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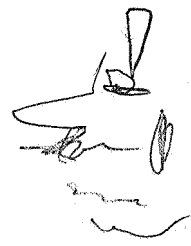
BA 71-2396-1

GEOLOGIC SUMMARY

COMPLETION REPORT

EXTENSION TEST

ESSO 25/10-3



Geologic Summary

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GEOLOGIC HISTORY

I. Introduction:

A. Well Designation: Esso 25/10-3

B. Well Classification: Extension Test

C. Well Location:

1) Country: Norway, Jurisdictional waters

2) License: 028

3) Coordinates:

Latitude 59° 12' 58.994"N

Longitude 2° 19' 41.964"E

4) Seismic Location:

Line SC 72, Shotpoint 6626

5) Water Depth: 414 feet

II. Purpose of Well:

Esso 25/10-3 was located 1) to test the Lower Eocene oil sands encountered in Esso wells 25/10-1, 25/11-1 and 25/8-1 in a lower structural position to accurately establish the oil/water contact in the area; 2) to determine the lateral continuity of the thin Lower Eocene oil sands; and 3) to test the theory that the Lower Eocene sands thicken towards the northwest.

III. Results of Well:

Esso 25/10-3 drilled to a total depth of 6304 feet and bottomed in Paleocene sediments. The 394 feet of Paleocene penetrated was composed primarily of 3 sands with beds of grey green shale between. From top to bottom the Paleocene sands were respectively 98 feet thick with 35% porosity, 111 feet thick with 35% porosity, and 30 feet thick with 30% porosity. These sands were water-bearing.

The 1700 foot thick Eocene section was chiefly grey to grey green clay shales with 22 feet of wet sand in the interval 4595-4635 feet, a 13 foot oil-bearing sand from 5741 to 5754 feet, and a 3 foot wet sand just above the Eocene-Paleocene contact at 5910 feet. The 13 foot oil sand had 32-36% porosity and tested 26° API gravity oil on a wire line formation test.

The Oligocene to Recent sediments consisted of clays and sands with no indications of hydrocarbons.

IV. Well History:

A. General

- 1) Spud date: August 27, 1970
- 2) Completion date: September 13, 1970
- 3) Status: Plugged and abandoned
- 4) Total depth: 6304 feet

B. Contractor and Rig: Glomar Grand Isle

C. Casing:

- 30 inch at 568 feet
- 13-3/8 inch at 1266 feet
- 9-5/8 inch at 3092 feet

D. Mud Program:

Initial drilling from the sea floor to 1320 feet was with sea water and gel. From 1320 to 3120 a mud system of sea water, Spersene XP-20 salinex was used. Below 3120 to TD at 6304 feet, the well was drilled with a fresh water Spersene XP-20 mud system.

E. Drilling Problems:

Except for stuck pipe at 4090 feet, which was worked free with Diesel oil and pipe lax in 4-1/4 hours, drilling operations were routine and trouble-free

F. Coring:

1) Conventional

<u>Number</u>	<u>Interval</u> <u>(feet)</u>	<u>Recovery Length</u> <u>(feet)</u>	<u>%</u>
1	5750-5801	51	100

2) Sidewall

None taken

G. Logging:

1) Baroid

Interval (feet)

- a. Drilling rate 1320 - 6300
- b. Lithology (%) 1320 - 6300
- c. Cuttings gas 1320 - 6300
- d. Mud gas 1320 - 6300
- e. Chromatograph 1320 - 6300

2) Schlumberger

<u>Type Log</u>	<u>Depth (feet)</u>	<u>Run Number</u>
√a. Induction Electric	3093-6295	1
√b. BHC Sonic-Gamma Ray	3092-6285	1
√c. Gamma Ray	446-3092	1
√d. Formation Density	3092-6295	1

3) Velocity Survey

Seismograph Services Ltd. ran a Velocity Survey at TD. A quality control geophysicist from the North Sea Study Group was present to observe the survey.

H. Testing:

1) Production Test Results:

None taken.

