1.5 Summary of FMT Results

Only one run was done using Western Atlas FMT, HP and strain gauges.

One sample was obtained from a small gas zone in the top Fangst Group at 1361 m RKB.

Gas analysis showed that the gas contained 99 mol % methan. Gas density was found to be 0.56 relative to air. The gas is interpreted to be biogenic.

The five good pretest points in the Fangst Group gave a water gradient of 1.02 g/cc.

FMT Pressure Points Run No. 2.

NO.	DEPTH M RKB	HYDROSTAT KPA	FORMATION KPA	REMARKS PERM.
1	1361	16164	13657	Good
2	1368	16255	13733	Good
3	1375	16332	13804	Good
4	1387	16473	13916	Good
5	1395	16566	14004	Good

MUD VOLUME DISTRIBUTION SUMMARY

WELL: 6507/8-3 RIG: WEST DELTA

Hole size	Hole from-to	Hole length	Mud/Brine built	Dumped	Lost to seabed	Lost over solids control equipment/ seabed	Mud left between csg/csg	Cuttings volume drilled	Mud transf. to next sec	Mud type used for interval
36"	337-401 m	64 m	359 cu.m 1)		162 cu.m			42 cu.m	197 cu.m	Spud Mud
26"	558 m	161 m	193 cu.m	5 cu.m	300 cu.m			55 cu.m	85 cu.m	Spud Mud
17 1/2"	1101 m	540 m	857 cu.m	236 cu.m		210 cu.m	35 cu.m	84 cu.m	461 cu.m	CMC
12 1/4"	2075 m	1014 m	572 cu.m	321 cu.m		323 cu.m	* 60 cu.m	77 cu.m	329 cu.m	Gel/Ligno/CMC
8 1/2"										
PLUG & ABANDON				293 cu.m		16 cu.m	20 cu.m			

Totals:

Mud/Brine built	: 1981 cu.m	Total Mud/Brine left in hole/+ between csg/cs	: 115 cu.m
Mud/Brine dumped	: 855 cu.m	Total Mud/Brine to sea	: 462 cu.m
Mud/Brine lost to seabed	: 462 cu.m	Total cuttings volume drilled	: 258 cu.m
Mud/Brine lost over solids control equipment	: 549 cu.m		
Mud/Brine left between csg/csg	: 115 cu.m		

