CONFIDENTIAL

GEOLOGIC SUMMARY

COMPLETION REPORT

NEW FIELD WILDCAT

ESSO 8/3-1

Esso Exploration Norway Inc.

CONFIDENTIAL

E s s o 8/3-1

GEOLOGIC SUMMARY

Contents

		Page
I.	Introduction	1
	A. Well designation	1
	B. Classification	1
	C. Location	1
	D. Objective	1
	E. Results	1
	F. Status	1
II.	Drilling history	2
	A. General	2
	B. Contractor and rig	2
	C. Casing	2
	D. Mud program	2
	E. Drilling problems	3
	F. Cores	4
	1. Conventional	4
	2. Sidewall	5
	G. Testing	5
	H. Abandonment	5
III.	Stratigraphy	
	A. Table of stratigraphy	6
	B. Lithologic description	7

Esso 8/3-1

GEOLOGIC SUMMARY

I. INTRODUCTION

A. Well designation: ESSO 8/3-1

B. Classification: New Field Wildcat

C. Location: 105 meters N 87°E from shot point 16386, line S-226 at coordinates 57°59'13.3" N and 03°40'13.3" E.

D. Objective: This was an exploratory location to test the sedimentary section in this portion of the North Sea basin. The well penetrated the pre-Permian sufficiently to date it.

E. Results: No shows occurred during drilling and no tests were made. Porous sandstone was encountered in the Jurassic, but neither the hot wire indicator, chromatograph, nor cuttings indicated hydrocarbons.

F. Status: Esso 8/3-1 was plugged and abandoned 10 October 1966 at a total depth of 3015 m. (-2989 m.)

II. DRILLING HISTORY

A. General

1. Spud date: 19 July 1966
2. Completion date: 10 October 1966
3. Status: Plugged and abandoned.
4. Total depth: 3015 m. (-2989 m.)

B. Contractor and rig: ODECO semi-submersible "Ocean Traveler"

C. Casing: 30" at 145.4 m. (-119.2 m.)
20" at 273.6 m. (-244.6 m.)
13 3/8" at 1063 m. (-1037 m.)
9 5/8" at 2963 m. (-2937 m.)

D. Mud program: Initial drilling from the sea floor to 277 m. was with sea water and gel without casing. Returns were to the sea floor. Below 277 m. to approximately 2290 m., a sea water slurry with Spersene, XP-20, and 0-12% diesel oi was used. At 2284 m. the major salt section was topped and the drilling fluid converted to a salt saturated mud.

While pulling out of the hole to pick up a core barrel at a depth of 2961 m. the pipe stuck at 1660 m. and was pumped free with sea water. The hole began caving immediately. Stable hole conditions were eventually attained by raising the mud weight to 12 ppg., viscosity to 150, dropping the pH and FL, adding diesel oil to 12% and increasing the pump rate. Casing was set at 2963 m. and no further hole trouble occurred. From 2290 m. to 3015 m. the drilling mud was essentially a salt saturated mud with Spersene, XP-20, and 6-12% diesel oil.

E. Drilling problems: Other than mechanical failures and a slight loss of drilling mud (75 barrels) at 2130 m. which resulted from the piston effect of the bottom-hole assembly while going in the hole, there was only one major drilling problem. Extensive caving was induced by water loss through a shale section. The interval extended approximately from 1320 m. to 2030 m. Water loss through this interval during drilling was 15-20 cc/30 min.

After the stuck pipe at 1660 m. (mentioned above) was pumped free with sea water, caving and sloughing problems increased markedly. The hole was re-entered with drillpipe and a bridge was hit at 1220 m. The hole was reamed to 1820 m. and began caving accompanied by loss of returns. The bit was pulled to 1465 m. and the mud weight raised to 10.5 ppg. The hole was then reamed to 2000 m. and the bit went to bottom at 2961 m. without trouble. The mud was conditioned and the hole circulated. It was decided to log the open hole but the sonde wouldn't pass below 1324 m. The hole was re-entered and mud circulated for 8½ hours. Tight hole was encountered from 2070 m. to 1510 m. while coming out of the hole. The tight section was reamed and drillpipe lowered to bottom of the hole. The mud weight was raised to 11.5 ppg. Pulled out of the hole with slight drag at 1815 m. The Gamma Ray-BHC Sonic with centralizers was run to 1415 m. where it stopped. The sonde was run again without centralizers to 1630 m. where it hit a bridge. The mud weight was raised to 12 ppg., the hole was re-entered with a bit, reaming through tight section and the mud was circulated and conditioned by raising viscosity, adding more diesel and dropping the FL and pH. The pump rate was also increased. Returns to the surface included shale fragments 5 cm. in diameter. The bit was pulled and the Gamma Ray-BHC Sonic

