6.3 Mud report

Re-entry - 3726 m

Operations commenced on 20th September after a 3 day wait for weather conditions to moderate. A further 3 days were spent working on and running the subsea equipment and marine riser. During this time 875 bbls of 2,03 rd (16,9 ppg) mud was built with properties compatible with the mud left in the hole on abandonment. Cement was tagged at 189 meters and drilled out to 286 meters. Light contamination was experienced and treated.

A drilling assy was then run in to 1500 meters and the mud circulated and treated to reduce viscosity.

At 2960 meters the string took weight so 2 stands were pulled and the mud circulated. The returns were contaminated with sand which appeared to have migrated through mud and balled up with Bentonite, producing a highly viscous fluid, 140 sec/qt. funnel viscosity at the shakers. This was heavily diluted with seawater and treated with Spersene. Subsequently, circulation had to be broken every 4 to 5 joints and bottoms up circulated approximately every 30 joints. Again, treatment of returns was as before. Hard fill was encountered 2 joints above the bridge plug and this was washed/reamed before circulating bottoms up.

The bridge plug was drilled out and circulation maintained while carrying out repair to the heave compensator. Cement was then drilled to the 9 5/8" casing shoe at 3726 meters.

8 3/8" Hole Section

Depth 3726 m - 4394 m.

Cement was drilled out and the mud was circulated to clear 3500 units of gas. A cement plug was set at 3860 m to make a firm base to kick off from. As this plug failed to harden properly and was washed/reamed to 3782 m, a second plug was set to 3676 m and subsequently dressed off to 3755 m.

A turbine assembly and diamond bit were then utilized to drill to 3767 m and achieve the required hole angle. At this point, the main engines failed and operations were suspended while repairs were effected.

8 3/8" hole was drilled to 4062 m with little or no problems. A tight spot at 3827 m was washed/reamed. The formation was then cored to 4159 m with good recovery on all cores. At 4093 m a trip was made with a bit and the cored section reamed/washed.

The hole was then drilled to 4394 m. A trip had to be made at 4227 m to replace a washed out joint of drill pipe. Operations were also suspended at 4347 m for a short time due to bad weather.

A full range of Schlumberger logs were run, wiper trips being made when hole conditions made it necessary. The 7" liner was run with the shoe at 4379 m and the hanger at 3676 m. Mud returns were lost while circulating the casing volume, and again during subsequent cementing and displacement. Total mud losses amounted to 692 bbls.

Excessive Barite consumption during this interval significantly affected the overall cost. This was due in the main to contamination of the active system necessitating dilution, accidental contamination with large volumes of water, and building new volume to replace losses to the formation. In the first instance, same 300 bbls of dilution occurred due to very heavy contamination with cement while attempting to set a plug to give a kick-off pont. Secondly, there were several accidental contaminations due to unexperienced rig crew leaving valves open after flushing lines and equipment. Added to contamination with water during riser displacement, BOP and surface tests, this amounted to approximately 650 bbls.

Lastly, 800 bbls of mud were lost to the formaton during operations to run and cement the 7" liner. New volume had to be built to maintain an active system. Overall, the equivalent of 1750 bbls of new mud had to be built outside the normally accepted amounts consumed. This necessitated the extra consumption of around 460 M/T Bartie and 16 M/T Bentinote as well as other chemicals, to maintain the system.

With the need to maintain a relatively low drill solids content in the mud, the centrifuge was utilized a great deal of the time, and though it made very little difference to Barite consumption, but did increase slightly the use of Bentonite and other chemicals.

6" Hole Section

Depth 4374 m - 4812 m.

Cement was tagged at 3429 m and washed/reamed to 3561 m where hard cement was encountered and drilled out to 3625 m. The casing was then successfully tested to 2690 psi. A 6" assembly was then utilized to drill cement and the baffle plate to 3637 m. The liner overlap was tested twice to 2407 psi and failed to hold.

A further cement plug was set and squeezed at the overlap. This was drilled out to 3626 m and tested to 2595 psi and bled down in 30 minutes. A six inch assy was used to drill to 3630 m and subsequntly to 4339 m where the liner was again unsuccessfully tested.

An RTTS packer was then run in, but had to be pulled after a broken chain tong was dropped in the hole. This was fished for and retrieved before running the RTTS tool, and testing both casing and liner. Again, the overlap failed to hold.

A cement plug was set and squeezed to hold at 2635 psi. The cement was subsequently drilled out and the overlap tested out to 2697 psi, which it held. Cement, float and shoe plus 3 m of new formation were drilled and a formation integrity test carrid out to an equivalent density of 2,24 (18,66 ppg) before drilling on to 4412 m.

A CBL was run at this point without problems. The hole being washed/reamed 1 - 2 joints to TD on trips. A core barrel was run from 4489 m to 4502 m before drilling to 4525 m.

The hole was drilled to TD at 4812 m with some problems encountered on trips. On every trip, difficulty was had, running back to TD. Tight hole was reamed/washed to TD on each occasion.

Logging was completed without major problems. Wiper trips being made to clean the hole very two to three logging runs.

Generally, the mud was kept within the program parameters until the hole was drilled beyond 4500 m. At this point, some problems were encountered with high temperature gelation and subsequent increase in HTHP fluid loss. Very heavy chemical treatment of the mud was instigated and subsequently proved successfull.