2) Formation Interval Test Results:

<u>Test Number</u>	<u>Depth (feet)</u>	<u>Result</u>
1	5744	Seal Failure
2	5748	Recovered 1.85 cf gas, 900 cc oil and 2300 cc gas and oil cut mud, GOR 327. Seal failure after 8 minutes. Sampling pressure 2500 psi, Hydrostatic pressure 3650 psi.

I. Abandonment:

A total of four cement plugs were set in this well. Two plugs were set in the open hole below the 9-5/8 inch casing. The first was a 200 sack neat cement plug from 6304 to 5821 feet, followed by a second, 220 sack neat cement plug, from 5821 to 5321 feet.

The third plug was set across the 9-5/8 inch casing shoe from 3250 to 2900 feet. This was a 150 sack neat cement plug and was tagged for confirmation with 10,000 pounds. The fourth plug was 125 sacks of neat cement set in the 9-5/8 inch casing from 1200 to 900 feet.

The guide structure and well head were left in place with the highest portion of the structure 16 feet above the sea bed. It is planned to remove the guide structure and well head at a later date.

V. Stratigraphy:

A. Table of Stratigraphy 25/10-3 (KB 33 feet)

<u>Stratigraphic Unit</u>	<u>Drill Depth (feet)</u>	<u>Subsea Top (feet)</u>	<u>Thickness (feet)</u>
Pliocene/Pleistocene/Recent	447-1750	(-414)	1303
Miocene	1750-3075	(-1717)	1325
Oligocene	3075-4210	(-3042)	1135
Eocene	4210-5910	(-4177)	1700
Paleocene	5910-6304 (TD)	(-5877)	394 +

B. Lithologic Descriptions

1) Sample Descriptions (wellsite)

1320 to 6300 feet

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ESSO 25/10-3

Wellsite Sample Descriptions.

1320' - 1410'	90%	<u>Clay</u> , light-medium gray, slightly calcareous, silty, very soft.
	10%	<u>Cement</u> .
1410' - 1500'	100%	<u>Clay</u> , as above, bentonitic, slightly sandy.
	TR	<u>Lithic</u> fragments.
1500' - 1560'	90%	<u>Clay</u> , as above, very sandy.
	10%	<u>Sand</u> , clear, very fine-fine, quartzitic, subangular, well sorted, no show.
1560' - 1800'	90%	<u>Clay</u> , light-medium gray, calcareous, silty, very sandy, very soft.
	10%	<u>Sand</u> , as above, fair sorting, no show.
	TR	<u>Lithic</u> fragments
	TR	<u>Limestone</u> , buff, micritic, firm.
	TR	<u>Macro-fossil</u> fragments at 1770 ft.
1800' - 1920'	80%	<u>Clay</u> , as above.
	10%	<u>Sand</u> , as above, with some medium-coarse grains, no show.
	10%	<u>Macro-fossil</u> fragments, as above.
1920' - 2040'	60%	<u>Clay</u> , as above, medium gray-light brown.
	30%	<u>Macro-fossil</u> fragments, as above.
	10%	<u>Sand</u> , as above, fine-coarse, no show.
	TR	<u>Lithic</u> fragments
2040' - 2250'	90%	<u>Clay</u> , as above.
	10%	<u>Sand-Sandstone</u> , white-buff, very fine- medium, subangular, poor-fair sorting, dolomitic, carbonaceous specks, friable-firm, no show.
	TR	<u>Limestone</u> , buff, micritic, firm.

Wellsite Sample Descriptions/ page 2.

