

# CAPLINE SYSTEM

## CRUDE OIL PROPERTIES AND QUALITY INDICATORS

Approved Crude List - 1st Quarter, 2004

Updated  
May 4, 2004

Section I. Crudes Approved, Moved and Capline Assay Reported																						
Mnmm	See Foot-notes	Crude Name	Product Code	Country	Assay Date	Density	RVP	Sulfur	a)Pour Point	Carbon Residue	Viscosity (SSU)			b) Metals (ppm)				TAN E	SALT	Organic Chlorides (ppm)		
						(API@60)	(psia)	(%)	(degF)	(%)	@60 F	@80 F	@100 F	H2S	Vanadium	Nickel	Whole	Pitch	Whole	Pitch	(mg KOH/g)	(lb/MB)
<b>Sweet - Low Metals Group</b>																						
BNL		BONNY LIGHT	82337	Nigeria	10/28/03	33.4	4.5	0.16	-5.8	1.2	52.7	43.9	39.7	<1	0.5	5.2	3.7	43.0	0.26	18	<1	<1
BSR		BRASS RIVER	82325	Nigeria	03/15/04	36.1	6.3	0.14	<-27.4	0.8	41.1	37.8	35.4	<1	0.3	3.8	2.0	33.0	0.23	4	<1	<1
BRN	<input checked="" type="checkbox"/>	BRENT	82288	U. K.	05/08/03	38.2	5.2	0.41	26.6	1.9	45.2	40.8	36.8	<1	6.7	38.0	1.3	7.9	0.05	17	<1	<1
CAB	<input checked="" type="checkbox"/>	CABINDA	82345	Angola	03/03/03	32.4	2.7	0.13	59.0	3.5	-	-	73.5	<1	1.7	6.0	17.0	63.0	0.17	3	<1	<1
DJEN	<input checked="" type="checkbox"/>	DJENO	82602	Congo	07/05/97	27.0	2.5	0.47	32.0	5.3	695.1	284.3	173.9	<1	6.7	22.0	12.3	62.0	0.82	10	<1	2.4
DRAUG		DRAUGEN	82575	Norway	04/26/02	39.1	7.3	0.16	<-27.4	0.7	42.1	39.2	35.5	<1	1.1	16.0	1.0	13.0	0.18	29	<1	<1
EAN		EA CRUDE	82991	Nigeria	03/15/04	34.5	4.1	0.09	32.0	0.3	42.4	39.1	36.0	<1	0.2	2.2	1.0	24.0	0.12	5	<1	<1
EKO		EKOFISK	82307	Norway	01/07/04	37.6	4.4	0.21	21.2	1.9	52.5	45.3	40.6	<1	1.5	9.8	2.7	17.0	0.09	6	<1	<1
ESC	<input checked="" type="checkbox"/>	ESCRAVOS	82338	Nigeria	07/21/01	36.4	5.2	0.18	42.8	1.3	68.0	44.1	39.1	<1	1.4	13.0	3.6	33.0	0.16	6	<1	<1
FON	<input checked="" type="checkbox"/>	FOINAVEN	82424	U. K.	06/12/00	26.6	0.6	0.40	42.8	2.0	478.5	188.6	110.6	<1	4.6	18.8	2.7	10.3	0.16	8	<1	2.0
FOR		FORCADOS	82331	Nigeria	10/27/03	30.6	3.2	0.16	-5.8	1.0	62.2	50.7	44.2	<1	0.6	5.9	2.5	37.0	0.33	12	<1	<1
FOT	<input checked="" type="checkbox"/>	FORTIES	82308	U.K.	09/27/03	44.5	7.9	0.18	-0.4	0.8	36.5	34.4	32.6	<1	1.5	17.0	0.7	7.7	0.42	8	<1	<1
GAL		GALEOTA	82314	Trinidad	08/24/03	37.8	6.0	0.19	53.6	0.2	-	37.7	35.1	<1	0.1	-	0.1	-	0.60	4	-	-
GIR		GIRASSOL	82583	Angola	10/26/03	31.1	3.0	0.38	26.6	3.2	130.7	93.9	60.4	<1	4.6	22.0	9.7	45.0	0.33	43	<1	<1
