

D.S.T.'s

No. 1 Interval 8635' - 8655'. Upper Cretaceous Chalk. September 23, 1969. Perforated 9 5/8" casing with 4 jet shots per foot. Water cushion 8200 feet. Packer set at:- 1st flow 8621, 2nd flow 8591 (Packer slipped at first attempt). Bottom choke 3/4". Top choke 1".

Initial Flow 12 mins. Initial Shut in 30 mins. Final Flow 269 mins. Final Shut in 90 mins.

Pressure Recorder at 8656'.

|               |            |
|---------------|------------|
| I.H.P.        | 6281.5 psi |
| I.F.P.(Final) | 4148.2 psi |
| I.S.I.P.      | 6205.7 psi |
| F.F.P.(Final) | 2851.4 psi |
| F.S.I.P.      | 5773.9 psi |
| F.H.P.        | 6339.9 psi |

Recovery: Flow oil 66 mins. rate unknown.

No. 2 Interval 8510' - 8545'. Lower Tertiary. September 25th 1969. Perforated 9 5/8" casing with 4 jet shots per foot. Packer set at 8482'. Water cushion 3500 ft. Bottom choke 3/4". Top choke 1".

Initial Flow 10 min. Initial Shut in 30 min. Final Flow - no blow so pulled packer after checking perforations open.

Pressure Recorder at 8517'.

|               |            |
|---------------|------------|
| I.H.P.        | 6476.3 psi |
| I.F.P.(Final) | 6268.5 psi |
| I.S.I.P.      | 6329.1 psi |
| F.F.P.(Final) | 1780.7 psi |
| F.S.I.P.      | -          |
| F.H.P.        | 6502.3 psi |

Recovery:- Test failed.

No. 3 Interval 8510' - 8545'. Lower Tertiary. September 25th 1969. Perforated 9 5/8" casing with 4 jet shots per foot. Packer set at 8482'. Water cushion 1500 feet. Bottom choke 3/4". Top choke 1/2". Initial flow 120 mins. Initial shut in 120 min. No final flow.

Pressure recorder at 8517'.

|                |            |
|----------------|------------|
| I.H.P.         | 6493.6 psi |
| I.F.P. (Final) | 967.1 psi  |
| I.S.I.P.       | 5539.2 psi |
| F.F.P.         | -          |
| F.S.I.P.       | -          |
| F.H.P.         | 6472.0 psi |

Recovery:- Water cushion and 472' of gas and oil cut mud, and 90' oil cut mud.

No. 4 Interval 8624 - 8664, 8680' - 8696'. Upper Cretaceous Chalk. September 28th 1969. Perforated 9 5/8" casing with 4 jet shots per foot. Packer set at 8580'. Water cushion 5000'. Bottom choke 3/4". Top choke 1/2". Initial flow 15 mins. Initial shut in 30 mins. Final flow 282 mins. Final shut in 436 mins.

Pressure recorder at 8618'.

|                |            |
|----------------|------------|
| I.H.P.         | 6467.6 psi |
| I.F.P. (Final) | 3026.3 psi |
| I.S.I.P.       | 6166.7 psi |
| F.F.P. (Final) | 2259.8 psi |
| F.S.I.P.       | 6216.5 psi |
| F.H.P.         | 6482.8 psi |

Recovery:- Oil to surface. Flow rate 38 barrels per hour. T.F.P. 480 - 240 psi. G.O.R. 488 cu. ft. per bbl.

No. 5 Interval 8680' - 8696'. Upper Cretaceous Chalk. September 30 th 1969. Perforated 9 5/8" casing with 4 jet shots per foot. Packer set at 8672'. Water cushion 1000 ft. Bottom choke 3/4". Top choke 1/2". Initial flow 15 mins. Initial shut in 30 mins. Final flow 180 mins. Final shut in 240 mins.

Pressure recorder at 8710

|                |            |
|----------------|------------|
| I.H.P.         | 6552.1 psi |
| I.F.P. (Final) | 2006.5 psi |
| I.S.I.P.       | 4465.8 psi |
| F.F.P. (Final) | 2471.5 psi |
| F.S.I.P.       | 6067.1 psi |
| F.H.P.         | 6617.0 psi |

Recovery: - Water cushion and 560 ft. of invert mud and 1000 ft. clubbered mud plus 90 feet of fluid below reversing sub - 60% water, 20% oil and 20% solids.

**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.  
 Oil Ratio \_\_\_\_\_ cu. ft./bbf.

Date Sept. 23, 1969 Ticket Number T-507976  
 Kind of Job D.S.T. Halliburton District England  
 Tester S. Haggard Witness + Watson

Drilling Contractor I.D.C. (Orion)

**EQUIPMENT & HOLE DATA**

Formation Tested Cretaceous  
 Elevation \_\_\_\_\_ Ft.  
 Net Productive Interval 8635 to 8655 Ft.  
 All Depths Measured From Kelly Bushings  
 Total Depth 11,093 Ft.  
 Motor Hole/Casing Size 9 5/8 47#  
 Drill Collar Length 260 I.D. 2 13/16  
 Drill Pipe Length 8344' I.D. 4.276  
 Packer Depth(s) 8621' Ft.  
 Depth Tester Valve 8610' Ft.

TYPE AMOUNT CUSHION salt water 150 bbls Ft. Depth Back Pres. Valve no Surface Choke 1" Bottom Choke 3/4

Recovered 5600 Feet of Oil

Recovered \_\_\_\_\_ Feet of \_\_\_\_\_

Recovered \_\_\_\_\_ Feet of \_\_\_\_\_

Recovered \_\_\_\_\_ Feet of \_\_\_\_\_

Recovered \_\_\_\_\_ Feet of \_\_\_\_\_

Remarks Due to packer slipping could not get a packer seat so pull to first collar which packer took wt. 1st flow period. packer at 8621 - 2nd flow packer at 8591. After 248 min. 2nd flow - oil to surface for 60 min, then close tool at 318 min.

