888	15194	20777	5740	13720	73318	55430	75.6	39319	0.42
556-077	1445-1460	1713	1807	4262	2138	5604	15523	13810	89.0	23820	0.38
556-078	1460-1475	361	20	17	25	67	491	129	26.4	5	0.38
556-079	1690-1705	885	1387	1747	384	898	5300	4415	83.3	2585	0.43
556-080	1705-1720	4103	2625	1718	264	540	9249	5146	55.6	1049	0.49
556-081	1720-1735	475	878	1208	315	561	3437	2962	86.2	1658	0.56
556-082	1735-1750	5780	3922	2484	431	856	13472	7692	57.1	2079	0.50
556-083	1750-1765	27275	15596	6179	739	1121	50910	23635	46.4	1100	0.66
556-084	1765-1780	28251	18532	7599	1078	1751	57211	28960	50.6	1608	0.62
556-085	1780-1795	20041	11981	4911	682	1048	38665	18623	48.2	1258	0.65
556-086	1795-1810	21221	9406	3702	557	781	35667	14446	40.5	765	0.71
556-087	1810-1825	20134	9547	3362	493	674	34209	14075	41.1	769	0.73
556-088	1825-1840	12455	7637	2409	269	323	23094	10639	46.1	186	0.83
556-089	1840-1855	27655	21154	7209	757	683	57458	29803	51.9	325	1.11
556-090	1855-1870	35984	22974	8838	1110	989	69893	33910	48.5	717	1.12
556-091	1870-1900	9824	5810	2291	355	326	18606	8782	47.2	369	1.09

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-001	260-275m	A 40% Quartz sand, mostly unconsolidated grading to quartzite, grains sub-rounded, fine to medium grained, pinkish grey	5YR8/1	
		B 20% Siltstone, blocky, rounded, non calc., mostly caved, medium light grey	N6	0.73
		C 15% Lost circulation material - drilling mud		
		D 15% Shell fragments, mainly sponge and forams		
		E 10% Igneous, mainly granitic and basaltic origin		
		Minor mica schist		
556-002	275-290m	A 35% Sand, as 556-001A	5YR8/1	
		B 40% Igneous, as 556-001E		
		C 5% Minor shell fragments and siltstone		
556-003	290-305m	A 50% Sand, as 556-001A	5YR8/1	
		B 30% Igneous, as 556-001E		
		C 20% Lost circulation material - drilling mud		
		Minor dolomite		
556-004	305-320m	A 40% Sand, as 556-001A	5YR8/1	
		B 40% Lost circulation material - drilling mud		
		C 20% Igneous, as 556-001E		
556-005	320-335m	A 55% Sand, as 556-001A, pale milky C.	5YR8/1	
		B 25% Lost circulation material - drilling mud		
		C 20% Igneous, as 556-001E		
556-006	335-350m	A 45% Sand, as 556-001A	5YR8/1	
		B 35% Igneous, as 556-001E		
		C 20% Lost circulation material - drilling mud		
556-007	350-365m	A 60% Sand, as 556-001A	5YR8/1	
		B 30% Igneous, as 556-001E		
		C 10% Siltstone, blocky, rounded, non calc., medium to medium light grey	N5-N6	0.54
		Minor drilling mud		
556-008	365-380m	A 55% Sand, as 556-001A	5YR8/1	
		B 25% Igneous, as 556-001E		
		C 20% Siltstone, as 556-007C	N5-N6	0.87
556-009	380-395m	A 55% Sand, as 556-001A	5YR8/1	
		B 25% Igneous, as 556-001E		
		C 20% Siltstone, as 556-007C	N5-N6	0.80,0.78
		Minor pyrites		

Abbreviations = argillaceous, calcareous, Cut, Fluorescence, slightly

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-010	395-410m	A 65% Sand, mostly unconsolidated grading to quartzite, grains sub-rounded, fine to medium grained, pinkish grey	5YR8/1	
		B 25% Igneous, mainly granitic and basaltic origin		
		C 10% Drilling mud Minor siltstone		
556-011	410-425m	A 70% Sand, as 556-010A	5YR8/1	
		B 25% Igneous, as 556-010B		
		C 5% Minor siltstone		
556-012	425-440m	A 70% Sand, as 556-010A	5YR8/1	
		B 20% Igneous, as 556-010B, cavings		
		C 10% Drilling mud Minor siltstone		
556-013	440-455m	A 65% Sand, as 565-010A	5YR8/1	
		B 20% Igneous, as 556-010B, cavings		
		C 15% Drilling mud		
556-014	455-470m	A 80% Shale, fissile to platy, soft, subrounded plates, non calc., medium to medium light grey	N5-N6	1.02
		B 15% Sand, as 556-010A	5YR8/1	
		C 5% Igneous, as 556-010B		
556-015	470-485m	A 85% Shale, as 556-014A	N5-N6	0.88
		B 10% Sand, as 556-010A	5YR8/1	
		C 5% Minor igneous, as 556-010B, mostly caved		
556-016	485-500m	A 80% Shale, as 556-014A, minor cavings	N5-N6	0.84
		B 20% Sand, as 556-010A Minor igneous rock	5YR8/1	
556-017	500-515m	A 85% Shale, as 556-014A	N5-N6	0.82
		B 15% Sand, as 556-010A Minor igneous	5YR8/1	
556-018	515-530m	A 65% Shale, as 556-014A	N5-N6	0.99
		B 35% Sand, as 556-010A Minor igneous, minor cavings	5YR8/1	
556-019	530-545m	A 80% Shale, fissile, soft, v. sl. calc. to non calc., medium grey to medium olive grey	N5-5Y5/1	0.91,0.88
		B 20% Sand, as 556-010A Minor igneous	5YR8/1	

Abbreviations = argillaceous, calcareous, Cut, Fluorescence, slightly ,

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-020	545-560m	A 85% Shale, fissile, soft, v. sl. calc. to non calc., medium grey to medium olive grey	N5-5Y5/1	1.00
		B 15% Sand, mostly unconsolidated grading to quartzite, grains sub-rounded, fine to med. grained, pinkish grey	5YR8/1	
556-021	560-575m	A 95% Shale, subfissile to blocky, sl. silty, v. sl. calc., medium grey to medium light grey	N5-N6	0.93
		B 5% Minor sand		
556-022	575-590m	A 80% Shale, as 556-021A	N5-N6	0.84
		B 20% Drilling Mud		
556-023	590-605m	A 70% Shale, as 556-021A	N5-N6	1.13
		B 30% Lost circulation material - cement, drilling mud		
556-024	605-620m	A 60% Shale, as 556-021A	N5-N6	1.14,1.12
		B 40% Lost circulation material - cement, drilling mud, metal turnings		
556-025	620-635m	A 55% Shale, as 556-021A	N5-N6	1.36
		B 45% Lost circulation material - cement		
556-026	635-650m	A 75% Shale, as 556-021A	N5-N6	1.42
		B 25% Lost circulation material - cement		
556-027	650-665m	A 90% Shale, as 556-021A	N5-N6	1.48
		B 10% Lost circulation material - cement		
556-028	665-680m	A 95% Shale, as 556-021A	N5-N6	1.28
		B 5% Lost circulation material - cement, metal turnings		
556-029	680-695m	A 85% Shale, as 556-021A	N5-N6	1.16
		B 15% Drilling Mud		
556-030	695-710m	A 80% Shale, fissile, non calc., medium dark grey to medium grey	N4-N5	1.26
		B 20% Lost circulation material - cement, drilling mud and metal turnings		
556-031	710-725m	A 80% Shale, as 556-030A	N4-N5	1.20,1.18
		B 20% Drilling Mud		
556-032	725-740m	A 75% Shale, as 556-030A	N4-N5	1.27
		B 25% Drilling Mud		
556-033	740-755m	A 95% Shale, as 556-030A	N4-N5	1.18
		B 5% Drilling Mud		
556-034	755-770m	A 95% Shale, as 556-030A, cavings	N4-N5	1.19
		B 5% Drilling Mud		

Abbreviations = argillaceous, calcareous, calc, fissile, calcareous, slightly

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-035	770-785m	A 95% Shale, fissile, non calc., medium dark grey to medium grey, cavings B 5% Drilling Mud	N4-N5	1.13
556-036	785-800m	A 95% Shale, as 556-035A, cavings B 5% Drilling Mud	N4-N5	1.34
556-037	800-815m	A 95% Shale, as 556-035A, cavings B 5% Lost circulation material - cement, drilling mud	N4-N5	1.76,1.69
556-038	815-830m	A+B 95% Shale, as 556-035A, abundantly caved C 5% Lost circulation material - cement, drilling mud	N4-N5	1.43
556-039	830-845m	A+B 95% Shale, as 556-035A, abundantly caved C 5% Lost circulation material - drilling mud	N4-N5	1.43
556-040	845-860m	A 95% Shale, as 556-035A, cavings B 5% Lost circulation material - cement, drilling mud	N4-N5	1.32,1.28
556-041	860-875m	A 98% Shale, muddy, fissile to blocky, non calc., abundantly caved, medium to medium light grey	N5-N6	1.52
556-042	875-890m	A 98% Shale, as 556-041A, abundantly caved	N5-N6	1.38
556-043	890-905m	A 90% Shale, as 556-041A B 10% Lost circulation material - drilling mud	N5-N6	1.42
556-044	905-920m	A 98% Shale, as 556-041A, abundant cavings Minor drilling mud	N5-N6	1.31
556-045	920-935m	A 98% Shale, as 556-041A, abundantly caved	N5-N6	1.26,1.27
556-046	935-950m	A 98% Shale, as 556-041A, abundantly caved Minor drilling mud	N5-N6	1.19
556-047	950-965m	A 98% Shale, as 556-041A, cavings Lost circulation material - drilling mud	N5-N6	1.30
556-048	965-980m	A 95% Shale, as 556-041A, cavings B 5% Minor lost circulation material - drilling mud	N5-n6	1.24

