

EVALUATION REPORT
WELLFILE

15/12-2

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LIST OF CONTENTS

	PAGE
I INTRODUCTION	2
II DISCUSSION	3
III CONCLUSION AND RECOMMENDATION	5 & 6

INTRODUCTION

The Statoil/Esso well 15/12-2 was spudded January 7 1976, to test a structure in the eastern part of block 15/12. The semisubmersible "Ross Rig" was used and was navigated and positioned on the intended location with an integrated satellite navigation system. The final coordinates for the 15/12-2 well are:

Latitude 58°08' 31.10" N
Longitude 01°55' 47.47" E

The main objective was the Middle Jurassic Sandstone, where hydrocarbon accumulations had been discovered in the adjacent area. There was also a slight possibility that hydrocarbons might be found in the Lower Paleocene sands.

The actual formation tops encountered in the well proved to be very close to earlier predictions based on seismic interpretation. The discrepancies between the actual drilling results and the prognosis did not exceed 20 meters for any of the various formation tops above the Triassic.

The results of the drilling were discouraging. Paleocene and Danian sandstones were not found and hence no hydrocarbon accumulations in these formations. The Middle Jurassic reservoir sand had a thickness of 50 meters. The quality of the sand was remarkably good, with porosities up to 30% and permeabilities in the range of 0.5 to 1.5 darcies. The sand was 100% water-saturated.

The well was plugged and abandoned February 27 1976, after reaching a total depth of -2900 meters in the Triassic beds.

DISCUSSION

There are several possible explanations why the 15/12-2 structure was water-saturated, and in the following paragraphs some of these possibilities are discussed.

1.

The sand found in the Dogger was an excellent reservoir-sand. This sand might be an isolated channel-sand or near shore-sand of limited extension, surrounded by a shale or a low-permeability-sand isolating the reservoir from the source rocks.

This explanation is possible, but if the Kimmeridge shale produced hydrocarbons, even a very poor permeability would allow some hydrocarbons, leaving traces in the reservoir rock.

2.

A possible source for the hydrocarbons is coal. This is present in all the adjacent wells with hydrocarbon shows, but not in 15/12-2.

This reason is not regarded as the most likely, since the adjacent wells to the west have oil shows, rather than gas, as would be expected if coal was the source.

3.

There was no structure present to trap the hydrocarbons when they were produced and migrated.

This possibility should be seriously considered. The time interval map "Dogger - Kimmerian" shows a structure to the west of the well location. The structural closure to the south-east might be questioned, and the mapped Jurassic structure might be doubtful. Therefore, if the hydrocarbons were produced in the late Jurassic, the drilled structure did not

form any trap at this time. One implication of this is that there has been no overburden, and many geochemists find it difficult to see how hydrocarbons can be produced under such conditions.

The next two time interval maps "Dogger - T.L. Cretaceous" and "Dogger-Paleocene" both show a rather small, but well defined structure. This is the most probable time interval for hydrocarbon-production and migration, and the overburden would be sufficient to provide the necessary pressure and temperature conditions. Therefore, if hydrocarbons ever were produced, a small accumulation in the structure would have been evident.

4.

The source rock in the vicinity of the structure never produced any hydrocarbons. The geochemical report from 15/12-1 (personal conversation with Esso) indicates that the Kimmeridge shale is mature, rich in organic matter, and contains a high amount of wet gas. A geochemical study of samples from 15/12-2 has not yet been done, but the log correlation between the two wells is excellent, and the Kimmeridge shale in this well appears to have the same good source rock characteristics as in 15/12-1.

What is not confirmed in the report is if this source, for one reason or another, never gave up its hydrocarbon content and thereby never yielded oil. This might be caused by the combination of temperature pressure conditions occurring correctly for the production of hydrocarbons, or that the source rock is surrounded by impermeable shales.

5.

Hydrocarbons are only produced in the deeper basins (Viking Trough and Central Trough), where a rapid burial and possible heat-flow from the trough created optimum conditions for the source rock to produce hydrocarbons, and where migration from source to reservoir sands might take place.

As in paragraph 4, the source rock is questioned, but this explanation has a more regional aspect. It appears that most of the significant hydrocarbon accumulations in the North Sea are found in areas where the Jurassic has been buried rapidly, in and near the Viking Trough and Central Trough. The Norwegian - Danian Basin does not appear to have the same hydrocarbon-potential, possibly because of slower burial. This may give such temperature and pressure conditions, resulting in the source rock never giving up its hydrocarbon content.

If this assumption is correct, hydrocarbons are most likely trapped in structures in, or near, the deep troughs. Excess oil or gas will only migrate from the production area to more distant structures after the nearest structures are saturated.

This might be caused by too little production of hydrocarbons in the area or that the permeability in the rock is too poor to conduct hydrocarbons.

Of all the possible explanations to the water-wet Dogger structure encountered by the 15/12-2 well, the number 4, or 5, is regarded as the most probable at this stage.