TABLE B-5

DAILY MUD PROPERTIES

Norsk Hydro,
Well: 30/7-8, Re-Entry

1981 DATE	Meters DEPTH	WT.	VIS SEC	CORR. 115°F PV	CORR. 115°F YP	GELS Pascals 0	GELS Pascals 10	pH BECK 29 STRIP ☐	FLUID LOSS 100 PSI API	FLUID LOSS 500 PSI 250°F HT-HP	CL ☒ CACL ☐ NACL ☐	ALKALINITY PF	ALKALINITY PM	ALKALINITY MF	CA ppm	RETORT % OIL	RETORT % SOL	RETORT % WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC		$ TOTAL MUD COST
20/09		MIXING	UP	MUD																							9939.38
21		MIXING	UP	MUD																							19592.66
22		1.86	43	17	2	1	4	9.5	4.0		12000	0.5	1.1	1.6	240												23921.60
23		2.03	50	30	3	3	4	9.2	3.8		12000	0.4	1.0	1.6	240		33	67									29600.00
24		2.03	58	32	8	2	15	11.2	4.4		14000	1.5	4.7	2.8	280		34	66									38093.00
25	3663	2.03	45	23	4	5	20	11.2	6.2		13000	0.9	5.2	2.0	400		34	66	54	31	23	14	4	3	20		49224.17
26	3860	2.03	48	28	7	4	18	11.2	5.8		13000	0.8	5.8	2.0	280		35	65	70	42	32	20	5	4	20		61039.91
27	3860	2.03	48	32	4	3	12	11.2	5.8		13000	0.8	5.8	2.0	480		35	65	72	40	29	18	4	3	20		62650.23
28	3782	2.03	47	27	6	6	24	11.4	6.8		13000	1.7	6.8	3.3	360		34	66	67	40	31	20	5	4	20		65587.39
29	3676	2.03	46	24	4	3	10	11.4	6.4		13000	2.4	8.6	4.9	240		34	66	56	32	22	14	3	2	20		68243.05
30	3755	2.03	46	24	5	3	14	11.5	6.2		13000	2.5	8.6	4.2	640		35	65	58	34	25	16	3	3	17.5		75174.89
01/10	3456	2.03	45	24	4	4	14	11.2	6.6	18.8	13000	2.0	7.6	3.6	240		36	64	56	32	22	14	3	3	18		85097.77
02	3767	2.03	44	26	5	5	14	11.0	5.8	18.2	12000	2.2	8.4	3.0	240		35	65	62	36	25	18	4	3	20		94466.25
03	3767	2.03	45	25	4	3	15	11.1	6.0	17.2	12000	2.3	82.	3.1	220		35	65	58	33	22	15	3	2	20		94466.25
04	3767	2.03	44	25	4	4	14	11.0	6.0	17.4	12000	2.3	8.2	3.1	220		35	65	58	33	22	15	3	2	20		94466.25
05	3767	2.03	43	24	9	3	13	11.0	6.0	17.8	12000	2.1	8.0	3.2	220		35	65	56	32	22	16	3	2	20		94466.25
06	3767	2.03	45	25	4	5	15	11.0	5.2	17.8	12000	1.8	7.6	3.0	180		34	66	58	33	22	16	4	2	20		97978.80
07	3767	2.03	47	25	5	5	14	10.8	5.0	17.4	12000	1.8	7.2	3.1	180		34	66	60	35	25	18	5	3	20		98546.64
08	3767	2.03	46	24	5	4	15	10.8	5.0	17.2	12000	1.8	7.2	3.1	180		34	66	58	34	23	18	4	3	19		98546.64
09	3767	2.03	48	25	5	4	15	10.9	5.2	17.0	13000	1.7	7.4	3.0	180		34	66	60	35	25	18	5	3	19		98546.64
10	3767	2.03	48	25	4	5	14	10.8	5.2	17.2	13000	1.7	7.3	3.0	200		34	66	58	33	22	16	4	2	18		99114.48
11	3767	2.03	46	26	5	5	16	11.0	5.0	16.0	11000	1.7	8.0	3.0	160		34	66	62	36	26	20	6	3	17.5		102809.69
12	3769	2.03	48	27	5	5	14	11.0	4.4	14.6	13000	2.1	6.9	3.3	200		33	67	64	37	28	21	6	3	17		111444.52
13	3778	2.03	46	26	5	4	15	11.1	4.0	15.8	12000	2.0	6.0	3.4	160		33	67	62	36	26	20	6	2	17		119299.67
14	3807	2.03	48	24	5	5	14	11.11	4.2	13.8	12000	1.7	6.1	3.0	120		33	67	68	39	28	20	6	3	18		128078.15
15	3818	2.03	50	50	5	6	14	11.1	4.1	13.6	12000	1.6	6.0	3.0	120		33	67	70	40	29	21	7	4	20		128812.49
16	3835	2.03	50	25	5	4	12	11.0	3.8	12.8	12000	2.1	6.2	4.2	160		33	67	59	34	24	15	4	3	20		130442.49
17	3862	2.03	49	26	4	4	11	11.0	3.6	12.8	12000	2.0	6.0	4.1	160		34	66	62	36	24	14	3	3	20		134911.69

DATE SPUD: DATE T.D.: COST:

DAILY MUD PROPERTIES

Norsk Hydro,
Well: 30/7-8, Re-entry

1981 DATE	Meters DEPTH	WT.	VIS SEC.	CORR. 115°F PV	YP	GELS Pascals 0	10	pH BECK ☒ STRIP ☐	FLUID LOSS 100 PSI API	500 PSI 300 °F HT-HP	CL ☒ CACL ☐ NACL ☐	ALKALINITY PF	PM	MF	CA ppm	RETORT % OIL	% SOL	% WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC		TOTAL MUD COST
18/10	3918	2.03	52	31	5	3	10	10.8	3.6	12.6	11000	1.6	5.8	3.6	240	TR	33	67	72	41	30	18	3	3	20.0		139462.23
19	3941	2.03	52	31	5	4	9	10.9	3.6	12.8	11000	1.2	5.6	3.2	400	TR	33	67	72	41	31	19	3	3	17.5		146856.27
20	3945	2.03	55	31	5	4	9	10.9	3.6	12.8	11000	1.2	5.6	3.2	400	TR	33	67	72	41	31	19	3	3	17.5		147849.99
21	3988	2.04	49	28	5	3	8	10.7	3.4	12.2	11000	1.4	5.0	3.6	240	TR	34	66	67	39	29	17	3		20.0		156698.33
22	4028	2.04	51	29	4	3	9	10.7	3.4	12.0	11000	1.4	3.6	3.8	240	TR	34	66	66	37	27	16	3	2	20.0		163514.44
23	4062	2.04	49	29	4	3	10	10.8	3.2	11.8	11000	1.4	4.4	3.4	160	TR	34	66	67	38	30	19	3	3	20.0		174142.02
24	4076	2.04	52	27	4	3	10	10.7	3.2	12.0	11000	1.4	3.4	3.6	160	TR	33	67	62	35	26	16	3	2	20.0		176271.42
25	4088	2.04	52	29	4.3	3	9	10.7	3.0	11.8	11000	1.2	3.3	3.4	140	TR	34	66	67	38	29	17	3	3	20.0		180377.82
26	4106	2.04	50	29	4.3	4	11	11.0	3.0	12.6	11000	1.8	3.6	4.0	120	TR	34	66	67	38	29	18	3	3	20.0		185681.07
27	4106	2.04	52	29	4.3	4	11	11.0	3.0	12.6	11000	1.8	3.6	4.0	120	TR	34	66	67	38	29	18	3	3	20.0		185681.07
28	4122	2.04	50	25	4.3	3	8	10.7	2.8	11.6	11000	1.2	3.3	3.2	240	TR	34	66	59	34	25	15	2	2	20.0		195518.53
29	4137	2.04	54	28	4	2	8	10.8	2.6	11.8	11000	1.2	3.7	3.1	200	TR	33	67	64	36	25	16	3	2	20.0		200275.35
30	4159	2.04	48	29	4	3	8	10.4	2.6	12.0	11000	1.3	37.	3.2	180	TR	34	66	66	37	27	16	3	2	20.0		265897.11
31	4197	2.04	48	29	5	3	10	11.1	3.0	11.2	14000	1.3	3.8	3.4	160	TR	34	66	68	39	29	18	5	2	21.0		209209.11
01/11	4257	2.04	49	31	5	2	11	11.0	2.7	10.8	13000	1.4	3.9	3.6	240	TR	34	66	72	41	31	79	4	2	22.0		215715.75
02	4314	2.04	50	31	6	3	11	11.1	3.0	11.6	12000	1.6	4.0	3.8	180	TR	34	66	74	43	32	20	4	3	21.0		223162.23
03	4343	2.04	49	29	6	3	13	10.9	3.0	11.2	12000	1.3	3.8	3.1	180	TR	33	67	70	41	30	19	5	3	21.0		229749.07
04	4347	2.04	52	30	6	2	10	10.8	3.0	11.4	12000	1.3	3.6	3.2	160	TR	33	67	72	42	29	19	4	2	21.5		232925.78
05	4347	2.04	56	29	5	2	9	10.7	2.8	11.2	12000	1.1	3.5	3.0	180	TR	33	67	68	39	27	17	3	2	21.0		232925.78
06	4389	2.04	50	29	5	3	11	11.2	2.4	10.8	11000	1.6	4.0	3.5	200	TR	34	66	68	39	29	18	7	4	22.0		239509.34
07	4394	2.04	47	28	5	2	9	11.1	2.5	11.2	11000	1.4	3.4	3.5	180	TR	33	67	66	38	26	16	3	2	20.0		250143.04
08	4394	2.04	50	29	5	2	9	11.2	2.8	11.0	11000	1.4	4.0	3.4	160	-	33	67	68	39	29	18	5	2	30.0		253363.84
09	4394	2.04	56	30	7	4	12	11.0	2.4	10.6	11000	1.3	3.9	3.1	160	-	33	67	74	44	31	22	6	3	21.0		249457.40
10	4394	2.04	56	29	7	4	11	11.0	2.6	11.2	11000	1.3	3.8	3.3	160	-	33	67	72	43	29	22	5	3	21		249457.40
11	4394	2.04	58	30	6	3	14	11.2	2.8	11.2	10500	1.5	3.8	3.4	140	-	33	67	72	42	30	21	5	3	20.0		254317.58
12	4394	2.04	63	30	6	3	14	11.2	2.8	11.8	10500	1.4	3.4	3.1	160	-	33	67	72	42	30	21	5	3	20.0		256525.22
13	4394	2.04	58	33	4	4	20	11.0	3.8	12.2	10000	2.4	4.2	4.6	180	TR	34	66	74	41	29	17	4	3	20.0		260358.14
14	4394	2.04	64	34	5	5	21	11.0	3.8	12.2	10000	2.4	4.2	4.6	180	TR	34	66	78	44	32	19	4	3	20.0		260358.14

