Formation Pressures, Well 34/7-9

RUN	DEPTH	HYDROSTATIC MUD PRESSURE		FORMATION PRESSURE
	(mRKB)	Before (psia)	After (psia)	(psia)
2A	2456.4	6176.4	6171.5	5552.7
	2488.5	tight		
	2488.4	tight		
	2503.1	6294.8	6291.1	5560.8
	2512.0	6312.8	6308.9	5570.7
	2533.0	6365.5	6358.6	5593.5
	2552.0	6410.6	6410.3	5612.3
	2582.5	6496.7	6492.1	5642.5
	2585	6499.7	6495.7	5644.7
	2588.2	6503.4	6498.2	5707.8
	2591.3	6504.9	6501.6	5650.9
	2623.5	6599.4	6597.1	5694.3
	2637.5	6638.4	6633.5	5713.2
	2656.0	6685.6	6680.2	5739.5
	2698.5	6810.8	6803.6	5801.3
	2585	Sample attempt - tool problem		
2B	2585	Sample attempt - no seal		
2C	2591.3	Sample attempt - tool plugged		
2D	2584.7	Sample attempt - tool problem		
2E	2552	Sample attempt - lost seal		
2F	2592	Sample		
2G	2585	Sample attempt - partial recovery		
2H	2583.9	Sample attempt - tool problem		
2I	2502.6	Sample attempt - tool problem		
4K	2503	5926.6	5920.5	5561.4
	2552	6047.5	6042.7	5612.5
	2585	6129.5	6109.7	5645.6
	2623.5	6212.6	6222.3	5692.8
	2656	6303.8	6265	5739.5
	2698.5	6396	6392	5801.9
	2592	sample		
4L	2585	sample		