CONCLUSION AND RECOMMENDATION

The drilling in block 15/12, so far, both the 15/12-1 and the 15/12-2, has greatly reduced the hydrocarbon potential in Production License 038. When the license was awarded, the Lower Paleocene or the Danian sand was regarded as the most potential formation, based on encouraging results from the Maureen structure, situated in U.K. waters, west of block 15/12. The 1975 seismic survey and the results from the 15/12-1 and the 15/12-2 have proven that the Paleocene or Danian sand is of limited distribution in the license area, only present in the northwest corner.

The only remaining prospects within the license are, therefore, sandstones of Middle Jurassic age or older formations.

The seismic shows that several well defined, though rather small, Dogger structures still remain. In view of the complete water-wet Dogger structure encountered by the 15/12-2, the possibility of not finding hydrocarbons in the other remaining structures has to be strongly considered. In order to get a better understanding of the relation between oil-generation, migration and the trapping mechanism in the area, it is recommended to undertake an age determination of the oil in the Maureen field, with a detailed study of the source rock, not only within the license area, but in the whole Norwegian-Danish Basin. The study should contain rock quality determination with an investigation of its ability to produce hydrocarbons.

The results of the 15/12-2 well have not affected the deeper Rotliegendes potential, which will be subject to a more detailed geological study for a future drilling recommendation.

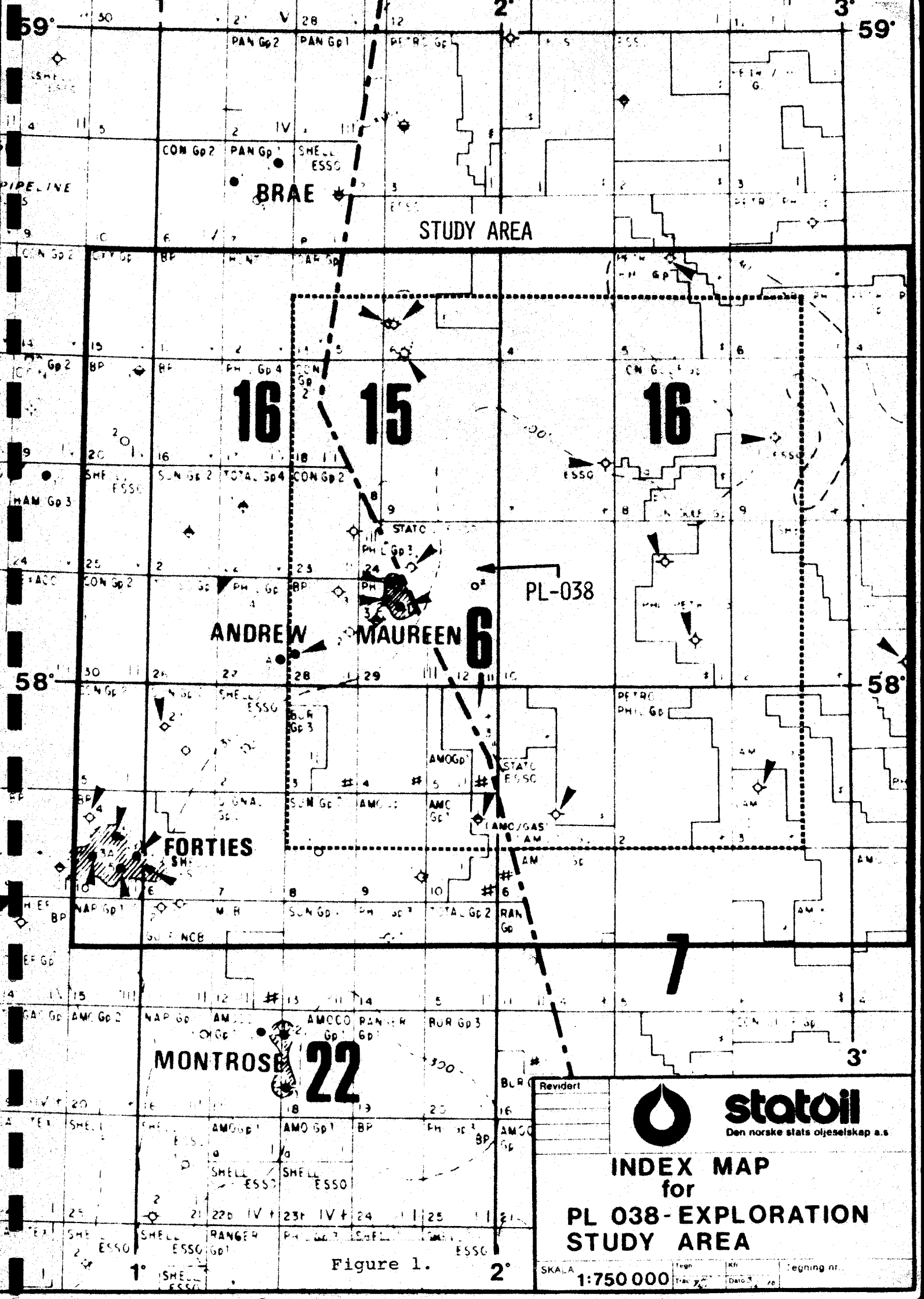


Figure 1.

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statoil

Den norske stats oljeselskap a.s.

INDEX MAP
for
PL 038 - EXPLORATION
STUDY AREA

SKALA 1:750 000

Tegn	Kfr	tegning nr.
Trac	Dato	20