



National Oil Corporation
Libyan Petroleum Institute

Crude Oil Assay
Messla Crude Oil

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Messla Crude Oil

Evaluation of Messla Crude Oil

This assay is a part of a series of crude oil evaluation reports have been prepared for Crude oil marketing department of National Oil Corporation. A bout 60 Liters of Crude oil sample was collected from Arabian Golf oil Company. A homogenous sample has been collected on 11th July 2008 from tank at Messla field, the sample was collected according to standard method ASTM D4057.

The analysis of crude oil sample was carried out using well recognized standard procedures given in ASTM, IP and UOP methods. The distillation of crude oil was carried out using a batch fractionation unit made according to ASTM D-2892 method & ASTM D-1160 method.

The crude oil was distilled under atmospheric and vacuum pressure and the atmospheric residue was further distilled to obtain distillate fractions. Distillate fractions corresponding to true boiling point up to 550⁺°C were collected.

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TABLE (1)

CRUDE OIL GENERAL TESTS

DESCRIPTION		METHOD
Density@ 15 °C, g/ml	0.8356	ASTM D-4052
Specific gravity@60/60 °F	0.8363	Calculation
API gravity	37.7	Calculation
Flash point, °C	<-39	ASTM D-56
Reid vapour pressure, psi	5.50	ASTM D-323
Hydrogen sulphide, ppm	3.22	IP 103
Water and sediment content, vol. %	0.035	ASTM D-4007
Sulphur content, wt. %	0.125	ASTM D-4294
Pour point, °C	+9	ASTM D-97
Kinematic viscosity @ 70 °F, cSt	-	ASTM D-445
@ 100 °F, cSt	8.1222	ASTM D-445
Asphaltenes content, wt. %	0.30	IP 143
Conradson carbon residue, wt. %	2.791	ASTM D-189
Ash content, wt. %	0.006	ASTM D-482
Characterisation factor	12.2	UOP 375
Salt content (as NaCl) mg/l	3.00	IP 77
Vanadium, ppm	0.197	ASTM D 5708
Nickel, ppm	2.982	ASTM D 5708



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Continued Table-1

<u><i>Distillation Characteristics</i></u>		<i>°C</i>	<i>METHOD</i>
<i>IBP</i>	<i>@ 760mmHg</i>	52	
5%		79	
10%		109	
20%		156	
30%		215	
40%		270	
50%		312	<i>ASTM D-86 Modified</i>
60%		335	
70%		-	
80%		-	
<i>FBP</i>		336	
<i>Recovery % vol.</i>		67	
<i>Residue % vol.</i>		25	
<i>Loss % vol.</i>		8	



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Table (2)

TBP Distillation of Crude Oil

<i>Cut Temp °C</i>	<i>Yield</i>		<i>Cumulative Yield</i>		<i>Specific Gravity @ 60/60°F</i>
	<i>wt. %</i>	<i>vol. %</i>	<i>wt. %</i>	<i>vol. %</i>	
Condensate	1.21	1.82	1.21	1.82	0.5556
C5 - 70	4.80	6.21	6.01	8.03	0.6469
70 - 90	2.80	3.36	8.81	11.39	0.6966
90 - 110	2.94	3.39	11.75	14.77	0.7258
110 - 130	3.35	3.75	15.10	18.53	0.7461
130 - 150	2.93	3.25	18.03	21.78	0.7534
150 - 175	3.80	4.16	21.83	25.94	0.7648
175 - 195	2.96	3.17	24.79	29.10	0.7815
195 - 215	2.78	2.94	27.57	32.05	0.7902
215 - 235	3.05	3.20	30.62	35.25	0.7964
235 - 255	3.01	3.11	33.63	38.36	0.8086
255 - 275	3.60	3.70	37.23	42.06	0.8147
275 - 295	2.83	2.88	40.06	44.94	0.8221
295 - 315	3.78	3.83	43.84	48.77	0.8244
315 - 335	3.59	3.62	47.43	52.39	0.8298
335 - 350	2.97	2.96	50.40	55.35	0.8387
350 - 370	4.78	4.68	55.18	60.03	0.8545
370 - 400	7.16	6.92	62.34	66.95	0.8653
400 - 440	7.44	7.07	69.78	74.02	0.8795
440 - 460	4.36	4.12	74.14	78.14	0.8856
460 - 480	3.21	3.01	77.35	81.15	0.8915
480 - 500	3.28	3.04	80.63	84.19	0.9028
500 - 520	2.89	2.66	83.52	86.85	0.9092
520 - 550	3.20	2.91	86.72	89.76	0.9186
550+	13.28	11.18	100.00	100.94	0.9936

