



RESEARCH
DEPARTMENT

ESSO PETROLEUM COMPANY, LIMITED
ESSO RESEARCH CENTRE
ABINGDON BERKSHIRE

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CONFIDENTIAL

RECEIVED
19 JUL 1967
A. J. CAAN

Mr. A.J. Caan,
Esso Exploration Inc.,
North Sea Study Group,
Block 5, The Centre,
Walton-On-Thames,
Surrey.

17th July, 1967

ESSO	
NORTH SEA GRO	
NOTE A	
AEC	<input checked="" type="checkbox"/>
JTW	<input checked="" type="checkbox"/>
F.	<input checked="" type="checkbox"/>
AKC	<input checked="" type="checkbox"/>
HMP	<input type="checkbox"/>
BDM	<input type="checkbox"/>
FILE	6244

Dear Mr. Caan,

Action: NSG-1024 dd
19.7.67.

Request for Crude Oil Analysis
(6244/6231)

With reference to your letter dated 6th July to Dr. Tomlinson and our subsequent telephone conversations, I am sending herewith the results of our preliminary inspection of the two samples of crude oil. We have also suggested some possibilities for future work.

If you feel that we can be of further assistance to you, please let me know.

Yours sincerely,

C.F. McCue
C.F. McCue
Section Head - Analytical

CFM/MMM

Attachments:

NSG-0-1 from FIT @ 5758 ft
in Esso 25/11-1 well

NSG-0-2 from FIT @ 5829 ft
in Esso 25/11-1 well

Analyses of Crude Oils NSG-0-1 and NSG-0-2

N.B. The samples were leaking on receipt and it is likely that some light ends may have been lost.

I. Details of analyses performed on the crudes "as received"

		5758ft	5829ft
		0-1	0-2
1. <u>gravity</u>	{ S.G. 60°/60° °API	.9202 22.3	.9205 20.2
2. <u>pour point</u>		+15°F	+15°F
3. <u>viscosity</u>	{ SUS 60°F SUS 100°F	Unreliable due to wax separation. 625	226
4. <u>water and sediment</u>	ASTM D-96	8.4 vol%	16.0 vol%
5. <u>total sulphur (bomb)</u>	ASTM D-129-58	0.64 wt%	0.61 wt%
6. <u>vanadium</u>	X-ray fluorescence	10 ppm	15 ppm
7. <u>nickel</u>	" "	<10 ppm	<10 ppm

8. distillation

(a) 250 mls. distilled to 430°F by method similar to ASTM D-86, then to 800°F by method similar to ASTM D-1160 (approximates to a "1-plate" distillation).

volumes % off

at (°F)

	0-1	0-2
0.5	150	-
0.6	-	150
5	209	194
10	212	210
15	226	212
20	430	265
25	511	435
30	549	500
35	572	550
40	622	600
45	666	650
50	710	708
55	750	760
58.8	-	800
59.4	800	-

residue 40.6 vol% residue 41.2 vol%
actual loss 0.7 vol% actual loss 0.4 vol%

(b) during the above distillation several fractions were recovered; details are given below:

boiling range	sample					
	0-1			0-2		
	vol. %	grav. 60/60	°API	vol. %	grav. 60/60	°API
Below 150°F.	0.5	-	-	0.6 *	-	-
Water	6.0	-	-	13.1	-	-
150-300°F.	9.0	.7683	52.7	5.0	.7786	55.0
300-430°F.	4.8	.8310	38.8	3.8	.8277	39.4
430-500°F.	3.5	.8553	34.0	5.5	.8495	35.0
500-650°F.	18.6	.8763	30.3	16.8	.8790	29.5
650-800°F.	17.0	.9129	23.5	14.0	.9144	23.5
residue	40.6	.9860	12.0	41.2	.9914	11.0

9. gas chromatography

The two crudes were analysed for carbon number distribution using a 6' packed column with silicone gum as stationary phase. The results, as weight percent on the total crude, are given below:-

<u>carbon number</u>	<u>0-1</u>	<u>0-2</u>
< 8	2.9	2.2
8	2.5	2.0
9	1.7	1.3
10	2.0	1.6
11	2.1	1.6
12	2.5	1.9
13	2.8	2.2
14	3.3	2.6
15	4.0	2.7
16	3.6	2.7
17	3.2	2.7
18	3.2	2.4
19	2.8	1.9
20	3.0	1.9
21	2.7	1.7
22	2.6	1.7
23	2.3	} extra work required for breakdown in this range on sample 0-2
24	2.0	
25	2.0	
26	1.6	
27	1.7	
28	1.6	

* The sulphur content of this fraction was below the detection limit, 0.1 microg/ml⁻¹.