| TEMPERATURE       | Gauge No. 2322    |            | Gauge No. 2323 |            | Gauge No.   |        | TIME                  |                          |
|-------------------|-------------------|------------|----------------|------------|-------------|--------|-----------------------|--------------------------|
|                   | Depth: 8613'      | Ft.        | Depth: 8656    | Ft.        | Depth:      | Ft.    | Hour Clock            | Tool                     |
| Est. 160 °F.      | 8541 -12          | Hour Clock | 24-8551        | Hour Clock | Blanked Off |        | Blanked Off           | Tool 7:10 A.M.<br>Opened |
| Actual °F.        | Pressures         |            | Pressures      |            | Pressures   |        | Tool Closed 1310 P.M. | Reported<br>Minutes      |
|                   | Field             | Office     | Field          | Office     | Field       | Office |                       | Computed<br>Minutes      |
| Hydrostatic       | 6270              | 6265.5     | 6283           | 6281.5     |             |        |                       |                          |
| ow                | Initial           | 3848       | 3857.2         | 4040       | 4037.0      |        |                       |                          |
|                   | Final             | 3890       | 3899.3         | 4040       | 4148.2      |        |                       | 12                       |
| ow                | Closed in         | 6187       | 6205.5         | 6215       | 6205.7      |        |                       | 30                       |
|                   | Initial           | 3870       | 3945.2         | 4170       | 4196.1      |        |                       |                          |
| ow                | Final             |            | 3369.8         | 2813       | 2851.4      |        |                       | 318                      |
|                   | Closed in         |            |                | 5738       | 5773.9      |        |                       | 90                       |
| Third Period Flow | Initial           |            |                |            |             |        |                       |                          |
|                   | Final             |            |                |            |             |        |                       |                          |
|                   | Closed In         |            |                |            |             |        |                       |                          |
|                   | Final Hydrostatic |            |                | 6283       | 6339.9      |        |                       |                          |

Legal Location Sec. - Twp. - Rng. 56-14-978 North  
 Lease Name 2-11-1  
 Well No. 1  
 Test No. 8635' - 8655  
 Tested Interval 03-27-051-East  
 County Norway  
 State North Sea

AMOCO NORWAY OIL CO.  
 Lease Owner/Company Name

**FORMATION TEST DATA**

**SPECIAL PRESSURE DATA**

**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.

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 14.4 vis \_\_\_\_\_ cp

RESISTIVITY \_\_\_\_\_ CHLORIDE CONTENT \_\_\_\_\_

Date Sept.25, 1969 Ticket Number T-507977

Kind of Job D.S.T. Halliburton District England

Tester S. Haggard Witness + Watson

Drilling Contractor I.D.C. (Orion)

**EQUIPMENT & HOLE DATA**

Formation Tested Tertiary

Elevation \_\_\_\_\_ Ft.

Net Productive Interval 8510 - 8545 Ft.

All Depths Measured From K.B.

Total Depth 8590 Ft.

Main Hole/Casing Size 9 5/8" 47 #

Drill Collar Length \_\_\_\_\_ I.D.

Drill Pipe Length 8470 I.D. 4.276

Packer Depth(s) 8482 Ft.

Depth Tester Valve 8469 Ft.

| TYPE                 | AMOUNT  | Depth Back Pres. Valve | Surface Choke | Bottom Choke |
|----------------------|---------|------------------------|---------------|--------------|
| Injection salt water | 3500    | Ft.                    | 1"            | 3/4          |
| covered              | Feet of |                        |               |              |
| covered              | Feet of |                        |               |              |
| covered              | Feet of |                        |               |              |
| covered              | Feet of |                        |               |              |
| covered              | Feet of |                        |               |              |

Remarks No blow - Hy-spring open - in 3 min. 1st flow 10:57 - 10 min. close 11:05 - 30 min. open 11:35 - no blow - pull packer loose and pressure annulus to see if perf. are open - operf. opened pump - 4 bbls into perf. at 2150 psi.

| TEMPERATURE         | Gauge No. 2322 |            | Gauge No. 2322 |            | Gauge No.   |        | TIME       |            |
|---------------------|----------------|------------|----------------|------------|-------------|--------|------------|------------|
|                     | Depth: 8473'   | Ft.        | Depth: 8517'   | Ft.        | Depth:      | Ft.    | Hour Clock |            |
| 160 °F.             | 24             | Hour Clock | 24             | Hour Clock |             |        | Tool       | XXI.       |
|                     | Blanked Off    | no         | Blanked Off    | yes        | Blanked Off |        | Opened     | 10:57 P.M. |
| Tool                | Pressures      |            | Pressures      |            | Pressures   |        | Tool       | A.M.       |
|                     | Field          | Office     | Field          | Office     | Field       | Office | Closed     | P.M.       |
| Initial Hydrostatic | 6933           | -          | 6473           | 6476.3     |             |        | Reported   | Computed   |
|                     |                |            |                |            |             |        | Minutes    | Minutes    |
| Flow Initial        | 6360           | 6608.0     |                | 5819.6     |             |        |            |            |
| Flow Final          | 6360           | 6959.2     |                | 6268.5     |             |        |            |            |
| Closed in           | 6933           | 7012.8     | 6302           | 6329.1     |             |        |            |            |
| Flow Initial        | 2140           | 2248.4     | 1723           | 1728.1     |             |        |            |            |
| Flow Final          | 2140           | 2355.2     | 1760           | 1780.7     |             |        |            |            |
| Closed in           |                |            |                |            |             |        |            |            |
| Flow Initial        |                |            |                |            |             |        |            |            |
| Flow Final          |                |            |                |            |             |        |            |            |
| Closed in           |                |            |                |            |             |        |            |            |
| Initial Hydrostatic | 7003           | 7119.3     | 6473           | 6502.3     |             |        |            |            |

Legal Location Sec. - Twp. - Rng. 56-14-16.978 North

Lease Name 2-11-1

Well No. 2

Field Area East-03-27-051

Tested Interval 8510 - 8545

County Norway

State North Sea

Amoco Norway Oil Co.

Lease Owner/Company Name

**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.

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 14.4 \_\_\_\_\_ vis \_\_\_\_\_ cp

Date Sept. 25, 1969 Ticket Number T-507978  
 Kind of Job D.S.T. Halliburton District England  
 Tester Mr. J. Haggard Witness + Mr. Watson  
 Drilling Contractor I.D.C. (Orion)

**EQUIPMENT & HOLE DATA**  
 Formation Tested tertiary  
 Elevation \_\_\_\_\_ Ft.  
 Net Productive Interval 8510' - 8545' Ft.  
 All Depths Measured From K.B.  
 Total Depth 8590 Ft.  
 Main Hole/Casing Size 9 5/8 47#  
 Drill Collar Length \_\_\_\_\_ I.D. \_\_\_\_\_  
 Drill Pipe Length 8470' I.D. 4.276  
 Packer Depth(s) 8482' Ft.  
 Depth Tester Valve 8469' Ft.

