PETROFINA S.A.

EXPLORATION & PRODUCTION DEPARTMENT

NORWAY

REPORT ON ANALYSIS OF AN OIL SAMPLE

WELL EKOFISK 2/4-1X

15/70-MC/md

9 January 1970.

WELL EKOFISK 2/4-1X

GENERAL DATA.

SAMPLE.

Collected : september 1969 while circulating hole after oil and gas shows at 5,450 ft.

Quantity available for analysis : approximately one liter consisting of an emulsion of oil in drilling mud. In order to separate the oil from the mud, centrifugation took place 1 1/2 hour at 3500 rpm. A solid phase, a water phase and an oil phase were obtained. The quantity of oil thus available was 200 ml of which 150 ml were dehydrated by distillation for analysis.

Date received in Laboratories : November 27, 1969.

Analysed by : LABOFINA - 98-100, Ch. de Vilvorde - 1120 Brussels.

PROBABLE INTERVAL WHERE SAMPLE IS COMING FROM.

Between depths of 5,400 and 5,450 feet in Miocene formations.

SUMMARY OF THE ANALYSIS.

I. GENERAL CHARACTERISTICS OF THE CRUDE OIL SAMPLE.

Sample description : the oil separated by centrifugation is viscous, has a dark brown colour and a disagreeable odor of oxidized hydrocarbons. The water content was still high after centrifugation.
In the interpretation of the results, it should be taken into account that the oil sample was contaminated by a small quantity of gasoil present in the mud.

Methods	Characteristics	Results
ASTM D 1298	Density 15/4° C Density ° API at 60° F	0.998 10.2
ASTM D 664	Strong acidity mg KOH/g	nil
ASTM D 664	Total acidity mg KOH/g	7.33
Martin Floret	Total sulphur, % weight	0.78
ASTM D 189	Carbon Conradson, % weight	11.4
ASTM D 482	Ashes content, % weight	4.54
ASTM D 445	Viscosity (Cst) at 50° C	1035
Distillation	Water content, % weight	13.4
UOP 375-59	K Factor	11.2

Comments : The ashes content and Carbon Conradson which are abnormally high indicate that there is in suspension about 4.5 % by weight of solid particles. These two factors certainly lead to uncertain figures with respect to viscosity and density. Total acidity is very high for a strong acidity which is nil. This is typical of a highly oxidated oil.

II. TBP DISTILLATION.

(Density ° API at 60° F : 10.2)

A. Results.

(see graph n° 1)

Temperature ° C, 760 mm Hg	% Cumulative volume	% Cumulative weight
154	P.I.	P.I.
182.5	0.5	
186.5	1.0	
198	1.6	
200	2.1	1.6
240.5	4.9	
250	6.6	5.5
268	9.2	
276	10.5	
281	11.8	
289	13.1	
300	14.3	12.7
305	16.1	
315	17.4	
320	18.7	
328.5	20.0	
340	21.5	
344	22.6	
350	23.4	20.5
360	24.7	
366	26.0	
372	27.2	
382	28.6	
391	29.8	
400	31.4	28.0
Residue	100.0	100.0

The TBP distillation has been made considering a reflux rate of 10 to 1. The quantity of crude loaded in the apparatus was 40 ml.

B. Characteristics of the Cuts.

The distillates have all a desagreeable odor of oxidized hydrocarbons. They change colour rapidly in presence of air and light.

Temperature °C/760mm Hg	% volume	% weight	Sulphur % weight	Refraction Index at 20° C
154 - 200	2.1	1.6	0.37	1.4528
200 - 250	4.5	3.9	0.31	1.4581
250 - 300	8.2	7.2	0.32	1.4788
300 - 350	8.6	7.8	0.37	1.4964
350 - 400	8.0	7.5	0.53	1.5131
Residue at 400	68.6	72	0.93	

