

Crude Assay Report

on

Crude Oil sample marked

"AL SHAHEEN CRUDE OIL"

dated 10th April 2006

On Behalf Of

Maersk Oil Qatar AS

With compliments
Intertek Caleb Brett, Fujairah

Caleb Brett Fujairah

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"AL SHAHEEN CRUDE OIL" ASSAY

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LABORATORY REPORT NO. - FUJ/FCA1025/06

Date: June 5, 2006

Maersk Oil Qatar As
P.O.Box 22050
Doha
Qatar

For the Attention of : Mr. Michael D. Pedersen

Sample(s) received from : Maersk Oil Qatar As

Sample(s) submitted as : Crude Oil - 3 x 20 Ltrs IATA Cans
- 2 x 10 Ltrs IATA Cans

Description(s) on Label(s) : Al Shaheen Crude Oil Ex Qatar sampled on
10th April 2006.

Work Order No. : CWO-14064

Seals on Sample(s) : 042351, 042666, 042100, 042548, 042052

Sample(s) received on : May 2, 2006

The above sample(s) was/were examined as detailed below and the following results obtained:

Please refer attached sheet for analytical results.

LABORATORY REPORT NO. - FUJ/FCA1025/06

SUMMARY & COMMENTS

General:

The Al Shaheen Crude Oil samples were received from Intertek Caleb Brett Qatar Branch on May 02, 2006. The samples were in 3 x 20 Ltrs & 2 x 10 Ltrs IATA Cans. The labels indicated that the samples were drawn on 10th April 2006.

Appearance & Initial Examination:

The sample observed to be liquid at room temperature with good flow properties. After cooling (to Zero degree centigrade) and homogenization of the sample. H₂S content on the vapour phase of the samples within the original containers were measured and noted to be in the range of 3000-1400 ppm within the containers. A representative portion of the sample was drawn and tested for API and Water contents. API observed to be 27.97°API and the Water content as 0.18% Vol. The Dry API of the sample was calculated and observed to be 28.03° API.

Distillation and Analysis:

The distillation of the sample was carried out in two major steps as per ASTM D 2892 (15 Theoretical plate column) & ASTM D 5236 (Vacuum potstill) methods. The yield pattern of each fraction collected are tabulated in percentage weight and percentage volume and in graphical form.

Results of the analysis carried on the various fractions are shown in pages 8-17. Some of the properties are also presented in chart form in pages 18-21.

Please do not hesitate to contact us for any additional information or clarifications that you may require on this analysis.

LABORATORY REPORT NO. - FUJ/FCA1025/06**SUMMARY OF WHOLE CRUDE CHARACTERISTICS**

Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	Whole Crude
Density @ 15°C	kg/L	ASTM D 5002	0.8868
Specific Gravity @ 60/60° F		Calculated	0.8873
API Gravity @ 60° F		Conversion	27.97
Density @ 15°C (dry)	kg/L	Calculated	0.8865
Specific Gravity @ 60/60° F (dry)		Conversion	0.8870
API Gravity @ 60° F (dry)		Calculated	28.03
Water Content	% Vol.	ASTM D 4298	0.18
Light Ends			
methane			0.000
ethane			0.039
propane			0.309
i-butane	% mass	GC	0.260
n-butane			0.811
Total C1-C4			1.419
i-pentane			0.950
n-pentane			0.633
Sulphur Content	% mass	ASTM D 4294	2.37
Mercaptan Sulphur	mg/kg	UOP 163	339
Total Nitrogen	% mass	ASTM D 5291 (Mod)	0.15
Pour Point (upper)	° C	ASTM D 5853	Below -45
Pour Point (lower)	° C	ASTM D 5853	Below -45
Kinematic Viscosity @ 20° C			44.06
Kinematic Viscosity @ 40° C	mm ² /S	ASTM D 445	13.32
Kinematic Viscosity @ 50° C			10.21
Refractive Index @ 70° C		ASTM D 1218	1.5008
Asphaltene	% mass	IP 143	1.70
Total Acid Number	mgKOH/g	ASTM D 664	0.329
Benzene Content	% mass	GLC	< 0.01
Salt Content	PTB	ASTM D 3230	46.3
Salt Content as NaCl	mg/L	IP 265	145.8
Salt Content	mg/kg	ASTM D 3230	149.0
Flash Point	° C	ASTM D 93(Mod)	Below -5
Sediment by Extraction	% mass	ASTM D 473	0.01
Reid Vapour Pressure @ 100° F	psi	ASTM D 323	6.4
Hydrogen Sulphide	mg/kg	UOP 163	< 1
Mercury	mg/kg	Cold Vapor	< 1
Lead	mg/kg	ASTM D 5863 / AAS	< 0.1
Wax Content prec. at -30° C	% mass	UOP 46	1.0