TYPE AMOUNT Depth Back Surface Bottom  
 Disposition salt water 1500' Ft. Pres. Valve no Choke 1/2 Choke 3/4

Recovered 472' Feet of gas and oil cut mud  
 Recovered 90 Feet of Oil  
 Recovered \_\_\_\_\_ Feet of \_\_\_\_\_  
 Recovered \_\_\_\_\_ Feet of \_\_\_\_\_  
 Recovered \_\_\_\_\_ Feet of \_\_\_\_\_

Remarks tool open with no blow after 15 min. had good blow, open  
 120 min. close for 120 min. no 2nd flow period.

| TEMPERATURE         | Gauge No. 2322   |               | Gauge No. 2323   |               | Gauge No.   |            | TIME   |      |
|---------------------|------------------|---------------|------------------|---------------|-------------|------------|--------|------|
|                     | Depth: 8473' Ft. | Hour Clock    | Depth: 8517' Ft. | Hour Clock    | Depth:      | Hour Clock | Tool   | XXX  |
| st. 160°F.          | Blanked Off      | no            | Blanked Off      | yes           | Blanked Off |            | 12:56  | XXX  |
| Actual °F.          | Pressures        |               | Pressures        |               | Pressures   |            | Opened | P.M. |
| Initial Hydrostatic | Field 6490       | Office 6462.5 | Field 6475       | Office 6493.6 | Field       | Office     | 16:26  | XXX  |
| Flow                | Initial          | 790           | 793.5            | 845           | 809.6       |            | Closed | P.M. |
|                     | Final            | 942           | 964.9            | 933           | 967.1       |            | 120    | 120  |
| Closed in           | 5497             | 5527.0        | 5520             | 5539.2        |             |            | 120    | 120  |
| Flow                | Initial          |               |                  |               |             |            |        |      |
|                     | Final            |               |                  |               |             |            |        |      |
| Closed in           |                  |               |                  |               |             |            |        |      |
| Flow                | Initial          |               |                  |               |             |            |        |      |
|                     | Final            |               |                  |               |             |            |        |      |
| Closed in           |                  |               |                  |               |             |            |        |      |
| Final Hydrostatic   | 6447             | 6456.0        | 6475             | 6472.0        |             |            |        |      |

Legal Location Sec. - Twp. - Rng. 56-14-16.978 North  
 Lease Name 2-11-1  
 Well No. 3  
 Test No. 8510 - 8545  
 Field Area 03-27-051 East  
 Tested Interval  
 County Norway  
 State North Sea  
 Lease Owner/Company Name AMOCO NORWAY OIL CO.

**FORMATION TEST DATA**

**SPECIAL PRESSURE DATA**

LITTLE'S 82428 4/59-50, 51-52

**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 25 ° API @ 60 °F.  
 Oil Ratio 719 cu. ft./bbl.

RESISTIVITY \_\_\_\_\_ CHLORIDE CONTENT \_\_\_\_\_

Water @ \_\_\_\_\_ °F. \_\_\_\_\_ ppm  
 Mud @ \_\_\_\_\_ °F. \_\_\_\_\_ ppm  
 Mud Filtrate @ \_\_\_\_\_ °F. \_\_\_\_\_ ppm  
 Mud Pit Sample @ \_\_\_\_\_ °F. \_\_\_\_\_ ppm  
 Mud Pit Sample Filtrate @ \_\_\_\_\_ °F. \_\_\_\_\_ ppm  
 Mud Weight 14.2 vis \_\_\_\_\_ cp

Date Sept. 28, 1969 Ticket Number T-507981

Kind of Job D.S.T. Halliburton District England

Tester Jim Haggard Witness Wood + Watson

Drilling Contractor I.D.C. (Orion)

**EQUIPMENT & HOLE DATA**

Formation Tested Cretaceous

Elevation \_\_\_\_\_ Ft.  
 Net Productive Interval 8624-8664, 8680-8696 Ft.  
 All Depths Measured From K.B.

Total Depth 11,053 Ft.  
 Main Hole/Casing Size 9 5/8 47# P-110 Csg.

Drill Collar Length no I.D. no  
 Drill Pipe Length 8555' I.D. 4.276  
 Packer Depth(s) 8580' Ft.  
 Depth Tester Valve 8567' Ft.

TYPE AMOUNT Depth Back Surface Bottom  
 Cushion salt water 5000' Ft. Pres. Valve no Choke 1/2 Choke 3/4

Recovered \_\_\_\_\_ Feet of \_\_\_\_\_  
 Recovered \_\_\_\_\_ Feet of \_\_\_\_\_  
 Recovered \_\_\_\_\_ Feet of \_\_\_\_\_  
 Recovered \_\_\_\_\_ Feet of Tool open at 10:21 with strong blow for 15 min.  
 Recovered \_\_\_\_\_ Feet of Close at 10:36 for 30 min. open for 2nd flow at

Remarks 11:06 am in 46 min, water cushion to surface at 14:10 oil to surface max. psi 480 min 240 psi for one hour and 38 min - flow rate 38 bbls per hour, close tool at 15:48, rev. out 22:30 total flow 2nd 282 gas - oil ratio 719 cu.ft. per bbl.