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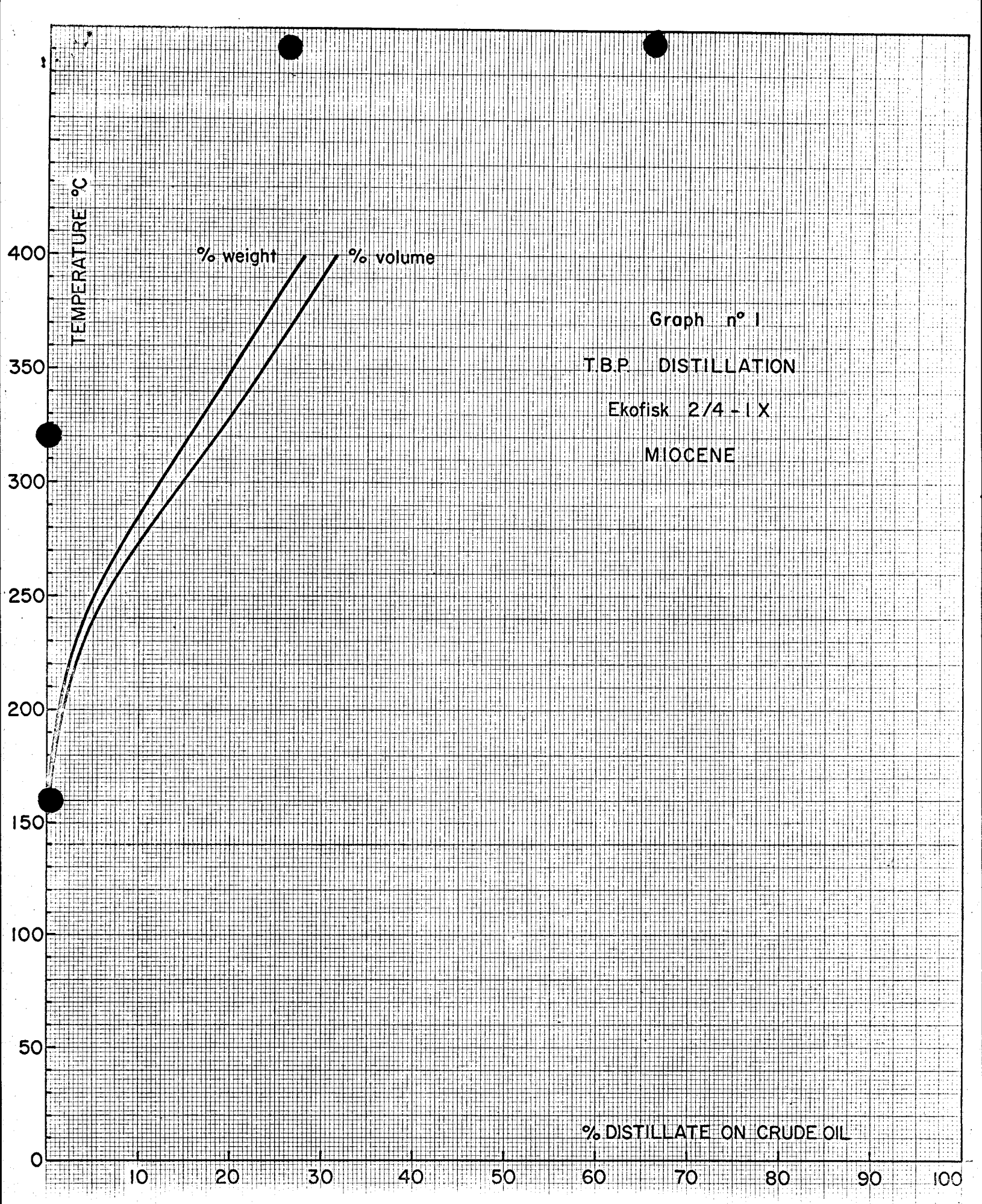
III. CONCLUSIONS.

This oil is very viscous and has a high density. Sulphur content is weak and oil sample contains some weak acids resulting in a desagreeable odor. The characterisation factor indicates that the oil is of naphtenic basis.

The sample contains practically no light nor heavy gasoline and very little kerosene. The first distillate of importance is gasoil comparable to other crudes like Kuwait. The odor of the distillates is bad. The high refraction index seems to indicate a high content in aromatics.

Non of the characteristics determined can lead to believe that there is a direct relationship between this sample and the one taken at Ekofisk 2/4-1AX at 10,464 feet during DST n° 4.


TEMPERATURE °C
% weight
% volume
Graph n° 1
T.B.P. DISTILLATION
Ekofisk 2/4 - 1 X
MIOCENE
% DISTILLATE ON CRUDE OIL
0
50
100
150
200
250
300
350
400
10
20
30
40
50
60
70
80
90
100