

Casing and Cementing

30" conductor refused at 16' penetration. 17 1/2" hole was drilled to 73' with no returns. Conductor was driven to 51'. 26" hole was drilled to 1137' where circulation was lost apparently around conductor. 20" casing was set at 1091' and cemented with 1900 sacks class "B" with 6% gel and 300 sacks neat. No returns while cementing.

13 3/8" casing

Set 91 joints 13 3/8" - 68 lbs K-55 buttress casing at 3511' landed in Cameron mud line hanger at 315' with a DV tool at 1560', 500' below the 20" shoe. Due to an apparent plug failure it was necessary to recement the primary stage. The casing was cemented with 1355 sacks class "B" cement with 2.2% gel water premix and 300 sacks class "B" neat. Second stage was cemented through DV tool with 450 sacks 2.5% gel premix and 700 sacks class B neat cement. The DV tool did not close but the casing tested to 1000 psi ok.

9 5/8" casing

Set 156 joints 9 5/8" 47 lbs N-80 buttress casing at 6242'. Landed in mud line hanger at 315'. Cemented with 1000 sacks 4% gel and 300 sacks class "B" neat.

Plugging

Plugged open hole 8430' - 9030' with 200 sacks class B neat. Set retainer in 9-5/8" casing at 6180'. Squeezed open hole below retainer with 150 sacks class "B". Spotted 50 sacks on top retainer. Tested plug and casing to 1500 p.s.i. Cut 9-5/8" 100' below mud line and cemented at 467' - 50' below cut up to 330', 13' below mud line. Cut all strings a minimum of 8' below mud line. Checked bottom for obstruction, o.k.

Mud

Total mud cost on this well was approximately \$ 75,000 of which \$ 44,000 was used for weighting material. It was necessary to increase mud weight to 12.7 lbs/gal to control shale gas prior to logging before 13-3/8" casing and a barite plug was placed from 3551' to 3654' prior to opening the 12-1/4" hole to 17 1/2". Mud weight was gradually increased to 14.5 lbs/gal and at a depth of 6114' partial returns were lost. Mud weight was reduced to 13.8, a core was taken, hole drilled to 6267' where the hole was logged and 9-5/8" casing set at 6242'. It was attempted to increase weight to 14.5 lbs/gal on drilling out but returns were lost at 14.1 lbs/gal before drilling any new hole. The open hole from the shoe at 6242' to TD of 6267' was squeezed with 200 sacks. Mud weight was reduced to 13.6 and the hole drilled to T.D. with no further difficulty. A copy of the mud company final report and materials breakdown is attached.

IMC DRILLING MUD N.V. (Norway)

Materials For Conoco - 8/12-1

26" Hole to 1091' for 20" Casing

	<u>SKS</u>	<u>Unit Price</u>	<u>Cost</u>
IMCO-GEL	239	\$ 4.05	\$ 967.95
IMCO Bringel	134	\$ 6.25	\$ 837.50
Caustic Soda	22	\$ 11.03	\$ 242.66
Lime	2	\$ 4.19	\$ 8.38
Myca	20	\$ 6.72	\$ 134.40
Quick Seal	20	\$ 16.00	\$ 320.00
Fiber Seal	10	\$ 6.60	\$ 66.00
Fiber Tex	15	\$ 6.60	\$ 99.00
Mud Fiber	20	\$ 6.60	\$ 132.00
			<u>\$ 2,807.89</u>

17½" Hole to 3654' For 13 3/8" Casing

	<u>SKS</u>	<u>Unit Price</u>	<u>Cost</u>
IMCO-Bar	6686	\$ 2.98	\$19,933.22
IMCO-GEL	560	\$ 4.05	\$ 2,268.00
IMCO-Bringel	105	\$ 6.25	\$ 656.25
IMCO-RD 333	148	\$ 10.75	\$ 1,591.00
Drill Aid	239	\$ 6.50	\$ 1,553.50
XP-20	35	\$ 10.75	\$ 376.25
Caustic Soda	79	\$ 11.03	\$ 871.37
Soda Ash	24	\$ 5.13	\$ 123.12
Lime	3	\$ 4.19	\$ 12.57
Myca	15	\$ 6.72	\$ 100.80
Nut Plug	6	\$ 6.88	\$ 41.28
IMCO Lubbriklean	2	\$ 412.50	\$ 825.00
			<u>\$28,361.36</u>

IMCO DRILLING MUD N.V. (Norway)