* Left in hole

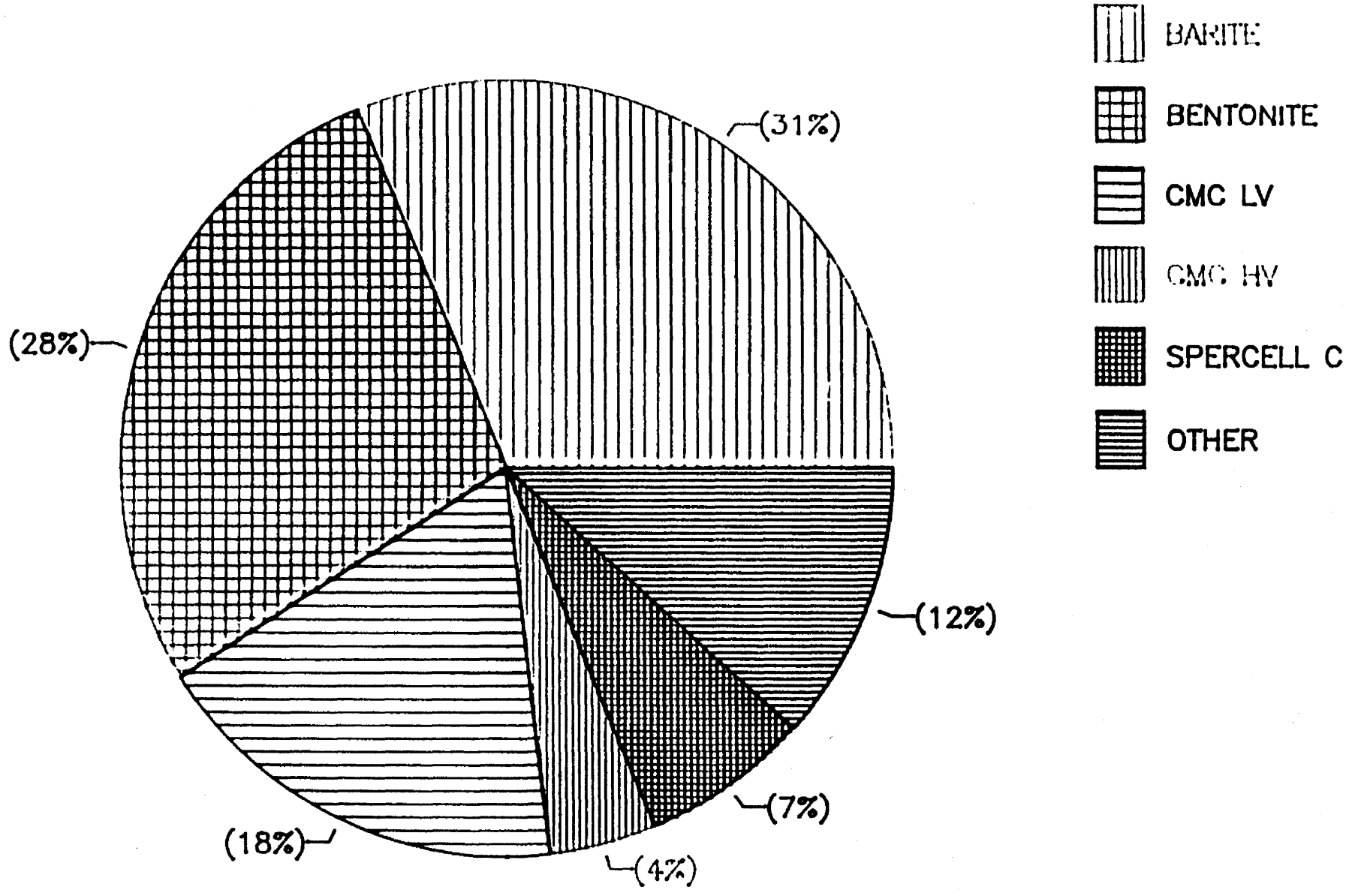
1) Includes 205 m3 transferred from well 6506/12-8