Fig. 5.3 FMT-HP Formation pressures, 34/7-9

Date 10.86	Auth. BR	Appr. PS
Draw.by	Ref	

Formation Pressures, Well 34/7-9

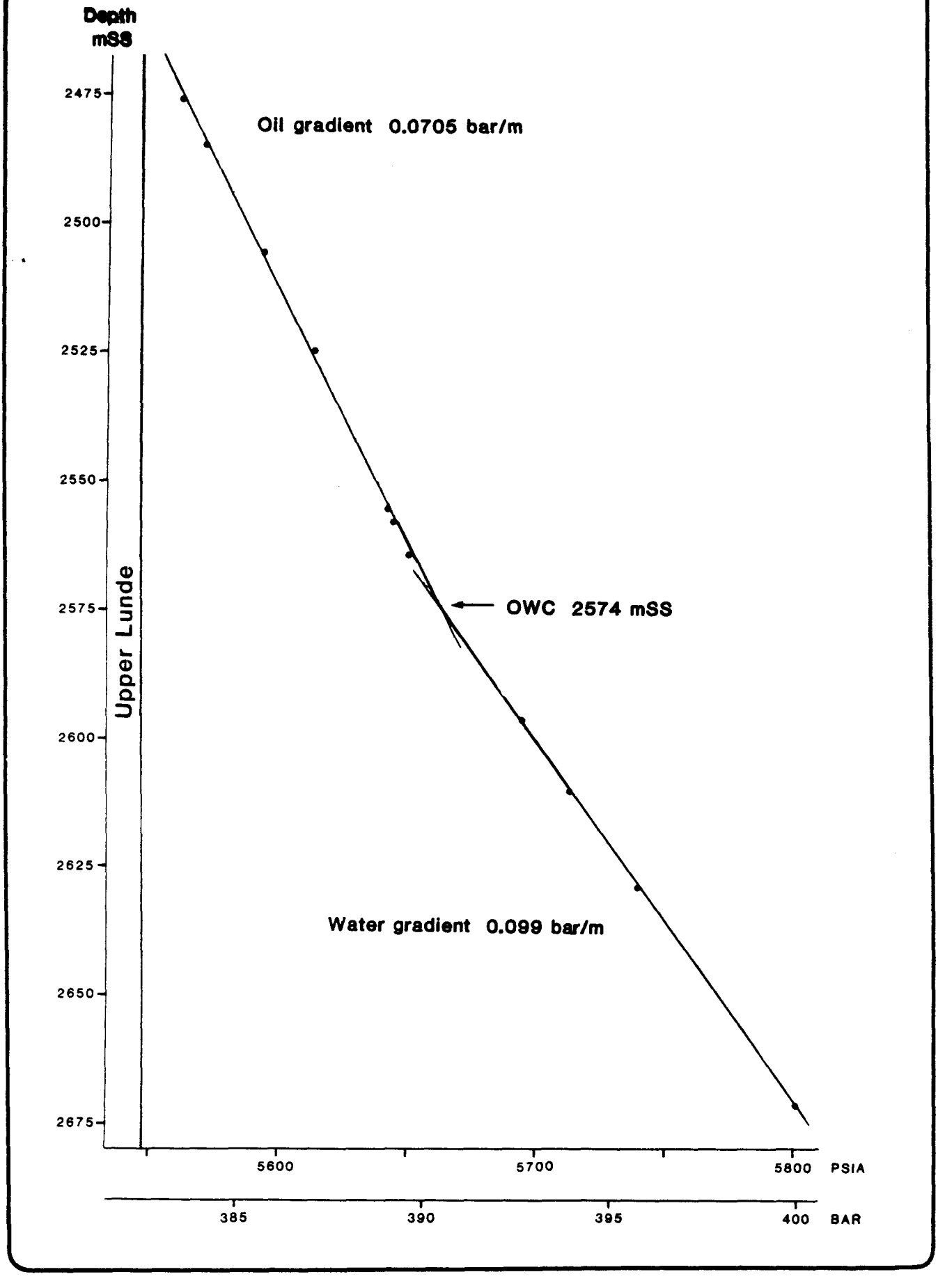

Fig. 5.4 Formation pressures vs. depth, 34/7-9

Date 10.86	Auth. BR	Appr PS
Draw by	Ref	

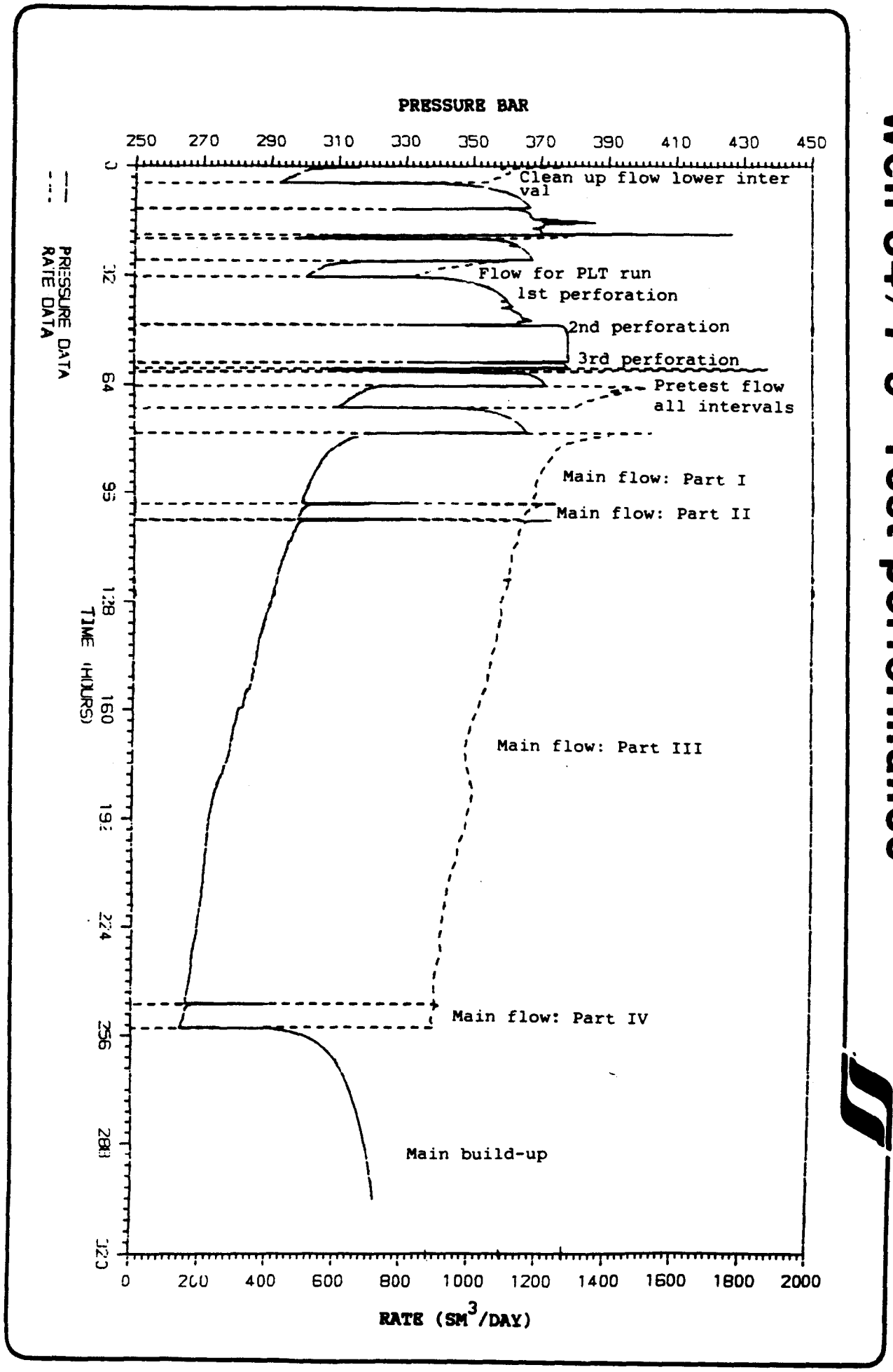

Fig. 5.5 Well 34/7-9, Test performance

Summary Of The Flowperiods, Well 34/7-9

Event	Date	Clocktime (hrs.min)	Choke (mm)	Flowrate (Sm^3/D)	Bottomhole pressure[1] (bar)	Wellhead pressure (bar)	Remarks
Perforated 2550-2553 mRKB	21.05.86	20:10					
Started to run in hole with the test string	21.05.86	21:00					
Set packer	23.05.86	08:28					
Clean up flow lower interval	23.05.86	12:26	14.3				
	23.05.86	15:00		1088.4	297.3	116.5	
Shut in the well	23.05.86	17:15		1031.4	292.0	114.1	
Dropped bar to activate TCP tool	24.05.86	00:47					
Initial flow after TCP perfor.	24.05.86	00:48	11.1				
Shut in the well	24.05.86	01:00		841.7	326.5	145.5	
Clean up flow ball drop	24.05.86	06:32	15.9				
Shut in the well	24.05.86	06:34			319.1		Produced 2.1 Sm^3
Clean up flow gun drop	24.05.86	08:32	15.9				
Shut in the well	24.05.86	09:36		1201.9	298.2	115.2	

1) Reference depth 2439.8 mRKB

Fig. 5.6 Summary of the flow periods, well 34/7-9

