

DSTs

A. Open Hole DST (8 1/2" hole) 9 5/8" csg a 9981' (3-4 Sept. 1970)
DST No. 1 (10175-9981') packer at 9920'. Bot.hole choke 3/4"
Wtr. cushion: 166 Bbls sea water. Formation: Danian Ls.

	<u>Depths</u>	
IF Time: 7 mins.	9908'	9941'
	<u>Pressures (PSI)</u>	
IFFP:	4900	4985
ISI Time 1 hr. 5 mins.		
ISIP:	7016	7040
No. 1 Production Period:	8 hours	
Choke Size:	0.625"	
Flow Rate:	1315 BOPD	
G.O.R.:	1068 CFPB	
Gravity:	41.5° API	
BS&W:	2.5%	
FBHP:	1539 psi	1589 psi
Press. B.U. Time:	8 hours	
FSIP:	6677	6679
No. 2 Production Period:	8 hours	
Choke Size:	0.50"	
Flow Rate:	847 BOPD	
G.O.R.:	1350 CFPB	
Gravity:	41.1° API	
BS&W:	3.0%	
FBHP:	1710 psi	1700 psi
Press. B.U. Time:	8 hrs 40 mins.	
FSIP:	6574	6569

B. DSTs through Perforations after Acidization

DST No. 2 (10740-10750) 4 SPF. RTTS set at 10722'. Mud in test string displaced with sea water, and surface pressure was 2800 psi after displacing with water. The well was opened and the pressure bled to zero. Connected Howco and attempted to breakdown formation - pressured to 4700 psi, and pressure bled back to 4200 psi. Opened well on flow, but had no change. Released packer and reversed out water cushion. Displaced 500 gals of 15% HCl to packer, then set packer and started squeezing to formation. Initial squeeze pressure 4550 psi with acid at perforations pressured dropped to 4200 psi. Pressure remained constant during squeeze. Final feed pressure: 4200 psi; Final Feed rate: 2.5 BPM. Closed well for 30 mins., then opened to observe flow. Good surge, bleeding off immediately to lazy 1/2" stream, with no increase in flow over 2 hr. period. Pulled packer loose and reversed out water cushion.

DST No.3 (Mechanical Failure due to packer mal-function).

DST No. 4 (10,642-10,654) Packer set at 10622'. Well flowed sea water cushion at slow rate, after acidizing with 1000 gals of 15% HCl. Well unloaded water cushion and flowed on 1/2" surface choke for 2 hrs. to clean up. At end of 2 hrs. flow rate was 2675 BOPD, with a GOR of 1440 CFPB, no free water, and 1% BS&W. (Rate was not stable). Well was then put on a 1/4" choke and apparently stabilized in 2 hrs. at 2232 psi surface pressure. Flow rate was 1090 BOPD, GOR 1490, with 1.5% BS&W. No formation water was recovered and gravity of oil was 38° API. The well shut in at surface for pressure build up and after 5 1/2 hours surface pressure was 3583 psi.

DST No. 5 (10580-10610') Perforated with 4 SPF. Acidized well with 4050 gal of 15% HCl plus formic acid. Flowed to clean up then measured flow rate of about 900 BOPD on a 1/4" choke and about 3500 psi surface pressure. Rates not stabilized: Noted small leak in annulus which was flowing small amount of gas cut mud, and therefore considered unsafe to continue test.

DST No. 6 (10580-10610') Leak noted in DST No. 5. Found 45 stands from surface. Went in hole filling tubing with water and J-4 each 10 stands' testing tubing to 7000 psi. Reacidized with 4050 gals of HCl and formic acid. Opened well to clean out mud. Well flowed 2800 BOPD on 3/8" choke; and 1400 BOPD on a 1/4" choke. There were bubbles noted in the annulus which indicated a leak. The well was killed and the tubing pulled. The test was considered sufficient.

DST No. 7 (10348-10468') Perforated with 4 SPF.
After acidizing with 16,200 gals of 15% HCL and formic acid, opened well to clean. Well flowed 2130 BOPD on a 1/4" choke with a surface pressure of 4000 psi. Gravity of oil was 42.5 API and a GOR of 1690 with 0.25% BS&W. Oil rate was limited by wind direction on burner.

