

M U D C O N T R O L
=====

WELL SUMMARY

BP well 7/12-3 was spudded April 5th, 1977. 36" hole was drilled to 174 m and 30" casing run and cemented. A 36" hole was drilled to 460 m and 20" casing run and cemented. During these phases no notable problems were encountered.

Drilled out of 20" casing with a 17½" bit. A lime Drispac mud was formulated and used during this and all subsequent sections. From approximately 800 m to the end of this interval at 1679 m gumbo was abundant and proved troublesome. Heavy mud losses were incurred over riser and from the flow line when it was plugged by gumbo. Heavy water dilution and building of new mud was necessary during this interval to maintain volume due to losses during unplugging operations. The mud cost during this interval was above projected because of the subsequent chemical and barite additions. 13-3/8" casing was set at 1679 m and cemented.

A 12-1/4" hole was drilled out below the 13-3/8" casing. This section of hole was drilled with no major problems. Hard formations caused slow penetration rates. This interval from 1679 m to 3575 m was drilled in 25 days giving a penetration rate of 75.8 metres/day. No casing was run.

An 8½" rat hole was drilled out below the 12-1/4" hole. At these depths (below 10,000') temperature problems often arise. High temperature, high pressure fluid loss tests were conducted twice daily to simulate down-hole conditions and spot possible problems. Resinex additions were started at a depth of 3,300 m and maintained until T.D. at 3710 m. Resinex was lowering HT-HP values to 15 cc per 30 minutes at 300° F and 500 psi pressure. At 3612 m coring was begun and continued to 3630 m, cores were retrieved with 100% recovery. At this depth there was a tendency of torque and drag. And on trips from 3630 m to T.D. 3710 m there was 60,000 - 100,000 lbs. overpull.

On May 28th T.D. was reached. Schlumberger then started their logging programme and on June 3rd the 7/12-3 well was plugged back ready to sidetrack below 13-3/8" casing and drill well 7/12-3A.



WELL DATA SHEET

MAG-545-A

PAGE 1

OPERATOR BP Pet. Dev. of Norway A/S		SURVEY SEC. T R		CASING SIZE 30"		DEPTH 169 m.		DRLG. DAYS 1		BIT SIZE 36"	
WELL 7/12-3		FIELD North Sea		SURFACE 20"		460 m.		5		26"	
CONTRACTOR Rowan (NOR-101) Inc.		COUNTY		INTERMEDIATE 13-3/8"		1679 m.		9		17-1/2"	
ENGINEER Strand/Hilton/O'Hara/Tangen		STATE		COUNTRY Norway		PRODUCTION					