Date	Auth	Appr
10/86	BåB	RNy
Draw by	Ref	

Summary Of The Flowperiods, Well 34/7-9

Event	Date	Clocktime (hrs.min)	Choke (mm)	Flowrate (Sm^3/D)	Bottomhole pressure[1] (bar)	Wellhead pressure (bar)	Remarks
Flow for PLT run	24.05.86	16:05	12.7				Performed passes with the
	24.05.86	18:30		897.0	304.5	127.0	PLT
Shut in the well	24.05.86	20:52		832.9	300.5	124.0	
Clean up flow:1st perforation							
2527-2536 mRKB	25.05.86	05:50	12.7				Perforated 2527-2536 mRKB
Shut in the well	25.05.86	05:54				148.0	Produced 2.7 Sm^3
Clean up flow:2nd perforation							
2506-2515 mRKB	25.05.86	10:59	12.7				Perforated 2506-2515 mRKB
Shut in the well	25.05.86	11:03			330.2	140.1	Produced 2.9 Sm^3
Clean up flow:3rd perforation							
2501-2504 mRKB	25.05.86	22:03	12.7				Perforated 2501-2504 mRKB
Shut in the well	25.05.86	22:08				143.0	Produced 2.6 Sm^3
Clean up flow all perforations	25.05.86	23:53	15.9				Change choke at 23:58
Shut in the well	26.05.86	00:15	19.1	1876.3	308.0	111.5	Change choke at 00.35
	26.05.86	00:43	11.1		339.3	160.7	
Pretest flow all intervals	26.05.86	04.59	15.9				Performed passes with the
	26.05.86	08:00		1390.2	314.8	130.0	PLT
Shut in the well	26.05.86	11:22		1305.4	310.4	127.6	