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Table (3)

Detailed Hydrocarbon Analysis of 70-175°C Fraction (ASTM D5134)

PIONA Analysis (Identified Compounds Listed in Chromatographic order)

<i>Compounds</i>	<i>Wt%</i>	<i>Vol.%</i>	<i>Mol.%</i>	<i>Compounds</i>	<i>Wt%</i>	<i>Vol.%</i>	<i>Mol.%</i>
Isobutane	0.058	0.077	0.111	2,4DMC6	0.329	0.345	0.320
n-C4	0.165	0.209	0.315	ctc-1,2,4TMCC5	0.663	0.653	0.656
Isopentane	0.230	0.272	0.353	3,3DMC6	0.085	0.088	0.082
n-C5	0.444	0.521	0.684	ctc-1,2,3TMCC5	0.827	0.807	0.818
CC5	0.122	0.121	0.194	2,3,4-TMC5	0.191	0.197	0.186
2,3DMC4	0.099	0.110	0.127	Toluene	1.656	1.405	1.996
2MC5	0.730	0.821	0.940	2,3DMC5	0.520	0.530	0.506
3MC5	0.616	0.681	0.794	2M3EC5	0.131	0.135	0.128
n-C6	2.585	2.881	3.331	2MC7	2.852	3.007	2.773
2,2DMC5	0.099	0.108	0.109	4MC7	0.686	0.716	0.667
MCC5	1.515	1.488	1.999	3,4DMC6(L)	0.082	0.085	0.080
2,4DMC5	0.226	0.247	0.249	C8 Olefin?	0.097	0.102	0.096
Benzene	0.373	0.312	0.530	cis-1,3DMCC6	3.975	3.841	3.935
3,3DMC5	0.069	0.073	0.076	trans-1,4DMCC6	0.852	0.822	0.843
CC6	2.016	1.905	2.661	1,1 DMCC6	0.315	0.299	0.312
2MC6	1.855	2.010	2.045	trans-1,3EMCC5	0.225	0.213	0.223
2,3DMC5	0.801	0.848	0.883	cis-1,3EMCC5	0.214	0.203	0.212
1,1DMCC5	0.528	0.515	0.598	trans1-,2EMCC5	0.541	0.510	0.536
3MC6	2.266	2.425	2.499	1E1MCC5	0.074	0.070	0.073
cis-1,3DMCC5	0.980	0.967	1.108	trans-1,2DMCC6	1.261	1.196	1.249
trans-1,3DMCC5	0.925	0.909	1.047	n-C8	7.634	7.994	7.423
3EC5	0.203	0.214	0.224	C9 Naphthene 1?	0.132	0.125	0.116
trans-1,2DMCC5	1.911	1.870	2.162	C9 Naphthene 2?	0.087	0.083	0.077
n-C7	7.239	7.785	7.981	2,3,5-TMC6	0.042	0.043	0.037
MCC6	6.317	6.041	7.147	cis-1,2EMCC5	0.063	0.058	0.062
1,1,3-TMCC5	0.731	0.723	0.724	2,2DMC7	0.107	0.110	0.093
ECC5	0.417	0.401	0.472	Vinylcyclohexene-1	0.228	0.217	0.232