DATE	m DEPTH	WT.	VISCOSITY		CORR. 115°F		GELS		pH		FLUID LOSS		CL <input checked="" type="checkbox"/>			ALKALINITY			RETORT			ACTIVITY		RATIO		# Bbl CEC
			SEC.	CPS.	PV	YP	0	10	BECK <input type="checkbox"/> STRIP <input type="checkbox"/>	100 PSI API	500 PSI 300 °F HT-HP	CACL <input type="checkbox"/>	NACL <input type="checkbox"/>	PF	PM	MF	CA ppm	Mg ppm	% OIL	% SOL	% WATER	As	Am	OIL	H2O	
5-4		1.05	130																							
6-4		1.05	130																							
7-4		1.05	130																							
8-4	176	1.05	150																							
9-4	176	1.06	200																							
10-4	176	1.06	60																							
11-4	254	1.10	50						10.0	18.0																2.0
12-4		1.12	85						10.0	18.0																2.0
13-4		1.12	85						10.0	18.0																2.0
14-4		1.26																								Excess Lime
15-4		1.29	37		10	5	1	1	11.5	5.4		18.000	4.5	11.1		360			5	95.0					1.65	
16-4		1.30	48		18	10	0	2	11.5	8.5		18.000	4.5	11.1		120			5	95.0					1.65	
17-4		1.33	47		21	18	1	2	11.5	5.0		23.000	2.6	11.1		320			9	91.0					2.13	
18-4	977	1.34	60		26	18	2	6	12.0	5.6		22.000	4.0	14.0		180			12	88.0					2.5	
19-4	1098	1.35	47		30	20	1	3	11.5	4.5		22.000	4.0	14.0		240			9	91.0					2.5	
20-4	1289	1.38	47		30	15	1	4	11.5	4.5		24.000	3.8	13.8		200			11	89.0					2.5	
21-4	1500	1.41	49		30	15	1	4	11.5	6.0		22.000	3.2	12.5		200			11	89.0					2.35	
22-4	1596	1.42	47		25	18	1	4	11.5	5.6		22.000	3.6	11.8		200			11	89.0					2.2	
23-4	1676	1.45	49		18	15	1	4	12.0	6.1		22.000	4.2	12.0		240			12	88.0					2.38	
24-4	1679	1.49	55		20	15	1	4	12.0	5.8		22.000	3.8	12.0		220			13	87.0					2.50	
25-4	1679	1.45	55		20	15	1	4	12.0	5.6		22.000	3.8	13.0		220			13	87.0					2.45	
26-4	1679	1.45	47		22	15	1	4	12.0	5.8		22.000	3.5	13.0		250			13	87.0					2.59	
27-4	1820	1.46	53		25	19	1	5	12.0	6.0		20.000	2.9	14.0		320			13	87.0					3.0	
28-4	2069	1.48	47		12	9	1	5	12.0	7.5		22.000	2.5	13.5		420			13	87.0					2.9	
29-4	2225	1.50	53		13	8	1	6	12.0	7.8		22.000	2.5	15.0		460			13.5	86.5					3.3	
30-4	2490	1.51	49		15	10	1	4	12.0	8.2		23.000	3.0	12.5		280			14.0	86.0					2.9	

DATE SPUD: 5-4-77 DATE T.D.: 3-6-77 B.H.T. COMPLETION FLUID TYPE: COST: 20

PACKER MUD TYPE: COST:

WELL DATA SHEET

MAG-545-A

PAGE 1

OPERATOR BP Pet. Dev. of Norway A/S	SURVEY SEC. T R	CASING SIZE 30"	DEPTH 169 m	DRLG. DAYS 1	BIT SIZE 36"
WELL 7/12-3	FIELD North Sea	SURFACE 20"	460 m	5	26"
CONTRACTOR Rowan (NOR-101) Inc.	COUNTY	INTERMEDIATE 13-3/8"	1679 m	9	17-1/2"
ENGINEER Strand/Hilton/O'Hara/Tangen	STATE	COUNTRY Norway	PRODUCTION		