was run to bottom at 2961 m. An attempt was made to run the LL-7 and MLL-Caliper but the tools wouldn't pass below 1880 m. The hole was reamed from 1880 m. to 2000 m. where the pipe tried to stick. The mud weight and viscosity were raised, the hole was again reamed to 2050 m. and the bit run to bottom. Bad hole conditions prevented coring and the decision was made to set casing. The hole was deepened to 2968 m. in order to have an adequate section of firm carbonate rock for a satisfactory casing seat. Again the bit was pulled and an attempt made to run the LL-7 and MLL but with no success. The hole was re-entered and the section from 1880 m. through 2030 m. reamed four times. The weather had deteriorated meanwhile so the bit was pulled and operations suspended. After waiting on weather, the hole was re-entered, the mud conditioned and circulated, and the bit pulled. The 9 5/8" casing was then run to 2963 m. A total of 18 days had elapsed from the initial attempt to core at 2961 m., through the various logging attempts, until the setting of the 9 5/8" casing. No further hole problems were encountered in Esso 8/3-1.

F. Cores

1. Conventional

Number	Interval (m)	Recovery	
		Length (m)	Percent (%)
1	2075-79	1.68	42
2	2079-89	4.0	40
3	2206-16	8.8	88
4	2968.4-72	3.6	100
5	3007-15	4.2	53

2. Sidewall

Number	Depth (m)	Length (inches)	Reason
1	2962	--	Misfire
2	2962.5	--	*Not attempted
3	2963	1/4	
4	2963.5	--	*Not attempted
5	2964	1/4	
6	2964.5	1/2	
7	2965	--	Misfire
8	2965.5	--	Misfire
9	2976.5	--	*Not attempted
10	2977.5	--	" "
11	2978	1/4	
12	2979	--	Misfire
13	2980	1/4	
14	2982	--	*Not attempted
15	2985	1/4	
16	2086	1/2	
17	2987.5	--	Misfire
18	2989.9	3/4	
19	2990	1/2	
20	2991	3/8	
21	2991.5	1/2	
22	2992.5	1/2	
23	2993	1/2	
24	2993.5	1/2	
25	2994	0	No recovery
26	2994.5	0	No recovery
27	2995	1/2	
28	3002	1/2	
29	3003	1/4	
30	3004	1/2	

*Not attempted because of repeated tool malfunction.

G. **Testing:** No oil or gas shows were encountered and no open hole or production tests were made. Plans were to test any porous interval in the open hole below 1063 m. for formation fluid. The Schlumberger FIT tool was on hand but the caving problem previously discussed precluded running this tool.

H. **Abandonment:** a 100 sack cement plug was set at 3000 m. in the open hole. Schlumberger then cut the 9 5/8" casing at 1065 m. but the casing would not pull free. A second cut was made at 1030 m. and the 9 5/8" casing above this point was salvaged. A second cement plug of 125 sacks was set at 1080 m. and the top was later tagged at 1020 m. Another cement plug of 100 sacks was set at 165 m.