- 2250' - 2340' 50% Clay, as above, light gray-light brown.
50% Sand, clear-light gray, very fine-fine, subangular,
fair sorting, no show.
TR Glauconite.
- 2340' - 2610' 60% Sand-Sandstone, clear-light gray, very fine-coarse,
quartz with feldspar, subangular, poor sorting,
dolomitic, argillaceous, friable-firm, no show.
40% Clay, as above.
TR Quartz grains, light green.
TR Lignite at 2550 ft.
- 2610' - 2730' 50% Clay, as above.
40% Sand-Sandstone, clear-frosted, very fine-coarse,
quartzitic, subangular-subrounded, poorly sorted,
argillaceous, very friable, no show.
10% Silt, clear-light gray, quartzitic.
- 2730' - 2790' 50% Clay, as above, light gray green-buff.
40% Sand-Sandstone, as above.
10% Silt, as above.
NOTE 30% of these samples is composed of granular,
dark green Glauconite.
- 2790' - 2940' 50% Clay, as above.
40% Sand, as above, very fine-medium, no show.
10% Silt, as above.
TR Glauconite granules, as above.
TR Carbonaceous material.
- 2940' - 3120' 50% Sand, as above, very fine-coarse, no show.
40% Clay, as above, light gray-buff.
10% Silt, as above.
TR Sphalerite (?), dark brown at 2940' feet.
TR Shell fragments
- 3120' - 3210' 80% Clay, light gray-medium brown, silty, sandy, slightly
calcareous, soft.

Wellsite Sample Descriptions / Page 3.

20% Sand, clear, quartzitic, very fine-coarse, subangular-subrounded, poorly sorted, no show.

TR Lignite.

TR Glauconite.

3210' - 3240'

50% Clay, buff-brown, very silty, sandy, slightly calcareous, soft.

40% Siltstone, medium-dark brown, calcareous, very argillaceous, very soft.

10% Sand, as above, no show.

TR Glauconite.

3240' - 3420'

80% Clay, as above.

10% Siltstone, as above.

10% Sand, as above, slight trace of orange quartz, coarse at 3240 ft., no show

TR Glauconite.

3420' - 3600'

70% Clay, as above, buff-light brown.

20% Siltstone, as above.

10% Sand, as above, subrounded, no show.

TR Glauconite.

NOTE: Clay becoming shaley at 3570 ft.

3600' - 3690'

70% Clay, as above, buff, sticky.

20% Sand, as above, very fine-fine, no show.

10% Siltstone, as above.

TR Dolomite, white-buff, very silty, very argillaceous, soft at 3600 ft.

3690' - 3810'

50% Clay, as above.

40% Sand, as above, very fine-medium, no show.

10% Siltstone, as above.

TR Glauconite.

NOTE: Clay becoming shaley at 3750 ft.

3810' - 3900'

60% Clay, as above.

30% Sand, as above, no show.

- 10% Siltstone, as above.
TR Shale, gray green, silty, slightly dolomitic, very soft.
- 3900' - 3990'
50% Clay, as above.
40% Shale, as above.
10% Sand, as above, no show.
TR Siltstone, as above.
TR Chert, yellow-orange at 3900 ft.
- 3990' - 4050'
50% Clay, as above.
30% Shale, as above.
10% Sand-Sandstone, clear, quartzitic, very fine-fine, subangular-subrounded, fair sorting, siliceous, friable-firm, no show.
10% Siltstone, as above.
TR Pyrite at 4020 ft.
- 4050' - 4110'
90% Shale, brown gray- dark gray, very silty, calcareous, soft-firm.
10% Clay, gray-brown, very silty, very soft.
TR Sand-Sandstone, clear, quartzitic, very fine-coarse, subangular-subrounded, poorly sorted, argillaceous, friable, No show.
TR Siltstone, gray-white, calcareous, soft.
TR Limestone, buff, micritic, firm.
- 4110' - 4200'
70% Clay, medium gray, very silty, sandy, calcareous, very soft.
30% Shale, as above.
TR Sand, as above, No Show.
- 4200' - 4260'
70% Shale, dark gray, very silty, slightly calcareous, soft-firm.
30% Clay, as above.
TR Sand, as above, No Show.
TR Siltstone, white, calcareous, soft.

4260' - 4410' 70% Clay, as above.
30% Shale, medium gray-gray green, as above.
TR Sand, as above, No Show.
TR Siltstone, as above.