DATE SPUD: DATE T.D.: COST:

DAILY MUD PROPERTIES

Norsk Hydro,

Well : 30/7-8 Re-entry

1981 DATE	Meters DEPTH	WT.	VIS SEC.	CORR. 115°F PV	YP	GELS Pascals 0	10	pH BECK ☒ STRIP ☐	FLUID LOSS 100 PSI API	500 PSI 300 °F HT-HP	CL ☒ CACL ☐ NACL ☐	ALKALINITY PF	PM	MF	CA ppm	RETORT % OIL	% SOL	% WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC		TOTAL MUD COST
15/11	4394	17.0	64	34	5	5	21	11.0																			
16 - 21 November			RIG ON STRIKE																								
22/11	4394	17.0	54	27	5	3	15	11.3																			
23	4394	17.0	51	25	4	3	14	11.4	6.6	18.4	10000	2.0	6.4	3.6	240	TR	33	67									
24	4394	17.0	50	25	4	3	10	11.3	5.8	16.4	10000	1.8	6.0	3.4	240	TR	55	67									
25	4394	17.0	50	25	4	3	10	11.3	5.8	16.4	10000	1.8	6.0	3.4	240	TR	34	66							17.5		
26	4394	17.0	54	31	5	4	14	11.3	4.0	13.4	9000	1.6	5.6	4.0	220	TR	34	66	72	41	31	19	3	3	17.5		
27	4394	17.0	55	29	4	3	15	11.3	6.0	14.2	10000	1.7	6.0	4.7	260	TR	34	66	66	37	27	17	3	3	17.5		
28	4394	17.0	56	30	4	4	15	11.4	5.0	14.0	10000	1.3	6.0	3.6	280	TR	34	66	66	37	27	17	3	3	17.5		
29	4394	17.0	54	21	5	4	14	11.4	5.0	12.5	10000	1.4	7.0	4.4	300	TR	34	66	71	40	29	18	4	3	17.5		
30	4394	17.0	54	36	6	4	10	11.1	6.0	13.3	10000	1.4	4.4	3.8	250	TR	34	66	84	48	36	22	5	3	17.5		
01/12	4394	17.0	60	33	6	4	12	11.1	5.0	13.1	10000	1.2	5.2	3.8	280	TR	34	66	78	45	34	21	4	3	17.5		
02	4394	17.0	56	33	5	4	14	11.2	6.2	17.2	10000	1.2	6.2	3.4	300	TR	34	66	76	43	32	19	4	3	17.5		
03	4390	17.0	54	28	5	4	15	11.2	6.0	13.2	9000	1.3	6.6	3.6	360	TR	34	66	66	38	32	19	4	3	18.5		
04	4412	17.0	54	32	5	4	15	11.0	7.0	13.1	9000	1.4	7.0	3.5	280	TR	34	66	78	45	34	20	4	3	20.0		
05	4421	17.0	54	29	6	5	16	11.1	5.8	13.0	9000	1.2	7.4	3.4	280	TR	34	66	70	41	30	18	3	3	20.0		
06	4458	17.0	50	33	5	6	16	11.0	6.4	13.0	9000	1.2	6.6	3.4	350	TR	34	66	70	41	30	17	3	3	20.0		
07	4467	17.0	54	31	3	4	11	10.9	5.2	13.0	10000	1.1	6.8	3.2	350	TR	33	67	68	37	28	17	3	3	20.0		
08	4489	17.0	52	32	4.5	3	9	10.9	4.0	12.5	9000	1.2	5.8	3.4	300	TR	33	67	73	44	30	18	3	3	20.0		
09	4527	17.0	54	30	3	3.5	10	11.1	4.6	13.2	10000	1.2	5.4	3.4	300	TR	32	68	71	47	VG-METER 2				18.0		
10	4540	17.0	55	28	4	4	11	11.2	4.8	13.4	10000	1.4	6.2	2.8	300	TR	33	67	64	36	"	"	"	"	18.0		
11	4554	17.0	55	26	4	4	9	11.2	3.8	12.6	10000	1.1	5.6	2.5	280	TR	33	67	60	34	"	"	"	"	18.5		
12	4589	17.0	58	30	5	3	10	11.2	3.6	11.8	10000	1.0	5.6	2.5	280	TR	34	66	70	40	28	16	2	2	20.0		
13	4621	17.0	60	31	5	3	10	11.1	3.6	11.8	10000	0.8	5.2	2.4	320	TR	34	66	72	41	30	17	2	2	20.0		
14	4633	17.0	62	32	6	4	12	11.0	3.6	11.6	10000	1.0	5.2	2.4	300	TR	34	66	74	42	31	17	2	2	20.0		
15	4683	17.0	57	32	4	3	6	10.7	3.2	12.4	9000	1.0	4.2	3.2	320	TR	34	65	72	40	29	17	2	2	18.5		
16	4690	17.0	63	32	5	4	8	11.0	3.0	11.8	9000	1.2	4.6	3.4	360	TR	34	65	74	42	30	18	3	2	18.5		
17	4732	17.0	58	31	4	2	6	11.1	1.8	11.8	9000	1.4	5.4	4.0	320	TR	33	66	70	39	26	14	2	1	17.5		

DATE SPUD: DATE T.D.: COST:

DAILY MUD PROPERTIES

Norsk Hydro,
Well : 30/7-8 Re-entry

1981 DATE	Meters DEPTH	WT.	VIS SEC.	CORR. 115°F PV	YP	GELS Pascals 0	10	pH BECK ☒ STRIP ☐	FLUID LOSS 100 PSI API	500 PSI 300 °F HT-HP	CL ☒ CACL ☐ NACL ☐	ALKALINITY PF	PM	MF	CA ppm	RETORT % OIL	% SOL	% WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC		TOTAL MUD COST
18/12	4746	17.0	65	35	4	2	6	10.7	1.6	11.4	9000	1.2	4.8	4.4	180	1	34	65	78	43	31	18	2	1	19.0		363102.83
19	4786	17.0	59	35	4	2	6	10.7	1.6	10.6	9000	1.4	4.8	5.6	320	1	33	66	78	43	31	18	2	1	18.5		371055.60
20	4786	17.0	64	35	4	2	6	10.7	1.6	10.6	9000	1.4	4.8	5.6	320	1	33	66	78	43	31	18	2	1	18.5		371055.60
21	4791	17.0	74	42	6	2	10	10.7	2.2	9.6	9000	1.6	5.2	5.0	400	1	34	65	96	54	38	22	3	2	18.0		372914.00
22	4812	17.0	57	35	5	2	7	11.0	1.2	9.8	9000	2.1	6.0	6.2	360	1	34	65	80	45	30	16	2	1	17.5		380728.76
23	4812	17.0	58	26	4	2	6	10.9	1.6	10.0	9000	1.6	5.8	5.6	320	1	33	66	60	34	23	13	2	1	17.0		380728.76
24	4812	17.0	69	28	4	2	8	10.9	1.6	10.2	9000	1.6	5.8	5.6	320	1	33	66	68	36	24	14	2	1	17.5		381781.16
25	4812	17.0	65	27	5	2	5	10.9	1.8	10.2	9000	1.4	5.6	5.8	280	1	33	66	64	34	26	15	2	1	17.5		381781.16
26	4812	17.0	61	27	5	2	5	10.9	1.6	10.0	9000	1.6	5.6	5.8	280	1	33	66	64	34	26	15	2	1	17.5		384644.64
27	4812	17.05	63	27	5	2	5	10.9	1.6	10.0	9000	1.6	5.6	5.8	280	1	33	66	64	34	26	15	2	1	17.5		384644.64
28	4812	17.0	60	30	4	2	7	11.0	2.0	10.6	9000	1.7	4.8	4.9	240	1	34	65	68	38	26	16	2	2	17.0		388176.44
29	4812	17.1	64	30	8	2	6	10.9	1.8	10.9	9000	1.8	4.7	5.4	260	1	34	64	76	46	30	17	2	2	17.0		388602.32
30	4812	17.0	63	32	4	2	5	10.8	2.0	10.7	10000	2.1	3.2	3.4	240	1	34	64	75	42	30	18	2	2	17.5		391049.50
31	4305	17.0	60	35	5.5	2	6	10.8	2.0	10.8	10000	1.6	3.4	3.6	240	2	33	65	81	46	33	15	2	2	17.5		391737.70
01/01	4305	17.0	64	34	4	2	5.5	10.9	2.0	11.0	10000	1.6	3.0	2.8	300	1	33	66	76	42	28	17	2	1	17.5		394711.59
02	4305	17.0	52	24	6	4	10	11.0	1.0	12.2	9000	1.6	3.6	3.2	350	1	33	66	60	36	26	15	3	2	17.0		408568.61
03	4305	17.0	60	29	5	4	8	10.8	1.0	12.2	9000	1.6	3.4	3.4	320	1	34	65	68	39	26	17	2	1	17.0		413195.73
04	4305	17.0	66	32	5	4	8	10.8	1.0	12.0	9000	1.5	3.2	3.4	300	1	34	65	72	42	30	18	2	1	17.0		413975.67
05	4305	17.0	65	32	5	4	8	10.8	1.0	12.0	9000	1.6	3.2	3.4	300	1	34	65	74	42	29	17	2	2	17.0		413975.67
06	4305	17.0	68	32	4.5	3	10	10.8	1.0	11.6	9000	1.6	3.2	3.5	300	1	34	65	73	41	30	18	3	2	17.0		414117.63
07	4305	17.0	70	35	3.5	3	10	10.8	1.0	11.1	9000	1.2	3.2	3.4	280	1	34	65	77	42	31	18	2	2	17.0		417098.79
08	4305	17.0	68	32	3.5	3	10	10.8	1.0	11.4	9000	1.4	3.2	3.4	280	1	34	65	71	39	28	17	2	2			417098.79
09	4305	17.0	60	30	35	3	9	10.8	1.0	11.8	9000	1.2	3.0	3.4	280	1	34	65	67	37	26	17	2	1	17.0		421456.83
10	4305	17.0	76	33	7	3	10	10.8	1.0	11.8	9000	1.5	3.1	3.4	280	1	34	65	80	47	31	19	2	2			426296.10
11	4305	17.0	58	28	4	2	5	10.8	1.0	12.0	10000	1.4	3.0	3.2	280	1	34	65	64	36	23	15	2	1	17.0		430922.88
12	4305	17.0	68	28	3	2	4.5	10.8	1.0	12.0	10000	1.1	2.1	2.0	280	1	34	65	–	–	–	–	–	–	17.0		435685.26
13	4305	17.0	64	35	4	2	5	10.8	1.0	12.0	10000	1.1	2.8	3.0	300	1	33	66	78	43	29	16	2	1	17.0		435711.36

DATE SPUD: DATE T.D.: COST:

6" TESTING

DRESSER

DAILY MUD PROPERTIES

Norsk Hydro,
Well : 30/7-8 Re-entry

PAGE 5

1982 DATE	Meters DEPTH	WT.	VIS Ltr SEC.	CORR. 115°F PV	CORR. 115°F YP	GELS 0	GELS 10	pH BECK ☒ STRIP ☐	FLUID LOSS 100 PSI API	FLUID LOSS 500 PSI 300 °F HT-HP	CL ☒ CACL ☐ NACL ☐	ALKALINITY PF	ALKALINITY PM	ALKALINITY MF	CA ppm	RETORT % OIL	RETORT % SOL	RETORT % WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC	·	$ TOTAL MUD COST
14/01	4305	17.0	74	35	4	3	7	10.7	2.8	12.0	10000	1.2	2.8	3.2	300	1	34	65	78	43	29	16	2	1	17.0		436563.22
15	4305	17.0	74	35	4	3	7	10.7	2.8	12.0	10000	1.2	2.8	3.2	300	1	34	65	78	43	29	16	2	1	17.0		437733.13
16	4305	17.0	72	34	5	4	8	10.7	2.6	12.0	10000	1.1	2.6	3.0	300	1	34	65	78	44	30	17	2	1	18.0		437733.13
17	4305	17.0	72	34	5	4	8	10.7	2.6	12.0	10000	1.1	2.6	3.0	300	1	34	65	78	44	30	17	2	1	18.0		437733.13
18	4305	17.0	73	34	5	4	8	10.7	2.6	12.0	10000	1.1	2.6	3.0	300	1	34	65	78	44	30	17	2	1	18.0		437733.13
19	4305	17.0	73	34	5	4	8	10.7	2.6	12.0	10000	1.1	2.6	3.0	300	1	34	65	78	44	30	17	2	1	18.0		437733.13
20	4305	17.0	55	32	4	3	8	10.5	3.4	15.6	10500	1.0	2.4	2.8	240	1	34	65	72	40	28	17	2	2	17.0		439700.69
21	4305	17.0	54	31	4	2	7	10.6	4.2	-	10500	1.2	2.8	3.0	240	1	34	65	70	39	26	16	2	1	17.0		442397.93
22	3676	11.7	38	7	2	1	4	10.0	-	-	-	-	-	-	-	-	12	88	18	11	7	4	1	0	-		444941.54
23	-	11.7	36	7	2	1	4	10.0	-	-	-	-	-	-	-	-	12	88	18	11	7	4	1	0	-		444941.54