Abbreviations = argillaceous, calcareous, Cut, Fluorescence, slightly

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-049	980-995m	A 98% Shale, fissile, soft, muddy, non calc., minor cavings, medium grey Minor drilling mud	N5	1.44
556-050	995-1010m	A 98% Shale, as 556-049A, minor pyrites Minor drilling mud	N5	1.76
556-051	1010-025m	A 98% Shale, as 556-049A, minor pyrites Minor drilling mud	N5	1.75
556-052	1025-040m	A 98% Shale, fissile, non calc., medium dark grey to medium grey, cavings Minor other shale	N4-N5	1.52
556-053	1040-055m	A 98% Shale, as 556-052A Minor drilling mud	N4-N5	1.62
556-054	1055-070m	A 98% Shale, as 556-052A Minor drilling mud	N4-N5	1.43
556-055	1070-090m	A 98% Shale, as 556-052A Minor drilling mud	N4-N5	1.55,1.52
556-056	1090-105m	A 98% Shale, as 556-052A, cavings Minor other shale Minor pyrites	N4-N5	1.57
556-057	1105-120m	A 98% Shale, as 556-052A Minor cavings Minor drill mud	N4-N5	1.90
556-058	1120-135m	A 98% Shale, as 556-052A Minor pyrites and limestone Minor drill mud	N4-N5	1.75
556-059	1135-150m	A 95% Shale, as 556-052A, cavings B 5% Limestone, blocky, no F., pinkish grey Minor other shale Minor pyrites	N4-N5 5YR8/1	1.61
556-060	1150-165m	A 98% Shale, as 556-052A, cavings Minor limestone and pyrites	N4-N5	1.44
556-061	1165-171m	A 98% Shale, as 556-052A, cavings Minor limestone	N4-N5	1.54,1.52
556-062	1183-195m	A 98% Shale, as 556-052A, cavings Minor limestone	N4-N5	2.18
556-063	1195-210m	A 70% Shale, as 556-052A, cavings B 30% Drilling Mud Minor limestone	N4-N5	2.18

Abbreviations = argillaceous, calcareous, Cut, Fluorescence, slightly ,

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-064	1210-225m	A 98% Shale, fissile, non calc., medium dark grey to medium grey Minor lost circulation material and drill mud	N4-N5	1.54
556-065	1225-240m	A 98% Shale, as 556-064A Minor drill mud	N4-N5	1.46
556-066	1240-255m	A 98% Shale, as 556-064A, cavings Minor silty shale	N4-N5	2.35
556-067	1255-270m	A 98% Shale, as 556-064A, cavings Minor silty shale and drill mud	N4-N5	1.61,1.60
556-068	1255-270m	A 90% Shale, platy, fissile, soft to mod. hard, brittle, non calc., fossil shell remains, medium dark grey B 10% Lost circulation material - cement, metal	N4	4.01
556-069	1270-285m	A 90% Shale, as 556-068A, minor cavings B 10% Lost circulation material - cement, rubber	N4	3.82
556-070	1285-300m	A 95% Shale, silty, platy to subfissile, soft, sl. micaceous, non calc., minor cavings, very dark brownish grey B 5% Lost circulation material - metal	5YR3/1	6.32
556-071	1300-315m	A 98% Shale, as 556-070A, minor cavings	5YR3/1	6.99
556-072	1315-330m	A 98% Shale, as 556-070A, minor cavings Lost circulation material - metal	5YR3/1	9.87
556-073	1330-345m	A 80% Shale, as 556-070A, minor cavings B 20% Siltstone, blocky, dolomitic in part, soft to mod. hard, calc., medium greyish brown	5YR3/1 5YR4/2	9.90 1.84
556-074	1345-360m	A 60% Shale, as 556-070A, minor cavings, B 40% Siltstone, as 556-073B Minor lost circulation material - cement	5YR3/1 5YR4/2	8.22,8.34 1.12
556-075	1360-375m	A 55% Siltstone, as 556-073B B 45% Shale, as 556-070A, mod. caved Lost circulation material - cement	5YR4/2 5YR3/1	2.74 0.66

Abbreviations = argillaceous, calcareous, Cut, Fluorescence, slightly

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-076	1430-445m	A 70% Sand, unconsolidated, med. grained subangular, mostly quartz, pinkish grey to very pale yellowish brown	5YR8/1-10YR7/2	
		B 30% Shale, silty, platy to subfissile, soft, micaceous, non calc., minor cavings, very dark brownish grey, mod. caved Minor other shale	5YR3/1	8.68
556-077	1445-460m	A 65% Shale, as 556-076B	5YR3/1	2.74
		B 35% Limestone, platy to blocky, mod. hard, sl. arg., sl. dolomitic in part, medium light grey Minor other shale Minor lost circulation material	N6	0.66
556-078	1460-475m	A 85% Sand, as 556-076A	5YR8/1-10YR7/2	
		B 15% Shale, as 556-076B Minor other siltstone and dolomite Lost circulation material - cement, metal turnings	5YR3/1	4.82
556-079	1460-475m	A 85% Sandstone, blocky, very fine grained, mainly quartz, very pale yellowish brown	10YR7/2	
		B 15% Shale, as 556-076B, minor cavings Minor lost circulation material, minor coal	5YR3/1	4.01
556-080	1705-720m	A 95% Sandstone, as 556-079A, patchy creamy white F., pale milky C.	10YR7/2	
		B 5% Shale, as 556-076B, minor cavings	5YR3/1	8.47
556-081	1720-735m	A 95% Sandstone, as 556-079A, becoming unconsolidated in part	10YR7/2	
		B 5% Shale, as 556-076B, minor cavings Minor mica	5YR3/1	3.30
556-082	1735-750m	A 95% Sandstone, as 556-079A, becoming unconsolidated	10YR7/2	
		B 5% Shale, as 556-076B, minor cavings Minor mica	5YR3/1	4.02,3.96
556-083	1750-765m	A 55% Coaly Shale, platy, fissile to sub-fissile, soft, brittle, non calc., greyish black to dark grey	N2-N3	20.48
		B 45% Sandstone, as 556-079A Minor mica	10YR7/2	

Abbreviations = argillaceous, calcareous, Cut, Fluorescence, slightly

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-084	1765-780m	A 40% Coaly Shale, platy, fissile to sub-fissile, soft, brittle, non calc., greyish black to dark grey	N2-N3	20.30
		B 45% Sandstone, blocky, very fine grained, mainly quartz, very pale yellowish brown	10YR7/2	
		C 10% Mica (as lost circulation material)		
556-085	1780-795m	A 65% Sandstone, as 556-084B, pale milky C., unconsolidated in part	10YR7/2	
		B 35% Shale, platy, fissile, soft to mod. hard, brittle, non calc., minor cavings, medium dark grey	N4	3.32
		Minor other shale		
		Lost circulation material - mica		
556-086	1795-810m	A 65% Sandstone, mostly unconsolidated, fine grained, subrounded to sub-angular, mostly quartz grains, sl. calc. cement, very pale yellowish brown	10YR7/2	
		B 35% Coaly Shale, as 556-084A	N2-N3	40.32
		Minor other shale		
		Lost circulation material - mica, metal turnings		
556-087	1810-825m	A 80% Sandston, as 556-086A	10YR7/2	
		B 20% Coaly Shale, as 556-084A	N2-N3	23.46
		Minor other shale		
		Lost circulation material - mica		
556-088	1825-840m	A 95% Sand, unconsolidated, very fine grained, subrounded, mostly quartz, very pale orange	10YR8/2	
		B 5% Coaly Shale, as 556-084A	N2-N3	62.02
		Minor mica		
556-089	1840-855m	A 80% Sand, unconsolidated, fine to med. grained, subrounded, mostly quartz, very pale orange	10YR8/2	
		B 20% Coal, blocky, soft to mod. hard, brittle, greyish black to dark grey	N2-N3	64.86
		Lost circulation material - fibre		
556-090	1855-870m	A 75% Sand, as 556-089A	10YR8/2	
		B 25% Coal, as 556-089B	N2-N3	66.58
		Lost circulation material - mica		

Abbreviations = argillaceous, calcareous, Cut, Fluorescence, slightly ,

TABLE 2
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (% of Rock)
556-091	1870-1900m	A 65% Sand, unconsolidated, fine to med. grained, subrounded, mostly quartz, very pale orange	10YR8/2	
		B 35% Coal, shaly, platy, fissile, mod. hard, brittle, non calc., dark grey to medium dark grey Minor other shale Lost circulation material - mica and fibre	N3-N4	30.18

Abbreviations = **argil**laceous, **calc**areous, **C**ut, **F**luorescence, **sl**ightly