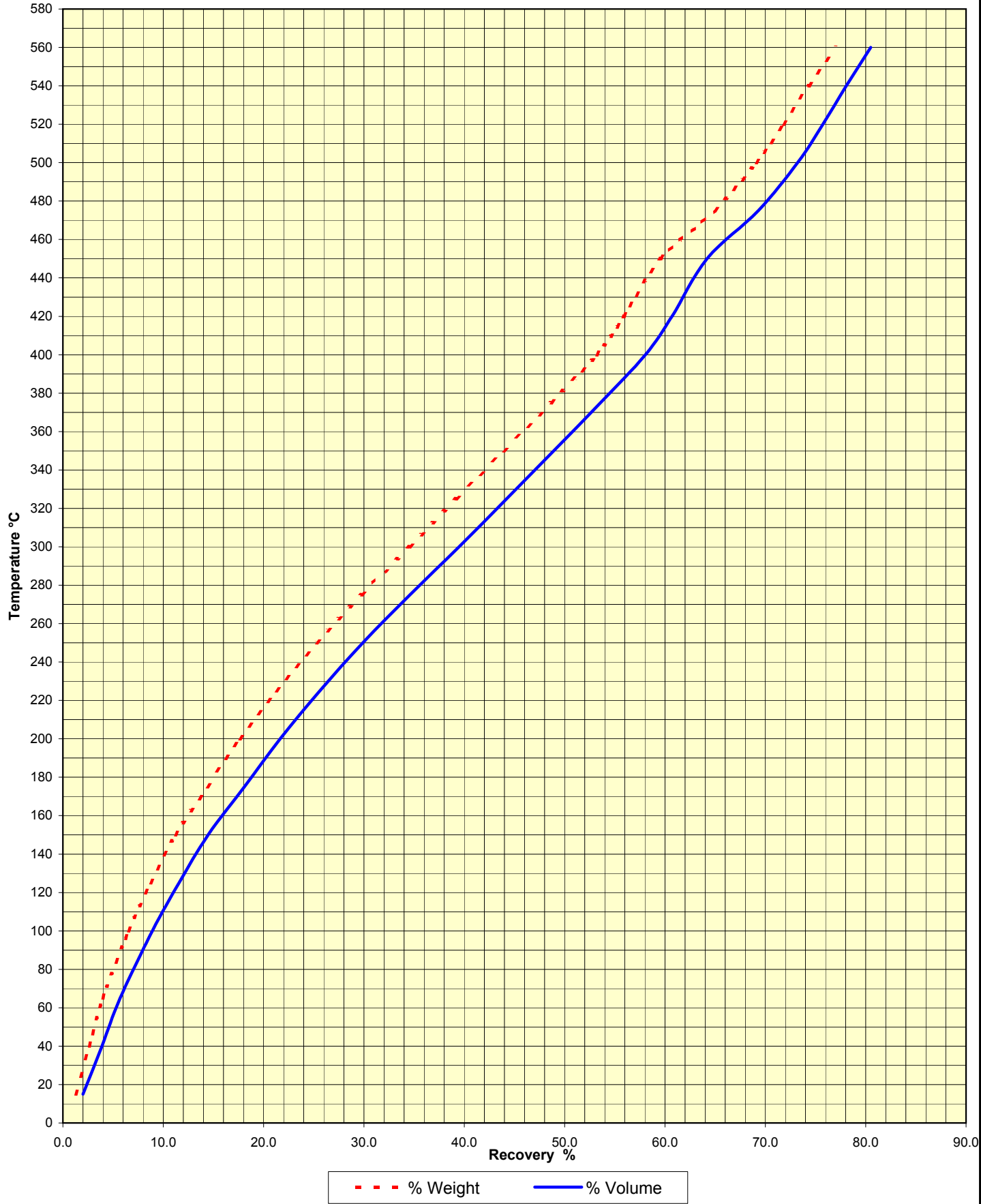
LABORATORY REPORT NO. - FUJ/FCA1025/06**TRUE BOILING POINT DISTILLATION DATA**

(ASTM D 2892 & ASTM D 5236)

Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

Sl. No.	Vapour Temperature °C	% Weight	Cumulative % Weight	% Volume	Cumulative % Volume
1	Gas	1.28	1.28	2.00	2.00
2	15 - 40	1.35	2.63	1.90	3.90
3	40 - 65	1.35	3.98	1.80	5.70
4	65 - 100	2.57	6.55	3.22	8.92
5	100 - 125	2.19	8.74	2.64	11.56
6	125 - 150	2.47	11.21	2.91	14.47
7	150 - 175	3.16	14.37	3.61	18.08
8	175 - 200	3.23	17.60	3.58	21.66
9	200 - 225	3.64	21.24	3.95	25.61
10	225 - 250	4.01	25.25	4.28	29.89
11	250 - 275	4.49	29.74	4.69	34.58
12	275 - 300	4.78	34.52	4.90	39.48
13	300 - 325	4.63	39.15	4.73	44.21
14	325 - 350	4.74	43.89	4.71	48.92
15	350 - 375	4.74	48.63	4.65	53.57
16	375 - 400	4.56	53.19	4.47	58.04
17	400 - 420	2.73	55.92	2.65	60.69
18	420 - 450	3.65	59.57	3.50	64.19
19	450 - 475	5.37	64.94	5.11	69.30
20	475 - 500	4.15	69.09	3.91	73.21
21	500 - 520	2.71	71.80	2.52	75.73
22	520 - 540	2.53	74.33	2.33	78.06
23	540 - 560	2.69	77.02	2.44	80.50
24	560 + Residue	22.98	100.00	19.50	100.00

TRUE BOILING POINT DISTILLATION CURVE
(ASTM D 2892 & ASTM D 5236)
AL SHAHEEN CRUDE OIL Ex Qatar sampled on 10th April 2006



LABORATORY REPORT NO. - FUJ/FCA1025/06

SUMMARY OF PRODUCT / RESIDUE CUT POINTS AND YIELDS

Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

		Yield %	
Cut Points (° C)	Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.		
	Weight %	Volume %	
IBP - 65	2.70	3.70	
65 - 150	7.23	8.77	
150 - 200	6.39	7.19	
200 - 250	7.65	8.23	
250 - 300	9.27	9.59	
300 - 350	9.37	9.44	
350 - 420	12.03	11.77	
420 - 560	21.10	19.81	
560 +	22.98	19.50	

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - C5 - 65°C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			2
			C5 - 65°C
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 2892	2.70
Yield	% Vol.		3.70
Cum. Yield	% Wt.	ASTM D 2892	3.98
Cum. Yield	% Vol.		5.70
Density @ 15°C	kg/L	IP 365	0.6464
Specific Gravity @ 60/60° F		Conversion	0.6465
API Gravity @ 60° F		Calculated	87.37
Sulphur Content	% mass	ASTM D 4294	0.043
Mercaptan Sulphur	mg/kg	ASTM D 3227	235
Research Octane Number ***		ASTM D 2699	74.2
Motor Octane Number ***		ASTM D 2700	71.0
PIONA analysis			
Total Paraffins	% Vol	GC	95.32
Olefins			< 0.01
Napthenes			4.65
Aromatics			0.03
> 200° C & Unidentified			< 0.01
Poly-Napthenes			< 0.01

Note: *** Samples were blended with ASTM grade Iso Octane, and results were calculated from the blend's result.

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - 65 - 150°C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			3
			65 -150°C
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 2892	7.23
Yield	% Vol.		8.77
Cum. Yield	% Wt.	ASTM D 2892	11.21
Cum. Yield	% Vol.		14.47
Density @ 15°C	kg/L	IP 365	0.7316
Specific Gravity @ 60/60° F		Conversion	0.7318
API Gravity @ 60° F		Calculated	61.86
Sulphur Content	% mass	ASTM D 4294	0.066
Mercaptan Sulphur	mg/kg	ASTM D 3227	314
Research Octane Number ***		ASTM D 2699	57
Motor Octane Number ***		ASTM D 2700	55
PIONA analysis			
Total Paraffins	% Vol	GC	61.63
Olefins			< 0.01
Napthenes			36.24
Aromatics			2.13
> 200° C & Unidentified			< 0.01
Poly-Napthenes			< 0.01

Note: *** Samples were blended with ASTM grade Iso Octane, and results were calculated from the blend's result.