DATE	DEPTH	WT.	VISCOSITY		CORR. 115°F		GELS		pH	FLUID LOSS			CL <input checked="" type="checkbox"/>	ALKALINITY			CA ppm	Mg ppm	RETORT			ACTIVITY		RATIO		# Bbl
			SEC.	CPS.	PV	YP	0	10		100 PSI API	500 PSI 300 °F HT-HP	BECK <input type="checkbox"/>		STRIP <input type="checkbox"/>	PF	PM			MF	% OIL	% SOL	% WATER	As	Am	OIL	
1-5	2698	1.51	51		17	13	1	4	12.0	7.0		21.000	2.7	11.8		320		14	86					2.2		
2-5	2759	1.53	47		15	12	1	10	12.5	6.0		21.000	2.8	11.8		320		15	85					2.25		
3-5	2812	1.53	49		10	11	2	15	12.0	7.2		23.000	2.1	11.8		400		16	84					2.4		
4-5	2904	1.55	45		15	5	1	10	12.0	6.8		21.000	3.7	13.2		240		16	84					2.4		
5-5	2929	1.55	46		13	10	1	11	12.0	6.4		21.000	3.0	13.1		320		16	84					2.5		
6-5	2953	1.55	47		17	14	2	10	12.0	6.2		21.000	2.5	12.0		440		16	84					2.3		
7-5	3039	1.55	43		15	9	1	6	12.5	6.4		21.000	2.4	14.5		320		17	83					3.3		
8-5	3090	1.55	43		15	13	1	6	12.5	6.2		21.000	2.6	13.0		240		17	83					2.8		
9-5	3151	1.55	45		18	14	1	7	12.5	6.2		21.000	2.9	14.0		280		17	83					3.0		
10-5	3188	1.55	46		18	14	1	5	13.0	6.2		23.000	4.2	15.0		220		17.5	82.5					5.3		
11-5	3209	1.55	47		19	15	1	5	13.0	6.4		23.000	2.9	15.0		240		17.5	82.5					3.2		
12-5	3250	1.55	52		15	10	1	5	12.5	5.0		23.000	2.4	13.5		320		17.5	82.5					3.0		
13-5	3301	1.55	45		18	11	1	5	12.5	5.0		23.000	1.8	12.0		350		17.5	82.5					3.1		
14-5	3328	1.55	47		20	15	1	4	12.0	4.5	18.0	21.000	2.1	11.1		400		17.0	83					2.5		
15-5	3360	1.55	50		17	13	0	4	12.5	4.0	18.0	23.000	2.1	12.5		400		18	82					2.6		
16-5	3390	1.55	47		20	15	1	4	12.0	3.5	18.0	21.000	3.1	12.0		320		17	83					2.2		
17-5	3406	1.55	50		23	14	1	4	12.5	3.5	18.0	23.000	2.9	12.5		240		18	82					2.4		
18-5	3452	1.55	51		21	16	1	3	12.5	3.9	16.0	23.000	2.8	12.7		320		18	82					2.4		
19-5	3477	1.55	50		23	14	1	3	12.0	3.2	16.0	23.000	2.8	11.8		320		18	82					2.25		
20-5	3522	1.55	47		22	18	1	3	12.0	3.2	14.0	23.000	2.8	12.2		320		18	82					2.3		
21-5	3575	1.55	50		21	15	0	4	12.5	3.6	15.0	23.000	2.5	13.5		320		18	82					2.5		
22-5	3587	1.55	55		22	18	1	5	12.5	3.8	16.0	23.000	2.5	13.5		320		18.5	81.5					2.9		
23-5	3597	1.55	50		22	18	1	5	12.5	3.6	16.0	23.000	2.5	13.5		320		18.5	81.5					2.9		
24-5	3612	1.55	49		22	17	1	5	12.5	3.8	21.0	23.000	2.5	13.5		300		19.0	81					2.9		
25-5	3630	1.55	53		21	18	1	5	12.5	3.8	20.0	23.000	2.0	12.5		210		20.0	80					2.8		
26-5	3650	1.55	53		23	19	1	6	12.0	3.8	20.0	23.000	2.0	12.0		200		20.0	80					2.7		
27-5	3695	1.55	57		25	21	1	7	12.5	3.8	19.5	23.000	2.0	12.0		180		20.0	80.0					2.7		

DATE SPUD: 5-4-77 DATE T.D.: 3-6-77 B.H.T. COMPLETION FLUID TYPE: COST: PACKER MUD TYPE: COST: 21



WELL DATA SHEET



MAG-545-A

PAGE 1

OPERATOR BP Pet. Dev. of Norway A/s	SURVEY SEC. T R	CASING SIZE 30"	DEPTH 169 m	DRLG. DAYS 1	BIT SIZE 36"
WELL 7/12-3	FIELD North Sea	SURFACE 20"	460 m	5	26"
CONTRACTOR Rowan (NOR-101) Inc.	COUNTY	INTERMEDIATE 13-3/8"	1679 m	9	17-1/2"
ENGINEER Strand/Hilton/O'Hara/Tangen	STATE	COUNTRY Norway	PRODUCTION		