TABLE 3

VISUAL KEROGEN DATA

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION				THERMAL MATURATION INDEX
		TYPES	REMARKS	PARTICLE SIZE	PRESERV-ATION	
556-001B	260-275m	Am*;I-W-Al;H	*poor quality, grainy, includes incompletely developed material.	F-M	P	1+ to 2-
556-008C	365-380m	I;W-Al;H	significant Am material resembling contaminant.	F-M	P-F	1+
556-014A	455-470m	I-W;Al-H;Am	significant Am-like contaminant	F-M	F	1+
556-016A	485-500m	I;Al-W;H-Am		M	F-G	1+
556-018A	515-530m	I;W-Al;H-Am		M	F-G	1+
556-020A	545-560m	I-Al;W;H-Am		M	F-G	1+
556-023A	590-605m	I-W;Al-H;Am	significant Am-like contaminant.	M	F	1+ to 2-
556-026A	635-650m	I-W;Al;H	significant Am-like contaminant.	M	F	1+ to 2-
556-030A	695-710m	I-W;Al;H		M	F	1+ to 2-
556-032A	725-740m	I-W;Al-H;Am	H at 2-	M	F	1+ to 2-
556-035A	770-785m	I-W;Al-H;-		M	F	1+ to 2-
556-037A	800-815m	I-W;Al;H-Am		M	F	1+ to 2-/2-
556-040A	845-860m	I-W;H-Al;-		M	F	2-
556-044A	905-920m	I-W;-;H-Al-Am		M	F	2-
556-047A	950-965m	I-W;H;Al	H at 2- to 2	M	F	2-
556-050A	995-1010m	I-W;H-Al	significant Am-like contaminant. H at 2- to 2.	F-M	P-F	2-
3 556-054A	1055-070m	I-W;H;Al	H at 2-	M	F	2- to 2
3/2 556-057A	1105-120m	I-W;Al*;H-Am	*includes material passing to Am.	M	F	2- to 2
3/2 556-060A	1150-165m	I-W-Al*;-;H-Am	*as 057A.	M	F	2- to 2
3/2 556-062A	1183-195m	Al*-I-W;H;Am	H at 2. *as 057A.	M	F	2- to 2
3/2 556-064A	1210-225m	W-I-Al*;H;Am	*as057A.	M	F	2- to 2

Algal, Amorphous, Coaly, Herbaceous, Stem, Woody.

TABLE 3
VISUAL KEROGEN DATA

	GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION				THERMAL MATURATION INDEX
			TYPES	REMARKS	PARTICLE SIZE	PRESERV-ATION	
2/3	556-066A	1240-255m	Al*;I-W-H;Am	*as 057A.	M	F	2- to 2
2/3	556-068A	1255-270m	Al*;AM*-I-H*-W;-	*includes material passing to Am.	M	P	2- to 2
2/3	556-070A	1285-300m	Al*;Am**-I;W-H	*frequently passing to Am. **includes Al passing to Am.	M	P	2- to 2
2/3	556-072A	1315-330m	Al*;Am**-I;W-H	* ** as 070A.	F-M	P	2- to 2
2/3	556-077A	1445-460m	Al*;Am**-I-W;H	H at 2. * ** as 070A.	F-M/C	P	2- to 2
2/3	556-079B	1690-705m	Al*;Am*-W-I;H	*includes Al passing to Am.	F-M	P	2- to 2
3	556-083A	1750-765m	W-I;H;Am		F-C	P	2- to 2/2(?)
3	556-089B	1840-855m	W;I;H		F-M	F	2- to 2

Algal, Amorphous, Coaly, Herbaceous, Stem, Woody.

TABLE 4
VITRINITE REFLECTANCE DATA

GEOCHEM SAMPLE NUMBER	DEPTH	SAMPLE TYPE	AVERAGE REFLECTIVITY Ro (%)			NUMBER OF PARTICLES			REMARKS
			1	2	3	1	2	3	
556-001B	260-275m	WHOLE ROCK	0.34	0.54	0.75	11	3	1	
556-008C	365-380m	WHOLE ROCK	0.38	0.56	-	13	1	-	
556-014A	455-470m	KER. CON & WHOLE ROCK	0.38	0.51	0.63	8	12	6	4th pop. 0.77(2)
556-016A	485-500m	WHOLE ROCK	0.36	0.51	-	10	7	-	
556-018A	515-530m	WHOLE ROCK	0.30	0.37	0.45	2	10	8	
556-020A	545-560m	WHOLE ROCK	0.38	0.56	-	11	5	-	
556-023A	590-605m	WHOLE ROCK	0.37	0.57	-	17	3	-	
556-026A	635-650m	KER. CON.	0.38	0.47	0.58	12	7	1	
556-030A	695-710m	WHOLE ROCK	0.40	0.49	-	14	6	-	
556-032A	725-740m	WHOLE ROCK	0.45	0.62	-	15	5	-	
556-035A	770-785m	WHOLE ROCK	0.33	0.40	0.46	1	8	11	
556-037A	800-815m	WHOLE ROCK	0.47	0.73	-	19	1	-	
556-040A	845-860m	WHOLE ROCK	0.35	0.43	0.49	1	4	8	4th pop. 0.73(7)
556-044A	905-920m	WHOLE ROCK	0.45	0.64	0.79	12	5	4	
556-047A	950-965m	WHOLE ROCK	0.37	0.43	0.48	2	4	7	4th pop. 0.64(7)
556-050A	995-1010	WHOLE ROCK	0.44	0.55	0.69	5	7	4	4th pop. 0.86(8)
556-054A	1055-070m	WHOLE ROCK	0.46	0.61	0.72	6	5	8	4th pop. 0.87(1)
556-057A	1105-120m	KER. CON.	0.44	0.65	0.88	18	7	2	
556-060A	1150-165m	WHOLE ROCK	0.48	0.55	0.70	14	3	3	
556-062A	1183-195m	WHOLE ROCK	0.40	0.50	-	11	10	-	
556-064A	1210-225m	WHOLE ROCK	0.45	0.56	0.73	9	6	5	
556-066A	1240-255m	WHOLE ROCK & KER. CON.	0.34	0.44	0.53	8	17	9	4th pop. 0.75(5)

TABLE 4

VITRINITE REFLECTANCE DATA

GEOCHEM SAMPLE NUMBER	DEPTH	SAMPLE TYPE	AVERAGE REFLECTIVITY Ro (%)			NUMBER OF PARTICLES			REMARKS
			1	2	3	1	2	3	
556-068A	1255-270m	KER. CON.	0.38	0.49	0.65	10	2	4	4th pop. 0.94(4)
556-072A	1315-330m	KER. CON.	0.46	0.61	0.86	36	11	1	
556-077A	1445-460m	KER. CON.	0.35	0.49	0.70	1	9	1	
556-083A	1750-765m	KER. CON.	0.49	0.56	0.67	8	13	9	
556-089B	1840-855m	KER. CON.	0.52	-	-	40	-	-	

KER. CON. - KEROGEN CONCENTRATE

TABLE 4A

VITRINITE REFLECTANCE - RAW DATA

GEOCHEM SAMPLE NUMBER	DEPTH	READINGS
556-001B	260-275m	0.30, 0.35, 0.39, 0.34, 0.34, 0.31, 0.38, 0.75, 0.30, 0.31, 0.54, 0.56, 0.51, 0.34, 0.32.
556-008C	365-380m	0.40, 0.43, 0.40, 0.39, 0.32, 0.39, 0.39, 0.36, 0.30, 0.31, 0.47, 0.40, 0.56, 0.36.
556-014A	455-470m	0.40, 0.38, 0.35, 0.54, 0.41, 0.45, 0.55, 0.41, 0.65, 0.65, 0.55, 0.41, 0.44, 0.37, 0.62, 0.55, 0.55, 0.60, 0.51, 0.50, 0.79, 0.75, 0.59, 0.45, 0.50, 0.53, 0.65, 0.33.
556-016A	485-500m	0.32, 0.47, 0.48, 0.53, 0.52, 0.51, 0.60, 0.45, 0.32, 0.33, 0.35, 0.36, 0.40, 0.39, 0.39, 0.37, 0.32.
556-018A	530-545m	0.42, 0.43, 0.46, 0.48, 0.51, 0.44, 0.42, 0.38, 0.36, 0.41, 0.29, 0.39, 0.31, 0.37, 0.39, 0.34, 0.38, 0.36, 0.37, 0.37.
556-020A	545-560m	0.40, 0.39, 0.57, 0.32, 0.42, 0.38, 0.37, 0.57, 0.36, 0.42, 0.39, 0.37, 0.55, 0.55, 0.60, 0.31.
556-023A	590-605m	0.34, 0.35, 0.44, 0.42, 0.52, 0.36, 0.40, 0.38, 0.38, 0.36, 0.38, 0.39, 0.37, 0.35, 0.58, 0.34, 0.35, 0.36, 0.40, 0.60.
556-026A	635-650m	0.47, 0.36, 0.37, 0.37, 0.37, 0.58, 0.40, 0.33, 0.51, 0.39, 0.48, 0.49, 0.40, 0.45, 0.42, 0.45, 0.40, 0.40, 0.36, 0.48.
556-030A	695-710m	0.44, 0.40, 0.43, 0.34, 0.34, 0.46, 0.49, 0.43, 0.42, 0.51, 0.51, 0.39, 0.40, 0.41, 0.47, 0.50, 0.36, 0.42, 0.44, 0.38.
556-032A	725-740m	0.69, 0.63, 0.43, 0.45, 0.46, 0.45, 0.41, 0.42, 0.39, 0.58, 0.40, 0.44, 0.47, 0.49, 0.42, 0.48, 0.63, 0.48, 0.59, 0.51.
556-035A	770-785m	0.42, 0.45, 0.45, 0.46, 0.47, 0.39, 0.39, 0.33, 0.50, 0.42, 0.42, 0.41, 0.39, 0.44, 0.45, 0.47, 0.48, 0.44, 0.46, 0.39.
556-037A	800-815m	0.73, 0.48, 0.40, 0.45, 0.50, 0.55, 0.44, 0.47, 0.48, 0.38, 0.54, 0.45, 0.49, 0.42, 0.57, 0.45, 0.48, 0.49, 0.50, 0.44.