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - 150 - 200°C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			4
			150 - 200°C
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 2892	6.39
Yield	% Vol.		7.19
Cum. Yield	% Wt.	ASTM D 2892	17.60
Cum. Yield	% Vol.		21.66
Density @ 15°C	kg/L	IP 365	0.7897
Specific Gravity @ 60/60° F		Conversion	0.7901
API Gravity @ 60° F		Calculated	47.59
Sulphur Content	% mass	ASTM D 4294	0.180
Mercaptan Sulphur	mg/kg	ASTM D 3227	225
PIONA analysis			
Total Paraffins			33.72
Olefins			< 0.01
Napthenes	% Vol	GC	23.61
Aromatics			18.23
> 200° C & Unidentified			24.44
Poly-Napthenes			5.97
Aniline Point			° C
Smoke Point	mm	IP 57	27.0
Naphthalene content	%Vol.	ASTM D 1840	0.17
Freeze Point	° C	ASTM D 2386	Below -70.0

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - 200 - 250°C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			5
			200 - 250°C
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 2892	7.65
Yield	% Vol.		8.23
Cum. Yield	% Wt.	ASTM D 2892	25.25
Cum. Yield	% Vol.		29.89
Density @ 15°C	kg/L	IP 365	0.8250
Specific Gravity @ 60/60° F		Conversion	0.8254
API Gravity @ 60° F		Calculated	39.93
Sulphur Content	% mass	ASTM D 4294	0.356
Mercaptan Sulphur	mg/kg	ASTM D 3227	103
Aniline Point	° C	ASTM D 611	58.4
Smoke Point	mm	IP 57	21.0
Freeze Point	° C	ASTM D 2386	- 52.5
Cloud Point	° C	ASTM D 2500	Below -42
Kinematic Viscosity @ 40° C	mm ² /S	ASTM D 445	1.670
Kinematic Viscosity @ 50° C			1.443
Distillation		ASTM D 86	See page 17
Cetane Index		ASTM D 976	43.3
Refractive Index @ 20° C		ASTM D 1218	1.4578

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - 250 - 300°C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			6
			250 - 300°C
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 2892	9.27
Yield	% Vol.		9.59
Cum. Yield	% Wt.	ASTM D 2892	34.52
Cum. Yield	% Vol.		39.48
Density @ 15°C	kg/L	IP 365	0.8578
Specific Gravity @ 60/60° F		Conversion	0.8583
API Gravity @ 60° F		Calculated	33.36
Sulphur Content	% mass	ASTM D 4294	1.04
Mercaptan Sulphur	mg/kg	ASTM D 3227	54
Total Nitrogen	% mass	ASTM D 5291 (Mod)	< 0.05
Aniline Point	° C	ASTM D 611	60.4
Cloud Point	° C	ASTM D 2500	- 29
Pour Point (upper)	° C	ASTM D 97	- 30
Kinematic Viscosity @ 40° C	mm ² /S	ASTM D 445	3.069
Kinematic Viscosity @ 50° C			2.531
Kinematic Viscosity @ 80° C			1.629
Distillation		ASTM D 86	See page 17
Cetane Index		ASTM D 976	45.8
Refractive Index @ 20° C		ASTM D 1218	1.4771

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - 300 - 350°C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			7
			300 - 350°C
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 2892	9.37
Yield	% Vol.		9.44
Cum. Yield	% Wt.	ASTM D 2892	43.89
Cum. Yield	% Vol.		48.92
Density @ 15°C	kg/L	IP 365	0.8803
Specific Gravity @ 60/60° F		Conversion	0.8808
API Gravity @ 60° F		Calculated	29.15
Sulphur Content	% mass	ASTM D 4294	1.88
Total Nitrogen	% mass	ASTM D 5291 (Mod)	< 0.05
Aniline Point	° C	ASTM D 611	68.6
Cloud Point	° C	ASTM D 2500	- 4
Pour Point (upper)	° C	ASTM D 97	- 6
Kinematic Viscosity @ 40° C	mm ² /S	ASTM D 445	6.438
Kinematic Viscosity @ 50° C			4.977
Kinematic Viscosity @ 80° C			2.640
Distillation		ASTM D 86	See page 17
Cetane Index		ASTM D 976	46.8
Refractive Index @ 20° C		ASTM D 1218	1.4893