DATE	DEPTH	WT.	VISCOSITY		CORR. 115°F		GELS		pH	FLUID LOSS		CL <input checked="" type="checkbox"/> CACL <input type="checkbox"/> NACL <input type="checkbox"/>	ALKALINITY			CA ppm	Mg ppm	RETORT			ACTIVITY		RATIO		# Bbl
			SEC.	CPS.	PV	YP	0	10		100 PSI API	500 PSI 300 °F HT-HP		PF	PM	MF			% OIL	% SOL	% WATER	As	Am	OIL	H2O	
28-5	3710	1.55	58		24	19	1	6	12.5	3.8	19.0	23.000	2.3	12.2		220		20	80						2.7
29-5	3710	1.55	59		24	19	1	5	12.5	3.8	19.0	23.000	2.1	12.2		240		20	80						2.5
30-5	3710	1.55	58		24	19	1	6	12.5	3.5	19.0	23.000	2.3	12.2		240		20	80						2.5
31-5	3710	1.55	55		23	19	1	5	12.5	3.4	19.0	23.000	2.3	12.2		200		20	80						2.4
1-6	3710	1.55	65		22	19	1	7	12.5	3.3	19.0	23.000	2.2	12.2		220		20	80						2.5
2-6	3710	1.55	60		22	19	1	6	12.5	3.4	19.0	23.000	2.3	12.2		240		20	80						2.5
3-6	3710	1.55	75		22	18	1	6	12.5	3.0	19.0	23.000	3.0	12.0		500		20	80						2.2

DATE SPUD: 5-4-77 DATE T.D.: 3-6-77 B.H.T. COMPLETION FLUID TYPE: COST: 22

PACKER MUD TYPE: COST:

WELL DATA SHEET

MAG-545-1-A

PAGE 2

EQUIPMENT		MAKE		CHOKE (L.P.)		PVT							
DESANDER	<input checked="" type="checkbox"/>	MILCHEM		CHOKE (L.P.)	<input type="checkbox"/>	PVT	<input checked="" type="checkbox"/>						
DESILTER	<input checked="" type="checkbox"/>	MILCHEM		CHOKE (SUPER)	<input checked="" type="checkbox"/>	SWACO	FLOW SENSOR <input checked="" type="checkbox"/>						
CENTRIFUGE	<input checked="" type="checkbox"/>	SWACO		CLAYJECTOR	<input type="checkbox"/>		ROP <input checked="" type="checkbox"/>						
DEGASSER	<input checked="" type="checkbox"/>			FINE SCREEN	<input checked="" type="checkbox"/>		OTHER <input type="checkbox"/>						
							TOTAL MUD COST:	TOTAL DEPTH:					
MAGCOBAR	MAGCOGEL	SPERSENE	XP-20	CAUSTIC	SODA ASH DRISPAK REG.	LIME	RESINEX	DESCO	D-D	MAGCONOL DRISPAK S.L.	COST	TOTAL MUD COST	REMARKS
4-4													
5-4	140			4	4								
6-4													
7-4													
8-4													
9-4	104			3		1							
10-4													
11-4	79			2	2								
12-4	347	2		3									
13-4													
14-4				18	16	13	25						
15-4	7					2				6			
16-4		26				44				6			
17-4	73	14		4		24				16			
18-4	86	14		15	17	41	87	3		69			
19-4	108	5		44	29		92	1		81			
20-4	15	4		13	8		76	2		78			
21-4	268	1		18	14	1	75	2		56			
22-4	77	1		19	19	8	96	2		82			
23-4	40			7	11	3	25	1		21			
24-4	12						4			6			
25-4													
26-4													
27-4	68	20		8	8		53			43			
28-4	56	17		7	33			4		21			
29-4	21	14		4		11		1		25			
30-4	73	37		15			64	1		51			
FINAL COST													