STATOIL WELL NO.6507/8-3 AREA: HALTENBANKEN RIG: WEST DELTA MATERIAL COST AND CONSUMPTION

PRODUCT	UNIT SIZE	UNIT PRICE $	36"+26" SECTION	COST $	17 1/2" SECTION	COST $	12 1/4" SECTION	COST $	P & A	COST $	TOTAL USED	TOTAL COST
BARITE	M.T.	86.00	74	6364.00		.00	126	10836.00	6	516.00	206	17716.00
BENTONITE	M.T.	219.00	28	6132.00		.00	44	9636.00		.00	72	15768.00
CAUSTIC SODA	25 KG	11.50	11	126.50	1	11.50	50	575.00		.00	62	713.00
BICARBONATE	50 KG	17.92		.00		.00		.00		.00		
SODA ASH	30 KG.	9.60	5	48.00		.00	46	441.60		.00	51	489.60
GYPSUM	40 KG.	8.50		.00		.00		.00		.00		
BENTONITE	50 KG.	14.08		.00		.00		.00		.00		
SODA ASH	50 KG.	16.00		.00		.00		.00		.00		
XC-POLYMER	50 LBS.	216.00		.00		.00		.00		.00		
DRISPAC REG.	50 LBS.	80.50		.00		.00		.00		.00		
DRISPAC SLO.	50 LBS.	80.50		.00		.00		.00		.00		
GYPSUM	25 KG.	5.31		.00		.00		.00		.00		
CMC LV	25 KG.	28.50		.00	266	7581.00	88	2508.00		.00	354	10089.00
SPERCELL C	25 KG	12.00		.00		.00	279	3348.00	54	648.00	333	3996.00
DESCO	25 LBS.	35.84		.00		.00	42	1505.28		.00	42	1505.28
CMC HIVIS	25 KG.	31.50		.00	80	2520.00		.00		.00	80	2520.00
[illegible]OLIG C	25 KG.	20.48		.00		.00	95	1945.60		.00	95	1945.60
[illegible]A C	25 KG.	10.00		.00		.00		.00		.00		
MICA F	25 KG.	10.00		.00		.00		.00		.00		
NUT PLUG C	25 KG.	14.08		.00		.00		.00		.00		
NUT PLUG F	25 KG.	14.08		.00		.00		.00		.00		
ANCO RESIN	25 KG	89.60		.00		.00		.00		.00		
IMCOSPOT	50 LBS	90.00		.00		.00		.00		.00		
ZINCCARBONATE	25 KG.	57.60		.00	26	1497.60		.00		.00	26	1497.60
DEFOAMER	25 LIT.	75.52		.00		.00		.00		.00		
ANCOCIDE	25 KG.	69.12		.00	7	483.84		.00		.00	7	483.84
PIPELAX	200 L	160.00		.00		.00		.00		.00		
TOTALS				12670.50		12093.94		30795.48		1164.00		56723.92
HOLE DRILLED (METRES)				221		543		974				1738
COST PR.METRE				57.33		22.27		31.62				32.64
TOTAL DAYS				4		3		5		5		17
COST PR. DAY				3167.63		4031.31		6159.10		232.80		3336.70
[illegible]MIXED (CU.M)				347		857		572		0		1776
COST PR.CU.M				36.51		14.11		53.84				31.94

STATOIL, WELL NO: 6507/8-3

MATERIAL COST ESTIMATE



STATOIL

STATOIL WELL NO. 6507/8-3

DRILLING MUD PROPERTIES RECORD

AREA: HALTENBANKEN

MUD SYSTEM: SPUD MUD

RIG: WEST DELTA

DAY No.	DATE 1986	DEPTH metre	HOLE SIZE (M)	M.W. S.g	F.V. s/qt	600	300	A.V cps	P.V cps	Y.P	GEL 0	GEL 10	API ml.	Chl. mg/l	TH mg/l	pH	%Sol.	%Sand	MBT ppb	Ex.Gypsum ppb
1	3/ 9	401		1.12	100											11.5				
2	4/ 9	567		1.05	100											10.5				
3	5/ 9	558		1.05	100											10.5				
4	6/ 9	555		1.05	100											10.5				
5	7/ 9	725	17.50	1.15	42	22	15	11	7	8	1	1	5.9	20000	180	9.7	7		4	
6	8/ 9	1100	17.50	1.16	39	24	15	12	9	6	1	1	4.5	20000	180	9.2	7		8	
7	9/ 9	1101	17.50	1.15	41	24	15	12	9	6	1	1	4.9	21000	180	9.0	7	.25	9	
8	10/ 9	1296	17.50	1.20	124	34	24	17	10	14	10	17	7.0	15000	1440	9.6	7	.50	18	
9	11/ 9	1388	12.25	1.21	65	38	24	19	14	10	4	55	7.0	14000		9.5	7	.50	18	
10	12/ 9	1636	12.25	1.20	55	36	21	18	15	6	2	54	7.0	13000	640	10.2	7	.50	21	
11	13/ 9	1852	12.25	1.21	80	52	32	26	20	12	3	57	6.3	15000	700	9.4	7	.75	21	
12	14/ 9	2075	12.25	1.21	62	48	31	24	17	14	4	50	6.2	14500	600	9.4	7	.75	21	
13	15/ 9	2075	12.25	1.20	60	48	31	24	17	14	4	48	6.1	15000	600	9.2	6	.75	21	
14	16/ 9	2075	12.25	1.21	65	51	32	26	19	13	4	57	6.2	14500	600	9.1	6	.75	20	
15	17/ 9	2075	12.25	1.20	50	27	17	14	10	7	8	40	9.0	15000	750	12.1		.75	20	
16	18/ 9			1.20	50															