TABLE 4A

VITRINITE REFLECTANCE - RAW DATA

GEOCHEM SAMPLE NUMBER	DEPTH	READINGS
556-040A	845-860m	0.79, 0.68, 0.72, 0.43, 0.68, 0.43, 0.52, 0.50, 0.73, 0.43, 0.46, 0.47, 0.79, 0.74, 0.47, 0.51, 0.49, 0.35, 0.41, 0.47.
556-044A	905-920m	0.70, 0.74, 0.75, 0.86, 0.69, 0.37, 0.79, 0.49, 0.53, 0.43, 0.39, 0.65, 0.42, 0.60, 0.44, 0.43, 0.58, 0.50, 0.49, 0.45, 0.46.
556-047A	950-965m	0.63, 0.63, 0.43, 0.51, 0.47, 0.63, 0.36, 0.48, 0.47, 0.47, 0.42, 0.43, 0.62, 0.74, 0.37, 0.51, 0.42, 0.46, 0.59, 0.67.
556-050A	995-1010m	0.85, 0.75, 0.58, 0.88, 0.87, 0.70, 0.86, 0.87, 0.53, 0.65, 0.47, 0.40, 0.85, 0.40, 0.57, 0.55, 0.85, 0.57, 0.82, 0.51, 0.49, 0.44, 0.56, 0.67.
556-054A	1055-070m	0.69, 0.59, 0.58, 0.61, 0.62, 0.63, 0.70, 0.70, 0.71, 0.87, 0.42, 0.44, 0.45, 0.46, 0.75, 0.44, 0.75, 0.53, 0.71, 0.76.
556-057A	1105-120m	0.58, 0.46, 0.46, 0.63, 0.46, 0.67, 0.45, 0.59, 0.73, 0.42, 0.37, 0.44, 0.61, 0.43, 0.45, 0.43, 0.41, 0.75, 0.48, 0.46, 0.88, 0.41, 0.46, 0.47, 0.47, 0.88, 0.47.
556-060A	1150-165m	0.48, 0.51, 0.51, 0.56, 0.48, 0.65, 0.49, 0.46, 0.42, 0.76, 0.42, 0.52, 0.46, 0.49, 0.56, 0.68, 0.50, 0.54, 0.46, 0.46.
556-062A	1183-195m	0.44, 0.51, 0.51, 0.41, 0.50, 0.36, 0.37, 0.41, 0.40, 0.46, 0.36, 0.38, 0.48, 0.46, 0.52, 0.42, 0.43, 0.54, 0.51, 0.50, 0.40.
556-064A	1210-225m	0.46, 0.42, 0.45, 0.56, 0.48, 0.56, 0.44, 0.44, 0.78, 0.73, 0.69, 0.69, 0.57, 0.52, 0.42, 0.65, 0.47, 0.53, 0.45, 0.60.
556-066A	1240-255m	0.55, 0.46, 0.42, 0.82, 0.70, 0.57, 0.50, 0.48, 0.49, 0.51, 0.45, 0.46, 0.79, 0.33, 0.82, 0.40, 0.45, 0.51, 0.52, 0.34, 0.40, 0.54, 0.36, 0.41, 0.34, 0.55, 0.53, 0.39, 0.44, 0.46, 0.41, 0.32, 0.34, 0.41, 0.43, 0.33, 0.63, 0.45.

TABLE 4A

VITRINITE REFLECTANCE - RAW DATA

GEOCHEM SAMPLE NUMBER	DEPTH	READINGS
556-068A	1255-270m	0.75, 0.36, 0.64, 0.34, 0.65, 0.35, 0.87, 0.41, 0.99, 0.43, 0.36, 0.42, 0.93, 0.49, 0.56, 0.41, 0.42, 0.95, 0.32, 0.49.
556-072A	1315-330m	0.40, 0.41, 0.86, 0.47, 0.57, 0.43, 0.48, 0.43, 0.52, 0.58, 0.51, 0.52, 0.46, 0.45, 0.57, 0.70, 0.44, 0.44, 0.39, 0.49, 0.37, 0.68, 0.54, 0.56, 0.60, 0.57, 0.64, 0.41, 0.50, 0.41, 0.47, 0.72, 0.48, 0.46, 0.57, 0.44, 0.45, 0.40, 0.46, 0.47, 0.43, 0.47, 0.46, 0.40, 0.51, 0.50, 0.44, 0.43.
556-077A	1445-460m	0.47, 0.51, 0.70, 0.52, 0.44, 0.49, 0.46, 0.49, 0.44, 0.55, 0.35.
556-083A	1750-765m	0.70, 0.44, 0.64, 0.56, 0.57, 0.63, 0.57, 0.57, 0.53, 0.54, 0.47, 0.47, 0.48, 0.50, 0.64, 0.61, 0.51, 0.51, 0.59, 0.53, 0.67, 0.55, 0.65, 0.74, 0.58, 0.64, 0.68, 0.51, 0.54, 0.56.
556-089B	1840-855m	0.60, 0.51, 0.45, 0.52, 0.44, 0.50, 0.50, 0.51, 0.51, 0.52, 0.49, 0.53, 0.50, 0.54, 0.50, 0.54, 0.52, 0.54, 0.50, 0.46, 0.43, 0.52, 0.54, 0.60, 0.50, 0.48, 0.54, 0.55, 0.53, 0.58, 0.50, 0.48, 0.53, 0.51, 0.50, 0.49, 0.53, 0.57, 0.59, 0.50.

TABLE 5A

WEIGHT (GRAMMES) OF C_{15+} EXTRACTS AND CHROMATOGRAPHIC FRACTIONS

GEOCHEM SAMPLE NUMBER	INTERVAL	ROCK EXTRACTED	TOTAL EXTRACT OBTAINED	TOTAL EXTRACT		nC_5 SOLUBLE FRACTION				
				Preciptd. Asphaltenes	nC_5 soluble	Paraffin – Naphthenes	Aromatics	Eluted NSO's	Non-eluted NSO's	Sulphur
556-008	260-275	15.9600	0.00971	0.00611	0.00360	0.00128	0.00093	0.00055	0.00084	0.00000
556-013A	275-290	14.7100	0.00324	0.00258	0.00066	0.00023	0.00006	0.00021	0.00016	0.00000
556-014A	455-470	6.3600	0.00554	0.00418	0.00136	0.00045	0.00024	0.00047	0.00020	0.00000
556-016	485-500	17.6700	0.01832	0.01569	0.00263	0.00093	0.00072	0.00038	0.00060	0.00000
556-018	515-530	7.5300	0.00356	0.00188	0.00168	0.00044	0.00012	0.00076	0.00036	0.00000
556-023A	590-605	17.0800	0.01776	0.01062	0.00714	0.00276	0.00199	0.00166	0.00073	0.00000
556-026A	635-650	2.2000	0.00766	0.00569	0.00197	0.00042	0.00020	0.00064	0.00071	0.00000
556-028A	665-680	5.3100	0.00623	0.00412	0.00211	0.00056	0.00034	0.00052	0.00069	0.00000
556-030A	695-710	10.2100	0.00334	0.00245	0.00089	0.00033	0.00025	0.00023	0.00008	0.00000
556-035A	770-785	10.3400	0.00907	0.00786	0.00121	0.00016	0.00023	0.00038	0.00044	0.00000
556-040A	845-860	9.5500	0.01215	0.00895	0.00320	0.00141	0.00064	0.00097	0.00018	0.00000
556-044A	905-920	8.5900	0.00632	0.00374	0.00258	0.00039	0.00027	0.00113	0.00079	0.00000
556-052	1025-1040	20.8600	0.01039	0.00794	0.00245	0.00076	0.00081	0.00050	0.00038	0.00000
556-054	1055-1070	17.9100	0.00990	0.00652	0.00338	0.00165	0.00108	0.00027	0.00038	0.00000
556-060	1150-1165	9.7300	0.00748	0.00505	0.00243	0.00053	0.00038	0.00084	0.00068	0.00000
556-062	1183-1195	9.6000	0.01877	0.01413	0.00464	0.00070	0.00139	0.00173	0.00082	0.00000
556-066	1240-1255	13.8300	0.03885	0.03125	0.00760	0.00159	0.00332	0.00269	0.00000	0.00000
556-068A	1256-1270	6.7000	0.02603	0.01755	0.00848	0.00150	0.00323	0.00303	0.00072	0.00000
556-070A	1285-1300	8.4800	0.05499	0.03396	0.02103	0.00307	0.00639	0.00770	0.00387	0.00000
556-072A	1315-1330	8.2600	0.06055	0.04431	0.01624	0.00231	0.00650	0.00674	0.00069	0.00000
556-077	1445-1460	6.1600	0.00979	0.00460	0.00519	0.00186	0.00141	0.00181	0.00011	0.00000
556-083A	1750-1765	4.3900	0.05007	0.03538	0.01469	0.00263	0.00626	0.00434	0.00146	0.00000
556-089A	1840-1855	2.4200	0.10495	0.08228	0.02267	0.00328	0.01198	0.00741	0.00000	0.00000