23

WELL DATA SHEET

MAG-545-1-A

PAGE 2

EQUIPMENT		MAKE		CHOKE (L.P.)		PVT													
DESANDER	<input checked="" type="checkbox"/>	MILCHEM			<input type="checkbox"/>		<input checked="" type="checkbox"/>												
DESILTER	<input checked="" type="checkbox"/>	MILCHEM		CHOKE (SUPER)	<input checked="" type="checkbox"/>	SWACO	FLOW SENSOR	<input checked="" type="checkbox"/>											
CENTRIFUGE	<input checked="" type="checkbox"/>	SWACO		CLAYJECTOR	<input type="checkbox"/>		ROP	<input checked="" type="checkbox"/>											
DEGASSER	<input checked="" type="checkbox"/>			FINE SCREEN	<input checked="" type="checkbox"/>		OTHER	<input type="checkbox"/>											
								TOTAL MUD COST:	TOTAL DEPTH:										
	MAGCOBAR	MAGCOGEL	SPERSENE	XP-20	CAUSTIC	SODA	ASH	DRISPAC	REG.	DRISPAC	S.L.	LIME	RESINEX	DESCO	D-D	MAGCONOL	COST	TOTAL MUD COST	REMARKS
1-5	85	27			11	7		58		55									
2-5	28	41			13	1		31		45				1					
3-5	46	20			6	2		15		21				1					
4-5	62	41			15	9		51		72				3					
5-5	18	6			2			16		16				1					
6-5	50	10			7			34		27				1					
7-5	41	5			7	3	23			14				1					
8-5	47	3			14	6	14	21		30					1				
9-5	18.5				5		24			11					2				
10-5	49	3			14	6	10	20		31									
11-5	16	11			4		13			10									
12-5	12	31			3		27			11									
13-5	20	22			5		11	25		13	40								
14-5	24	13			7			31		10	28								
15-5	16	16			11	1		21		39	22								
16-5	23	19			11			30		25	19								
17-5	8	11			8			20		12	12								
18-5	15	1			1			21		20	15								
19-5	23	4			4			14		9									
20-5	15	13			9			24		18									
21-5	18				6			35		17	14								
22-5	6				3			8		5	10				1				
23-5	5				2			6		3	6								
24-5	21				3			3		3	5								
25-5	10				2					14									
26-5					4		11			3	38	17							
27-5	10				8		8			3	31	25							
FINAL COST																			

24

WELL DATA SHEET

MAG-545-1-A

PAGE 2

EQUIPMENT		MAKE		CHOKE (L.P.)		PVT											
DESANDER	<input checked="" type="checkbox"/>	MILCHEM		<input type="checkbox"/>			<input checked="" type="checkbox"/>										
DESILTER	<input checked="" type="checkbox"/>	MILCHEM		CHOKE (SUPER)	<input checked="" type="checkbox"/>	SWACO	FLOW SENSOR	<input checked="" type="checkbox"/>									
CENTRIFUGE	<input checked="" type="checkbox"/>	SWACO		CLAYJECTOR	<input type="checkbox"/>		ROP	<input checked="" type="checkbox"/>									
DEGASSER	<input checked="" type="checkbox"/>			FINE SCREEN	<input checked="" type="checkbox"/>		OTHER	<input type="checkbox"/>									
							TOTAL MUD COST:	TOTAL DEPTH:									
	MAGCOBAR	MAGCOGEL	SPERSENE	XP-20	CAUSTIC	SODA ASH	DRISPAC	DRISPAC	S.L.L.	LIME	RESINEX	DESCO	D-D	MAGCONOL	COST	TOTAL MUD COST	REMARKS
28-5	6																
29-5	14																
30-5	5																
31-5	26		4		6	7	20	25	8								
1-6	3																
2-6	30																
3-6	12																
FINAL COST																	

SUMMARY OF MUD LOSSES ON THE 17-1/2" OPEN HOLE

16th April Started drilling. No losses.

17th April Lost 200 barrels due to dumping header tank.

18th April Heavy mud losses over riser and flow line when plugged by gumbo. Dumping header tank each connection. Lost 600 barrels.

19th April Plugged flow line causing losses and dumping header tank. Losses 560 barrels.

20th April Frequent blockage of flow line causing big losses. Dumping header tank. Losses 600 barrels.

21st April Flow line still frequently plugged causing mud losses. Dumping header tank. Losses 550 barrels.

22nd April Flow line plugged twice. Header tank dumped several times. Mud losses 250 barrels.

23rd April Flow line plugged. Dumping header tank and sandtrap. Mud losses 510 barrels.

24th April T.D. logging period. No losses period.

The total losses during this interval were 3,570 barrels.