ESSO 8/3-1 TABLE OF STRATIGRAPHY

Stratigraphic Units	Drill Depths Meters	Subsea Top Meters	Subsea Top Feet	Thickness Meters	Thickness Feet
TERTIARY - QUATERNARY	120 - 1048	- 94	- 308	928	3045
Recent	120 - 125	- 94	- 308	5	16
Pliocene-Pleistocene Undiff.	125 - 287	- 99	- 325	162	532
Pliocene	287 - 444	- 261	- 856	157	515
Miocene	444 - 540	- 418	- 1371	96	315
Oligocene	540 - 822	- 514	- 1686	282	925
Eocene	822 - 932	- 796	- 2612	110	361
Plaeocene	932 - 1048	- 906	- 2973	116	381
Danian	1030 - 1048	- 1004	- 3294	18	59
CRETACEOUS	1048 - 1640	- 1022	- 3353	592	1942
Upper Cretaceous (Maestrichtian) - chalk	1048 - 1316	- 1022	- 3353	268	879
-------unconformity-------	1316 - -	- 1290	- 4232	-	-
Lower Cretaceous	1316 - 1640	- 1290	- 4232	324	1063
Early Aptian	1316 - 1348	- 1290	- 4232	32	105
Barremian	1348 - 1415	- 1322	- 4337	67	220
Hautervian	1415 - 1600	- 1389	- 4557	185	607
Valanginian	1600 - 1640	- 1574	- 5164	40	131
JURASSIC	1640 - 2081	- 1614	- 5296	441	1447
Upper Jurassic Undiff.	1640 - 1975	- 1614	- 5296	335	1099
-------Kimmerian Unconformity-------	1975 - -	- 1949	- 6395	-	-
Dogger	1975 - 2081	- 1949	- 6395	106	348
-------unconformity-------					
TRIASSIC(?)	2081 - 2206	- 2055	- 6742	125	410
Keuper(?)	2081 - 2206	- 2055	- 6742	125	410
-------unconformity-------	2206 - -	- 2180	- 7153	-	-
PERMIAN	2206 - 2965	- 2180	- 7153	759	2490
Zechstein (cycle III?)	2206 - 2965	- 2180	- 7153	759	2490
Salt	2284 - 2957	- 2258	- 7408	673	2208
Dolomite	2957 - 2964	- 2931	- 9617	7	23
Shale	2964 - 2965	- 2938	- 9640	1	3
-------Hercynian Unconformity-------	2965 - -	- 2939	- 9643	-	-
UPPER SILURIAN basement rock	2965 - 3015	- 2939	- 9643	50	164

B. Lithologic description

QUATERNARY

Recent (5 m.)

Representative grab samples were taken from each anchor point for the "Ocean Traveler". These consisted of unconsolidated quartz sand, fine - to medium-grained, dark-gray to brown, with recent pelecypod shells and living echinoids. The drillers reported no resistance to the bit for the first five meters and we assume this interval was Recent sand.

TERTIARY-QUATERNARY

Pliocene-Pleistocene Undifferentiated (162 m.)

The upper 50 m. consisted of gray, gravelly sand. The gravel was composed of pebbles and cobbles of igneous and metamorphic rock probably rafted during Pleistocene glaciation. The sand was fine- to medium-grained quartz. Below the upper 50 m., the section consisted of interbedded sand and sandy clay. The Gamma Ray-BHC Sonic confirmed the interbedded nature of these lithologies. Cuttings returns through this interval were to the sea floor and the only samples obtained were of clay stuck to the square drill collar and sand gravel from the junk basket above the bit. The drillers reported resistance to the bit, which was probably the gravel, at the top of this section.

TERTIARY

Pliocene (157 m.)

The Pliocene consisted of clay, sticky, gray to brown-gray. Neither samples nor logs indicated sands or beds shows.

Miocene (96 m.)

The Miocene consisted of clay, sticky, greenish-gray and micaceous. The Miocene clay was more firm than the overlying Pliocene

clay and drill time was slightly greater. The top was based on log character. There were no sands nor shows.

Oligocene (282 m.)

The Oligocene was composed primarily or greenish-gray to brown clay with thin interbeds of hard brown dolomite and dolomitic limestone. Also noted were traces of yellow-white, subangular quartz grains and abundant glauconite, and pyrite. The top was selected on log character. There were no shows.

Eocene (110 m.)

The Eocene in Esso 8/3-1 was distinctive as is the Eocene found in the wells in the United Kingdom portion of the North Sea. It consisted of a distinctive clay, green, sticky, with abundant green glauconite and thin interbeds of angular quartz sands, medium- to coarse-grained. There were no shows.

Paleocene (116 m.)

The Paleocene, in its upper part, consisted of shale, gray to brown, silty and micaceous, with interbedded phosphatic shale, pinkish-gray, calcareous. The shale was harder than that of the overlying section and the drill rate increased. There were also traces of claystone, lignite, angular glassy chert and abundant pyrite. The top was picked on log character. There were no shows.

Danian (18 m.)

The lowermost Paleocene was the Danian. The distinctive, "marker bed" lithology consisted of cherty bryozoan limestone, cream to white, hard, containing siliceous spicules. The top was picked on log character. The Microlog also indicated porosity in this section.