STATOIL WELL [redacted]6507/8-3 SHEET 1 OF 1 HYDRAULICS REVIEW

DAY NO.	DATE MM.DD.YY	DEPTH (M)	HOLE SIZE (IN)	PUMP OUTPUT l/min	CIRC PRESS bars	ANN VEL DP/OH m/min	ANN VEL DC/OH m/min	CRIT VEL DC/OH m/min	PV	YP	BIT DATA NO.	TYPE	NOZ 1	NOZ 2	NOZ 3	NOZ 4	FLOW AREA sqin	PLOSS @BIT bars	NOZ VEL m/sec	TOTAL HHP	HHP @BIT	%HHP @BIT	H.I. @BIT Kgf	MUD WT S.G.	REYN NO.	D.C. O.D. ins.	D.P. O.D. ins.	n	K	MTZ DC/OH
1	3/ 9/88	401	36.00	3580	100	5.55	5.8553					SDSC	20	20	20	16	1143		.1	810.			1	1.12		9.50	5.00	1.00	.02	8737
2	4/ 9/88	567	36.00	2500	100	3.88	4.0018					SF335	18	18	18		763		.1	566.				1.05		8.00	5.00	1.00	.02	5322
3	5/ 9/88	558	26.00	4180	220	12.66	14.073					J11	21	21	21	21	2423			2081				1.05		9.50	5.00	1.00	.03	7887
4	6/ 9/88	555				N/A	N/A	N/A	9	6										N/A				1.05	N/A			.78	.17	N/A
5	7/ 9/88	725	17.50	3610	168	25.31	32.959	46.98	9	6		SDTC	16	14	18	18	1.96		47.5					1.15	1185	9.50	5.00	.82	.15	3267
6	8/ 9/88	1100	17.50	3610	220	25.31	32.959	70.13	10	14		SDTC	16	14	18	18	1.96	14.7	47.5	1797	119.97	6.68	338	1.16	512	9.50	5.00	.63	.61	1674
7	9/ 9/88	1101	17.50	1710		11.99	13.921	60.71	14	10							1.90	3.5	23.2	N/A	13.49	N/A	78	1.15	127	8.00	5.00	.70	.33	850
8	10/ 9/88	1296	12.25	2508	210	39.55	57.470	52.84	15	6		SVX4	14	14	14	14	.60	78.5	107.9	1192	445.44	37.38	552	1.20	3759	8.00	5.00	.82	.16	4010
9	11/ 9/88	1388	12.25	2508	190	39.55	57.470	73.49	20	12		FDGH	14	14	14	15	.60	79.2	107.9	1078	449.15	41.66	557	1.21	1895	8.00	5.00	.70	.41	2674
10	12/ 9/88	1636	12.25	2660	201	41.94	60.953	76.56	17	14		J11	16	16	18		.64	77.6	107.2	1210	467.08	38.61	582	1.20	1812	8.00	5.00	N/A	N/A	N/A
11	13/ 9/88	1852	12.25	2660	203	41.94	60.953	76.19	17	14		J11	16	16	18		.64	78.3	107.2	1222	470.97	38.55	587	1.21	1827	8.00	5.00	N/A	N/A	N/A
12	14/ 9/88	2075	12.25			N/A		N/A	19	13		J11					.64			N/A		N/A		1.21				N/A	N/A	N/A
13	15/ 9/88	2075	12.25			N/A		N/A	20	7														1.20				N/A	N/A	N/A

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REPORT TITLE

REPORT ON STABLE ISOTOPES ($\delta^{13}C$, δD, $\delta^{18}O$) ON HEADSPACE SAMPLES (1200-1362 M) AND TEST GAS (1361 M) FROM WELL 6507/8-3

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SUMMARY

The gas components C_1-C_4 and CO_2 have been separated from headspace samples (1200-1362 m) and test gas (1361 m) from well 6507/8-3.