1) Reference depth 2439.8 m RKB

Fig. 5.6 Summary of the flow periods, well 34/7-9

Date 10/86	Auth BåB	Appr RNy
Draw by	Ref	

Summary Of The Flowperiods, Well 34/7-9

Event	Date	Clocktime (hrs.min)	Choke (mm)	Flowrate (Sm^3/D)	Bottomhole pressure[1] (bar)	Wellhead pressure (bar)	Remarks
Main flow: Part I	26.05.86	18:46	15.9				
	27.05.86	00:00		1246.0	308.1	126.8	
	27.05.86	06:00		1204.2	303.5	123.0	
	27.05.86	12:00		1192.4	300.8	120.8	
Shut in the well	27.05.86	15:22		1183.7	299.5	119.6	
Main flow: Part II	27.05.86	15:40	15.9				
	27.05.86	18:00		1160.6	299.4	119.7	Performed passes with the PLT
Shut in the well	27.05.86	20:19		1134.9	298.4	119.0	
Main flow: Part III	27.05.86	20:31	15.9				
	28.05.86	00:00		1136.8	297.3	118.3	
	28.05.86	12:00		1108.6	292.7	114.7	
	29.05.86	00:00		1086.2	289.2	112.6	
	29.05.86	12:00		1058.5	286.5	110.1	
	30.05.86	00:00		1030.7	282.9	107.5	
	30.05.86	12:00		991.2	279.4	105.2	
	31.05.86	00:00		994.8	276.1	102.0	
	31.05.86	12:00		985.6	272.7	98.7	
	01.06.86	00:00		959.6	271.5	98.8	
	01.06.86	12:00		927.0	270.3	98.3	
	02.06.86	00:00		908.6	268.5	97.2	
	02.06.86	12:00		893.7	267.0	96.2	
	02.06.86	19:02		895.3	265.6	95.2	
Main flow: Part IV	02.06.86	19:13	15.9				
	03.06.86	00:00		886.0	264.9	94.1	
Shut in the well	03.06.86	02:10		896.3	264.2	93.2	

1) Reference depth 2439.8 mRKB

Fig. 5.6 Summary of the flow periods, well 34/7-9

Date	Auth	Appr
10/86	BåB	RNy
Draw by	Ref	

Fluid analysis Well 34/7-9

FMT samples

Sampling depth (m RKB)	Chamber volume (gall.)	Content	Remarks
2592	1	Black oil and brown water with sediments	No pressurized sample
2592	2 3/4	Black oil and brown/grey water with sediments	No pressurized sample
2585	1	Black oil and brown/grey water with sediments	Pressurized sample

Analysis of pressurized oil sample

Sampling depth (m RKB)	:	2585
Temperature used in analysis (°C)	:	93
Bubble point pressure (bar)	:	144.9
Reservoir oil density (kg/m^3)	:	711.3
Oil formation volume factor (Rm^3/Sm^3)[1]	:	1.39
Gas oil ratio (Sm^3/Sm^3)[1]	:	121.1
Stock tank oil density (kg/m^3)[2]	:	832.5

1) From single stage flash
Separator conditions : 1. atm pressure 15° C
2) After single stage flash

Dato 10.86	Forf. JMH	Godkj. JMH
Tegn.av	Ref.	

Fig. 5.8 Fluid analysis of FMT samples

Fluid analysis Well 34/7-9

Mid perf. interval (m RKB)	:	2527.0
Reservoir temperature (°C)	:	93.3
Bubble point pressure (bar)	:	155.0
Reservoir oil density (kg/m^3)	:	700.4
Reservoir oil viscosity (mPa s)	:	0.48
Oil formation volume factor (Rm^3/Sm^3) 1)	:	1.33
Gas oil ratio (Sm^3/Sm^3) 1)	:	104.8
Stock tank oil density (kg/m^3) 1)	:	825.8

1) From four stage flash

Separator conditions :

1. 63 bar	66° C
2. 31 bar	60° C
3. 14 bar	59° C
4. atm	15° C

Fig. 5.9 Fluid analysis of test sample

Dato 10.86	Forf. JMH	Godkj. JMH
Tegn.av	Ref.	