CRETACEOUS (592 m.)

Upper Cretaceous (Maestrichtian) - chalk (268 m.)

The upper Cretaceous consisted of cherty, chalky limestone. The chalk was extremely soft and in the uppermost section probably went into solution during drilling. The first chalk cuttings were recovered below the Sonic Log indications of chalky limestone. The chert was clear and glassy. Although cuttings in the upper part of this section were badly contaminated with shale cavings, there was a definite lithologic break at the top as denoted by the logs. There were no shows.

Lower Cretaceous (324 m.)

Aptian (32 m.)

The Aptian consisted of a soft clay, tan to brown-gray, which yielded plastic cuttings that could not be washed. The drill time was relatively fast through this interval. The top was picked on log characteristics. There were no shows.

Barremian (67 m.)

The Barremian consisted of a soft, plastic clay which was somewhat darker than the overlying Aptian, plus pyrite and thin silty beds. There were no shows.

Hauterivian (185 m.)

The top of the Hauterivian, occurred at 1415 m. with no change in lithology from the overlying Barremian. The upper Hauterivian was a soft clay, medium gray, containing minor shale and silty, sandy layers. This upper section was gradational from the lower shale, gray, silty and sandy, micaceous, soft to firm. There were no shows in the Hauterivian.

Valanginian (40 m.)

The Valanginian consisted of shale, gray, micaceous, firm to hard

with traces of gypsum and lignite. The Jurassic-Cretaceous contact (base of the Valanginian) was placed within a shale sequence that straddles the boundary. There were no shows in the Valanginian.

JURASSIC (441 m.)

Upper Jurassic Undifferentiated (335 m.)

The top of the Upper Jurassic Undifferentiated, was placed within a shale sequence as described above. Glauconite, pyrite, gypsum, and traces of lignite occurred within the section.

The gamma ray suggested the presence of prominent sand/sandstone beds within the shale as well as lesser sandy units within the overlying Lower Cretaceous (between 1325 m. and 1880 m.). These gamma ray deflections were found to be the result of borehole enlargement and did not actually reflect sand bodies.

Dogger (106 m.)

The lithology changes gradationally downward from the shale of the overlying Upper Jurassic Undifferentiated to a harder, sandier, carbonaceous facies. The sandy shale becomes a shaly sand between 2010 m. and 2040 m. The section below 2040 m. to the top of the Triassic(?) at 2181 m. is of quartz sandstone, white to tan, silty to medium-grained, subrounded, with clay matrix, interbedded with lignite, black and shiny.

TRIASSIC(?) - 125 m.

Keuper(?) - 125 m.

The sandstone-lignite sequence, as described above, continued downward to 2125 m. with no apparent change indicated lithologically or on the Schlumberger logs. Core no. 2 (2079-2089 m.) was taken approximately 40 m. below the top of the sandstone-lignite sequence. Evidence for placing the Triassic(?)-Jurassic contact at 2081 m. is provided by the petrographic analyses which indicates deposition in a

low-energy environment from a core chip from 2080.8 m. and in a medium-energy environment from a chip from 2081.6 m. The analyses also point out that the chip from 2081.6 m. is from more massive and uniform rock than the overlying cored sections. Red to reddish-brown sandstone and micaceous shale first noted in the cuttings at 2125 m., continued to make up 20% of the samples down to 2206 m. This suggests a relationship with the Triassic red beds in England. The sequence from 2185 m., logged as shale and carbonate and believed to be lowermost Triassic(?), may possibly represent a Triassic basal boulder conglomerate since there is evidence for an unconformable surface at 2206 m.

No shows were indicated in either the Jurassic or Triassic(?) sections during drilling. There were no stains, no non-mineral fluorescence and there were no hot wire nor chromatograph indications of hydrocarbons.

UPPER PERMIAN (759 m.)

The top of the Permian was picked at the top of the uppermost massive anhydrite as shown on the logs.

Core number 3 was cut at the contact of the Permian Zechstein and overlying Triassic(?) Keuper. The uppermost part of the core was a conglomeratic sandstone containing pebbles of reworked Permian rock in a Triassic(?) matrix.