| TEMPERATURE       | Gauge No. 2322 |        | Gauge No. 2323  |        | Gauge No.   |        | TIME                                  |                  |
|-------------------|----------------|--------|-----------------|--------|-------------|--------|---------------------------------------|------------------|
|                   | Depth:         | Ft.    | Depth:          | Ft.    | Depth:      | Ft.    |                                       |                  |
| 160 °F.           | 8570'          |        | 8618'           |        |             |        | Tool Opened 10:21 A.M. <del>XXX</del> |                  |
|                   | Blanked Off NO |        | Blanked Off YES |        | Blanked Off |        | Tool Closed 15:48 P.M. <del>XXX</del> |                  |
| Actual °F.        | Pressures      |        | Pressures       |        | Pressures   |        | Reported Minutes                      | Computed Minutes |
|                   | Field          | Office | Field           | Office | Field       | Office |                                       |                  |
| Flow              | Initial        | 6446   | 6453,2          | 6498   | 6467,6      |        |                                       |                  |
|                   | Final          | 2797   | 2592,7          | 2770   | 2790,2      |        |                                       |                  |
|                   | Closed in      | 3015   | 3010,9          | 3033   | 3026,3      |        |                                       | 15 15            |
| Flow              | Initial        | 6187   | 6171,3          | 6152   | 6166,7      |        |                                       | 30 30            |
|                   | Final          | 3142   | 3148,8          | 3165   | 3144,7      |        |                                       |                  |
|                   | Closed in      | 2295   | 2288,9          | 2290   | 2259,8      |        |                                       | 282 282          |
| Flow              | Initial        | 6232   | 6222,7          | 6218   | 6216,5      |        |                                       | 377 436          |
|                   | Final          |        |                 |        |             |        |                                       |                  |
|                   | Closed in      |        |                 |        |             |        |                                       |                  |
| Final Hydrostatic | 6446           | 6473,2 | 6498            | 6482,8 |             |        |                                       |                  |

Legal Location Sec. - Twp. - Rng. 56-14-16.978 North

Lease Name 2-11-1

Well No. 4

Test No. 8624-8664-8680-8696

Field Area 03-27-051 East

Tested Interval \_\_\_\_\_

County North Sea

State Norway

Lease Owner/Company Name Amoco Norway Oil Co.

**FORMATION TEST DATA**

**SPECIAL PRESSURE DATA**

Legal Location Sec. - Twp. - Rng. 56-14-16.978 North  
 Lease Name  
 Well No. 2-11-1  
 Test No. 5  
 Tested Interval 8680 - 8696  
 Field Area 03-27-051 East  
 County North Sea  
 State Norway  
 Amoco Norway Oil Co.  
 Lease Owner/Company Name

**FLUID SAMPLER DATA**  
 Sampler Pressure \_\_\_\_\_ P.S.I.G. at Surface  
 Recovery: Cu. Ft. Gas \_\_\_\_\_  
 cc. Oil \_\_\_\_\_  
 cc. Water \_\_\_\_\_  
 cc. Mud \_\_\_\_\_  
 Tot. Liquid cc. \_\_\_\_\_

Date Sept. 30, 1969 Ticket Number T-507982  
 Kind of Job D.S.T. Halliburton District England  
 Tester Jim Haggard Witness Wood + Watson  
 Drilling Contractor I.D.C. (Orion)

Gravity \_\_\_\_\_ ° API @ \_\_\_\_\_ ° F.  
 Gas/Oil Ratio \_\_\_\_\_ cu. ft./bbl.  
 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 8680 - 8696 Ft.  
 All Depths Measured From K.B. \_\_\_\_\_  
 Total Depth 11.053 Ft.  
 Main Hole/Casing Size 9 5/8" 47 # P.110 Casing  
 Drill Collar Length \_\_\_\_\_ I.D. \_\_\_\_\_  
 Drill Pipe Length 8647 I.D. 4.276  
 Packer Depth(s) 8672 Ft.  
 Depth Tester Valve 8659 Ft.

| TYPE      | AMOUNT   | Depth Back Pres. Valve | Surface Choke | Bottom Choke  |
|-----------|--|------------------------|---------------|---------------|
| Cushion   | salt water 1000'                                     | Ft. no                 | 1/2           | 3/4           |
| Recovered | 1000 Feet of Salt Water                              |                        |               | water cushion |
| Recovered | 560 Feet of invert mud                               |                        |               |               |
| Recovered | 1000 Feet of clubbered mud                           |                        |               |               |
| Recovered | Feet of 60 % H <sub>2</sub> O - Oil 20 % solids 20 % |                        |               |               |
| Recovered | Feet of  |                        |               |               |

Remarks Open tool at 18:00 hrs. with good blow remaining steady thru test, close tool at 18:15 then open at 18:45 with good blow for three hr. then close in for 3 hrs. no gas or fluid to surface. Rev. out.

| TEMPERATURE         | Gauge No. 2322 |        | Gauge No. 2323  |        | Gauge No.   |        | TIME             |           |
|---------------------|----------------|--------|-----------------|--------|-------------|--------|------------------|-----------|
|                     | Depth:         | Ft.    | Depth:          | Ft.    | Depth:      | Ft.    |                  |           |
| Est. 160°F.         | 24-8551        | 8659   | 24-8565         | 8710   |             |        | Tool XAMX        |           |
|                     | Blanked Off no |        | Blanked Off yes |        | Blanked Off |        | Opened 18:00P.M. |           |
| Actual °F.          | Pressures      |        | Pressures       |        | Pressures   |        | Tool Closed 2145 | A.M. P.M. |
|                     | Field          | Office | Field           | Office | Field       | Office | Reported         | Computed  |
| Initial Hydrostatic | 6618           | 6524.5 | 6562            | 6552.1 |             |        | Minutes          | Minutes   |
| Flow Initial        | 1598           | 1502.1 | 2052            | 1964.9 |             |        |                  |           |
| Flow Final          | 1598           | 1744.4 | 2052            | 2006.5 |             |        | 15               | 15        |
| Closed in           | 4502           | 4453.3 | 4475            | 4465.8 |             |        | 30               | 30        |
| Flow Initial        | 2100           | 2087.2 | 2118            | 2089.5 |             |        |                  |           |
| Flow Final          | 2470           | 2464.1 | 2552            | 2471.5 |             |        | 180              | 180       |
| Closed in           | 6058           | 6059.9 | 6088            | 6067.1 |             |        | 180              | 240       |
| Final Hydrostatic   | 6618           | 6601.0 | 6648            | 6617.0 |             |        |                  |           |

**SPECIAL PRESSURE DATA**

SOCIETE AUXILIAIRE DES PRODUCTEURS DE PETROLE

## FLOPETROL

BLOCK No. 3  
FISHWHARF  
GREAT YARMOUTH  
NORFOLK, ENGLAND

TELEPHONE :  
GREAT YARMOUTH 2081/4028

TELEX :  
97386

AMOCO NORWAY

*PROR  
FILE*

Drill Stem Tests  
on  
Well No. 2/11 - 1

From: 21st September 1969  
To: 1st October 1969

600 Psi NATIONAL SEPARATOR A3221  
5000 Psi NATIONAL HEATER A3937

Chief Operator:  
A. SCOTT



SUMMARY OF REPORT

1. Outline of Operations
  - (a) Object
  - (b) Description
  - (c) Main Results
2. Summary of Events
3. Comments
4. Final Data
5. Detailed Calculation of Gas Flow Rate
6. Barton Chart (original copy only)

## 1. OUTLINE OF OPERATIONS

---

- (a) Object
- (b) Description
- (c) Main Results

OUTLINE OF OPERATIONS

(a) OBJECT

The object of the operation was to carry out on Well 2/11-1 for AMOCO (NORWAY) PETROLEUM COMPANY LTD. production testing on perforated zones.