TABLE 5B

CONCENTRATION (PPM) OF EXTRACTED C_{15+} MATERIAL IN ROCK

GEOCHEM SAMPLE NUMBER	INTERVAL	TOTAL EXTRACT	HYDROCARBONS			NON HYDROCARBONS				
			Paraffin – Naphthenes	Aromatics	TOTAL	Preciptd. Asphaltenes	Eluted NSO's	Non-eluted NSO's	Sulphur	TOTAL
556-008	260-275	608	80	58	138	383	34	53	0	470
556-013A	275-290	220	16	4	20	175	14	11	0	201
556-014A	455-470	871	71	38	108	657	74	31	0	763
556-016	485-500	1037	53	41	93	888	22	34	0	943
556-018	515-530	473	58	16	74	250	101	48	0	398
556-023A	590-605	1040	162	117	278	622	97	43	0	762
556-026A	635-650	3482	191	91	282	2586	291	323	0	3200
556-028A	665-680	1173	105	64	169	776	98	130	0	1004
556-030A	695-710	327	32	24	57	240	23	8	0	270
556-035A	770-785	877	15	22	38	760	37	43	0	839
556-040A	845-860	1272	148	67	215	937	102	19	0	1058
556-044A	905-920	736	45	31	77	435	132	92	0	659
556-052	1025-1040	498	36	39	75	381	24	18	0	423
556-054	1055-1070	553	92	60	152	364	15	21	0	400
556-060	1150-1165	769	54	39	94	519	86	70	0	675
556-062	1183-1195	1955	73	145	218	1472	180	85	0	1737
556-066	1240-1255	2809	115	240	355	2260	195	0	0	2454
556-068A	1256-1270	3885	224	482	706	2619	452	107	0	3179
556-070A	1285-1300	6485	362	754	1116	4005	908	456	0	5369
556-072A	1315-1330	7331	280	787	1067	5364	816	84	0	6264
556-077	1445-1460	1589	302	229	531	747	294	18	0	1058
556-083A	1750-1765	11405	599	1426	2025	8059	989	333	0	9380
556-089A	1840-1855	43368	1356	4952	6308	34000	3060	0	0	37060

TABLE 5C

COMPOSITION (NORMALISED %) OF C_{15+} MATERIAL EXTRACTED FROM ROCK

GEOCHEM SAMPLE NUMBER	INTERVAL	HYDROCARBONS			NON HYDROCARBONS					HC / NON HC
		Paraffin – Naphthenes	Aromatics	P – N / AROM	Preciptd. Asphaltenes	Eluted NSO's	Non eluted NSO's	Sulphur	ASPH / NSO	
556-008	260-275	13.18	9.58	1.38	62.92	5.66	8.65	0.00	4.40	0.29
556-013A	275-290	7.10	1.85	3.83	79.63	6.48	4.94	0.00	6.97	0.10
556-014A	455-470	8.12	4.33	1.87	75.45	8.48	3.61	0.00	6.24	0.14
556-016	485-500	5.08	3.93	1.29	85.64	2.07	3.28	0.00	16.01	0.10
556-018	515-530	12.36	3.37	3.67	52.81	21.35	10.11	0.00	1.68	0.19
556-023A	590-605	15.54	11.20	1.39	59.80	9.35	4.11	0.00	4.44	0.37
556-026A	635-650	5.48	2.61	2.10	74.28	8.36	9.27	0.00	4.21	0.09
556-028A	665-680	8.99	5.46	1.65	66.13	8.35	11.08	0.00	3.40	0.17
556-030A	695-710	9.88	7.49	1.32	73.35	6.89	2.40	0.00	7.90	0.21
556-035A	770-785	1.76	2.54	0.70	86.66	4.19	4.85	0.00	9.59	0.04
556-040A	845-860	11.60	5.27	2.20	73.66	7.98	1.48	0.00	7.78	0.20
556-044A	905-920	6.17	4.27	1.44	59.18	17.88	12.50	0.00	1.95	0.12
556-052	1025-1040	7.31	7.80	0.94	76.42	4.81	3.66	0.00	9.02	0.18
556-054	1055-1070	16.67	10.91	1.53	65.86	2.73	3.84	0.00	10.03	0.38
556-060	1150-1165	7.09	5.08	1.39	67.51	11.23	9.09	0.00	3.32	0.14
556-062	1183-1195	3.73	7.41	0.50	75.28	9.22	4.37	0.00	5.54	0.13
556-066	1240-1255	4.10	8.54	0.48	80.44	6.93	0.00	0.00	11.61	0.14
556-068A	1256-1270	5.76	12.41	0.46	67.42	11.64	2.77	0.00	4.68	0.22
556-070A	1285-1300	5.58	11.62	0.48	61.76	14.00	7.04	0.00	2.94	0.21
556-072A	1315-1330	3.82	10.73	0.36	73.18	11.13	1.14	0.00	5.96	0.17
556-077	1445-1460	19.00	14.40	1.32	46.99	18.49	1.12	0.00	2.40	0.50
556-083A	1750-1765	5.25	12.50	0.42	70.66	8.67	2.92	0.00	6.10	0.22
556-089A	1840-1855	3.13	11.42	0.27	78.40	7.06	0.00	0.00	11.11	0.17

TABLE 6

SIGNIFICANT RATIOS (%) OF C_{15+} FRACTIONS AND ORGANIC CARBON

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC CARBON	HYDROCARBONS / TOTAL EXTRACT	HYDROCARBONS / ORGANIC CARBON	TOTAL EXTRACT / ORGANIC CARBON
556-008	260-275	0.35	22.76	3.96	17.38
556-013A	275-290	0.06	8.95	3.29	36.71
556-014A	455-470	1.01	12.45	1.07	8.62
556-016	485-500	0.73	9.01	1.28	14.20
556-018	515-530	0.53	15.73	1.40	8.92
556-023A	590-605	1.43	26.75	1.94	7.27
556-026A	635-650	1.85	8.09	1.52	18.82
556-028A	665-680	1.36	14.45	1.25	8.63
556-030A	695-710	1.17	17.37	0.49	2.80
556-035A	770-785	1.30	4.30	0.29	6.75
556-040A	845-860	1.43	16.87	1.50	8.90
556-044A	905-920	1.26	10.44	0.61	5.84
556-052	1025-1040	1.38	15.11	0.55	3.61
556-054	1055-1070	1.37	27.58	1.11	4.03
556-060	1150-1165	1.33	12.17	0.70	5.78
556-062	1183-1195	1.89	11.13	1.15	10.35
556-066	1240-1255	2.74	12.64	1.30	10.25
556-068A	1256-1270	3.51	18.17	2.01	11.07
556-070A	1285-1300	6.01	17.20	1.86	10.79
556-072A	1315-1330	7.92	14.55	1.35	9.26
556-077	1445-1460	0.72	33.40	7.37	22.07
556-083A	1750-1765	18.22	17.76	1.11	6.26
556-089A	1840-1855	47.86	14.54	1.32	9.06

TABLE 7

PYROLYSIS ANALYSIS

SAMPLE NUMBER	DEPTH	ORGANIC CARBON	PPM BITUMEN*	PPM PYROLYSATE+	PYROLYSATE ORGANIC CARBON	BITUMEN PYROLYSATE	PEAK PYROL TEMP (oC)
556-001B	260-275	0.73	403	4851	0.66	0.083	492
556-008C	365-380	0.87	489	954	0.11	0.513	498
556-014A	455-470	1.02	404	1267	0.12	0.319	498
556-016A	485-500	0.84	81	647	0.08	0.125	472
556-018A	515-530	0.99	121	709	0.07	0.170	494
556-020A	545-560	1.00	349	875	0.09	0.399	484
556-023A	590-605	1.13	245	1210	0.11	0.203	500
556-024A	605-620	1.14	163	665	0.06	0.245	494
556-026A	635-650	1.42	681	566	0.04	1.203	500
556-028A	665-680	1.28	244	581	0.05	0.420	492
556-030A	695-710	1.26	138	969	0.08	0.142	488
556-032A	725-740	1.27	83	1193	0.09	0.070	488
556-035A	770-785	1.13	362	739	0.07	0.490	494
556-037A	800-815	1.76	285	738	0.04	0.386	489
556-040A	845-866	1.32	163	480	0.04	0.339	500
556-041A	860-875	1.52	263	760	0.05	0.346	492
556-044A	905-920	1.31	410	467	0.04	0.878	496
556-047A	950-965	1.30	649	1030	0.08	0.630	489
556-050A	995-1010	1.76	94	449	0.03	0.209	494
556-052A	1025-1040	1.52	219	851	0.06	0.257	489
556-054A	1055-1070	1.43	401	618	0.04	0.649	486
556-057A	1105-1120	1.90	206	1893	0.10	0.109	500
556-059A	1135-1150	1.61	138	344	0.02	0.400	488
556-060A	1150-1165	1.44	220	1011	0.07	0.218	488
556-062A	1180-1195	2.18	120	2716	0.12	0.044	490
556-064A	1210-1220	1.54	572	1954	0.13	0.292	489
556-066A	1240-1255	2.35	314	2293	0.10	0.137	469
556-068A	1256-1270	4.01	669	8922	0.22	0.075	499
556-070A	1285-1300	6.32	418	12197	0.19	0.034	500
556-072A	1315-1330	9.87	794	16570	0.17	0.048	498