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Continued Table-3

<i>Compounds</i>	<i>Wt%</i>	<i>Vol. %</i>	<i>Mol. %</i>	<i>Compounds</i>	<i>Wt%</i>	<i>Vol. %</i>	<i>Mol. %</i>
2,5DMC6	0.258	0.274	0.251	2,4DMC7	0.394	0.408	0.341
4,4DMC7	0.047	0.048	0.041	C8?	0.061	0.064	0.059
ccc-1,3,5TMCC6+n-PCC5	2.050	1.961	1.804	IsoBCC5	0.103	0.098	0.091
2,6DMC7	0.992	1.036	0.859	Trans-4-Nonene	0.034	0.034	0.030
1,1,3TMCC6	1.844	1.752	1.622	cis-3-Nonene	0.107	0.108	0.094
1,1,4TMCC6	0.148	0.141	0.130	TMC6 (3)?	0.204	0.207	0.177
2,5DMC7+3,5DMC7(D)	0.438	0.446	0.379	n-C9	7.378	7.378	6.231
3,3DMC7+3,5DMC7(L)	0.097	0.099	0.084	trans-2-Nonene	0.064	0.064	0.056
C8?	0.106	0.111	0.103	1M2PCC5	0.064	0.060	0.057
C9 Naphthene 3?	0.191	0.181	0.168	IsoPbenzene	0.113	0.096	0.104
C9 Naphthene 4?	0.103	0.098	0.091	Tert-BCC5	0.512	0.483	0.451
Ebenzene	0.383	0.326	0.401	IsoPCC6	0.256	0.235	0.225
2,3,4-TMC6	0.307	0.316	0.266	3,3,5TMC7	0.249	0.248	0.195
Ctt-1,2,4TMCC6	0.832	0.772	0.732	2,2DMC8	0.301	0.306	0.235
C9 Olefin 2?	0.037	0.032	0.208	C9?	0.038	0.039	0.033
m-Xylene	1.355	1.155	1.418	C9?	0.135	0.139	0.117
p-Xylene	0.351	0.300	0.367	Sec-BCC5 ?	0.910	0.858	0.801
2,3DMC7	1.310	1.328	1.135	2,6DMC8	0.222	0.225	0.147
3,4DMC7(L)	0.350	0.353	0.303	n-BCC5	0.212	0.199	0.186
3,3MEC6	0.042	0.043	0.036	C9?	0.235	0.241	0.203
4EC7	0.112	0.114	0.097	C9?	0.095	0.097	0.082
4MC8	0.684	0.666	0.561	3,3DMC8	1.055	1.051	0.824
2MC8	1.062	1.095	0.919	1M3Ebenzene	0.689	0.587	0.637
C8?	0.040	0.042	0.039	1,3,5TM benzene	0.342	0.291	0.087
Ctc-1,2,4TMCC6	0.292	0.272	0.257	2,3DMC8	0.431	0.430	0.336
3EC7	0.144	0.147	0.125	C9?	0.108	0.111	0.093
3MC8	1.281	1.309	1.109	C9?	0.135	0.138	0.117



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Continued Table-3

Compounds	Wt%	Vol. %	Mol. %	Compounds	Wt%	Vol. %	Mol. %
2,4,6TMC6	0.069	0.071	0.060	1M2Ebenzene	0.217	0.182	0.201
O-xylene+1,1,2TMCC6	1.113	0.931	1.165	3,3,4TMC7	0.800	0.818	0.624
1,1,2TMCC6	0.055	0.050	0.048	2MC9	0.789	0.799	0.616
Cis-1,4EMCC6	1.285	1.194	1.131	3EC8	0.226	0.225	0.176
C8?	0.090	0.094	0.088	C9?	0.090	0.093	0.078
TMC6(2)?	0.451	0.457	0.390	3MC9	0.594`	0.596	0.463
C10 Paraffin 1?	0.038	0.039	0.030	C10?	0.054	0.054	0.042
1,2,4TMEbenzene	0.951	0.800	0.879	C10?	0.058	0.059	0.046
C10 Paraffin 3?	0.239	0.243	0.187	C10?	0.091	0.092	0.071
IsoBCC6	0.328	0.304	0.260	C10?	0.096	0.097	0.075
C10 Paraffin 5?	0.066	0.067	0.051	2,3-Dihydroindene	0.391	0.300	0.368
C10 Paraffin 6?	0.138	0.139	0.108	Sec-BCC6	0.149	0.135	0.118
Sec-Bbenzene	0.133	0.113	0.110	C10?	0.069	0.070	0.054
C9?	0.039	0.040	0.034	C10?	0.085	0.086	0.067
n-C10	3.848	3.879	3.004	C10?	0.100	0.101	0.078
C10?	0.410	0.414	0.320	C10?	0.033	0.033	0.026
C10?	0.115	0.116	0.090	n-BCC6	0.049	0.046	0.039
1M3IsoPbenzene	0.053	0.045	0.044	C10?	0.032	0.033	0.025
1M4IsoPbenzene	0.040	0.035	0.033	n-Bbenzene	0.030	0.026	0.025
C10?	0.121	0.122	0.094	Totals	100.00	100.00	100.00