(b) DESCRIPTION

The operation was carried out from the 21st September to the 1st October 1969 with:

- (a) A crew of 2 men
- (b) One 600 Psi NATIONAL separator
- (c) One split coil gas fired heater
- (d) Appropriate surface pressure and temperature recorders

D.S.T. No. 1

After running the test string, the test tool was opened to test the Interval 8635' - 8655'. The well was first unloaded overboard and switched through the separator when oil reached surface. The time allowed for testing through the separator was not long enough to obtain any viable measurement, as the well flow rate was declining steadily and rapidly to "no flow".

D.S.T. No. 2

After squeezing off the Interval 8635' - 8655', the top zone was perforated (8510' - 8545') and the test string ran back in hole with 3500' of water cushion.

Cont/.....

...../cont

As there were no surface indications of flow, 5 Bbls of calcium chloride solution were pumped to the formation at 2150 Psig. No evidence of flow resulted.

D.S.T. No. 3

The test string was then pulled out and the test tool checked.

The test was run back for D.S.T. No. 3 on the same zone (8510' - 8545') but with still no indication of flow to surface after opening the test tool.

D.S.T. No. 4

The cement retainer and plug were drilled out and two more intervals perforated : 8624'-8664'/8680'-8696'.

The perforated zones were acidized with 14 Bbls of 15% Hcl.

D.S.T. No. 4 was then run with 5000' of water cushion.

After oil appeared at surface, the well effluent was switched through the separator and measured.

Gas and oil samples were caught.

D.S.T. No. 5

The test string was pulled out and run back to test the interval 8630' - 8696'.

No surface indication of flow.

The test tool was then pulled out, D.S.T. No. 5 having concluded the test series.

.....  
Cont/.....

...../Cont

(c) MAIN RESULTS

D.S.T. No. 1  
8635'-8655'

Water flowing when unloading  
Oil to surface - flow rate decreasing  
to nil - No measurement possible

D.S.T. No. 2  
8510'-8545'

No flow

D.S.T. No. 3  
8510'-8545'

No flow

D.S.T. No. 4  
8624'-8664'  
8680'-8696'

Oil flow rate = 917.8 BOPD  
Gas flow rate = 0.448 Mmscf/d  
G.O.R. = 488 Cuft/Bbl.  
W.H.P. = 260 Psi/g  
W.H.T. = 75° F.

The above figures were derived from  
last readings as flow rate was  
decreasing

D.S.T. No.5  
8680'-8696'

No flow

2. SUMMARY OF EVENTS

---

**FLOPETROL**Center: YARMOUTH  
Date: September 69

Customer :

Service order : AMOCO NORWAY

Well : 2/11-1

Field : NORWEGIAN NORTH SEA

Pay zone :

**SUMMARY****OF EVENTS**

(1)

| Date    | Events  |
|---------|---|
| 21.9.69 | Flopetrol crew arrived on board "ORION"                                     |
|         |   |
| 22.9.69 | Schlumberger ran in hole to perforate Interval                              |
|         | 8635' - 8655'   |
|         | Misfire in top 5' of interval   |
|         | Well started producing  |
|         | Reconditioned mud   |
|         | Schlumberger ran in hole and perforated top 5' of interval (8635' - 8640')  |
|         |   |
| 23.9.69 | Rigged up for <u>D.S.T. No. 1</u>   |
|         | 07.10 Started test - tool open  |
|         | Well flowing overboard, separator and heater by-passed                      |
|         | Packer slipped  |
|         | 09.40 Unloading 8621' of water cushion                                      |
|         | 12.00 Oil to surface  |
|         | 12.15 Switched flow through separator                                       |
|         | 12.30 WHP 150 Psi   |
|         | Caught liquid samples   |
|         | Steady decline in well head pressure and liquid flow rate                   |
|         | Flowing time not long enough through separator to obtain any stable reading |
|         | 13.04 Well stopped flowing  |
|         | 13.10 Shut well in  |
|         |   |
|         | <u>END OF TEST NO. 1</u>  |
|         |   |
|         |   |

Chef Operateur  
A. SCOTT

Symbole 11 - CD 40 GB Imp. PEUCHEUR - PARIS 2431

**FLOPETROL**

Center YARMOUTH

Date : September 69

Customer : AMOCO NORWAY

Service order :

Field : NORWEGIAN NORTH SEA

Well : 2/11-1

Pay zone :

**SUMMARY**

**OF EVENTS (2)**

| Date    | Events  |
|---------|---|
| 24.9.69 | Set cement retainer                                     |
|         | Squeezed off perforated Interval 8635'-8655'            |
|         | Schlumberger ran in to perforate top zone               |
|         | 8510' - 8545'   |
| 10.57   | Opened test tool for D.S.T. No. 2                       |
|         | 3500' of water cushion                                  |
|         | No flow   |
|         | Pressured up to 2150 Psi                                |
|         | Pumped 5 Bbls of calcium chloride solution to formation |
|         | No flow   |
|         | END OF TEST NO. 2                                       |
|         |   |
| 25.9.69 | Pulled test string out of hole                          |
|         | Checked tool and ran back in hole on same zone          |
|         | <u>D.S.T. No. 3 (8510'-8545')</u>                       |
|         |   |
| 12.56   | Opened test tool  |
|         | A rise of approximately 500 feet in level of 1500'      |
|         | water cushion   |
|         | No flow   |
| 16.26   | Closed tool   |
|         | <u>END OF TEST NO. 3</u>                                |
|         |   |
| 26.9.69 | Ran in with drill pipes to drill out cement retainer    |
|         | and plug  |