TABLE 7

PYROLYSIS ANALYSIS

SAMPLE NUMBER	DEPTH	ORGANIC CARBON	PPM BITUMEN*	PPM PYROLYSATE+	PYROLYSATE / ORGANIC CARBON	BITUMEN / PYROLYSATE	PEAK PYROL TEMP (oC)
556-073B	1330-1345	1.84	396	1529	0.08	0.259	498
556-077A	1445-1460	2.74	645	4281	0.16	0.151	500
556-079B	1690-1705	4.01	1255	11822	0.29	0.106	501
556-083A	1750-1765	20.48	5351	29208	0.14	0.183	502
556-089B	1840-1855	64.86	4507	66571	0.10	0.068	503

*50-340°C

+350-550°C

TABLE 8

COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-008	-013A/B	-014	-016	-018	-023A	-026A
DEPTH	365-380m	440-455m	455-470m	485-500m	515-530m	590-605m	635-650m
SAMPLE TYPE							
nC_{15}	1.38	0.44	0.37	3.07	0.86	9.40	2.39
nC_{16}	5.70	0.87	5.50	10.16	7.43	16.06	13.83
nC_{17}	9.28	5.41	13.39	14.50	14.29	17.32	19.95
nC_{18}	9.19	10.03	12.84	15.13	13.14	14.56	17.42
nC_{19}	11.55	11.51	9.54	13.02	10.19	11.70	13.83
nC_{20}	8.95	11.77	7.52	10.79	7.52	8.37	9.57
nC_{21}	8.38	9.59	6.42	7.09	6.19	4.93	5.45
nC_{22}	6.83	9.15	4.68	4.97	4.95	3.67	4.39
nC_{23}	7.49	8.20	5.41	4.13	4.76	2.64	3.19
nC_{24}	5.94	6.45	4.50	2.75	3.81	2.18	2.39
nC_{25}	6.10	6.45	6.88	3.49	5.05	2.29	2.39
nC_{26}	4.56	5.23	4.04	2.22	3.90	1.38	1.20
nC_{27}	4.72	5.58	7.25	3.39	5.14	1.83	1.33
nC_{28}	4.31	3.57	3.58	1.48	3.05	0.92	0.80
nC_{29}	2.60	2.79	4.04	1.69	3.90	1.03	0.80
nC_{30}	1.38	1.48	1.93	0.95	2.38	0.69	0.40
nC_{31}	0.81	0.70	1.28	0.53	1.81	0.46	0.40
nC_{32}	0.41	0.44	0.46	0.32	0.95	0.34	0.13
nC_{33}	0.24	0.17	0.18	0.11	0.38	0.11	0.13
nC_{34}	0.08	0.09	0.09	0.11	0.19	0.11	-
nC_{35}	0.08	0.09	0.09	0.11	0.10	-	-
PARAFFIN	40.27	30.79	42.10	35.61	38.06	52.66	40.74
ISOPRENOID	5.60	1.77	4.79	5.46	4.31	8.09	6.45
NAPHTHENE	54.13	67.44	53.11	58.93	57.63	39.25	52.82
CPI INDEX A	1.12	1.07	1.40	1.23	1.20	1.09	1.06
CPI INDEX B	1.11	1.19	1.67	1.53	1.38	1.39	1.49
PRISTANE/PHYTANE	1.41	0.57	1.25	1.42	1.20	1.39	1.53
PRISTANE/nC_{17}	0.88	0.39	0.47	0.62	0.43	0.52	0.48

TABLE 8

COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-028A	-030A	-035A	-040A	-044A	-052	-054
DEPTH	665-680m	695-710m	770-785m	845-860m	905-920m	1025-040m	1055-070m
SAMPLE TYPE							
nC_{15}	3.06	0.33	0.32	3.75	0.82	1.69	2.46
nC_{16}	10.33	1.64	3.44	10.11	8.34	10.81	7.44
nC_{17}	14.75	7.14	10.87	13.87	15.76	16.55	10.57
nC_{18}	14.75	7.14	10.87	13.87	15.76	15.77	10.49
nC_{19}	15.17	10.02	15.61	15.85	14.83	12.95	9.97
nC_{20}	11.70	11.74	13.56	14.29	14.11	9.01	8.33
nC_{21}	10.22	11.25	10.12	10.32	9.99	7.21	7.81
nC_{22}	6.64	9.44	7.75	6.67	7.21	4.95	6.85
nC_{23}	4.95	7.80	5.71	5.01	4.84	4.50	6.77
nC_{24}	4.64	7.06	5.71	4.07	4.84	3.04	5.73
nC_{25}	3.06	5.09	3.88	2.61	3.09	3.49	5.73
nC_{26}	3.69	6.16	5.17	3.02	3.81	1.91	3.72
nC_{27}	2.42	4.35	3.34	2.09	2.16	2.59	4.54
nC_{28}	2.85	5.34	4.41	2.61	3.09	1.35	2.38
nC_{29}	1.58	2.71	2.15	1.36	1.54	1.58	2.68
nC_{30}	1.90	3.45	2.58	1.56	1.85	0.90	1.86
nC_{31}	1.16	2.46	1.72	1.15	1.24	0.79	1.41
nC_{32}	1.05	2.38	2.26	0.94	1.54	0.45	0.60
nC_{33}	0.53	1.15	0.86	0.42	0.62	0.23	0.45
nC_{34}	0.11	0.25	0.32	0.10	0.10	0.11	0.15
nC_{35}	0.11	0.16	0.11	0.10	0.10	0.11	0.07
PARAFFIN	38.93	37.79	44.51	52.81	46.84	47.56	45.71
ISOPRENOID	5.29	2.82	5.08	6.83	6.46	8.19	5.68
NAPHTHENE	55.78	59.39	50.41	40.36	46.70	44.24	48.61
CPI INDEX A	1.17	1.19	1.26	1.15	1.29	1.26	1.17
CPI INDEX B	1.41	1.40	1.54	1.38	1.57	1.50	1.36
PRISTANE/PHYTANE	1.48	0.98	1.30	1.25	1.44	2.06	2.04
PRISTANE/nC_{17}	0.55	0.52	0.59	0.52	0.52	0.70	0.79

TABLE 8

COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-060	-062	-066	-068A	-070A	-072A
DEPTH	1150-165m	1183-195m	1240-255m	1255-270m	1285-300m	1315-330m
SAMPLE TYPE						
nC_{15}	0.61	2.65	2.89	10.96	12.96	8.58
nC_{16}	6.47	8.03	6.51	12.62	15.33	8.72
nC_{17}	13.14	10.77	9.70	14.29	14.04	12.35
nC_{18}	14.76	10.31	8.97	8.31	9.29	7.27
nC_{19}	12.44	10.77	8.83	5.32	7.13	7.27
nC_{20}	8.70	8.85	6.95	5.32	4.97	5.67
nC_{21}	7.28	7.57	6.95	5.81	3.89	6.10
nC_{22}	5.46	6.20	5.79	4.82	3.46	5.52
nC_{23}	5.97	6.57	7.67	6.64	4.75	6.40
nC_{24}	3.64	5.02	5.50	4.98	3.46	5.38
nC_{25}	5.46	5.66	7.09	6.98	4.32	6.54
nC_{26}	2.83	3.47	3.91	4.15	3.24	4.22
nC_{27}	4.25	4.84	7.24	7.14	5.18	6.40
nC_{28}	2.02	2.10	1.74	1.16	3.24	3.34
nC_{29}	2.53	2.74	4.05	0.33	3.24	2.91
nC_{30}	1.62	1.55	2.32	0.33	0.86	1.74
nC_{31}	1.42	1.19	1.74	0.17	0.43	0.73
nC_{32}	0.71	1.00	1.30	0.17	0.22	0.44
nC_{33}	0.40	0.46	0.58	0.17	-	0.15
nC_{34}	0.20	0.18	0.14	0.17	-	0.15
nC_{35}	0.10	0.09	0.14	0.17	-	0.15
PARAFFIN	38.36	40.09	37.13	32.81	29.43	42.57
ISOPRENOID	7.06	8.74	14.35	13.62	15.19	14.54
NAPHTHENE	54.58	51.17	48.52	53.57	55.37	42.88
CPI INDEX A	1.38	1.26	1.51	1.57	1.28	1.30
CPI INDEX B	1.63	1.48	1.83	1.94	1.48	1.42
PRISTANE/PHYTANE	1.17	1.63	1.36	1.48	1.85	1.83
PRISTANE/nC_{17}	0.75	1.25	2.30	1.73	2.38	1.79