2nd Flow Test Flowed 6 hours as follows:

Flow Rate: 1500 BOPD on 12/64" choke
Tubing Pressure: 4187 psi
GOR: 1600 CFPB
Gravity: 42.8° API

3rd Flow Test

Flow Rate: 4600 BOPD on 24/64" choke
Gas Rate: 6500 MCFD
Tubing Pressure: 3775 psi
GOR: 1410 CFPB
Gravity: 41.9° API
SISP before flow: 4250 psi
Well flowed at above rates for about 3 1/2 hours and surface data indicated near stable conditions, however additional flow test were necessary due to failure of the BHP gauge.

Best Test

4th Flow Test (Re-acidized zone 10348-10468')

Flow Rate: About 1250 BOPD on a 12/64" choke
Gas Rate: About 1717 MCFD
Surface Tubing Press.: 4210 psi
GOR: 1374 CFPD
Gravity: 42.8° API
BS&W: 0.1%
BHP Flowing Press: About 6987 psi
BHSIP after flow: About 7050 psi

5th Flow Test

Flow Rate: About 1003 BOPD on 10/64" choke
Gas Rate: About 1286 MCFD
Surface Pressure: 4225 psi
GOR: About 1282 CFPB
Gravity: 42.8° API
BS&W: 0.1%
BHP Flowing Press: About 7016 psi
BHSIP after Flow: About 7070 psi

DST No. 8 (9982-10024') Perforated with 4 SPF

Acidized with 5770 gals of HCl and formic acid, and then flowed well for 7 hours.

1st Flow Test

^xFlow Rate: 800 BOPD on a 12/64" choke
Gas Rate: Not Reported
Surface Pressure: 3140 psi
GOR: 1600

^xFlow Rate limited by wind direction on burner.

2nd Flow Test

Flow Rate: 1450 BOPD on a 22/64" choke
Gas Rate: 2333 MCPD
Surface Pressure: 1710 psi
GOR: 1609
Gravity: 42.1° API
BS&W: 0.1%

Hole Size

36" to 464 ft.
26" to 1251 ft.
17 1/2" to 10021 ft.
8 1/2" to 13030 ft (total depth)

Casing Record

36" casing to 417 ft (pile driven)
20" casing shoe at 1240 ft. cemented with 1850 sacks of cls. "B" cement, plus 2% CaCl₂
13 3/8" casing shoe at 5218". Cemented with 1400 sacks of Class "B" cement with 3% pre-hydrated gel and 0.2% HR5, plus 200 sacks of class "B" neat cement.
9 5/8" casing shoe at 9988'. Cemented with 1100 sacks of class "B" cement with 3% gel, plus 400 sacks of class "B" cement with 0.4% HR-4.
7" liner - top at 9802', bottom at 10912', cemented with 160 sacks of class "B" cement, plus 4% gel and 60 lbs of cellophane, plus 30 sacs of class "B" neat cement.



MATERIAL CONSUMPTION BREAKDOWN BY INTERVAL

OPERATOR: Amoco Norway Oil Co.

WELL: 2/5-1

LOCATION: North Sea

36" hole

INTERVAL Seabed to 418'

DATE: Aug. 1 through Aug. 2, 1970

<u>PRODUCT</u>	<u>UNIT</u>	<u>COST</u>
Magcogel	270 sx.100 lb.	\$ 877.50
Salt Gel	210 sx.	980.70
Flosal	50 sx.	558.-
Caustic Soda	10 dr.	99.40
Lime	10 sx.	18.70
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		\$2.534.30

26" hole 20" casing

DATE: Aug. 3 through Aug. 5, 1970

INTERVAL 418' to 1.240'

<u>PRODUCT</u>	<u>UNIT</u>	<u>COST</u>
Magcogel	484 sx. 25kos.	\$ 880.88
Salt Gel	170 sx.	793.90
Caustic Soda	5 dr.	49.70
Lime	5 sx.	9.35
Condet	29 dr.	638.-
Diesel Oil	15 bbl.	0
Kwik Seal	10 sx.	148.80
Mica Fine	8 sx.	45.52
Nut Plug Fine	8 sx.	59.04
Imco Plug	8 sx.	56.88
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		\$2.682.07



MATERIAL CONSUMPTION BREAKDOWN BY INTERVAL

OPERATOR: Amoco Norway Oil Co.