II. Details of analyses performed on water-free crude or fractions

10. Metals by X-ray fluorescence

<u>element</u>	<u>content, by weight (ppm)</u>	
	<u>0-1</u>	<u>0-2</u>
iron	< 5	< 5
manganese	< 5	< 5
cobalt	< 5	< 5
zinc	5-10	5-10
barium	< 5	< 5
lead	5-10	5-10
potassium	< 5	< 5
strontium	5	5
calcium	115	2:5

11. Hydrocarbons in light ends, by gas chromatography

The < 150°F fraction of crude 0-2 was analysed by g.c. with the following results:-

<u>Component</u>	<u>wt. %</u>
methane	1.4
ethane	14.8
propane	24.8
iso-butane	11.4
n-butane	0.5
iso-pentane	11.6
n-pentane	4.6
hexanes)	balance
heptanes)	

III. Details of analysis performed on water separated from crudes

12. Ionic composition and pH

<u>ion</u>	<u>content, ppm by weight</u>	
	<u>0-1</u>	<u>0-2</u>
Cl ⁻	10	7.5
Na ⁺	6.1	3.7
K ⁺	0.7	0.3
Mg ²⁺	<0.1	<0.1
Ca ²⁺	1	0.5
Fe ^{2/3+}	<1	<1
pH	7	7

IV. Possible Future Work

The fractions from distillation 8(b) have been retained. Among the tests which could be performed are:-

- S content
- hydrocarbon type analysis (P,N,A)
- physical constants

CFM/MMM
17.7.67

ESSO PRODUCTION RESEARCH COMPANY

POST OFFICE BOX 2189
HOUSTON, TEXAS 77001

BASIN GEOLOGY DIVISION
EDWARD MCFARLAN, JR., MANAGER

August 15, 1967

ESSO NORTH SEA GROUP	
NOTE ACT	
AJO	<input checked="" type="checkbox"/>
JMW	<input checked="" type="checkbox"/>
FS	<input checked="" type="checkbox"/>
ME	<input checked="" type="checkbox"/>
HP	<input checked="" type="checkbox"/>
HHP	<input type="checkbox"/>
BJM	<input type="checkbox"/>
FILE 6231	

Strictly Confidential

Air Mail

RECEIVED
21 AUG 1967
A. J. CAAN

Esso 25/11-1

9042

Mr. A. J. Caan
Esso Exploration Inc.
Esso North Sea Group
Block 5, The Centre
Walton-on-Thames
Surrey, England

*Abington analyses in 6244 (1967)
Also in well file*

Dear Sir:

Enclosed are copies of the results of crude oil assays of two samples from the Esso Norway 25/11-1 well that were analyzed by Humble's Refinery Laboratory at Baytown, Texas. We just received these results and are sending them to you for your possible use prior to our later more complete report on these samples. We had already submitted these samples to the Baytown Laboratory before we received your letter NSG-1024 of July 19, 1967, which included the results of similar analyses performed by the Esso Research Center in Abington.

The samples are identified in the Baytown reports according to our sample numbering system as follows.

54051A - FIT 5,758 feet
54051B - FIT 5,829 feet

We are proceeding with other geochemical analyses of these oils in our own laboratories and expect to report the complete results shortly. We will not do any of the trace metal analyses mentioned in your letter NSG-1022 dated July 17, 1967, since similar studies were done for you at the Abington laboratory.

Yours truly,

E. McFarlan, Jr.

Patrick H. Monaghan
By Patrick H. Monaghan

PHM:rk

Enclosures

- c.c. Producing Coordination, Attention Mr. W. E. Wallis)
- Mr. J. B. Coffman) (without enclosures)
- Mr. Zeb Mayhew, Attention Mr. J. W. Gwinn/Mr. J. L. Roman)
- Mr. R. J. Loeffler) (with enclosures)
- Mr. R. E. Anderson, Attention Mr. L. Weiss)

HUMBLE OIL & REFINING COMPANY
MANUFACTURING DIVISION

REFINERY LABORATORY BAYTOWN, TEXAS

INTERMEDIATE ASSAY

FIELD:	ESSO PRODUCTION RESEARCH -- SAMPLE: 54051-A	REPORT DATE:	8-11-67
COUNTY:		DATE DISTILLED:	
REPRESENTATIVE OF:	One liter sample submitted by P. H. Monaghan, Esso Production Research	DATE SAMPLED:	
		ASSAY NO.:	
		FILE NO.:	
		CARDS:	
		COST CENTER:	2501-205
		REPORT BY:	<i>J. F. Hickerson</i> J. F. HICKERSON

DATA ON CHARGE		DATA ON PRODUCTS				
		NAPHTHAS				
GRAVITY °API	22.5 ✓					
SULFUR, %, DIETERT	0.71 ✓					
FLASH, °F, P.M.		VAPOR TEMP., °F				
S.U. VISCOSITY AT 100°F			. C5-175	C5-250	C5-300	C5-375
80°F				0.0-2.9	0.0-4.9	0.0-8.7
60°F				2.9	4.5	8.7
40°F						
B.S. & W., %						
WATER BY DISTILLATION, %						
VAPOR PRESSURE, LB.						
FOUR POINT, °F	10					
SALT AS NACL, PTB						
NEUTRALIZATION VALUE, D664						
HYDROCARBON ANAL., LV%:						
C2 & LIGHTER						
C3						
IC4						
NC4						
IC5						
NC5						
MERCAPTAN NO., MG/100 CC.						
COLOR, SAYBOLT						
COLOR, ROBINSON						