TABLE 8

COMPOSITION (NORMALISED %) OF C_{15+} PARAFFIN – NAPHTHENE HYDROCARBONS

GEOCHEM SAMPLE NUMBER	-077	-083A	-089A
DEPTH	1445-460m	1750-765m	1840-855m
SAMPLE TYPE			
nC_{15}	7.77	9.04	9.25
nC_{16}	9.68	8.06	6.17
nC_{17}	9.75	7.43	6.01
nC_{18}	9.09	7.25	5.52
nC_{19}	9.68	7.25	6.98
nC_{20}	9.22	6.80	5.19
nC_{21}	8.96	7.43	6.17
nC_{22}	7.51	6.89	6.17
nC_{23}	6.98	9.04	6.98
nC_{24}	5.67	6.18	7.31
nC_{25}	5.01	8.50	10.55
nC_{26}	3.69	4.57	7.31
nC_{27}	3.62	5.28	9.25
nC_{28}	1.71	2.33	4.55
nC_{29}	0.99	2.06	1.62
nC_{30}	0.26	0.81	0.49
nC_{31}	0.13	0.63	0.16
nC_{32}	0.07	0.18	0.16
nC_{33}	0.07	0.09	0.16
nC_{34}	0.07	0.09	–
nC_{35}	0.07	0.09	–
PARAFFIN	50.96	61.68	48.13
ISOPRENOID	6.48	6.24	13.83
NAPHTHENE	42.56	32.08	38.05
CPI INDEX A	1.13	1.38	1.29
CPI INDEX B	1.28	1.64	1.41
PRISTANE/PHYTANE	2.06	4.38	8.32
PRISTANE/nC_{17}	0.88	1.11	4.27

BRIEF DESCRIPTION OF THE ANALYSES PERFORMED BY GEOCHEM

"Screen Analyses" are described in sections A, C and D, "Sample Preparation" in section B, "Follow-up Analyses" in sections E through K and "Correlation Studies" in section L. The analyses can be run on either core or cuttings material with the proviso that samples must be canned for the C_1-C_7 analysis and should be canned (or at least wet) for the C_4-C_7 analysis. The other analyses can be run on both canned and bagged samples.

A) C_1-C_7 LIGHT HYDROCARBON ANALYSIS

The abundance and composition of the C_1-C_7 hydrocarbons in sediments reflects their source richness, maturity and the character of the hydrocarbons they can yield. Most importantly, it is extremely sensitive to the presence of migrated hydrocarbons and is an excellent method for their detection. As it provides the information on most of the critical parameters and is also economical, this analysis is excellent for screening samples to decide which of them merit further analysis.

During the time which elapses betwwen the collection of the sample at the wellsite and its analysis in the laboratory, a fraction of the total gas passes from the rock to the air space at the top of the can. For this reason, both the air space and the cuttings are analysed.

The analysis involves the gas chromatographic separation of the individual C_1-C_4 gaseous hydrocarbons (methane, ethane, propane, isobutane and normal butane) and a partial resolution of the C_5-C_7 gasoline-range hydrocarbons (for their complete resolution see Section E). The ppm abundance of the five gases and of the total C_5-C_7 hydrocarbons are calculated from their electronically integrated peak areas (not from peak height) by comparison with a standard.

In the report, the following data are tabulated: the abundance and composition of the air space gas, of the cuttings gas and of the combined air space and cuttings gases. The combined results are also presented graphically.

B) SAMPLE WASHING AND HAND PICKING

All of the analyses described in subsequent sections are run on washed and hand picked samples.

Cuttings are washed to remove the drilling mud, care being taken not to remove soft clays and fine sand during the washing procedure. Using the C_1-C_7 hydrocarbon data profile of the well, or the organic carbon profile (if this analysis is used for screening), electric logs (if supplied) and the appearance of the cuttings under the binocular microscope, samples are selected to represent the lithological and geochemical zones penetrated by the well. These samples are then carefully hand picked and the lithology of the uncaved material is described. It is these samples which are submitted for further analysis.

Sample material remaining after analysis is retained for six months. Unless instructions are received to the contrary, Geochem Laboratories may then destroy the samples.

Our reports incorporate a gross lithological description of all the samples which have been analysed and litho percentage logs. As screen analyses are recommended at narrow intervals, a complete lithological profile is obtained.

C) ORGANIC CARBON ANALYSIS

The organic carbon content of a rock is a measure of its total organic richness. Combined with the visual kerogen, C_1-C_7, C_4-C_7, pyrolysis and C_{15+} analyses, the organic carbon content is used to evaluate the potential (not necessarily actual) hydrocarbon source richness of the sediment. This analysis is an integral part of a total evaluation and it can also be used as an economical screen analysis for dry samples (when the C_1-C_7 analysis cannot be used).

Hand picked samples are dried, crushed and then acidised to remove the inorganic calcium and magnesium carbonates. The actual analysis involves combustion in a Leco carbon analyser. Blanks, standards and duplicates are run routinely for purposes of quality control at no extra cost to the client.

The data are tabulated and presented diagramatically in our reports in a manner which facilitates comparison with the gross lithology (see Section B) of the samples.

D) MINI-PYROLYSIS

An ideal screen analysis which provides a definitive measure of potential source richness upon those samples whose organic carbon contents suggest fair or good source potential. This is described in detail in section K.

E) DETAILED C_4-C_7 HYDROCARBON ANALYSIS

The abundance and composition of the C_4-C_7 gasoline-range hydrocarbons in sediments reflects their source quality, level of thermal maturation and organic facies. In addition, the data also reveal the presence of migrated hydrocarbons and can be used for crude oil-parent source rock correlation studies.

This powerful analysis, performed upon hand picked lithologies, is employed as a follow-up to confirm the potential of samples which have been selected using the initial screen analysis. It is used in conjunction with the organic carbon, visual kerogen and C_{15+} analyses.

The individual normal paraffins, isoparaffins, naphthenes and aromatics with between four and seven carbon atoms in the molecule (but also including toluene) are resolved by capillary gas chromatography and their peak areas electronically integrated.

Normalised compositions, selected ratios and the ppm abundance of the total gasoline-range fraction are tabulated in the report and also presented graphically.

F) KEROGEN TYPE AND MATURATION

Kerogen is the insoluble organic matter in rocks. Visual examination of the kerogen gives a direct measure of thermal maturity and of the composition of the organic matter (organic facies) and indicates the source quality of the sediment - which is confirmed using the organic carbon, light hydrocarbon, pyrolysis and C_{15+} analyses.

The type of hydrocarbon (oil or gas) generated by a source rock is a function of the types and level of thermal maturation of the organic matter which are present. Both of these parameters are measured directly by this method.

Kerogen is separated from the inorganic rock matrix by acid digestion and flotation methods which avoid oxidation of the organic matter. It is then mounted on a glass slide and examined at high and low magnifications with a Leitz microscope. Chemical methods measure the total kerogen population but, with this technique, individual particles can be selected for examination and spurious material identified. This is particularly valuable in reworked, contaminated and turbodrilled sediments.

The following data are generated: the types of organic matter present and their relative abundances, an estimate of the proportion of reworked material, preservation state, the thermal maturity of the non-reworked organic matter using the spore colouration technique.

Our maturation scale has been developed to digitise small but recognisable changes in organic matter colouration resulting from increasing maturity and to place particular emphasis upon the immature to mature transition. In the absence of a universal colouration scale, the most significant points on our scale have been calibrated against equivalent vitrinite reflectance values. The following maturation stages are recognised at the low end of the scale:-

a) immature; thermal index less than 2- (0.45% Ro)
b) marginally mature; indices between 2- and 2. Minor hydrocarbon generation from amorphous and herbaceous ($\pm$ algal) organic matter
c) mature; indices between 2 (0.53% Ro) and 2 to 2+ (0.72% Ro), significant generation from amorphous, algal and herbaceous organic matter but wood only marginally mature
d) oil window; indices of 2 to 2+ (0.72% Ro) through to 3 (1.2% Ro). Peak hydrocarbon generation.

The condensate zone starts at a thermal index of 3 whilst indices of 3+ (2.0% Ro) and higher indicate the eometamorphic dry gas stage.

A total of fourteen types of organic matter are sought based upon the major categories of algal, amorphous, herbaceous (spore, pollen, cuticle), wood, inertinite and resin. This detail is essential for a proper understanding of hydrocarbon source potential as the different sub-groups within each category have different properties.

Upon completion of the study, the kerogen slides are sent to the client.

G) VITRINITE REFLECTANCE

Vitrinite reflectance is an alternative/confirmatory method for evaluating thermal maturation which is used in conjection with the visual kerogen analysis. The reflectivity of vitrinite macerals increases in response to thermal alteration and is used to define maturation levels and, by projection, to predict maturity at depth or the thicknesses of section removed by erosion.

Measurements are made upon kerogen separations in conjunction with polished whole rock samples. In general, this analysis is performed upon the same samples as the visual kerogen analysis, thus facilitating a direct comparison of the two sets of results.

If possible, forty to fifty measurements are taken per sample - unless the sediments are organically lean, vitrinite is sparse or only a single uniform population is present. The data are plotted in a histogram which distinguishes the indigenous vitrinite from possible reworked or caved material. Averages are calculated for each population. Comments upon exinite fluorescence and upon the character of the phytoclasts are noted on the histograms. The reports contain the tabulated data, histograms and the reflectivities plotted against depth.

The vitrinite and visual kerogen techniques provide mutually complementary information upon maturity, organic matter type and diagenesis.

H) C_{15+} EXTRACTION, DEASPHALTENING AND CHROMATOGRAPHIC SEPARATION

Sections "A" and "E" dealt with analyses covering the light end of the hydrocarbon spectrum. This section is concerned with the solvent extractable organic material in the rock with more than fourteen carbon atoms in the molecule (i.e. the heavy end). The amount and composition of this extract indicates source richness and type, the level of thermal maturation and the possible presence of migrated hydrocarbons.