Fluid analysis Well 34/7-9

Reservoir fluid composition

Components	Wt %	MW	Mol %	Density
Carbon Dioxide	0.09	44.0	0.21	
Nitrogen	0.34	28.0	1.26	
Methane	4.91	16.0	31.55	
Ethane	2.35	30.0	8.07	
Propane	3.38	44.0	7.91	
i-Butane	0.68	58.0	1.20	
n-Butane	2.60	58.0	4.62	
i-Pentane	1.14	72.0	1.63	
n-Pentane	1.74	72.0	2.49	
Hexanes	2.69	84.3	3.30	671.0
Heptanes	4.33	92.8	4.82	731.0
Octanes	4.87	106.6	4.71	754.0
Nonanes	3.37	119.6	2.91	773.0
Decanes plus	67.51	275.0	25.32	880.0
	100.00		100.00	

	Measured	Calculated
Molecular Weight Stock Tank Oil	210	190
Density Stock Tank Oil (kg/m^3) (after single stage flash)	834.8	
Molecular Weight C7+		220
Density C7+ (kg/m^3)		857
Molecular Weight C10+	275	
Density C10+ (kg/m^3)	876.1	880.0

Fig. 5.10 Reservoir fluid composition, test sample

Dato 10.86	Forf. JMH	Godkj. JMH
Tegn.av	Ref.	

Fluid analysis Well 34/7-9

Trace element analysis

Gas

Hydrogen sulphide (H_2S)	0.1	ppm-vol
Carbonyl sulphide (COS)	<1	ppm-vol
Mercaptanes (R-SH)	<0.1	ppm-vol
Total mercury (Hg)	0.11-4.152	$\mu g/m^3$
Radon - 222	0.0.8-0.83	Bq/lit.
Water (H_2O)	0.17-0.64	mg/lit
Water vapour dew point	~-30°	C
Carbon dioxide (CO_2)	~0.30	mol %
Helium (He)	<0.005-0.011	mol %

Oil

Mercury (Hg)	<0.0005-0-0.0039	ppm-weight
Total sulphur	0.06-0.14	weight %
Polonium (Po-210)	<0.10-0.42	Bq/lit.
Nickel (Ni)	<0.1-0.2	ppm-weight
Vanadium (V)	0.7-1.4	ppm-weight

Fig. 5.11 Trace element analysis

Dato 10.86	Forf. JMH	Godkj. JMH
Tegn.av	Ref.	

SAGA PETROLEUM A.S.