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - 350 - 420°C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			8
			350 - 420°C
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 5236	12.03
Yield	% Vol.		11.77
Cum. Yield	% Wt.	ASTM D 2892 / ASTM D 5236	55.92
Cum. Yield	% Vol.		60.69
Density @ 15°C	kg/L	IP 365	0.9052
Specific Gravity @ 60/60° F		Conversion	0.9057
API Gravity @ 60° F		Calculated	24.73
Sulphur Content	% mass	ASTM D 4294	2.41
Total Nitrogen	% mass	ASTM D 5291 (Mod)	0.08
Aniline Point	° C	ASTM D 611	73.0
Cloud Point	° C	ASTM D 2500	+ 18
Pour Point (upper)	° C	ASTM D 97	+ 15
Kinematic Viscosity @ 40° C	mm ² /S	ASTM D 445	16.23
Kinematic Viscosity @ 50° C			11.46
Kinematic Viscosity @ 80° C			5.068
Distillation		ASTM D 86	*
Cetane Index		ASTM D 976	*

Note: * Unable to perform test due to the heavy nature of the fraction.

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - 420 - 560°C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			9
			420 - 560°C
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 5236	21.10
Yield	% Vol.		19.81
Cum. Yield	% Wt.	ASTM D 2892 / ASTM D 5236	77.02
Cum. Yield	% Vol.		80.50
Density @ 15°C	kg/L	IP 365	0.9449
Specific Gravity @ 60/60° F		Conversion	0.9455
API Gravity @ 60° F		Calculated	18.16
Sulphur Content	% mass	ASTM D 4294	2.86
Total Nitrogen	% mass	ASTM D 5291 (Mod)	0.15
Aniline Point	° C	ASTM D 611	84.6
Cloud Point	° C	ASTM D 2500	##
Pour Point (upper)	° C	ASTM D 97	+ 42
Kinematic Viscosity @ 50° C	mm ² /S	ASTM D 445	74.55
Kinematic Viscosity @ 80° C			21.06
Kinematic Viscosity @ 100° C			11.53
Micro Carbon Residue	% mass	ASTM D 4530	0.60

Note: ## Unable to test due to the dark colour of the fraction.

LABORATORY REPORT NO. - FUJ/FCA1025/06
CUT RANGE - 560 + °C
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

TEST	UNIT	METHOD	CUT RANGE
			10
			560° C +
Distillation of Crude Oil			
Yield	% Wt.	ASTM D 5236	22.98
Yield	% Vol.		19.50
Cum. Yield	% Wt.	ASTM D 2892 / ASTM D 5236	100.00
Cum. Yield	% Vol.		100.00
Density @ 15°C	kg/L	IP 190	1.0250
Specific Gravity @ 60/60° F		Conversion	1.0257
API Gravity @ 60° F		Calculated	6.45
Sulphur Content	% mass	ASTM D 4294	5.00
Total Nitrogen	% mass	ASTM D 5291 (Mod)	0.37
Vanadium (V)	mg/kg	IP 470 (AAS)	112
Nickel (Ni)			38
Iron (Fe)			15
Nickel / Vanadium Ratio		Calculated	0.34
Pour Point (upper)	° C	ASTM D 97	+ 51
Kinematic Viscosity @ 100° C	mm ² /S	ASTM D 445	3013
Kinematic Viscosity @ 150° C			193.9
Micro Carbon Residue	% mass	ASTM D 4530	23.3
Asphaltene	% mass	IP 143	9.02