WELL: 2/5-1

17 1/2" hole 13 3/8" casing

LOCATION: North Sea

INTERVAL 1.240' to 5.250'

DATE: Aug. 6 through Aug. 11, 1970

<u>PRODUCT</u>	<u>UNIT</u>	<u>COST</u>
Magcobar	11.880 sx.	\$35.640.-
Magcogel	276 sx. 25kos.	502.32
Drill Aid	670 sx.	4.355.-
XP-20	335 sx.	3.229.40
Caustic Soda	159 dr.	1.580.46
Lime	78 sx.	145.86
Soda Ash	50 sx.	253.50
D.D.	20 dr.	4.840.-
Soltex	214 sx.	4.489.72
Diesel Oil	200 bbl.	0
Magconol	5 dr.	1.807.-
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		\$56.843.26

12 1/4" hole 9 5/8" casing

INTERVAL 5.250' to 10.018'

DATE: Aug. 12 through Aug. 28, 1970

<u>PRODUCT</u>	<u>UNIT</u>	<u>COST</u>
Magcobar	16.790 sx.	\$50.370.-
Magcogel	30 sx. 25kos.	54.60
Drill Aid	1.205 sx.	7.832.50
XP-20	595 sx.	5.735.80
Caustic Soda	158 dr.	1.570.52
Soda Ash	134 sx.	679.38
Lime	88 sx.	164.56
D.D.	8 dr.	1.936.-
Soltex	90 sx.	1.888.20
Magconol	2 dr.	722.80
Sod. Chromate	6 sx.	69.78
Diesel Oil	225 bbl.	0
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		\$71.024.14



MATERIAL CONSUMPTION BREAKDOWN BY INTERVAL

OPERATOR: Amoco Norway Oil Co.

WELL: 2/5-1

LOCATION: North Sea

8 1/2" hole 7" liner

INTERVAL 10.018' to 13.030'

DATE: Aug. 29 through Oct. 13, 1970

<u>PRODUCT</u>	<u>UNIT</u>	<u>COST</u>
Magcohar	4.875 sx.	\$14.625.-
Magcogel	405 sx.25kos.	737.10
Drill Aid	592 sx.	3.848.-
XP-20	362 sx.	3.489.68
Caustic Soda	128 dr.	1.272.32
Soda Ash	40 sx.	202.80
Lime	0	0
Magconol	2 dr.	722.80
Diesel Oil	55 bbl.	0
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		\$24.897.70

INTERVAL

DATE: Oct. 14 through Nov. 9, 1970

<u>PRODUCT</u>	<u>UNIT</u>	<u>COST</u>
Magcohar	2.800 sx.	\$ 8.400.-
Magcogel	270 sx.25kos.	491.40
Drill Aid	20 sx.	130.-
Caustic Soda	16 dr.	159.04
Lime	3 sx.	5.61
C.M.C. (L.V.)	19 sx.	229.52
Salt Gel	97 sx.	452.99
Magconol	1 dr.	361.40
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		\$10.229.96

Dresser Magconbar

DIVISION OF DRESSER INDUSTRIES, INC.

TOTAL MATERIAL CONSUMPTION

OPERATOR Amoco Norway Oil Co.
WELL 2/5-1
LOCATION North Sea

PRODUCT	UNITS	COST
Magcogel	270 sx. 100 lb.	\$ 877.50
Magcogel	1.465 sx. 25kos.	2.666.30
Salt Gel	477 sx.	2.227.59
Flosal	50 sx.	558.-
Caustic Soda	476 dr.	4.731.44
Lime	184 sx.	344.08
Diesel Oil	495 bbl.	0
Kwik Seal	10 sx.	148.80
Mica Fine	8 sx.	45.52
Nut Plug Fine	8 sx.	59.04
Magcobar	36.345 sx.	109.035.-
Drill Aid	2.487 sx.	16.165.50
XP-20	1.292 sx.	12.454.88
Soda Ash	224 sx.	1.135.68
D.D.	28 dr.	6.776.-
Soltex	304 sx.	6.377.92
Magconol	10 dr.	3.614.-
Sod. Chromate	6 sx.	69.78
Condet	29 dr.	638.-
Imco Plug	8 sx.	56.88
C.M.C. (L.V.)	19 sx.	229.52

\$168,211.43

TOTAL