6.2.1 MUD PROPERTIES, DAILY REPORT
Well no: 34/7-9

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf / Mf	Ca++ mg/l	Cl- mg/l	Sand %	Solids %	Mudtype
860412		.0	1.03										SPUD MUD
860413	36	471.0	1.03										SPUD MUD
860414	36	471.0	1.05										SPUD MUD
860415	17-1/2	617.0	1.10	8	46	28/32	9.8	0.1/0.2	200	8000	0.3	4.0	GEL MUD
860416	17-1/2	856.0	1.15	6	45	33/36	9.5	0.1/0.2	240	8000	0.3	7.0	GEL MUD
860417	17-1/2	915.0	1.16	7	56	25/42	9.5	0.1/0.2	400	10000	0.3	8.0	GEL MUD
860418	26	915.0	1.20	8	58	30/50	9.5	0.1/0.2	640	10000	0.3	9.0	GEL MUD
860419	26	915.0	1.03										GYP/POLYMER MUD
860420	17-1/2	1002.0	1.10	12	16	3/4	10.0	0.1/0.3	2560	21000	0.1	4.0	GYP/POLYMER MUD
860421	17-1/2	1460.0	1.20	15	21	3/6	9.6	0.1/0.3	2960	19000	0.5	7.0	GYP/POLYMER MUD
860422	17-1/2	1498.0	1.20	16	20	4/6	9.8	0.1/0.4	2560	19000	0.3	8.0	GYP/POLYMER MUD
860423	17-1/2	1617.0	1.30	18	21	3/6	9.8	0.1/0.4	2400	20000	0.5	10.0	GYP/POLYMER MUD
860424	17-1/2	1837.0	1.41	22	20	7/22	10.0	0.1/0.4	2280	20000	0.8	14.0	GYP/POLYMER MUD
860425	17-1/2	1837.0	1.41	22	19	6/18	10.0	0.1/0.4	2300	20000	0.8	14.0	GYP/POLYMER MUD
860426	17-1/2	1837.0	1.41	22	18	5/16	9.7	0.1/0.4	2300	20000	0.8	14.0	GYP/POLYMER MUD
860427	12-1/4	2138.0	1.58	25	21	10/30	10.0	0.1/0.8	3000	19000	0.8	19.0	GYP/POLYMER MUD
860428	12-1/4	2350.0	1.65	28	18	6/34	10.4	0.2/0.9	1600	16000	0.5	22.0	GYP/POLYMER MUD
860429	12-1/4	2430.0	1.70	29	14	5/22	10.5	0.2/1.5	1600	16000	0.5	23.0	GYP/POLYMER MUD
860430	12-1/4	2479.0	1.73	27	14	4/14	10.3	0.2/1.5	1320	15000	0.2	25.0	GYP/POLYMER MUD
860501	12-1/4	2518.0	1.73	26	17	5/37	10.7	0.5/1.5	1120	13000	0.5	25.0	GEL MUD
860502	12-1/4	2546.0	1.73	26	14	5/35	10.5	0.3/1.8	1360	13000	0.5	25.0	GEL MUD
860503	12-1/4	2574.0	1.73	28	13	6/32	10.5	0.2/1.5	1280	13000	0.3	26.0	GEL MUD
860504	12-1/4	2604.0	1.73	25	18	5/34	10.3	0.2/1.5	1320	13000	0.5	26.0	GEL MUD
860505	12-1/4	2641.0	1.73	26	14	5/37	10.5	0.3/1.6	1160	12000	0.5	27.0	GEL MUD
860506	12-1/4	2670.5	1.73	25	14	4/33	10.6	0.2/1.3	1160	12500	0.5	26.0	GEL MUD
860507	12-1/4	2706.0	1.73	27	13	3/22	10.6	0.3/1.4	1120	12500	0.5	26.0	GEL MUD
860508	12-1/4	2720.5	1.73	28	13	4/20	10.6	0.2/1.3	900	12500	0.5	26.0	GEL MUD
860509	12-1/4	2720.5	1.73	28	13	5/26	10.3	0.2/1.3	1040	13000	0.5	27.0	GEL MUD
860510	12-1/4	2720.5	1.73	27	14	4/25	10.3	0.2/1.3	1040	13000	0.5	27.0	GEL MUD
860511	12-1/4	2806.0	1.73	26	15	5/29	10.2	0.2/1.2	1120	12500	0.5	27.0	GEL MUD
860512	12-1/4	2933.0	1.73	26	17	3/22	9.8	0.1/1.1	1280	13000	0.5	27.0	GEL MUD

SAGA PETROLEUM A.S.