Chef Operateur  
A. SCOTT

Symbol 11 - CD 40 GB Imp. PEUCHE - PARIS 2031



**FLOPETROL**

Center: YARMOUTH  
Date: September 69

Customer: AMOCO NORWAY  
Service order:  
Field: NORWEGIAN NORTH SEA Pay zone:  
Well: 2/11-1

**SUMMARY (3)  
OF EVENTS**

| Date    | Events  |
|---------|---|
| 27.9.69 | 08.30 Schlumberger perforated the following intervals:<br>8624'-8664'<br>8680'-8696'<br>Acidized this zone with 14 Bbls. of 15% Hcl.  |
| 28.9.69 | D.S.T. NO. 4<br>Ran D.S.T. string with 5000' of water cushion<br>10.21 Opened test tool<br>Well flowing overboard - separator and heater<br>by-passed<br>11.52 Water to surface<br>11.58 Switched water to flow through separator<br>[REDACTED]<br>12.30 By-passed separator<br>measured water cushion flow rate<br>14.10 Oil to surface<br>14.23 Switched flow through separator<br>Caught oil and gas samples<br>15.48 Shut well in |
| 29.9.69 | END OF TEST NO. 4<br>Pulled out test string<br>Ran back test string in hole for<br>D.S.T. NO. 5<br>on Interval 8680'-8696' with 1000' of water cushion<br>18.00 Opened test tool<br>No flow   |

Chef Operateur  
A. SCOTT

Symbol II - GD 40 CB Imp. RECHIT - PAFS 241

FLOPETROL

Customer : AMOCO NORWAY  
Service order :  
Field : NORWEGIAN NORTH SEA

Well : 2/11-1  
Pay zone :

Center: YARMOUTH  
Date: September/  
October 69

**SUMMARY OF EVENTS** (4)

| Date    | Events |   |
|---------|--------|---|
| 29.9.69 | 21.45  | Shut test tool  |
|         |        | <u>END OF TEST NO. 5</u>                                |
|         |        | Checked FLOPETROL Floco oil meter with Halliburton pump |
| 30.9.69 |        | Maintenance and stand-by                                |
| 1.10.69 | 14.45  | Flopetrol crew left "ORION" for Stavanger               |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |
|         |        |   |

|                 |
|-----------------|
| Chef Operateur  |
| <u>A. SCOTT</u> |

3. COMMENTS

---

## COMMENTS

### 1. GAS FLOW RATE

Reference is made to the rules and co-efficients given in the American Gas Association publication "Orifice Metering of Natural Gas". From the gas measuring report No.3 based on this, Flopetrol has prepared a calculation form "Gas Flow Rate by Orifice Meter". The value of the co-efficient  $F_u$  depends on the units in which the gas flow rate is to be given. In this report, the unit co-efficient is - 1, since gas flow rate is reported in cuft/hour and cuft/day at 14.73 Psi/a and 60°F.

### 2. CALCULATION

For calculation, the specific gravity of the gas and specific gravity of the oil were:

Specific gravity oil : 0.800

Specific gravity gas : 0.7568

### 3. OIL DISCHARGE READING

During half an hour passing through the separator, oil discharge registered 4.78 Bbl. on flow meter. As these results did not seem reasonable, in conjunction with Halliburton, the flow meter was tested by pumping 100 Bbl. of water through the Floco meter.

By checking every 25 Bbl., it was found that a co-efficient of X 4 was required to be used with the results of oil discharge reading on the Floco meter:

|         | <u>Floco Meter</u> | <u>Halliburton</u> |
|---------|--------------------|--------------------|
| Final   | 1099.5             | 110 Bbl.           |
| Initial | 1074.5             | 10 Bbl.            |
|         | <hr/>              | <hr/>              |
|         | 25.0               | 100 Bbl.           |

Co-efficient = X 4

4. FINAL DATA

---

|                                 |                                   |                   |
|---------------------------------|-----------------------------------|-------------------|
| <b>FLOPETROL</b>                | Customer: <b>AMOCO NORWAY</b>     | Well: <b>2/11</b> |
| Base: <b>GT. YARMOUTH</b>       | Service order:                    | Zone:             |
| Date: <b>23/24 September 69</b> | Field: <b>NORWEGIAN NORTH SEA</b> |                   |

**WELL TESTING  
Data Sheet**

|                              |              |                                      |                         |                         |                    |
|------------------------------|--------------|--------------------------------------|-------------------------|-------------------------|--------------------|
| Open hole<br>or perforations | From:<br>to: | Amerada depth:<br>Z origin of depth: | Casing:<br>Casing shoe: | Tubing:<br>Tubing shoe: | Packer:<br>Set at: |
|------------------------------|--------------|--------------------------------------|-------------------------|-------------------------|--------------------|

| 1<br>Hour | 2<br>Choke<br>or mm. | FLOWING CONDITIONS                              |                     |   |                     |   |   |                                       | SAMPLES                                |                  |  |  | OIL/CONDENSATE |   | GAS        |  | WATER     | 18<br>G. O. R.<br>m <sup>3</sup> /m <sup>3</sup><br>cuft/bbl |   |  |  |  |  |
|-----------|----------------------|---|---------------------|---|---------------------|---|---|---------------------------------------|--|------------------|--|--|----------------|---|------------|--|-----------|--|---|--|--|--|--|
|           |                      | BOTTOM HOLE                                     |                     | TUBING  |                     | CASING  | SEPARATOR                                       |                                       | OIL                                    |                  | GAS                                    |  | Flow rate      |   | Cumulative |  | Flow rate |  | Cumulative                              |  | Flow rate                              |  |  |
|           |                      | 3<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 4<br>Temp.<br>°C °F | 5<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 6<br>Temp.<br>°C °F | 7<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 8<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 9<br>Temp.<br>°C °F                   | 10<br>Specific<br>gravity<br>15°C 60°F | 11<br>%<br>Water | 12<br>Specific<br>gravity<br>15°C 60°F | 13<br>Flow rate<br>m <sup>3</sup> h Bbls/h |                | 14<br>Cumulative<br>m <sup>3</sup> Bbls |            | 15<br>Flow rate<br>m <sup>3</sup> h cuft/h |           |  | 16<br>Cumulative<br>m <sup>3</sup> cuft |  | 17<br>Flow rate<br>m <sup>3</sup> Bbls |  |  |
|           |                      |   |                     |   |                     |   |   | D.S.T. NO. 1 (Interval 8635' - 8655') |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 23/9      |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 07.10     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 09.40     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 10.00     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 10.20     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 10.40     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 11.00     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 11.20     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 11.40     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 12.00     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 12.15     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 12.30     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 13.04     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 13.10     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 24/9      |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
| 10.57     |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |
|           |                      |   |                     |   |                     |   |   |                                       |  |                  |  |  |                |   |            |  |           |  |   |  |  |  |  |