LABORATORY REPORT NO. - FUJ/FCA1025/06

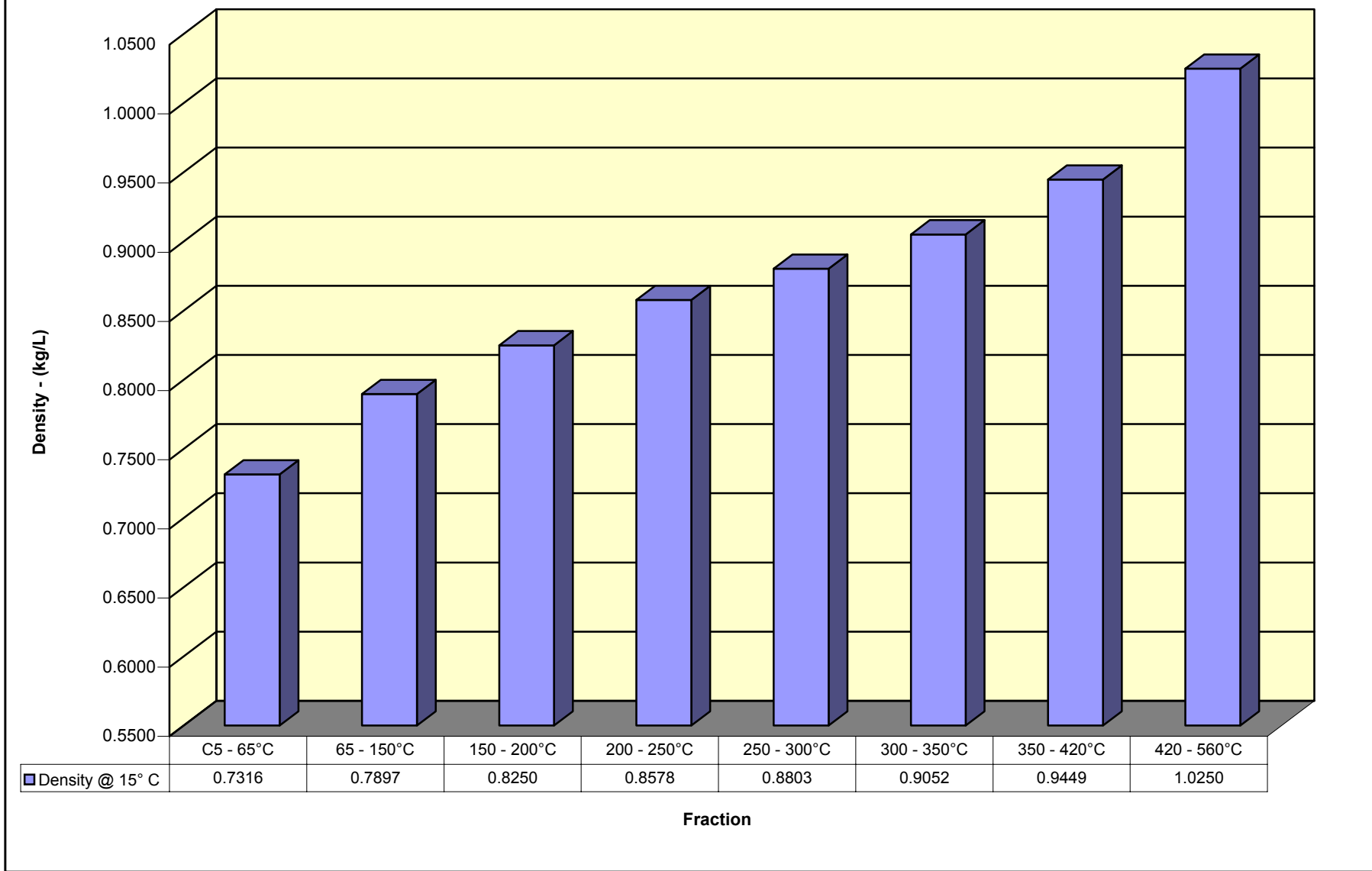
ASTM 86 - DISTILLATION DATA PER FRACTIONS