12 1/4" Hole to 6267' For 9 5/8" Casing

	<u>SKS</u>	<u>Unit Price</u>	<u>Cost</u>
IMCO-Bar	6260	\$ 2.98	\$18,654.80
IMCO-GEL	563	\$ 4.05	\$ 2,280.15
IMCO-Bringel	552	\$ 6.25	\$ 3,450.00
IMCO RD-333	232	\$ 10.75	\$ 2,494.00
Drill-Aid	250	\$ 6.50	\$ 1,625.00
Caustic Soda	43	\$ 11.03	\$ 474.20
Soda Ash	76	\$ 5.13	\$ 389.88
Sodium Bicarbonate	2	\$ 5.88	\$ 11.76
IMCO Lubriklean	1	\$412.50	\$ 412.50
Nut Plug	80	\$ 6.88	\$ 474.40
Kwick Seal	75	\$ 16.00	\$ 1,200.00
Myca	65	\$ 6.72	\$ 436.80
Flakes	20	\$ 16.53	\$ 330.60
			<hr/>
			\$32,310.09

IMCO DRILLING MUD N.V. (Norway)

8½" open Hole to 9430'

	<u>SKS</u>	<u>Unit Price</u>	<u>Cost</u>
IMCO-Bar	1740	\$ 2.98	\$ 5,185.20
IMCO-GEL	249	\$ 4.05	\$ 1,008.45
IMCO-Bringel	3	\$ 6.25	\$ 18.75
Caustic Soda	54	\$ 11.03	\$ 595.62
IMCO-RD-333	228	\$ 10.75	\$ 2,451.00
Drill-Aid	180	\$ 6.50	\$ 1,170.00
C.M.C.	4	\$ 14.33	\$ 57.32
Sodium Bicarbonate	8	\$ 5.88	\$ 47.04
IMCO Lubriklean	1	\$412.50	\$ 412.50
			<hr/>
			\$10,945.88
Total Diesel Oil used-147 Bbls at \$ 5.00/Bbl.			\$ 735.00
Total Material Cost			\$75,160.22

IMC DRILLING MUD



INTERNATIONAL MINERALS & CHEMICAL CORPORATION
2400 WEST LOOP SOUTH, HOUSTON, TEXAS

RECORD OF DRILLING MUD TESTS

IMC ENGINEER Eslinger/Bøe

TYPE MUD RD-333 Sea Water

COMPANY

Conoco Norway Inc.

WELL NAME & NO.

8/12-I

FIELD

North Sea

COUNTY

STATE

Norway

CONTRACTOR

Zapata

CASING PROGRAM

DATE 1971	DEPTH FT.	WEIGHT LBS/GAL LBS/CU.FT.	VISCOSITY		PLASTIC VISC. CPS	YIELD VALUE LBS/100FT.2	GEL STRENGTH INTL/10M	PH	FILTRATE ML	CAKE 32ND	HTHP FILTRATE 500 PSI TEMP. °F	ALKALINITY		<input type="checkbox"/> LIME <input type="checkbox"/> GYP LBS/BBL	<input checked="" type="checkbox"/> SALT CHLORIDE PPM G/GS	CALCIUM ION PPM	SAND % VOL.	SOLIDS % VOL.	OIL % VOL.	WATER CONTENT % VOL.
			SEC'S @ 300 RPM	CPS @ 300 RPM								PP-ML	PM-ML							
5-31	SPUD	8.7	55																	
6-1	IN	9.4	70																	
6-2		9.4	48																	
6-3		12.1	55	31	21	19	23/36	10.0	14.0	2										
6-4		12.4	54	24.5	22	5	4/18	10.0	10.1	2			.45		19000		1.25	20	4	76
6-5		12.5	45	25	20	10	5/22	10.5	9.0	2			1.1		15000		TR	19	3	78
6-6		12.8	45	24	20	8	3/17	11.0	8.5	2			1.1		15000		TR	20	3	77
6-7		12.8	47	30	23	14	3/18	10.5	7.2	2			.8		15000		1	20	3	77
6-8		12.7	48	23.5	19	11	4/14	10.0	7.2	2			.65		15000		1	19	3	78
6-9		12.7	47	29	22	14	5/19	10.5	7.0	2			.75		15000		1	20	3	77
6-10		12.8	50	32	25	14	4/20	10.5	6.0	2			.6		15000		1	20	3	77
6-11		12.8	48	26.5	19	15	5/21	11.5	7.8	2			1.15		12500	220	1	18	2	80
6-12		12.8	64	37.5	28	19	11/27	11.8	9.6	2			2.7		14000	120	1	20	2	79
6-13		12.8	42	20	17	6	2/11	11.8	9.4	2					14000	120		18	2	80
6-14		12.8	40	20	18	4	0/2	11.8	8.5	2			2.0	4.6	15000			18	2	80
6-15		12.8	40					11.8	8.5	2			2.0		15000			18	2	80
6-16		12.8	44	29	21	15	3/14	11.2	9.5	2			5.1	5.5	13000			19	1	80
6-17		13.5	52	28.5	20	17	7/18	11.2	9.5	2			4.0	6.5	13000	80		18	1	81
6-18		13.7	56	28.5	24	9	3/17	11.1	8.2	2			1.2	.7	13000			21	1	78
6-19		14.0	56	30	24	12	5/15	11.0	6.2	2			1.3		12000			22	5	73
6-20		14.5	65	43.5	35	17	7/20	11.0	4.4	2			1.0		10000			23	4	73
6-21		13.8	65	48	37	22	5/18	10.5	5.7	2			.9		11000			24	4	74
6-22		13.8	50	32	30	14	3/11	10.5	5.9	2			1.0	1.8	13000			23	3	74
6-23		13.8	48	28.5	16	5	2/6	11.0	5.8	2			1.6		13000			24	3	73