Chief Operator  
**A. SCOTT**

|                            |                                    |                      |                         |
|----------------------------|------------------------------------|----------------------|-------------------------|
| <b>FLOPETROL</b>           | Customer : <b>AMOCO NORWAY</b>     | Well : <b>2/11-1</b> | <b>WELL TESTING (2)</b> |
| Base : <b>GT. YARMOUTH</b> | Service order :                    | Zone :               | <b>Data Sheet</b>       |
| Date : <b>25-27.9.69</b>   | Field : <b>NORWEGIAN NORTH SEA</b> |                      |                         |

|                           |                |  |                           |                           |                      |
|---------------------------|----------------|--|---------------------------|---------------------------|----------------------|
| Open hole or perforations | From :<br>to : | Amerada depth :<br>Z origin of depth : | Casing :<br>Casing shoe : | Tubing :<br>Tubing shoe : | Packer :<br>Set at : |
|---------------------------|----------------|--|---------------------------|---------------------------|----------------------|

| 1<br>Hour | 2<br>Choke<br>or mm. | FLOWING CONDITIONS                              |                     |   |                     |   |   |                     | SAMPLES                                |                  |  | OIL/CONDENSATE   |        | GAS            |      | WATER            | 18<br>G. O. R.<br>m <sup>3</sup> /m <sup>3</sup><br>cuft/bbl |        |                |      |
|-----------|----------------------|---|---------------------|---|---------------------|---|---|---------------------|--|------------------|--|------------------|--------|----------------|------|------------------|--|--------|----------------|------|
|           |                      | BOTTOM HOLE                                     |                     | TUBING  |                     | CASING  |   | SEPARATOR           |  | OIL              |  | GAS              |        | 13             | 14   | 15               |  | 16     | 17             |      |
|           |                      | 3<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 4<br>Temp.<br>°C °F | 5<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 6<br>Temp.<br>°C °F | 7<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 8<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 9<br>Temp.<br>°C °F | 10<br>Specific<br>gravity<br>15°C 60°F | 11<br>%<br>Water | 12<br>Specific<br>gravity<br>15°C 60°F | m <sup>3</sup> h | Bbls/h | m <sup>3</sup> | Bbls | m <sup>3</sup> h |  | cuft.h | m <sup>3</sup> | cuft |
| 25/9      |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 12.56     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 16.26     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 26/9      |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 27/9      |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 08.30     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 28/9      |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 10.21     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 11.52     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 11.58     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 12.30     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
|           |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 12.40     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 12.45     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 13.00     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 13.10     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 13.20     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |
| 14.10     |                      |   |                     |   |                     |   |   |                     |  |                  |  |                  |        |                |      |                  |  |        |                |      |

Symbols II CD 4/68



WATER RATE  
BBL/H

34.410  
35.190  
41.000  
52.390  
72.530

Cont/.....

Chief Operator  
**A. SCOTT**

|  |   |                       |                                       |
|--|---|-----------------------|---------------------------------------|
| <b>FLOPETROL</b><br>Base: GT. YARMOUTH<br>Date: 28-29.9.69 | Customer: MOCO NORWAY<br>Service order:<br>Field: NORWEGIAN NORTH SEA | Well: 2/11-1<br>Zone: | <b>WELL TESTING (3)</b><br>Data Sheet |
|--|---|-----------------------|---------------------------------------|

|                           |           |                                   |                      |                      |                 |
|---------------------------|-----------|-----------------------------------|----------------------|----------------------|-----------------|
| Open hole or perforations | From: to: | Amerada depth: Z origin of depth: | Casing: Casing shoe: | Tubing: Tubing shoe: | Packer: Set at: |
|---------------------------|-----------|-----------------------------------|----------------------|----------------------|-----------------|