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Table (4)

Detailed Hydrocarbon Analysis of 70-175°C Fraction (ASTM D5134)

PIONA Analysis (Hydrocarbon totals by group types)

<i>Group Types</i>	<i>Wt%</i>	<i>Vol. %</i>	<i>Mol. %</i>
<i>Total Aromatics</i>	8.189	6.903	8.593
<i>Total Iso-Paraffins</i>	25.295	26.385	24.054
<i>Total Naphthenes</i>	34.073	32.658	35.431
<i>Total Olefins</i>	0.567	0.562	0.541
<i>Total n-Paraffins</i>	29.441	31.009	29.348
<i>Total Unknowns</i>	2.435	2.482	2.033
<i>Total</i>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>



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معهد النفط الليبي

Document No. LPI-LAB-004-04

Messla Crude Oil

Table (5)

Detailed Hydrocarbon Analysis of 70-175°C Fraction (ASTM D5134)

PIONA Analysis (Totals by Carbon Number)

<i>Group</i>	<i>Wt%</i>	<i>Vol.%</i>	<i>Mol.%</i>	<i>Ave. Mw.</i>	<i>Ave. Sp.Gr</i>
<i>Butanes</i>	0.223	0.286	0.426	58.105	0.577
<i>Pentanes</i>	0.796	0.914	1.231	71.823	0.645
<i>Hexanes</i>	7.932	8.197	10.383	84.861	0.716
<i>Heptanes</i>	25.491	25.818	28.594	99.026	0.731
<i>Octane's</i>	26.334	26.113	26.027	112.390	0.746
<i>Nonane's</i>	28.184	27.631	24.702	126.737	0.755
<i>Decanes</i>	11.040	11.041	8.637	141.985	0.740
<i>Total</i>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>	<i>110.099</i>	<i>0.724</i>



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Table (6)

GC-Carbon Distribution of Crude Oil

<i>Compounds</i>	<i>Wt. %</i>	<i>Mol. %</i>	<i>Fraction MW</i>	<i>MW Calculation</i>
C3	0.73	2.26	44.10	1.00
iC4	0.69	1.61	58.12	0.94
nC4	2.71	6.33	58.12	3.68
iC5	2.28	4.30	72.15	3.11
nC5	3.16	5.96	72.15	4.30
C6	5.69	8.98	86.18	7.74
C7	8.40	11.41	100.21	11.43
C8	10.21	12.16	114.23	13.89
C9	8.47	8.98	128.26	11.52
C10	7.48	7.16	142.29	10.18
C11	6.29	5.47	156.30	8.55
C12	4.48	3.58	170.30	6.10
C13	5.12	3.78	184.40	6.97
C14	4.74	3.25	198.40	6.45
C15	4.04	2.59	212.40	5.49
C16	3.34	2.01	226.40	4.54
C17	3.51	1.99	240.50	4.77
C18	2.83	1.51	254.50	3.85
C19	2.39	1.21	268.50	3.24
C20	1.87	0.90	282.60	2.55
C21	1.85	0.85	296.58	2.51
C22	1.64	0.72	310.61	2.23



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Continued Table-6

<i>Compounds</i>	<i>Wt. %</i>	<i>Mol. %</i>	<i>Fraction MW</i>	<i>MW Calculation</i>
C23	1.58	0.66	324.64	2.15
C24	1.23	0.49	338.66	1.67
C25	1.01	0.39	352.69	1.37
C26	0.92	0.34	366.72	1.25
C27	0.83	0.30	380.74	1.12
C28	0.61	0.21	394.77	0.84
C29	0.59	0.20	408.80	0.80
C30	0.46	0.15	422.82	0.63
C31	0.44	0.14	436.85	0.60
C32	0.39	0.12	450.88	0.53
C33	0.03	0.01	464.91	0.04
Total	100.00	100.00		136.05



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TABLE (7)