COMMENTS: 6-1 Lost Returns - Complete. Mix New Volume & L.C.M. - returns - Run Casing & Cement
 6-2 Drill Cement - 6-3 Well Kicked - WT. raised to 12.0 lb/gal. - 6-4 WT up to 12.5 - Building Volume
 6-7 Mixed & Pumped Barite Plug 22 lb/gal - Opened Hole to 17 1/2" 6-9 Centrifuge not working.
 6-11 Running 13 3/8" casing 6-12 cementing 6-13 W.O.C. - test 6-14 Drill Cement (400')[±] 6-16 Drill Cemen
 6-17 WT up to 13.5 lb/gal. - Drill Plug & Retainer - Test 6-18 Drill Float Collar & Barite Plug-raise
 WT to 14 lb/gal. 6-19 Drill Bumbo & weighting up to 14.0 lb/gal. 6-21 WT 14.5. Lost Returns - Mix L.C.M.
 Reduce WT to 13.8 lb/gal. 6-22 Logging 6-23 Coring - Logging.

IMC DRILLING MUD

INTERNATIONAL MINERALS & CHEMICAL CORPORATION
2400 WEST LOOP SOUTH, HOUSTON, TEXAS

RECORD OF DRILLING MUD TESTS

IMC ENGINEER Eslinger/Bøe

TYPE MUD RD-333 Seawater

COMPANY
Conoco Norway Inc.