4410' - 4530' 50% Clay, as above.
50% Shale, as above.
TR Sand, as above, very fine-medium, No Show.
TR Siltstone, as above.

4530' - 4590' 70% Clay, as above.
30% Shale, as above, medium gray-gray brown.
TR Sand, as above, No Show.

4590' - 4680' 60% Shale, medium gray-gray brown, very silty, firm.
40% Clay, as above.
TR Sand, as above, No Show.
TR Siltstone, white, slightly calcareous, soft.

4680' - 4800' 70% Clay, as above.
30% Shale, as above.
TR Sand, as above, No Show.
TR Siltstone, as above.

4800' - 4920' 80% Shale, as above, with clusters of crystalline Pyrite
(1-3 mm).
20% Clay, as above.
TR Siltstone, as above, calcareous.
TR Sand, as above, No Show.
TR Limestone, white- yellow, micritic.
TR Pyrite -- rosettes, crystalline clusters.

4920' - 5160' 90% Shale, as above.
10% Clay, as above.
TR Siltstone, as above.
TR Sand-Sandstone, clear, fine grained, subangular, well
sorted, calcareous, soft-firm, No Show.

TR Limestone, as above.

TR Pyrite.

NOTE: A slight trace of C₂, C₃, C₄ occurred at 5010 ft.

5160' - 5220'

70% Shale, as above, slightly carbonaceous.

30% Clay, as above.

TR Siltstone, as above.

TR Sand, as above, No Show.

TR Limestone, as above.

5220' - 5490'

90% Shale, as above, medium-dark gray.

10% Clay, as above.

TR Limestone, as above, gray-yellow.

5490' - 5550'

50% Shale, as above.

50% Clay, as above.

TR Limestone, as above.

5550' - 5570'

80% Shale, as above, with some light blue green, soft.
(5% red brown).

20% Clay, as above.

5570' - 5610'

80% Shale, as above, with (10% red brown).

10% Clay, as above.

10% Tuff, dark green, silty, with bright yellow mineral fluorescence.

NOTE: Top of Eocene Rex at 5576 ft.

5610' - 5630'

60% Shale, as above, with (10% red brown).

20% Clay, as above.

20% Tuff, as above.

5630' - 5660'

80% Shale, with pyrite, as above, with (20% red brown).

20% Clay, as above.

TR Tuff, as above, with bright yellow fluorescence and a very slight cut.

TR Limestone, yellow brown.

- 5660' - 5700' 60% Shale, as above, with trace of red brown.
40% Clay, as above.
TR Siltstone, yellow, dull gold fluorescence, poor cut.
TR Sandstone, clear, quartz and feldspar, very fine-
fine, subangular-subrounded, fair sorting, friable,
excellent stain, gold fluorescence, excellent bright
cut.
TR Limestone, as above, light brown.
- 5700' - 5750' 60% Shale, as above.
30% Clay, as above.
10% Siltstone, tan, argillaceous, slightly calcareous,
dull gold fluorescence, no cut.
TR Sandstone, as above, calcareous, with poor stain,
dull yellow fluorescence, poor cut.
TR Limestone, as above.
- 5750' - 5801' See Core Description No. 1.
- 5801' - 6010' 100% Shale, light-dark gray-red brown, grainy, hard.
TR Sand, clear, very fine-coarse, quartz with some
feldspar, subangular-subrounded, poor sorting, No
Show.
TR Limestone, as above, tan.
TR Pyrite (3-5 mm in size).
- 6010' - 6130' 80% Shale, as above.
20% Sand, clear-frosted, fine-medium, quartz, subrounded,
poorly sorted, No Show.
TR Siltstone, white, sandy.
TR Limestone, as above.
- 6130' - 6190' 60% Sand, as above, No Show.
40% Shale, as above.
TR Siltstone, as above.
TR Limestone, as above.
- 6190' - 6300' 50% Clay, light gray green, soft.

40% Shale, as above.

10% Sand, as above, becoming finer grained, No Show.