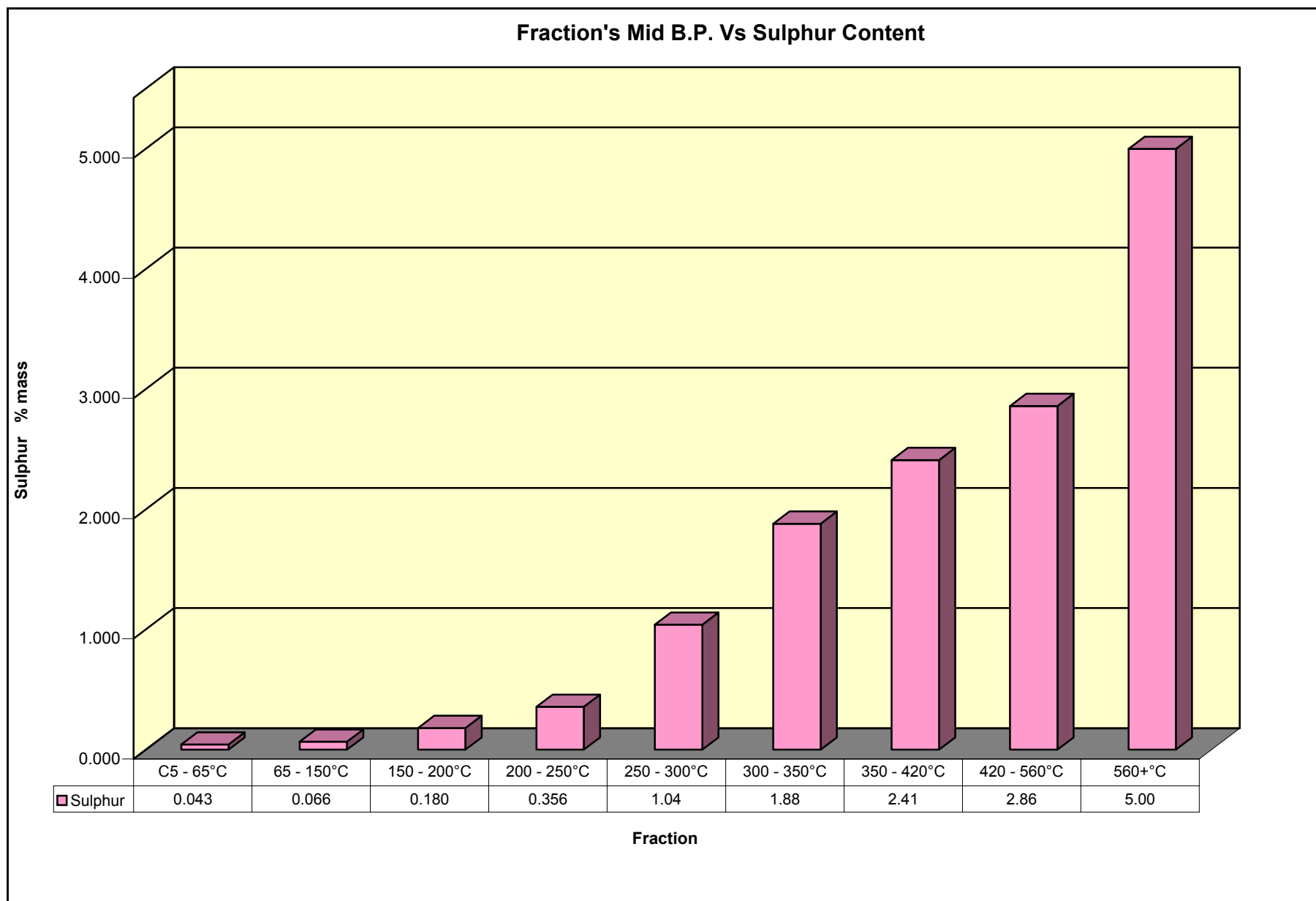
Sample Descriptions / Label : Al Shaheen Crude Oil Ex Qatar sampled on 10th April 2006.