VAPOR TEMPERATURE, °F	HEAVY NAPHTHAS			KEROSENE & TURBO FUELS		
	250-375	175-300	350-375	375-530	300-500	375-480
RANGE OF CUT, LV%	2.9-8.7	0.0-4.9	7.4-8.7	8.7-23.7	4.9-13.5	8.7-15.7
YIELD, LV%	5.8	4.9	1.3	15.0	13.6	8.0
MIDPOINT OF CUT, °F						
GRAVITY, °API				33.6	36.7	
RESEARCH OCTANE NO., CALC						
SULFUR, %, LAMP				0.089	0.055	
ANILINE POINT, °F						
MERCAPTAN NO., MG/100 CC.						
VISCOSITY, SAY. THERMO						
VISCOSITY, KINEMATIC, @ 40°F., CS						
FREEZING POINT, °F				-60	-90	
RING NUMBER						
L.P.T. SMOKE POINT, MM.						
COLOR, SAYBOLT						
AROMATICS, LV%, M.S.	17.3	4.7				
NAPHTHENES, LV%, M.S.	64.3	75.4				
PARAFFINS, LV%, M.S.	18.4	19.9				
AROMATICS, LV%, F.I.A.				23.5	22.5	
LUMINOMETER NO.						
REFRACTIVE INDEX, ND 20°C						
VISCOSITY, KINEMATIC @ 100°F., CS.						

544-0035D
FIELD:

ESSO PRODUCTION RESEARCH -- SAMPLE: 54051-A

ASSAY NO.:

FILE NO.:

INTERMEDIATE ASSAY, PAGE 2

VAPOR TEMPERATURE, °F	MIDDLE DISTILLATES			GAS OILS		
	430-530	530-650	650-850	850-990	1050-	
RANGE OF CUT, LV%	11.6-23.7	23.7-38.7	38.7-56.1	56.1-72.3		
YIELD, LV%	12.1	15.0	17.4	16.2		
GRAVITY, °API	32.6	28.1	21.4	18.5		
REFRACTIVE INDEX, ND ₅₇ ^{°C}						
SULFUR, %, DIETERT						
ANILINE POINT, °F						
DIESEL INDEX						
POUR POINT, °F						
CONRADSON CARBON, %	—					
NITROGEN, WT. %	—					
AROMATIC RINGS, CALC.						
NAPHTHENE RINGS, CALC.						
WET ASH, PPM NI	—	—	—	—	—	
V	—	—	—	—	—	
FE	—	—	—	—	—	
S.U. VISCOSITY AT 100°F.	—	—	—	—	—	
130°	—	—	—	—	—	
150°	—	—	—	—	—	
175°	—	—	—	—	—	
210°	—	—	—	—	—	
NEUTRALIZATION VALUE D974	—	—	—	—	—	

VAPOR TEMPERATURE, °F	WAXY LUBE OIL	DEWAXED LUBE	BOTTOMS		CORRELATED DATA	
	790-990		BEYOND 1050	BEYOND 990+	PHENOL TREATING CHARACTERISTICS ON NARROW LUBE CUT DEWAXED	
RANGE OF CUT, LV%	51.3-72.3	—		72.3-100.0		
YIELD, LV%	21.0	—		27.7		
GRAVITY, °API	19.5	17.8		8.1		
SULFUR, %, DIETERT	1.0	—		1.59		
ANILINE POINT, °F		170	—	—	% TREAT	V.I.
DIESEL INDEX			—	—	0	
S.U. VISCOSITY AT 100°F	—	1508	—	—	100	
130°F	388	—	—	—	200	
150°F	—	—	—	—	300	
175°F	—	—	—	—	V.G.C.	
210°F	71.9	78.2				
S.U. VISCOSITY AT 122°F	—	—				
210°	—	—		1254		
275°	—	—		—		
300°	—	—		—		
FLASH, °F, C.O.C.						
POUR POINT, °F		5	—	—		
VISCOSITY INDEX	27.8	4.5	—	—		
NEUTRALIZATION VALUE D664	0.67*	—				
WAX, S.B.A., %	—	—	—	—		
CONRADSON CARBON, %	—	—				
MOD. INSOL. IN 86° NAPHTH.	—	—		6.5; 6.8		
CLAY GEL:						
Saturates	—	—		19.4		
Aromatics	—	—		33.9		
Polars	—	—		42.4		
Asphaltenes	—	—		4.3		
SOFTENING POINT, °F	—	—				
PENETRATION AT 77°F	—	—				
PENETRATION AT 39.2°F	—	—				
DUCTILITY AT 77°F	—	—				
SOLUBLE IN						

*D974