NOTE: Clay is inferred to be caving from up hole. This interval is probably same as (6130 - 6190 ft.).

2) Core Description (conventional)

Core Number 1

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Core Description

- Core No. 1 (5750 - 5801) Rec 51 ft. 100%
- 5750' - 5758.4' SANDSTONE: Fine to medium grained, subangular to sub-rounded, well sorted (nearly bimodal), with some coarse quartz grains and 10-15% feldspar, micaceous, well indurated to very friable, trace glauconite, some zones well sorted, medium grained sand; good oil stain, bright gold fluorescence, excellent blue - white cut. Grade I oil show.
- 5758.4 - 5787.4' SHALE: Blue grey, light grey, and dark grey, all interbedded. Firm - hard, bedding from finely varved to several inches thick. Gold oil fluorescence displayed on fracture surfaces and in some silt as well as shale beds. Core when freshly pulled from core - barrel displayed sparse, spotty bleeding oil fluorescence over entire surface from 5758.4 to 5784.4 feet and from 5785.3 to 5786.4 feet. Very silty streaks within this interval are graded, with the finer particles at the top of each distinct zone grading to coarser grains at the bottom. Vertical displacement of some finely varved beds with undisturbed grosser zones indicates penecontemporaneous microfaulting during deposition. The above is well displayed at 5763 feet. Over the intervals from 5760 to 70 and from 5784 irregular fractures are filled with calcite and the fractured rock surfaces display slickensides. Bedding dips from 4° to 15°.
- 5787.4 - 5788' CONGLOMERATE: Intraformational, large shale fragments (up to 2 inches) in a very silty claystone matrix. Good oil stain and bleeding oil were observed over this interval.
- 5788 - 5801' SHALE: As above but no bleeding oil observed. After slabbing, very faint oil fluorescence noted in some shale and very silty beds. Oil fluorescence also noted along some fracture surfaces. Bedding dips from 6° to 14°.

Fractures noted as follows (apparent dips):

5752'.....45°
5752.6'.....58°
5767'.....45°
5771'.....65°

Bedding noted as follows (apparent dips):

5759'.....11°
5760'..... 7°
5764'..... 9°
5766'..... 5°
5769'..... 9°
5772'.....15°
5776.6..... 9°
5778.5.....10°
5781'..... 4°
5786'.....11°
5789.5..... 6°
5793.5.....11°
5796'.....14°
5800.5'.....13°

3) Sidewall Core Description

No sidewall cores taken

VI. Reservoirs:

Sand reservoirs are present in the Paleocene, Eocene, Oligocene and Miocene sections. With the exception of one thin sand in the Lower Eocene, all reservoirs were water-bearing.

The wet Paleocene sands were thick, ranging from 30 to 111 feet, and had porosities from 30 to 35%.

The only oil-bearing sand in 25/10-3 was a 13 foot Lower Eocene sand in the interval 5741-5754 feet. This sand had a porosity range of 32 to 36% and tested 26° API gravity oil on FIT.

VII. Conclusions:

Esso 25/10-3 was located to test three aspects of the Lower Eocene oil sands in the area of Esso wells 25/10-1, 25/11-1 and 25/8-1.

1) Oil/water contact

The Lower Eocene oil sand interval from 5741-5754 feet marked the lowest (and only) occurrence of oil stained sands in the well. Below the silty shale section from 5754 to 5903 feet, a 3 foot wet sand was topped at 5903 feet. The oil/water contact, then, appears to fall between drilled depths 5754 and 5903 feet.

2) Lateral continuity of Lower Eocene oil sands.

The thin Lower Eocene sands do not correlate between wells and appear to be lenticular and discontinuous.

3) Thickening of Lower Eocene sands to Northwest.

The Lower Eocene net sand thickness of 16 feet in 25/10-3 indicates a thinning rather than thickening of sands toward the Northwest.

The thin (13 foot) Lower Eocene oil sand encountered in 25/10-3 is not considered commercial and the well was plugged and abandoned.