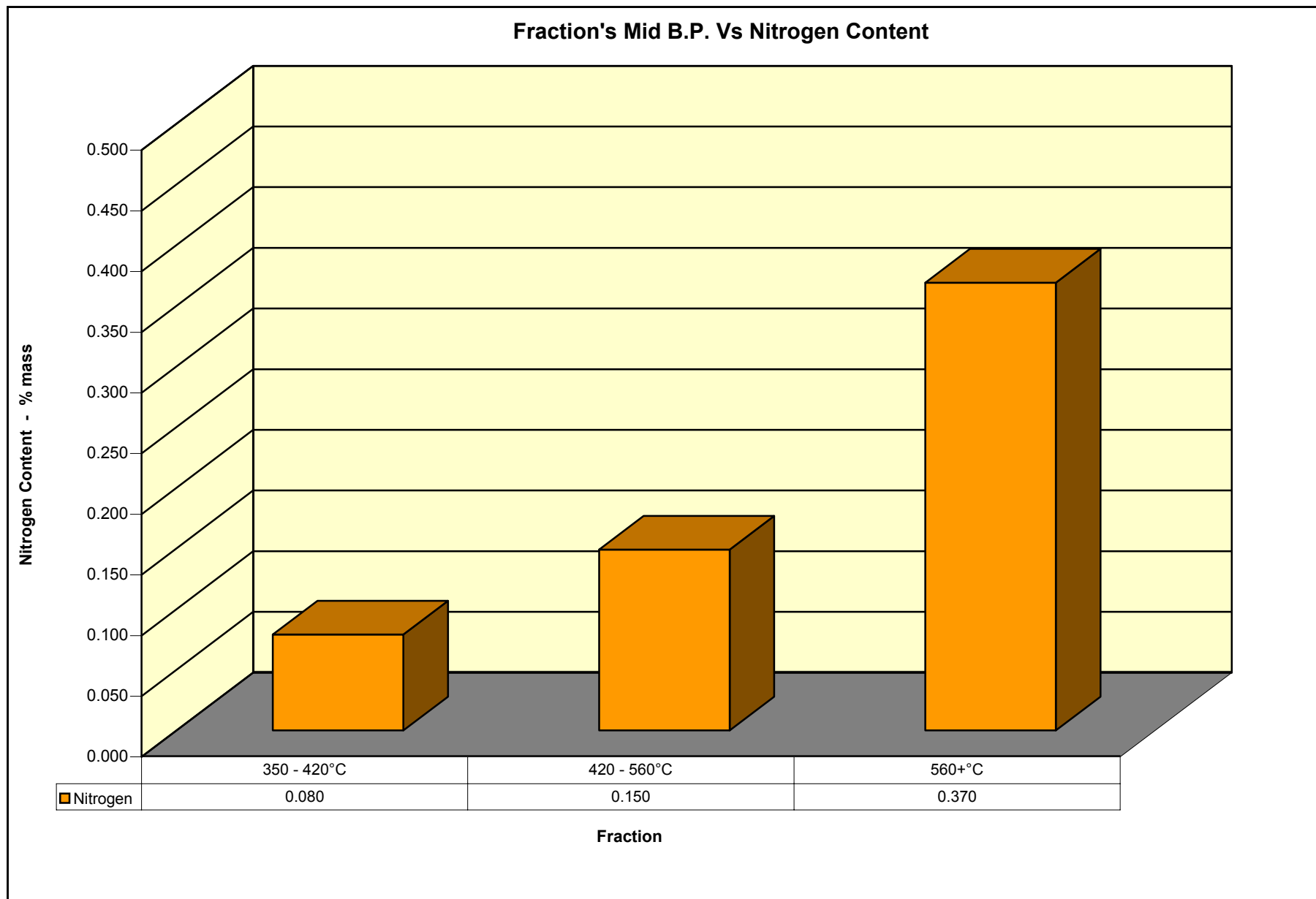
Boiling range	° C	200 - 250	250 - 300	300 - 350	350 - 420
Yield on whole crude	Wt. %	7.65	9.27	9.37	12.03
	Vol.%	8.23	9.59	9.44	11.77
Initial boiling point	° C	213.0	264.0	310.0	**
10% recovered	° C	216.0	266.5	314.0	**
20% recovered	° C	217.5	267.5	315.5	**
30% recovered	° C	219.0	269.0	317.0	**
40% recovered	° C	220.0	270.0	319.0	**
50% recovered	° C	222.0	272.0	321.0	**
60% recovered	° C	224.0	274.0	324.0	**
70% recovered	° C	226.5	275.5	326.0	**
80% recovered	° C	230.0	278.5	329.5	**
90% recovered	° C	235.0	284.0	337.5	**
Final Boiling Point	° C	243.0	290.5	345.1	**
Volume recovered	% Vol.	97.0	97.5	98.5	**
Residue	% Vol.	1.3	1.3	1.0	**
Loss	% Vol.	1.7	1.2	0.5	**

Note: ** Unable to perform ASTM Distillation due to the heavy nature of the fraction.

Fraction's Mid B.P. Vs Density







Fraction's Mid B.P. Vs Aniline Point