DATE SPUD: DATE T.D.: COST:

SECTION D

WELL TESTING

RFT RESULTS

WELL: 30/7-8

PHASE I, RUN I

	DEPT (m)	FORM. PRESS (PS)	REMARKS
1/1	4067 m	11284 m	Good perm.
2/1	4068.5 m	11285 m	—»—

PHASE II, RUN I

1/1	4059.5 m	11.276 m	Good perm.
2/1	4059.5 m	11289 M	—»—
3/1	4059.5	11294 m	—»—
4/1	4063.0	11295 m	—»—
5/1	4065.5 m	11297 m	Sample
6/1	4068.0 m	11301 m	Good perm.
7/1	4074.0 m	11304 m	—»—
8/1	4074.0 m	11308 m	—»—
9/1	4077.5 m	11308 m	—»—
10/1	4083.5 m	11332 m	—»—
11/1	4065.5 m	11300 m	—»—
12/1	4059.5 m	11298 m	—»—
13/1	4062.0 m	11300 m	—»—
14/1	4106.5	11333 m	Low perm.
15/1	4105.0 m	11332 m	—»—
16/1	4133.5 m	11361 m	Good perm.
17/1	4137.0 m	11366 m	—»—
18/1	4137.0 m	11371 m	—»—
19/1	4142.0 m	11378 m	—»—
20/1	4144.0 m	11380 m	—»—
21/1	4196.5 m	11739 m	Low perm.
22/1	4224.5 m	11523 m	—»—
23/1	4284.0 m	11615 m	—»—
24/1	4196.5 m	11744 m	—»—

PHASE II, RUN II

	DEPTH (m)	FORM. PRESS (Psi)	REMARKS
1/2	4068.0	11315	Good perm.
2/2	4062.0	11315	—»—
3/2	4065.6	11317	—»—
4/2	4074.0	0	Seal Failure
5/2	4074.0	11327	Good perm.
6/2	4105.0	11350	Sample

PHASE II, RUN 3

1/3	4487.5	0	Tight
2/3	4492.0	0	Seal failure
8/3	4503.5	0	Tight
4/3	4509.0	12707	Low perm.
6/3	4518.0	0	Tight
6/3	4488.0	0	—»—
7/3	4495.5	0	—»—
8/3	4494.0	0	Seal failure
9/3	4525.0	0	Tight
10/3	4528.0	0	Tight
11/3	4528.5	12742	Low perm.
12/3	4577.5	0	Tight
13/3	4578.5	12424	Low perm.
14/3	4612.0	12303	—»—
15/3	4617.5	12676	—»—
16/3	4664.0	12370	—»—
17/3	4719.0	12760	—»—
18/3	4612.0	0	Tight
19/3	4617.5	0	—»—
20/3	4616.5	0	Seal failure
21/3	4526.5	0	Tight
22/3	4526.0	0	Seal failure
23/3	4521.0	0	Tight
24/3	4505.0	0	Seal failure
25/3	4497.0	0	Seal failure

5/1 Took segregated sample at 4105 m.
2 3/4 gal chamber: opening pressure 3900 psi, recovered approx 1 liter condensate and 1 litre mud filtrate.
I gal chamber (lab): opening pressure 45 psi, recovered 44 litres gas. 950 cc of 41.4° AP1 condensate and 1500 cc filtrate.

6/2 Took segregated sample at 4105 m.
2 3/4 gal chamber: opening pressure 400 psi, recovered 0.2 cuft gas, 10.5 litres water/filtrate, trace condensate
1 gal. chamber (lab): opening pressure 35 psi, recovered 6 litres filtrate, 6 litres gas.

DST RESULTS

WELL
30/7-8 II

DST# 1 d

PERFORATED INTERVAL:	4064 - 4070 m
CHOKE:	32/64"
GAS RATE:	21.81 MM SCF/D
GAS GRAVITY:	0.679
CONDENSATE RATE:	3008 BBL/D
CONDENSATE GRAVITY:	41.3° API
GOR	7250 SCF/SB
WHP:	5476 PSIG
BHT	289° F
B.S. + W:	0
H2S:	0
CO2:	2.3%

LIST OF CONTENTS

SECTION D

1. REPEAT FORMATION TESTING (RFT)

1.1 Summary of events

Run no. 1, 9/11-81 (Brent fm), 8 3/8" hole: 24 tool settings/pressure tests attempted (test nos. 1 - 24), from 4059.5 m to 4284 m, plus segregated sampling at 4065.5 (2 3/4 gal + 1 gal chambers).

Run no. 2, 9/11-81 (Brent fm), 8 3/8" hole: 6 tool settings/pressure tests attempted, (test nos. 25 - 30), from 4062.0 m to 4105.0 m, plus segregated sampling at 4105.0 m (2 3/4 gal + 1 gal chambers).

Run no. 3, 23/12-81 (Statfjord fm), 6" hole: 25 tool settings/pressure tests attempted (test nos. 31 - 55), from 4425.0 m to 4719.0 m. No sampling attempted.

The pressure recordings are tabulated in

Table no. 1.1 for run 1
Table no. 1.2 for run 2
Table no. 1.3 for run 3

Plots of formation pressure vs. depth in fig. 1.1 for all surveys.

Plots of formation pressure vs. depth in fig. 1.2 for Top Brent only.

1.2 Comments on pressure surveys

Run no. 1

As can be seen from fig. 1.1 several settings were made at same depth to try to stabilize the pressure gauge. In spite of this, the pressure recordings seem to be

affected by the hostile environment (high temperature & pressure), and also by varying degree of supercharging.

However, by drawing "max" and "min" gradients through the points of presumably the best quality, one can conclude that H.C. - W.C. is at 4112+-5 mRKB. Detailed plot of this on fig. 1.2. This depth of contact is then in agreement with log interpretation.

Run no. 2

This was a second sampling run after run 1, note that to tie this run in with run 1 it is necessary to subtract 15 psi on all pressures.

Run no. 3

The entire survey is affected by tight or very low permeability formations. The pressures are probably far too high in places, due to supercharging effects or seal failures.

As can be seen from fig. 1.2 no clear gradients can be established due to the poor reservoir characteristics of these deep sands.

1.3 Comments on sampling

Two segregated sampling attempts were performed in top Brent fm to check on H.C.-type and composition.