These results are integrated with those derived from the pyrolysis, visual kerogen, organic carbon and light hydrocarbon analyses.

The techniques involved in this analysis employ pure solvents and have been designed to give reproducible results. Hand picked samples are ground and then solvent extracted in a soxhlet apparatus, or by blending, with dichloromethane (the solvent system can be adapted to client's specifications). After asphaltene precipitation, the total extract is separated by column chromatography or high pressure liquid chromatography into the following fractions: paraffin-naphthene hydrocarbons, aromatic hydrocarbons, eluted NSO's (nitrogen-, sulphur-, and oxygen- containing non-hydrocarbons) and non-eluted NSO's. Note that the non-hydrocarbons are split into three fractions and not reported as a gross value. These fractions can be submitted for further analyses (carbon isotopes, gas chromatography, high mass spectroscopy) including correlation studies.

For convenience and thoroughness, the data are reported in three formats: the weights of the fractions, ppm abundances and normalised percentage compositions. The data are also presented diagramatically.

J) GC ANALYSIS OF C_{15+} PARAFFIN-NAPHTHENE HYDROCARBONS

The gas chromatographic configurations of the heavy C_{15+} paraffin-naphthene hydrocarbons reflect source type, the degree of thermal maturation and the presence and character of migrated hydrocarbons or contamination.

Not only is this analysis an integral part of any source rock study but it also provides a fingerprint for correlation purposes and helps to define the geochemical/palynological environmental character of the source rocks from which crude oils were derived.

The paraffin-naphthene hydrocarbons obtained by column chromatography are separated by high resolution capillary chromatography. Excellent resolution of the individual normal paraffins, isoprenoids and significant individual isoparaffins and naphthenes is achieved. Runs are normally terminated at nC_{35}. A powerful in-house microprocessor system is being introduced to correct for the change in response factor with chain length.

The normal paraffin carbon preference indices (C.P.I.) indicate if odd (values in excess of 1) or even (values less than 1) normal paraffins are dominant. Strong odd preferences (± strong pristane peaks) are characteristic of immature land plant organic matter whilst even preferences (± strong phytane peaks) suggest a reducing environment of deposition. With increasing maturity, values approach 1.0 and oils are typically close to 1.0. The indices are calculated using the following formulae:

$$C.P.I_A = \frac{\frac{C_{21} + C_{23} + C_{25} + C_{27}}{C_{20} + C_{22} + C_{24} + C_{26}} + \frac{C_{21} + C_{23} + C_{25} + C_{27}}{C_{22} + C_{24} + C_{26} + C_{28}}}{2}$$

$$C.P.I_B = \frac{\frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{24} + C_{26} + C_{28} + C_{30}} + \frac{C_{25} + C_{27} + C_{29} + C_{31}}{C_{26} + C_{28} + C_{30} + C_{32}}}{2}$$

Chromatograms are reproduced in the report for use as visual fingerprints and in addition, the following data are tabulated: normalised normal paraffin distributions; proportions of paraffins, isoprenoids and naphthenes in the total paraffin-naphthene fraction; C.P.I_A and C.P.I_B; pristane to phytane ratio; pristane to nC_{17} ratio.

K) PYROLYSIS

The process of thermal maturation can be simulated in the laboratory by pyrolysis, which involves heating the sample under specified conditions and measuring the oil-like material which is freed/generated from the rock. With this analysis, the potential richness of immature sediments can be determined and, by coupling the pyrolysis unit to a gas chromatograph, the liberated material can be characterised. These results are correlated with those obtained from the organic carbon, kerogen and C_{15+} analyses.

Small amounts of powdered sample are heated in helium to release the thermal bitumen (up to 340°C) and pyrolysate (340-550°C). The thermal bitumen correlates with the solvent extractable material (see above) whilst the pyrolysate fraction does not exist in a "free" state but is generated from the kerogen, thus simulating maturation in the subsurface. Abundances (weight ppm of rock) are measured with a flame ionisation detector against a standard. Thermal bitumen includes source indigenous, contaminant and migrated hydrocarbons but the pyrolysate abundance is a measure of ultimate source richness. The capillary gas chromatogram of the pyrolysate is used to evaluate the character of the parent organic matter and whether it is oil or gas prone. Peak temperature(s) of pyrolysate evolution is recorded. Carbon dioxide can be measured if requested but is normally ignored as the separation of the organic and inorganic species has been found to be artificial and unreliable.

Pyrolysate yields provide a definitive measure of potential source richness which avoids the ambiguities of the organic carbon data and the problem of contamination. This analysis is also used to evaluate the quality and character of the organic matter and the degree to which it has realised its ultimate hydrocarbon potential. Geochem does not employ the pyrolysis technique to evaluate maturation, preferring the kerogen and vitrinite reflectance analyses which avoid the problem of reworking and hence, are more reliable.

Capillary chromatograms produced for the pyrolysate hydrocarbons range from C_1 (methane) out towards C_{35} but exhibit considerable variations. They are used to define whether a source rock will yield oil, condensate or gas. With this new technique, it is now possible to complete the evaluation of a source rock.

The data are tabulated and presented graphically. MINI-PYROLYSIS includes ppm thermal bitumen and ppm pyrolsate. PYROLYSIS also provides the above together with the temperature of peak pyrolysate evolution. The capillary chromatograms of the pyrolysate obtained by PYROLYSIS-GC are reproduced in the report. The Mini-Pyrolysis analysis is recommended as a screening technique.

L) CORRELATION STUDY ANALYSES

Oil to oil and oil to parent source rock correlation studies require high resolution analytical techniques. This requirement is satisfied by some of the analyses discussed above but others have been selected specifically for correlation work. Many of these analyses also provide information upon the character of the environment of deposition of the parent source rocks.

- detailed C_4-C_7 hydrocarbon (gasoline range) analysis. See Section E. Although these hydrocarbons can be affected by migrational/alteration processes, they commonly provide a very useful correlation parameter.
- capillary gas chromatography of the C_{15+} paraffin-naphthenes. See section J. The branched±normal paraffin distributions are used to "fingerprint" the samples.
- capillary chromatograms of whole oils and of the C_{8+} fraction of source rocks.
- capillary gas chromatography of C_{15+} aromatic hydrocarbons. Separate chromatograms of the hydrocarbons and of the sulphur-bearing species are reproduced.
- high pressure liquid chromatograms.
- mass spectrometric carbon isotope analyses of crude oil and rock extract fractions and of kerogen separations. A powerful tool for comparing hydrocarbons and correlating hydrocarbons to organic matter. With this technique the problem of source rock contamination can be avoided. The data are recorded on x-y or Galimov plots.
- mass fragmentograms (mass chromatograms) of fragment ions characteristic of selected hydrocarbon groups such as the steranes and terpanes. The fragmentograms provide a convenient and simple means of presenting detailed mass spectrometric data and are used as a sophisticated fingerprinting technique. This provides the ultimate resolution for correlating hydrocarbons and facilitates the examination of hydrocarbon classes.
- vanadium and nickel contents.

Suites of (rather than single) analyses are employed in correlation studies, the actual selection depending upon the complexity of the problem. See also section N.

M) ANALYSES FOR SPECIAL CASES

M-1) ELEMENTAL KEROGEN ANALYSIS

This analysis evaluates source quality, whether the sediments are oil or gas prone, the character of the organic matter and its level of thermal maturation. It is the chemical equivalent of the visual kerogen analysis. The pyrolysis analysis is generally preferred to this technique, both methods providing similar information.

M-2) SULPHUR ANALYSIS

The abundance of sulphur in source rocks and crude oils.

M-3) CARBONATE CONTENT

The mineral carbonate content of sediments is determined by acid treatment. These data are particularly useful when used in conjunction with organic carbon contents as a screening technique.

M-4) NORMAL PARAFFIN ANALYSIS

Following the removal of the branched paraffins and naphthenes from the total paraffin-naphthene fraction, a chromatogram of the normal paraffins is obtained. The resulting less complicated chromatogram facilitates the examination of normal paraffin distributions.

M-5) SOLID BITUMEN EVALUATION

Residual solid bitumen after crude oil is generated by three prime processes: the action of waters, gas deasphalting, thermal alteration. Thus it provides a means of determing the reservoir history of a crude and of evaluating whether adjacent traps will or will not be prospective for oil. In carbonate sections, where organic matter is sometimes sparse, this technique is also used to evaluate thermal maturation levels.

The analysis involves the determination of the solubility (in CS_2) of the solid bitumen and of the atomic hydrogen to carbon ratio of the insoluble fraction.

N) CRUDE OIL ANALYSIS

N-1) API GRAVITY

This can be performed upon large (hydrometer) and small (SG bottle, pycnometer) samples and even upon stains extracted from sediments (refractive index).

N-2) SULPHUR CONTENTS (ASTM E30-47)

N-3) POUR POINT (ASTM D97-66, IP15/67)

N-4) VISCOSITY (ASTM D445-72, IP71/75)

N-5) FRACTIONAL DISTILLATION

Graph of cumulative distillation yield against temperature. Five percent cuts taken for further analysis. Mass spectrometric studies of these fractions provide a detailed picture of the distribution of paraffins and of the various naphthene and aromatic groups within a crude, which is useful both for correlation and for refinery evaluation purposes.