Yield and Inspection of Light Naphtha Cut

TBP Cut Points	C₅-70 °C	METHOD
Vol. % on Crude	6.21	
Wt. % on Crude	4.80	
Density@15°C, g/ml	0.6558	ASTM D-4052
Specific gravity@ 60/60 °F	0.6564	ASTM D-4052
API gravity	84.1	Calculation
Reid vapour pressure@37.8 °C, psi	15.0	ASTM D-323
Volume Average Boiling Point, (VABP), °C	50.6	
Sulphur content, wt. %	0.021	ASTM D-4294
Octane Number; Research method	78.7	ASTM D-2699
Octane Number; Motor method	76.4	ASTM D-2700
<u>Distillation,</u> IBP °C	26	
5%	35	
10%	37	
20%	40	
30%	43	
40%	46	
50%	49	
60%	53	ASTM D-86
70%	57	
80%	61	
90%	67	
95%	71	
FBP	73	
Residue, vol. %	1.0	
Losses, vol. %	2.0	
Molecular weight	76.5	Calculation
Lead content, ppm	<0.03	ICP-OES



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TABLE (8)

Yield and Inspection of Heavy Naphtha

TBP Cut Points	70-175 °C	METHOD
Vol. % on Crude	17.91	
Wt. % on Crude	15.82	
Density@15°C, g/ml	0.7417	ASTM D-4052
Specific gravity@ 60/60 °F	0.7424	Calculation
API gravity	59.1	Calculation
Reid vapour pressure, psi	4.1	ASTM D-323
Volume Average Boiling Point, (VABP), °C	123.8	Calculation
Sulphur content, wt. %	0.030	ASTM D-4294
Characterization factor	12.0	UOP 375
Octane Number; Research method	69.9	ASTM D-2699
Octane Number; Motor method	69.4	ASTM D-2700
<u>Distillation,</u> <u>IBP °C</u>	74	
5%	95	
10%	99	
20%	106	
30%	111	
40%	117	
50%	121	
60%	128	ASTM D-86
70%	136	
80%	143	
90%	152	
95%	158	
FBP	164	
Residue % vol.	1.0	
Loss% vol.	1.0	
Molecular weight	112.1	Calculation
Lead content, ppm	<0.03	ICP-OES

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TABLE (9)
Yield and Inspection of Kerosene Cut

TBP Cut Points	175-235⁰C	METHOD
Vol. % on Crude	9.31	
Wt. % on Crude	8.79	
Density _{15 °C} , g/ml	0.7880	ASTM D-4052
Specific gravity@ 60/60 °F	0.7887	Calculation
API gravity	47.9	Calculation
Characterisation factor	12.0	UOP 375
Volume Average Boiling Point, (VABP) , °C	197.8	Calculation
Sulphur content. wt. %	0.032	ASTM D-4294
Aniline point, °C	65.0	ASTM D-611
Aromatic, vol. %	13.3	ASTM D-1319
Paraffin's+ Naphathenes, vol. %	0.70	ASTM D-1319
Olefins, vol. %	85.0	ASTM D-1319
K. Viscosity at -20 °C, cSt	4.30	ASTM D-445
K. Viscosity at 37.8 °C, cSt	1.2706	Calculation
K. Viscosity at 50 °C, cSt	1.0825	Calculation
Flash point Tag, °C	57.7	ASTM D-56
Freezing point , °C	-47	ASTM D-2386
Cold filter plugging point, °C	<-20	IP 309
Pour point, , °C	<-36	ASTM D-97
Saybolt colour	+30	ASTM D-156
Copper corrosion	1	ASTM D-130
Molecular weight	157.1	Calculation
Smoke point, mm	28	ASTM D-1322



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Continued Table-9

<i>TBP Cut Points</i>	<i>175-235⁰C</i>	<i>METHOD</i>
<u>Distillation,</u>	⁰ C	
IBP	178	
5%	186	
10%	188	
20%	190	
30%	192	
40%	194	
50%	196	
60%	199	
70%	202	
80%	205	
90%	211	
95%	217	
FBP	232	
Residue % vol.	0.5	
Loss % vol.	0.5	

ASTM D-86



Messla Crude Oil

TABLE (10)