RESULTS

Segregated sample no. 1 at 4065.5 mRKB:

2 3/4 gal.: drained on rig floor, opening pressure: 3900 psig at $T_{surface}$. Gas meter: mal-functioning, but considerable amount of gas escaped.
Oil/Cond.: Approx 1000 cc of 40° API.
Filtrate/Water: Approx 1000 cc
Checked chlorides: 11 000 ppm
Mud filtrate (PIT): 11 000 ppm

1 gal.: PVT-sample sent to Core-Lab, Aberdeen.

Segregated sample no. 2 at 4105.0 mRKB:

2 3/4 gal.: drained on rig floor, opening press.: 400 psig at $T_{surface}$. Gas meter: 0.2 cu.ft. Filtrate/water: approx. 10.5 litres. Oil/Cond: trace (film)
Checked chlorides: - 12 000 ppm

1 gal.: PVT-sample sent to Core-Lab, Aberdeen.

Results from analyses by Core-Lab are shown in appendix A 1.1. As can be read in this, both chambers had unfortunately developed a leak upon reaching Core-Lab and most of the gas had escaped. Consequently the analyses were of little use as to res. fluid composition. At the time of analyses it was important to get an idea of producing GOR, as the well was to be tested shortly after. In this respect it was particularly unfortunate that the chambers had leaked. However, by making the assumption that the empty volume in the 1 gal chamber had been filled with gas-condensate fluid at reservoir conditions at the time of sampling, one could estimate a GOR of approx. 5000 scf/bbl. This information was taken into account when designing the test, and a test GOR of 7700 ref/bbl did not come as a complete surprise.

Table 1.1

WELL 30/7-8 II ,RFT RUN 1, BRENT FM.

TEST NO	DEPTH MRKB	PHI PSIG	PF PSIG	PHA PSIG	REMARKS
1	-4059.5	11599	11276	11582	GOOD PERM.
2	-4059.5	11600	11289	11591	GOOD PERM.
3	-4059.5	11604	11294	11598	GOOD PERM.
4	-4063.0	11604	11295	11600	VERY GOOD PERM.
5	-4065.5	11614	11297	11544	PRE-TEST/VERY GOOD PERM.
5	-4065.5	11614	11247	11544	2 3/4 GAL. SAMPLE
5	-4065.5	11614	11238	11544	1 GAL. SEGREGATED SAMPLE
6	-4068.0	11612	11301	11611	GOOD PERM.
7	-4074.0	11631	11304	11629	GOOD PERM.
8	-4074.0	11639	11308	11635	GOOD PERM.
9	-4077.5	11640	11308	11638	GOOD PERM.
10	-4083.5	11661	11320	11658	GOOD PERM.
11	-4065.5	11601	11300	11602	VERY GOOD PERM.
12	-4059.5	11589	11298	11588	GOOD PERM.
13	-4062.0	11601	11300	11601	VERY GOOD PERM.
14	-4106.5	11746	11333	11744	LOW PERM.
15	-4105.0	11732	11332	11729	LOW PERM.
16	-4133.5	11830	11361	11825	VERY GOOD PERM.
17	-4137.0	11817	11366	11814	VERY GOOD PERM.
18	-4137.0	11816	11371	11814	VERY GOOD PERM.
19	-4142.0	11824	11378	11821	GOOD PERM.
20	-4144.0	11824	11380	11827	GOOD PERM.
21	-4196.5	12024	11739	12015	LOW PERM.
22	-4224.5	12110	11523	12100	LOW PERM
23	-4284.0	12303	11615	12291	LOW PERM.
24	-4196.5	11964	11744	11960	LOW PERM.
					TEMP. CORR. = +1 TO 0 PSI CORR. APPLIED
					MAX RECORDED TEMP. = 261 DF

PHI = INITIAL HYDROSTATIC PRESSURE
PF = FORMATION PRESSURE
PHA = HYDROSTATIC PRESSURE AFTER TEST

Table 1.2

WELL 30/7-B II (RFT RUN 2) BRENT FM.

TEST NO	DEPTH MRKB	PHI PSIG	PF PSIG	PHA PSIG	REMARKS
25	-4068.0	11570	11315	11574	GOOD PERM.
26	-4062.0	11574	11315	11572	GOOD PERM.
27	-4065.5	11567	11317	11567	GOOD PERM.
28	-4074.0	11587	00000	00000	SEAL FAILURE
29	-4074.0	11577	11327	11598	GOOD PERM.
30	-4105.0	11693	11350	11662	PRE-TEST/GOOD-LOW PERM.
30	-4105.0	11693	11341	11662	2 3/4 GAL. SAMPLE
30	-4105.0	11693	11343	11662	1 GAL. SEGREGATED SAMPLE
					PRESSURES RECORDED ARE 15 PSI TOO HIGH, NO CORR. APPLIED TO THIS TABLE.
					MAX RECORDED TEMP. = 262 DF

PHI = INITIAL HYDROSTATIC PRESSURE
PF = FORMATION PRESSURE
PHA = HYDROSTATIC PRESSURE AFTER TEST

Table 1.3

WELL 30/7-8 II /RFT RUN 3/ STATFJORD FM.

TEST NO	DEPTH MRKB	PHI PSIG	PF PSIG	PHA PSIG	REMARKS
31	-4487.5	12922	00000	12928	TIGHT
32	-4492.5	12929	00000	12934	SEAL FAILURE
33	-4503.5	12956	00000	12958	TIGHT
34	-4509.0	12968	12707	12968	V.LOW PERM. OR SEAL FAILURE?
35	-4518.0	12993	00000	12995	TIGHT
36	-4488.0	12910	00000	00000	TEST ABORTED
37	-4495.5	12929	00000	00000	TEST ABORTED
38	-4494.0	12924	00000	12921	SEAL FAILURE
39	-4525.0	13010	00000	00000	TEST ABORTED
40	-4528.0	13021	00000	00000	TEST ABORTED
41	-4528.5	13020	12742	13019	V.LOW PERM. OR SEAL FAILURE?
42	-4577.5	13158	00000	13153	TIGHT
43	-4578.5	13162	12424	13155	V.LOW PERM. OR SEAL FAILURE?
44	-4612.0	13253	12303	00000	V.LOW PERM./TEST ABORTED
45	-4617.5	13266	12676	13266	V.LOW PERM. OR SEAL FAILURE?
46	-4664.0	13402	12370	13399	V.LOW PERM. OR SEAL FAILURE?
47	-4719.0	13553	12760	13548	V.LOW PERM. OR SEAL FAILURE?
48	-4612.0	13244	00000	13245	TIGHT
49	-4617.5	13264	00000	13264	TIGHT
50	-4616.5	13258	00000	12255	SEAL FAILURE
51	-4526.5	13006	00000	00000	TEST ABORTED
52	-4526.0	13005	00000	12999	SEAL FAILURE
53	-4521.0	12983	00000	12986	TIGHT
54	-4505.0	12947	00000	12948	SEAL FAILURE
55	-4497.0	12923	00000	12923	SEAL FAILURE
					TEMP. CORR. = N/A
					NO CORR. APPLIED
					MAX RECORDED TEMP. = 304 D F