| 1<br>Hour | 2<br>Choke<br>or mm. | FLOWING CONDITIONS                              |                     |   |                     |   |   |                     | SAMPLES  |                  |                                   | OIL/CONDENSATE  |                  | GAS             |                  | 17<br>GAS<br>Mmsc/d | 18<br>G. O. R.<br>cuft, bbl |
|-----------|----------------------|---|---------------------|---|---------------------|---|---|---------------------|--|------------------|-----------------------------------|-----------------|------------------|-----------------|------------------|---------------------|-----------------------------|
|           |                      | BOTTOM HOLE                                     |                     | TUBING  |                     | CASING  |   | SEPARATOR           |  | OIL              | GAS                               | 13<br>Flow rate | 14<br>Cumulative | 15<br>Flow rate | 16<br>Cumulative |                     |                             |
|           |                      | 3<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 4<br>Temp.<br>°C °F | 5<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 6<br>Temp.<br>°C °F | 7<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 8<br>Pressure<br>kg/cm <sup>2</sup> psig<br>Bar | 9<br>Temp.<br>°C °F | 10<br>Specific<br>gravity<br>60°F                                      | 11<br>%<br>Water | 12<br>Specific<br>gravity<br>60°F | Bbls/h          | Bbls             | cuft/h          | cuft             |                     |                             |
| 28/9      |                      |   |                     |   |                     |   |   |                     | D.S.T. NO. 4 (continued)   |                  |                                   |                 |                  |                 |                  |                     |                             |
| 14.23     |                      |   |                     |   |                     |   |   |                     | Switched flow through separator  |                  |                                   |                 |                  |                 |                  |                     |                             |
| 4.33      |                      |   |                     |   |                     |   | 92  | 68                  |  |                  |                                   |                 |                  | 27997           |                  | 0.672               |                             |
| 14.43     |                      |   |                     |   |                     |   | 100   | 68                  | 0.800  | 0.757            |                                   |                 |                  | 24649           |                  | 0.592               |                             |
| 14.53     |                      |   |                     |   |                     |   | 95  | 69                  |  |                  |                                   |                 |                  | 23922           |                  | 0.574               |                             |
| 15.18     |                      |   |                     | 290   | 75                  |   | 38  | 70                  |  |                  |                                   | zero reading    |                  | 23294           |                  | 0.559               |                             |
| 15.28     |                      |   |                     | 290   | 75                  |   | 38  | 68                  |  |                  |                                   |                 |                  | 21857           |                  | 0.525               |                             |
| 15.38     |                      |   |                     | 260   | 75                  |   | 39  | 62                  |  |                  |                                   |                 |                  | 19654           |                  | 0.472               |                             |
| 15.48     |                      |   |                     |   |                     |   | 40  | 62                  |  |                  | 38.24                             | 19.12           | 18676            |                 | 0.448            | 488                 |                             |
|           |                      |   |                     |   |                     |   |   |                     | G.O.R. calculated with last reading 18676/38.24                        |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | The well produced 19.12 Bbl. of oil in half an hour, according to this |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | the OIL FLOW RATE was : 38.24 Bbls./h                                  |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | Oil and gas samples were caught during this flowing period             |                  |                                   |                 |                  |                 |                  |                     |                             |
| 15.48     |                      |   |                     |   |                     |   |   |                     | Shut well in   |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | END OF D.S.T. NO. 4  |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | Pulled out test string   |                  |                                   |                 |                  |                 |                  |                     |                             |
| 29/9      |                      |   |                     |   |                     |   |   |                     | Ran back test string in hole   |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | D.S.T. NO. 5 (Interval 8680'-8696')                                    |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | 1000' of water cushion   |                  |                                   |                 |                  |                 |                  |                     |                             |
| 18.00     |                      |   |                     |   |                     |   |   |                     | Opened test tool   |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | No flow  |                  |                                   |                 |                  |                 |                  |                     |                             |
| 21.45     |                      |   |                     |   |                     |   |   |                     | Shut in test tool  |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | END OF D.S.T. NO. 5  |                  |                                   |                 |                  |                 |                  |                     |                             |
|           |                      |   |                     |   |                     |   |   |                     | END OF TESTING PERIOD  |                  |                                   |                 |                  |                 |                  |                     |                             |

Chief Operator  
**A. SCOTT**



5. DETAILED CALCULATION OF GAS  
FLOW RATE

---

$$Q_h = \sqrt{hwPf} \cdot C'$$

C' = Fu. Fg. Fb. Fm. Ft. Fpv. Y. Fr.

Where Fu. = Fpb. Ftb. conversion factor

Imp. REGIST. PAT. 5 2251

**FLOPETROL**

Base : GT. YARMOUTH  
Date :

Customer : AMOCO NORWAY

Service order :

Field : NORWEGIAN NORTH SEA

Well : 2/11-1

Zone :

**GAS FLOW RATE BY ORIFICE METER**

Computation form

| 1<br>Hour | 2<br>Elapsed Time | 3<br>Orifice | 4<br>T of the air °C | 5<br>T of the gas at the outlet °C | 6<br>Pf or absolute pressure psi | 7<br>hw or mm. Water | 8<br>√hw. Pf. | 9<br>C'                  |           |            |          |           | 14<br>C' | 15<br>Flow rate (Qh) Standard Conditions 60°F 14.7Psi | 16<br>Observations Mmscf/d |
|-----------|-------------------|--------------|----------------------|------------------------------------|----------------------------------|----------------------|---------------|--------------------------|-----------|------------|----------|-----------|----------|---|----------------------------|
|           |                   |              |                      |                                    |                                  |                      |               | 9<br>C = Fu. Fg. Fb. Fm. | 10<br>Ft. | 11<br>Fpv. | 12<br>Y. | 13<br>Fr. |          |   |                            |
| 1423      |                   |              |                      |                                    |                                  |                      |               | Fu : through separator   |           |            |          |           |          |   |                            |
|           | 0.10              | 1.000        |                      |                                    |                                  |                      |               | d : 0.757                |           |            |          |           |          |   |                            |
| 1433      | 0.20              | "            |                      | 68                                 | 107                              | 135                  | 120.2         | Fg : 1.1493              |           |            |          |           | 232.917  | 0.672   |                            |
| 1443      | 0.30              | "            |                      | 68                                 | 115                              | 96                   | 105.1         | Fb : 201.99              |           |            |          |           | 24649    | 0.592   |                            |
| 1453      | 0.55              | "            |                      | 69                                 | 110                              | 96                   | 102.8         | Fm : 1                   |           |            |          |           | 23922    | 0.574   |                            |
| 1518      | 1.05              | "            |                      | 70                                 | 53                               | 192                  | 100.8         | c 232.147                |           |            |          |           | 232.706  | 0.559   |                            |
| 1528      | 1.15              | "            |                      | 68                                 | 53                               | 168                  | 94.4          |                          |           |            |          |           | 231.092  | 0.525   |                            |
| 1538      | 1.25              | "            |                      | 62                                 | 54                               | 132                  | 84.4          |                          |           |            |          |           | 231.535  | 0.472   |                            |
| 1548      |                   |              |                      | 62                                 | 55                               | 117                  | 80.2          |                          |           |            |          |           | 232.865  | 0.448   |                            |
|           |                   |              |                      |                                    |                                  |                      |               | Fu :                     |           |            |          |           |          |   |                            |
|           |                   |              |                      |                                    |                                  |                      |               | d :                      |           |            |          |           |          |   |                            |
|           |                   |              |                      |                                    |                                  |                      |               | Fg :                     |           |            |          |           |          |   |                            |
|           |                   |              |                      |                                    |                                  |                      |               | Fb :                     |           |            |          |           |          |   |                            |
|           |                   |              |                      |                                    |                                  |                      |               | Fm :                     |           |            |          |           |          |   |                            |
|           |                   |              |                      |                                    |                                  |                      |               | c                        |           |            |          |           |          |   |                            |

Orifice meter : no.  
Serial Orifice no. :

D = 4.026"  
= 1.000"

hw nominal : 300" water

Chief Operator :

A. SCOTT