6.2.1 MUD PROPERTIES, DAILY REPORT
Well no: 34/7-9

Date	Hole size	Hole depth	Mud weight	PV	YP	Gel strength	pH	Alkalinity Pf / Mf	Ca++ mg/l	Cl- mg/l	Sand %	Solids %	Mudtype
860513	12-1/4	3090.0	1.73	26	16	4/24	10.3	0.2/1.1	1200	12500	0.3	27.0	GEL MUD
860514	12-1/4	3156.5	1.73	23	15	4/22	10.1	0.1/1.0	1200	12500	0.5	27.0	GEL MUD
860515	12-1/4	3159.0	1.73	21	15	4/21	10.2	0.1/1.0	1200	12500	0.5	27.0	GEL MUD
860516	12-1/4	3240.0	1.73	24	17	5/29	10.3	0.1/1.0	1040	12500	0.5	27.0	GEL MUD
860517	12-1/4	3240.0	1.73	24	16	5/29	10.1	0.2/1.1	1040	12500	0.5	27.0	GEL MUD
860518	PB	2820.0	1.73	25	13	8/58	11.3	0.7/1.7	520	12700	0.5	27.0	GEL MUD
860519	PB	2820.0	1.73	20	13	7/38	11.5	0.7/1.6	520	12700	0.5	27.0	GEL MUD
860520	PB	2751.0	1.73	22	15	9/35	11.5	0.3/1.1	320	13000	0.5	24.0	GEL MUD
860521	PB	2751.0	1.73	19	10	4/27	11.5	0.4/1.6	280	13000	0.8	24.0	GEL MUD
860522	PB	2751.0	1.73	19	10	4/27	11.5	0.3/1.5	280	13000	0.5	24.0	GEL MUD
860523	PB	2751.0	1.73	18	10	4/27	11.5	0.3/1.5	1200	13000	0.5	24.0	GEL MUD
860524	PB	2751.0	1.73	18	10	4/27	11.5	0.3/1.5	1200	13000	0.5	24.0	GEL MUD
860525	PB	2751.0	1.73	18	10	5/30	11.5	0.3/1.5	1200	13000	0.5	24.0	GEL MUD
860526	PB	2751.0	1.73	18	10	5/30	11.3	0.3/1.5	1200	13000	0.5	24.0	GEL MUD
860527	PB	2751.0	1.73	18	10	5/32	11.3	0.3/1.5	1000	12500	0.3	24.0	GEL MUD
860528	PB	2751.0	1.73	19	12	5/32	11.2	0.3/1.5	1000	12500	0.3	24.0	GEL MUD
860529	PB	2751.0	1.73	19	12	5/32	11.2	0.3/1.5	1000	12500	0.3	24.0	GEL MUD
860530	PB	2751.0	1.73	19	11	5/32	11.2	0.3/1.5	1000	12500	0.3	24.0	GEL MUD
860531	PB	2751.0	1.73	19	11	5/32	11.1	0.3/1.5	1000	12500	0.3	24.0	GEL MUD
860601	PB	2751.0	1.73	19	11	5/32	11.1	0.3/1.5	1000	12500	0.3	24.0	GEL MUD
860602	PB	2751.0	1.73	20	12	5/38	11.1	0.3/1.5	920	10500	0.3	24.0	GEL MUD
860603	PB	2751.0	1.73	20	12	5/38	11.1	0.3/1.5	920	10500	0.3	24.0	GEL MUD
860604	PB	2751.0	1.73	20	12	5/38	11.1	0.3/1.5	920	10500	0.3	24.0	GEL MUD
860605	PB	2751.0	1.73	20	12	5/38	10.8	0.3/1.5	920	10500	0.3	24.0	GEL MUD
860606	PB	2751.0	1.73	20	12	5/38	10.8	0.3/1.5	920	10500	0.3	24.0	GEL MUD
860607	PB	2293.0	1.73	20	12	5/38	10.8	0.3/1.5	920	10500	0.3	24.0	GEL MUD
860608	PB	1659.0	1.73	20	12	5/38	10.8	0.3/1.5	920	10500	0.3	24.0	GEL MUD
860609	PB	390.0	1.03										WATER BASED
860610	PB	390.0	1.03										WATER BASED
860611	PB	390.0	1.03										WATER BASED
860612	PB	390.0	1.03										WATER BASED

SAGA PETROLEUM A.S. 6.2.2 MUD MATERIALS USED

Well no: 34/7-9

Materials	Unit	36 in hole	26 in hole	17-1/2 hole	12-1/4 hole	8-1/2 hole	Total
BARITE	M/T	0	77	287	884	0	1248
BICARBONATE	50 KG	0	3	0	21	0	24
PROTHIN	25KG	0	0	0	591	0	591
CAUSTIC SODA	25 KG	6	6	31	128	0	171
DRISPAC REG	50 LB	0	0	94	21	0	115
DRISPAC S/L	50 LB	0	0	0	59	0	59
GYPSUM	50 KG	0	0	450	86	0	536
LIGCON	50 LB	0	0	0	37	0	37
LIME	40 KG	10	0	0	0	0	10
MICA C/F	SXS	0	0	0	14	0	14
MILBIO	55 GA	0	0	6	1	0	7
PROPLUG F/V	SXS	0	0	6	0	0	6
MILPOL 302	25 KG	0	0	157	16	0	173
PERMALOSE	25 KG	0	0	264	56	0	320
PRO-DEFOAMER	25 L	0	0	7	6	0	13
SODA ASH	50 KG	3	0	0	3	0	6
W.O.21	25 KG	0	0	0	1	0	1
BENTONITE	M/T	10	19	2	8	0	39