PHI = INITIAL HYDROSTATIC PRESSURE
PF = FORMATION PRESSURE
PHA = HYDROSTATIC PRESSURE AFTER TEST

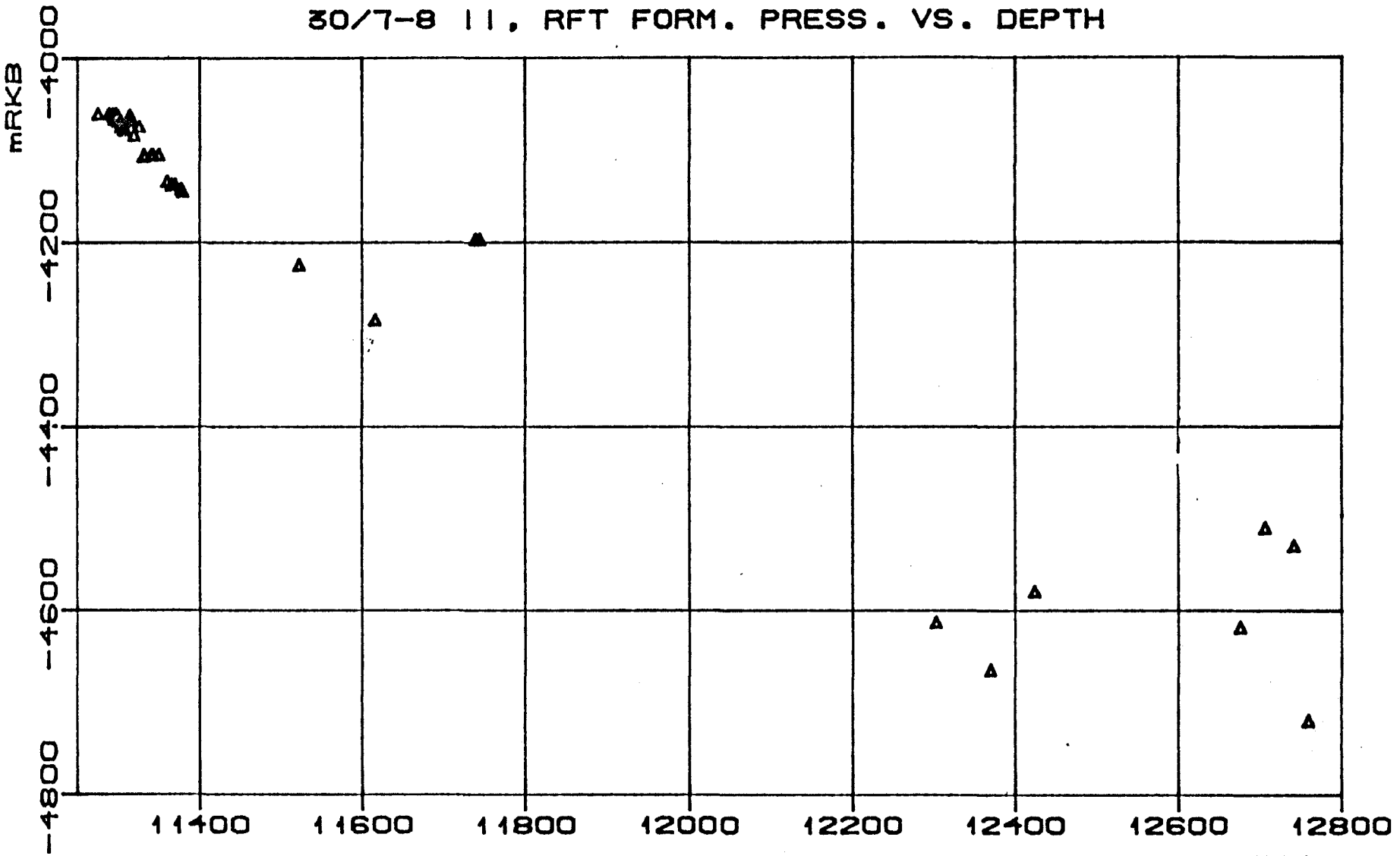
30/7-8 11, RFT FORM. PRESS. VS. DEPTH
mRKB
-4000
-4200
-4400
-4600
-4800
11400
11600
11800
12000
12200
12400
12600
12800
PSIg

fig 1.1

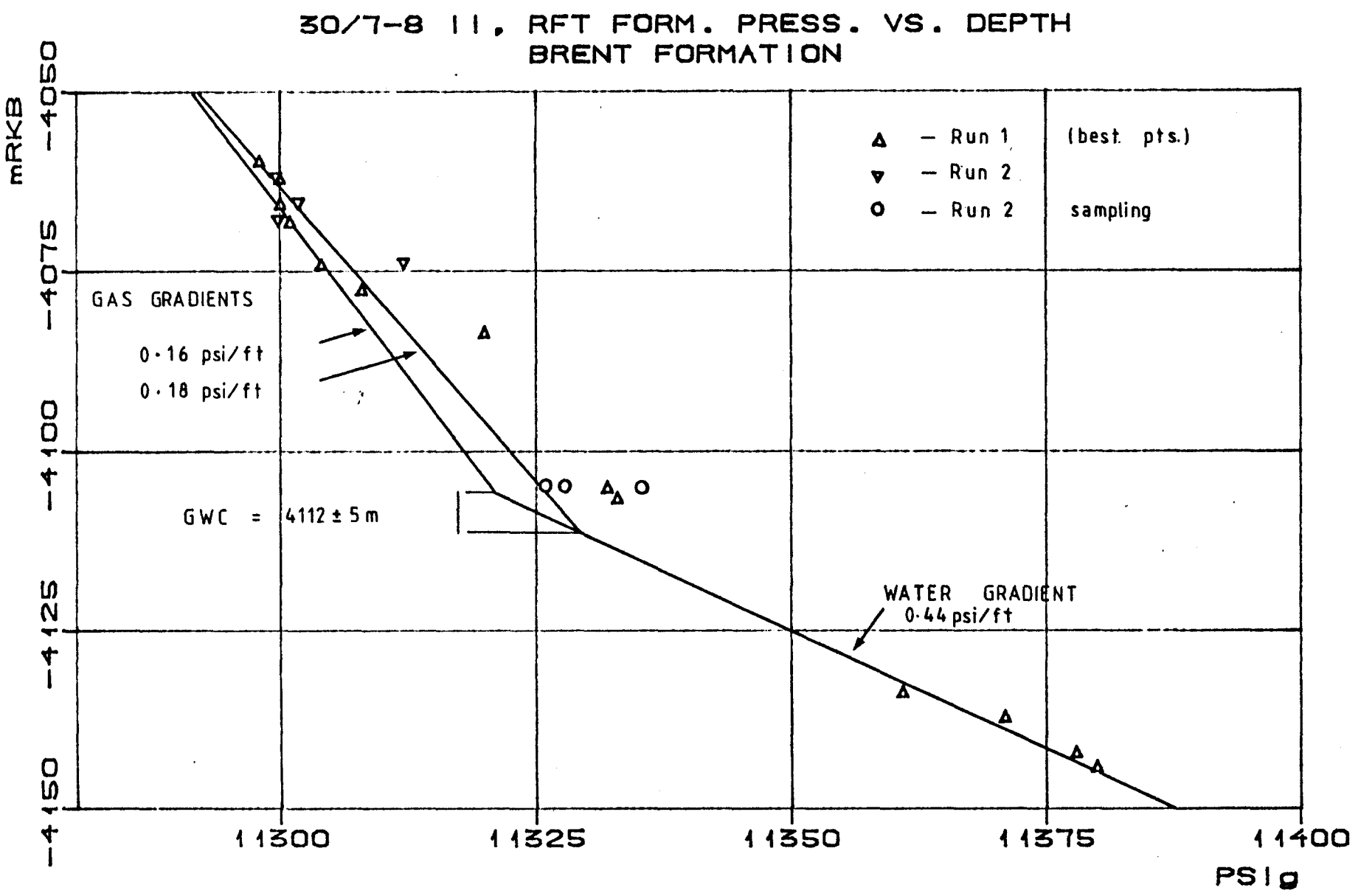
30/7-8 II, RFT FORM. PRESS. VS. DEPTH
BRENT FORMATION
mRKB
-4050
-4075
-4100
-4125
-4150
11300
11325
11350
11375
11400
PSIg
Δ — Run 1 (best pts.)
▼ — Run 2
O — Run 2 sampling
GAS GRADIENTS
0·16 psi/ft
0·18 psi/ft
GWC = 4112 ± 5 m
WATER GRADIENT
0·44 psi/ft