The uppermost 20 m. of the Permian was anhydrite, underlain by 25 m. of dolomitic limestone and dolomitic shale. Beneath the limestone and shale section was 32 m. of anhydrite overlying 673 m. of halite. Several thin beds of potassium salt occurred within the halite. Beneath the salt, the radioactivity logs indicated a shale bed 1-2 m. thick, a 7 m. bed of dolomite and

a 1 m. thick shale bed with caused a distinctive break in the gamma ray curve. Unfortunately, hole problems forced the setting of pipe within the section beneath the salt and the cuttings from this zone were so contaminated by cavings that no reliable lithologic description was possible.

The lowermost dolomite (2957-2964 m.) was interpreted from logs as having a porosity of 17% and a resistivity index of 6.5 (EPRCo). Only a trace of cuttings of this dolomite was recovered. This was insufficient to estimate visual porosity and neither fluorecence nor cut was observed on the miniscule sample available. The hot wire and chromatograph also failed to register any indication of hydrocarbons.

Upper Silurian basement rock (50+ m.)

Core number 4 (2968.4 - 2972 m.) was cut immediately below the 9 5/8" casing and recovered muscovite-chlorite-quartz schist. The hole was deepened to insure velocity values from the Velocity Survey and core number 5, from 3007 m. to 3015 m. (T.D.), also recovered muscovite-chlorite-quartz schist. The schist contained bands of quartz and feldspar which paralleled foliation. The foliation dipped 30-50 degress. Schlumberger-logs through the basement rock section exhibited some curve character, but sidewall cores taken of the various zones recovered only schist. The top of the Upper Silurian was picked on log character immediately beneath the lowermost shale of the Permian Zechstein.

ESSO EXPLORATION NORWAY INC.

COMPLETION LOG

WELL NAME: 1/3-4
WELL TYPE: EXPLORATION
LOCATION: 1/3-NORWAY
OPERATOR: ESSO
DATE: 1 JUNE - 1 JULY 1981
TOTAL DEPTH: 4000 METERS

ESSO

DATE SPUDDED	1 JUNE 1981
DATE COMPLETED	1 JULY 1981
TOTAL DEPTH	4000 METERS
PLUG BACK DEPTH	3990 METERS
CASING	20" @ 1000 METERS
	13 3/8" @ 3990 METERS
PERFORATIONS	NONE
STATUS	P&A
FORMATION AT TD	BRENT
LITHOLOGY	SANDSTONE
	SHALE
	COAL
	LIMESTONE

ESSO

DATE SPUDDED	1 JUNE 1981
DATE COMPLETED	1 JULY 1981
TOTAL DEPTH	4000 METERS
PLUG BACK DEPTH	3990 METERS
CASING	20" @ 1000 METERS
	13 3/8" @ 3990 METERS
PERFORATIONS	NONE
STATUS	P&A
FORMATION AT TD	BRENT
LITHOLOGY	SANDSTONE
	SHALE
	COAL
	LIMESTONE

CONTRACTOR: SEDCO 703
RIG TYPE: SEMI SUBMERSIBLE
DRILLING MUD TYPE: SEA WATER
MAX. DEVIATION: 1 DEGREE
MAX. DEPTH: 4000 METERS

DATE	1 JUNE 1981
DATE	1 JULY 1981
TOTAL DEPTH	4000 METERS
PLUG BACK DEPTH	3990 METERS
CASING	20" @ 1000 METERS
	13 3/8" @ 3990 METERS
PERFORATIONS	NONE
STATUS	P&A
FORMATION AT TD	BRENT
LITHOLOGY	SANDSTONE
	SHALE
	COAL
	LIMESTONE

DRILLING MUD
CORE
DRILL STEM TEST
PERFORATED
CASING
CEMENT
PLUG
DRILLING MUD
CORE
DRILL STEM TEST
PERFORATED
CASING
CEMENT
PLUG
DRILLING MUD TYPE: SEA WATER
MAX. DEVIATION: 1 DEGREE
MAX. DEPTH: 4000 METERS
CONTRACTOR: SEDCO 703
RIG TYPE: SEMI SUBMERSIBLE
DATE SPUDDED: 1 JUNE 1981
DATE COMPLETED: 1 JULY 1981
TOTAL DEPTH: 4000 METERS
PLUG BACK DEPTH: 3990 METERS
CASING: 20" @ 1000 METERS
13 3/8" @ 3990 METERS
PERFORATIONS: NONE
STATUS: P&A
FORMATION AT TD: BRENT
LITHOLOGY: SANDSTONE
SHALE
COAL
LIMESTONE