The $\delta^{13}C$ and δD methane values have been measured. The isotopic composition of CO_2 from the test gas has also been measured.

DISTRIBUTION

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KEYWORDS

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APPROVED BY	Arne Råheim	1988-10-06	Arne Råheim

1. INTRODUCTION

Seven canned gas samples (1200 - 1362 m) and one test gas (1361 m) from well 6507/8-3 were received and analysed during September 1988.

On the samples C_1-C_4 and CO_2 (test gas) are quantified.
It was in this case just possible to measure the isotopic composition of methane and CO_2 (test gas).

2. ANALYTICAL PROCEDURE

The canned and test gases have been quantified and separated into the different gas components by a Carlo-Erba 4200 instrument. This gas chromatograph is equipped with a special injection loop in order to concentrate the samples, in the case of low concentration of the gas components. Methane was oxidized in a CuO oven. The combustion products CO_2 and H_2O were frozen into collection vessels and separated.

The water was reduced with zinc metal in a sealed tube to prepare hydrogen for isotopic analysis. The isotopic measurements were performed on a Finnigan Mat 251 and a Finnigan Mat Delta mass spectrometer. Our $\delta^{13}C$ value on NBS 22 is -29.77 $\pm$ .06 o/oo PDB.

After the isotopic determination the cans were carefullly opened and the gas space quantified by adding up with water.
The samples were then washed with temperated water on 4, 1 and 0.125 mm sieves to remove drilling mud and then dried at 35 - 40^{0}C before weighing.

3. RESULTS

The composition of the headspace and test gas is given in tables 1 and 2. The results in Table 2 have been normalized to 100%. The stable isotope results are given in Table 3.

Our uncertainty on the $\delta^{13}C$ value is estimated to be ± 0.3 o/oo and includes all the different analysis step. The uncertainty on the δD value is likewise estimated to be ± 5 o/oo.

Table 1 Composition of headspace gas from well 6507/8-3

Sample m	IFE No.	Volume ml	Weight kg	Cl ml/kg	C_2 µl/kg	C_3 µl/kg	i-C_4 µl/kg	n-C_4 µl/kg
1200	7703	112	0.2083	20	1	2	<1	<1
1250	7704	150	0.1405	23	18	10	<1	<1
1281	7705	188	0.0734	100	248	13	<3	<3
1308	7706	116	0.0530	149	438	31	<2	<2
1335	7707	140	0.0703	46	213	18	<2	<2
1353	7708	126	0.1081	26	71	<1	<1	<1
1362	7709	63	0.2674	6	14	<1	<1	<1

Table 2 Volume composition of a test gas sample from well 6507/8-3

Sample m	IFE No.	C_1 %	C_2 %	C_3 %	i-C_4 %	n-C_4 %	CO_2 %	ΣC_1-C_4	$\frac{\Sigma C_2\text{-}C_4}{\Sigma C_1\text{-}C_4}$
1361	7716	99.8	0.1	<0.01	<0.01	0.01	0.1	99.9	0.001

Table 3 Isotopic composition of headspace and test gas from well 6507/8-3

Sample m	IFE No.	C_1		O_2	
		$\delta^{13}C$ PDB	δD SMOW	$\delta^{13}C$ PDB	$\delta^{18}O$ PDB
1200	7703	-64.0	-142		
1250	7704	-61.7	-148		
1281	7705	-51.1	-210		
1308	7706	-50.5	-169		
1335	7707	-48.9	-140		
1353	7708	-47.0	-		
1362	7709	-48.2	-228		
1361*	7716	-50.8	-196	-16.4	1.1

* Test gas sample