fig. 1.2

CORE LABORATORIES UK LTD.
Petroleum Reservoir Engineering
ABERDEEN, SCOTLAND

Appendix A 1.1

File RFLA 81248

RFT RECOVERY DATA

RFS AD 1170

Opening pressure at 62°F = 45 psig 1 gal. @ 4065.5 mRKB

Total Recovery: 44 standard litres of gas
950cc condensate liquid of 41.4 Api
1550cc of water

RFS AD 1197

Opening pressure at 62°F = 35 psig 2 3/4 gal. @ 4105 mRKB

Total Recovery: 6 standard litres of gas
2800cc of water

2 PRODUCTION TESTING

2.1 INTRODUCTION

In January 1982 one sandstone zone was production tested with the following objectives:

- to obtain representative fluid samples
- to determine reservoir productivity
- to verify reservoir properties

This report summarizes the data gathered during the test and presents the results from the analysis of the data.

All depths are with reference to the LDT/CNL log depths and are measured RKB.

2.2 SUMMARY

Test interval: 4064 - 4070 m.

Main flow period: 25 hours
Main shut in period: 36 hours

The test operations are listed in appendix, A 2.1.

Average test data recorded during main flow period:

Gas rate	MMSCF/D	21.81
Condensate rate	STB/D	3008
Separator gas-oil ratio	SCF/STB	7250
Wellhead pressure	PSIG	5476
Wellhead temperature	^{o}F	159
Choke size	1/64"	32
Gas gravity	Air = 1	0.679
Condensate gravity	^{o} API	41.3
Separator pressure	PSIG	960
Separator temperature	^{o}F	135
B.S. & W.	%	NIL
CO_2	%	2.3
H_2S	%	NIL

The recorded test data vs time is plotted in figs. 2.1 to 2.4.

2.3 Results and conclusions

The analysis of the test data has given the following results:

kh	md-ft	1250
k	md	21
Skin	dimensionless	0.5
P	PSIG	11269.4
P*	PSIG	11219.1
T-MAX (B.H.)	^{O}F	293
REF DEPTH (P ,P*)	m	4048.5

The test permeability of 21 md is somewhat low compared to the core permeabilities.

The reservoir pressure behaviour during the test indicates a limited size of the reservoir. Pressure drawdown analysis as well as estimations based on the observed difference in initial and final extrapolated static pressure indicate the following gas in place reserves:

$$\text{GIIP: } 0.1 \times 10^{9} \text{ Sm}^{3}$$

Compared with the information gathered when drilling well no. 1 it is believed proven that the re-entry well is only 40 - 50 ft from a pinch-out. This is based on the change in pay-thickness from the first well to the re-entry well. Since the well is so close to a pinch-out, the first theoretical straight line on the Horner plot might be missing. The first straight line on the actual Horner plot might in fact be 2 (or more) times the theoretical value describing the formation permeability. Consequently the calculated test permeability from the first straight line on the actual Horner plot might only be a half (or a fraction) of what

should be the real permeability of the formation. This might explain the discrepancy between the test and core permeability. Furthermore looking at later times on the Horner plot, the test also confirms that the reservoir is severely bounded. All these effects combined with some leakage in the downhole tester valve during final build up, distort the build-up curve very badly, so that the results from this analysis are not very conclusive.

The parameters used in the above calculations are listed in appendix A 2.2, and the build up curves are shown on figs. 2.5 to 2.7.

2.4 Pressure analysis technique

Method of analysis used was originally conventional Horner-analysis. Because of the distortion of the build up curve, type-curve analysis was also applied. (Ref. S.P.E. 8205). Both methods gave results within the same range as given above.

History-matching/reservoir-simulation was also tried in order to find out more about the size, shape and dip of the reservoir. This was not successful due to lack of enough information about the reservoir.

2.5 Sampling

During main flow 3 sets of separator recombination samples and 5 x 25 ltr stock-tank fluid samples were taken.

APPENDIX A 2.1

SEQUENCE OF EVENTS
DST1D, WELL 30/7-8II

DATE	TIME	EVENT
04.01.82	18.35	Perforated DST-interval
05.01.82	ca.04.00	Doing 4 test attempts, but none were
16.01.82	ca.19.00	successful
16.01.82	20.00	Start running in with the test string
17.01.82	20.31	Open the APR-N tester valve
	20.34	Open choke manifold on 8/64" adj. choke
	20.38	Shut in choke manifold and leave APR-N tester valve open
	21.46	Increase to 24/64" adj. choke
	21.50	Increase to 24/64" adj. choke
	22.00	Increase to 32/64" fixed choke
	22.31	Bypassed heater
	23.13	Flow directed through separator
	23.25	Bypass separator, back-pressure valve is not working satisfactorily
	23.30	Start injecting glycol in S.S.T.T
18.01.82	01.15	Start flowing through separator
	03.12	Bypass separator, orifice box leaking
	04.12	Flowing through separator
	05.16	Bypass separator to change orifice-plates
	05.36	Flowing through separator
	05.46	Bypass separator
	06.04	Flowing through separator
	06.17	Bypass separator, depressurize and purge all control and sensor lines, flush out orifice meter, calibrate Barton meter
	06.42	Flow directed through separator
	07.46	Bypass separator to change orifice plate
	08.04	Flow through separator
	10.50	Slugs of mud and water to surface, liquid

		flowrates fluctuating
	15.05	Bypass separator, depressurize and dump fluid, re-purge control and sencor lines, repair liquid-flow meter, check back-pressure valve
	16.45	Flow directed through separator
	22.41	Bypass separator
	22.47	Shut-in APR-N tester valve. Bleed off excessive pressure in tubing
20.01.82	11.00	Proceed to kill the well

APPENDIX A 2.2

Parameters used in pressure build-up calculations:

h_{net}	m	18
m	psi/cycle	66
tp	hrs	25
Bg	m^3/Sm^3	3.27×10^{-3}
C_t	psi^{-1}	3.37×10^{-5}
μ	cp	0.043
r_w	ft	0.258
ϕ	%	17
P_{1hr}	psig	10950
P_{wf}	psig	10531