Yield and Inspection of Atmospheric Gas Oil Cut

TBP Cut Points	235-350 °C	METHOD
Vol. % on Crude	20.10	
Wt.% on Crude	19.78	
Density 15 °C, g/ml	0.8229	ASTM D-4052
Specific gravity@ 60/60 °F	0.8236	Calculation
API gravity	40.3	Calculation
Characterization factor	12.1	UOP 375
Volume Average Boiling Point, (VABP), °C	286.8	Calculation
Sulphur content, wt. %	0.054	ASTM D-4294
Aniline point, °C	76	ASTM D-611
K. Viscosity at 37.8 °C, cSt	2.4295	ASTM D-445
K. Viscosity at 50 °C, cSt	2.2096	ASTM D-445
Pour point, °C	-18	(ASTM D-97)
Molecular weight	223.4	Calculation
Calculated cetane index	52.5	ASTM D-976
<u>Distillation, °C</u>		
IBP	233	
5%	258	
10%	263	
20%	269	
30%	272	
40%	277	
50%	281	
60%	290	ASTM D-86
70%	298	
80%	307	
90%	320	
95%	-	
FBP	334	
Residue % vol.	0.5	
Loss% vol.	0.5	



Messla Crude Oil

Continued Table-10

<i>TBP Cut Points</i>	<i>235-350⁰C</i>	<i>METHOD</i>
Vanadium, ppm	<0.005	ASTM D 5708
Nickel, ppm	<0.01	ASTM D 5708
Calcium, ppm	0.061	Dry ashing
Potassium, ppm	<0.030	Dry ashing
Sodium, ppm	<0.002	Dry ashing



Messla Crude Oil

TABLE (11)

Yield and Inspection of Vacuum Gas Oil Cut

<i>Boiling Range</i>	<i>350-550⁰C</i>	<i>METHOD</i>
Vol. % on Crude	34.41	
Wt. % on Crude	36.32	
Density ¹⁵ °C, g/ml	0.8847	ASTM D-4052
Specific gravity@ 60/60 °F	0.8853	Calculation
API gravity	28.3	Calculation
Characterisation factor	12.3	UOP 375
Volume Average Boiling Point, (VABP), °C	444	Calculation
Sulphur content, wt. %	0.173	ASTM D-4294
Aniline point, °C	97.6	ASTM D-611
K. Viscosity at 37.8 °C, cSt	-	ASTM D-445
K. Viscosity at 50 °C, cSt	19.578	ASTM D-445
K. Viscosity at 100 °C, cSt	5.1395	ASTM D-445
Pour point, °C	+45	(ASTM D-97)
Molecular weight	403.9	Calculation
<u>Distillation, °C</u>		
IBP	346	
5%	365	
10%	374	
20%	390	
30%	403	
40%	420	
50%	439	
60%	457	ASTM D-1160
70%	477	
80%	500	
90%	529	
95%	550	
FBP	578	
Residue % vol.	1.0	
Loss% vol.	Nil	
Vanadium, ppm	<0.005	ASTM D 5708
Nickel, ppm	0.154	ASTM D 5708
Calcium, ppm	0.061	Dry ashing
Potassium, ppm	<0.030	Dry ashing
Sodium, ppm	0.297	Dry ashing



Messla Crude Oil

TABLE (12)
Atmospheric Residue 350⁺ °C

Boiling Range	350⁺ °C	METHOD
Vol. % on Crude	44.65	
Wt.% on Crude	49.60	
Density@ 15 °C, g/ml	0.9204	ASTM D-4052
Specific gravity@60/60 °F	0.9211	Calculation
API gravity	22.1	Calculation
Asphaltenes content, wt. %	0.91	IP 143
n-Heptane Insolubles, wt. %	4.32	ASTM D893
Sulphur content, wt. %	0.197	ASTM D-4294
Pour point, °C	+39	ASTM D-97
K. Viscosity @ 37.8 °C, cSt	-	ASTM D-445
K. Viscosity @ 50 °C, cSt	-	ASTM D-445
K. Viscosity @100 °C, cSt	15.7071	ASTM D-445
Ash content ,wt. %	0.010	ASTM D-482
Conradson carbon residue, wt. %	6.19	ASTM D-189
Calorific value, MJ/Kg gross	44.46	Calculation
Calorific value, Kcal/Kg gross	10621	Calculation
Vanadium, ppm	0.221	ASTM D 5708
Nickel, ppm	6.241	ASTM D 5708
Sodium, ppm	4.506	Dry ashing