WELL NAME & NO.
8/12-J

FIELD COUNTY STATE
North Sea Norway

CONTRACTOR
Zapata

CASING PROGRAM

DATE 19 71	DEPTH FT.	WEIGHT X LBS/GAL LBS/CUFT.	VISCOSITY		PLASTIC VISC. CPS	YIELD VALUE LBS/100FT.2	GEL STRENGTH INTL/10N	PH	FILTRATE ML	CAKE 32ND	HTHP FILTRATE 500 PSI TEMP. °F	ALKALINITY		<input type="checkbox"/> LIME <input type="checkbox"/> GYP LBS/BBL	<input type="checkbox"/> SALT CHLORIDE X PPM GPG	CALCIUM ION PPM	SAND % VOL.	SOLIDS % VOL.	OIL % VOL.	WATER CONTENT % VOL.
			SEC'S	CPS								PP-ML	PM-ML							
6-24		13.8	55	41	34	14	2/13	11.0	5.9	2		1.5			13000		24	3	73	
6-25		14.2	45	27	24	6	2/19	11.0	6.4	2		1.2			13000		24	3	73	
6-26		13.8	53	38	30	16	2/16	11.5	7.4	2		2.8			12000		23	3	74	
6-27		13.8	50	32.5	27	11	2/13	11.5	7.1	2		2.8			11500		23	3	74	
6-28		13.8	54	38	30	16	2/16	11.5	6.0	2		3.2			12000		24	3	73	
6-29		13.6	54	40	32	16	4/11	11.5	5.0	2		3.8			11000		23	3	74	
6-30		13.6	50	37	30	14	4/17	11.2	5.5	2		3.8	5		11000		22	4	74	
7- 1		13.6	52	33	27	12	3/12	11.0	5.6	2		3.0			12000		22	3	75	
7- 2		13.6	50	35	28	14	4/14	11.0	4.6	1		1.7			11000		23	5	72	
7- 3		13.6	48	36	30	12	3/11	11.0	4.4	1		1.6			9000		23	5	72	
7- 4		13.6	46	32	25	14	3/10	11.0	4.6	1		1.3			8000		23	6	71	
7- 5		13.6	50	34	28	12	4/12	11.0	5.0	1		1.0			8000		24	5	71	
7- 6		13.6	50	37	30	14	3/12	11.0	5.0	1		1.0			8000		24	5	71	
7- 7		13.6	52	40	31	18	3/10	11.0	3.9	1		1.0			8000		24	5	71	
7- 8		13.6	52	41.5	33	17	2/8	11.0	3.6	1		1.2			8000		24	5	71	
7- 9		13.6	48	35	29	12	2/5	11.5	3.5	1		1.3			7800		24	5	71	
7-10		13.6	50	39.5	32	15	2/11	11.5	3.8	1		1.2			7800		25	5	70	
7-11		13.6	48	32.5	27	11	2/8	11.5	4.0	1		1.2			7600		24	5	71	
7-12		13.6	49	35	29	13	3/8	11.0	4.0	1		1.15			7600		24	4.5	71	
7-13		13.6	50	39.5	32	11	2/10	11.5	3.7	1		1.2			7600		24	4.5	71	
7-14		13.6	50	37	31	12	3/13	11.0	4.0	1		1.0			9000		24	4	72	
7-15		13.6	48	35	30	11	2/11	11.0	4.2	2		1.1			10000		23	4	73	
7-16		13.6	48	35	29	12	3/14	11.0	4.8	2		1.8			10000		23	4	73	
7-17		13.6	48	35.5	30	11	3/11	11.0	4.6	2		1.5			10000		24	3	73	

COMMENTS: 6-25 Cement- Test - Start to weight up to 14.2 lb/gal. 6-26 Drill Cement - WT. 14.2 lb/gal. partial loss - Cut WT to 13.8. - Cement Squeeze 6-27 Drill Plug retainer 7-1 Centrifuge Broke 7-9 No Centrifuge 7-10 Logging 7-12 Logging 7-13 Drilling & Logging - Coring. 7-18 Logging.

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CASING PROGRAM

DATE 19 71	DEPTH FT.	WEIGHT LBS/GAL LBS/CUFT.	VISCOSITY		PLASTIC VISC. CPS	YIELD VALUE LBS/100FT. ²	GEL STRENGTH INTL/10M	PH	FILTRATE ML	CAKE 32ND	HTPP FILTRATE 500 PSI TEMP. °F	ALKALINITY		<input type="checkbox"/> LIME <input type="checkbox"/> GYP LBS/BBL	<input type="checkbox"/> SALT <input checked="" type="checkbox"/> CHLORIDE <input type="checkbox"/> PPM <input type="checkbox"/> GPG	CALCIUM ION PPM	SAND % VOL.	SOLIDS % VOL.	OIL % VOL.	WATER CONTENT % VOL.
			SEC'S	CPS								PP-NL	PM-ML							
7-18		13.6	48	31.5	30	13	3/14	11.0	4.8	2		.9			10000			24	3	73

COMMENTS: 7-18 - Logging

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Final Report - Drilling Operations, Conoco-Pelican-Texaco 8/12-1Drill Stem Tests

Two drill stem tests were run, one conventional and one wire line, as follows:

- No. 1 Open hole from 9-5/8" casing shoe at 6242' to 6400' was tested with packer in casing at 6221' - Test interval 6242' - 6400'. Ran 1500' fresh water cushion, 286' of mud and 86' of muddy water, chloride 12,000 ppm. A copy of the testing report is attached.
- No. 2 Tool set at 8748'. Tool open 10 min. Recovered 100 c.c. salt water 55,000 p.p.m. Sodium Chloride. Shut in pressure 4600 p.s.i. Test satisfactory.

FLUID SAMPLER DATA

Sampler Pressure _____ P.S.I.G. at Surface

Recovery: Cu. Ft. Gas _____

cc. Oil _____

cc. Water _____

cc. Mud _____

Tot. Liquid cc. _____

Gravity _____ ° API @ _____ ° F.

Gas/Oil Ratio _____ cu. ft./bbl.