Messla Crude Oil

TABLE (13)
Vacuum Residue 550⁺ °C

Boiling Range	550⁺ °C	METHOD
Vol. % on Crude	11.18	
Wt. % on Crude	13.28	
Density@ 15 °C, g/ml	0.9929	ASTM D-4052
Specific gravity@60/60 °F	0.9936	Calculation
API gravity	10.9	Calculation
Asphaltenes content wt. %	3.62	IP 143
n-Heptane Insolubles, wt. %	6.06	ASTM D893
Sulphur content , wt. %	0.298	ASTM D-4294
Pour point, °C	+57	ASTM D-97
K. Viscosity at 50 °C, cSt	-	ASTM D-445
K. Viscosity at 100 °C, cSt	2206.55	ASTM D-445
Ash content ,wt. %	0.026	ASTM D-482
Conradson carbon residue, wt. %	20.47	ASTM D-189
Calorific value, MJ/Kg gross	43.3	Calculation
Calorific value, Kcal/Kg gross	10329.7	Calculation
Vanadium, ppm	1.519	ASTM D 5708
Nickel, ppm	24.95	ASTM D 5708

Messla Crude Oil

Appendix

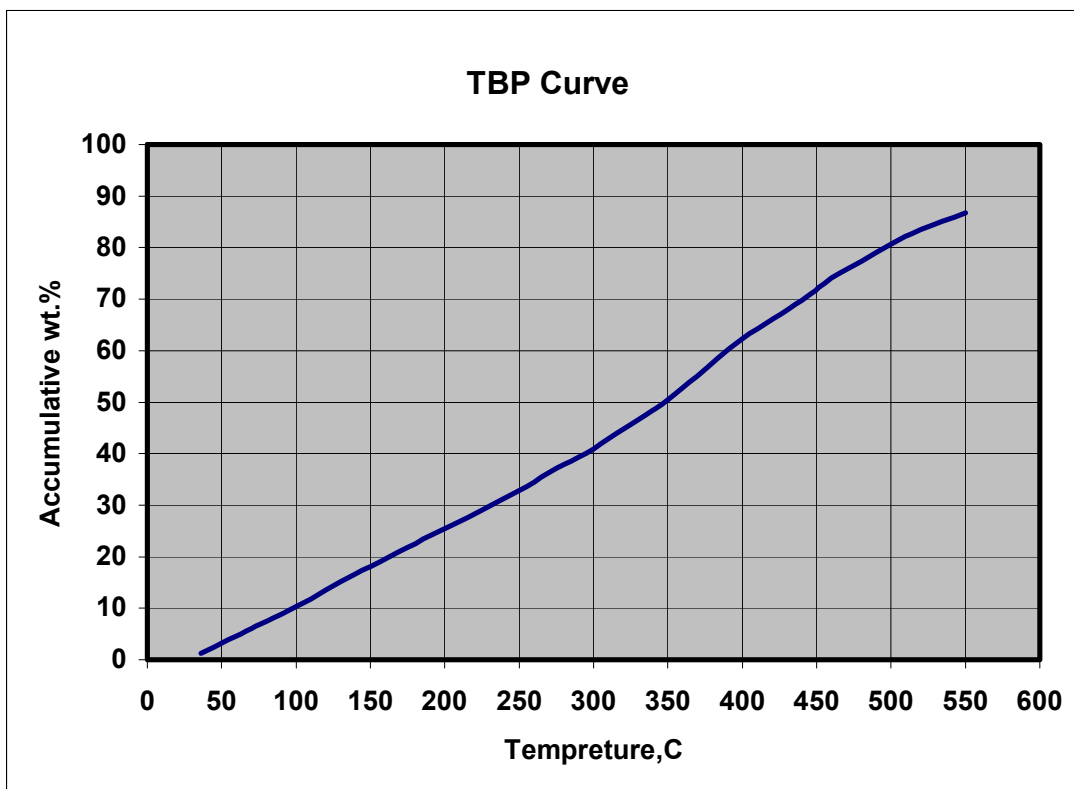


Fig.1 TBP versus cumulative yield (wt. %) on crude