Date June 28, 1971 Ticker Number HI 4541

Kind of Job Casing Hook 9 5/8" Helliburton District Tananger, Norway

Tester Mr. H. Counts Witness Mr. Oldenburg

Drilling Contractor ZAPATA RIG 16

RESISTIVITY **CHLORIDE CONTENT**

Recovery Water @ _____ ° F. _____ ppm

Recovery Mud @ _____ ° F. _____ ppm

Recovery Mud Filtrate @ _____ ° F. _____ ppm

Mud Pit Sample @ _____ ° F. _____ ppm

Mud Pit Sample Filtrate @ _____ ° F. _____ ppm

Mud Weight _____ vis _____ cp

EQUIPMENT & HOLE DATA

Formation Tested _____

Elevation _____ Ft.

Net Productive Interval _____ Ft.

All Depths Measured From RKB

Total Depth 6400 Ft.

Main Hole/Casing Size 8 1/2" + 9 5/8" Casing

Drill Collar Length 172' I.D. 2 1/4"

Drill Pipe Length 6118 I.D. 4 1/2" XO

Packer Depth(s) 6221 Ft.

Depth Tester Valve 6209 Ft.

TYPE AMOUNT TYPE AMOUNT

Cushion water 1500 Ft. Depth Back Pres. Valve 6123 Surface Choke 1" Bottom Choke 3/4"

Recovered	286	Feet of	Rat Hole Mud
Recovered	86	Feet of	Salt water cut mud
Recovered		Feet of	
Recovered		Feet of	
Recovered		Feet of	

Remarks Opened tool 01:35. No blow at surface. f. 15 min initial flow:

closed tool at 1:50 f. 60 min. Closed in press.: opened tool at

02:50 f. 30 min final flow no blow at surface. Closed tool 03:20

f. 60 min. close in pressure. Found blow plugs plugged,

Pulled tool loose at 04:25.

TEMPERATURE	Gauge No. 2550		Gauge No. 2651		Gauge No. 2549		TIME
	Depth:	Ft.	Depth:	Ft.	Depth:	Ft.	
Est. °F.	24	Hour Clock	72	Hour Clock	24	Hour Clock	Tool Opened A.M. P.M.
Actual °F.	Pressures		Pressures		Pressures		Tool Closed A.M. P.M.
	Field	Office	Field	Office	Field	Office	Reported Minutes
Initial Hydrostatic		4550.3		4572.1	4443	4595.7	Computed Minutes
Flow	Initial	737	804.1	834.1	860	848.8	
	Final	898	891.7	908.6	940	934.9	15
	Closed in	3463	3442.6	3451.5	3480	3482.6	59
Flow	Initial	898	917.0	938.4	953	972.1	
	Final	990	1041.2	1056.7	1092	1085.0	27
	Closed in		3323.3	3333.4	3365	3358.5	63
Flow	Initial						
	Final						
Final Hydrostatic		4389.7		4396.3	4420	4419.9	

Field Area Wild Cat

County North Sea

State Norway

Well No. 6400 - 6221

Tested Interval

CONTINENTAL OIL CO.

Location/Company Name

To: Mr. J.C. Shepler - London Date: 2nd September, 1971.

Subject: ANALYSIS OF DST NO. 1 - WELL NO. 8/12-1

The subject DST was run over the interval 6242' - 6400'. Recovery in addition to the 1500 feet of water cushion was 286 feet of rat mud and 86 feet of salt water cut mud. Flow and shut-in period during the test were as follows :-

Initial flow	-	15 minutes
Initial Shut-in	-	59 minutes
Final Flow	-	27 minutes
Final Shut-in	-	63 minutes

There was no surface flow of air during either of the flow periods. It was discovered after the test that valve blockage in the surface control equipment prevented air flow and surface pressure measurement.

Pressure build-up curves for each of the three pressure gauges are shown in the attached figures 1, 2 and 3. Analysis of these curves indicated the following :-

	<u>Gauge No.</u> 2550 <u>at 6213'</u>	<u>Gauge No.</u> 2651 <u>at 6217'</u>	<u>Gauge No.</u> 2549 <u>at 6241'</u>
Q, BFPD	124	124	124
Transmissibility, md.ft./cp. (kh/mb)	16.2	21.1	17.6
Extrapolated Pressures			
Initial Shut-in, psi	3575	3575	3610
Final Shut-in, psi	3510	3480	3535

All three pressure instruments indicated a low permeability zone that was depleted during the test period. If the zone contains water, as indicated by the recovery of salt water cut mud, a reasonable estimate for kh would be 20 md.ft. with a permeability of 0.13 md.


Edward A. Herring

EAH/im
Encl.

c.c. B. Brandorff	-	Exploration
A. Madrazo	-	New York
D.E. Gregg	-	London
K. Gough	-	Exploration