GFAQ		GULLFAKS	82270	Norway	07/17/03	36.9	3.6	0.19	37.4	0.1	66.4	39.4	36.0	<1	0.2	2.0	0.1	2.3	0.29	63	<1	<1
HLS		HEAVY LA SWEET	82720	USA	03/17/04	32.9	2.2	0.35	<-27.4	2.1	69.3	54.3	46.6	<1	2.0	11.0	3.0	21.0	0.70	86	<1	<1
HBA	<input checked="" type="checkbox"/>	HIBERNIA	82139	Canada	08/16/03	34.4	3.2	0.41	42.8	2.3	-	52.0	49.9	<1	1.0	4.5	1.0	4.3	<0.05	12	<1	<1
KIT	<input checked="" type="checkbox"/>	KITINA	82580	Congo	09/21/02	36.4	4.2	0.11	59.0	2.3	-	56.8	48.5	<1	1.0	4.7	9.1	38.0	0.10	4	<1	<1
LMS		LA MISSISSIPPI SWEET	82723	USA	09/03/03	40.8	3.5	0.41	16.6	1.5	41.8	37.9	35.4	<1	2.1	20.0	0.7	8.1	0.55	78	<1	<1
LLS		LIGHT LOUISIANA SWEET	82722	USA	03/22/04	37.6	3.3	0.34	-11.2	1.0	47.4	42.2	38.6	<1	1.9	19.0	1.4	14.0	0.49	13	<1	<1
LION	<input checked="" type="checkbox"/>	LION CRUDE	82604	Ivory Coast	03/01/04	39.6	7.2	0.18	10.4	1.6	44.2	39.9	36.8	<1	3.7	26.0	3.3	25.0	0.20	10	<1	<1
NAK		NAPHTHA - KOCH	82161	USA	08/03/02	57.8	3.1	0.11	<-27.4	0.2	<32.0	<32.0	<32.0	<1	1.2	-	0.4	-	0.11	10	<1	<1
NBA	<input checked="" type="checkbox"/>	NEMBA	82255	Angola	07/17/03	40.9	7.1	0.18	26.6	1.4	41.7	37.7	35.8	<1	1.5	14.0	1.5	12.0	<0.05	34	<1	<1
NOR	<input checked="" type="checkbox"/>	NORNE	82430	Norway	03/17/03	32.6	2.4	0.20	64.4	1.0	-	56.8	46.5	<1	<0.5	23.5	0.9	8.6	0.07	33	<1	<1
OSB		OSEBERG	82271	Norway	04/26/03	38.7	5.2	0.22	15.8	1.8	45.1	39.4	38.5	<1	1.1	8.6	1.1	8.9	0.11	7	<1	<1
OSO	<input checked="" type="checkbox"/>	OSO CONDENSATE	82403	Nigeria	09/16/02	45.7	8.9	0.06	64.4	0.3	38.2	32.6	<32.0	<1	<0.1	-	0.7	-	0.11	10	<1	<1
SAH	<input checked="" type="checkbox"/>	SAHARAN BLEND	82298	Middle East	03/01/04	47.1	10.8	0.10	<-27.4	0.7	34.3	32.8	31.9	<1	0.2	2.8	<0.1	0.8	<0.05	18	<1	<1
STB		SANTA BARBARA	82251	Venezuela	03/12/03	39.5	5.4	0.49	-22.0	0.9	38.8	36.0	34.2	<1	4.2	69.0	0.9	15.0	0.02	29	<1	<1
SCH	<input checked="" type="checkbox"/>	SCHIEHALLION	82441	Scotland	10/17/03	26.4	1.3	0.46	42.8	2.9	340.0	159.0	93.8	<1	7.2	33.0	4.2	19.0	0.33	13	<1	<1
SLS		SOUTH LOUISIANA SWEET	82586	USA	03/18/04	35.9	3.3	0.33	10.4	2.1	54.2	46.4	42.2	<1	1.8	11.0	4.4	28.0	0.32	9	<1	1.1
TROL	<input checked="" type="checkbox"/>	TROLL EXPORT	82421	Norway	06/27/03	27.2	1.4	0.25	<-27.4	1.7	122.6	86.4	65.9	<1	0.6	4.3	0.8	4.3	1.10	8	<1	<1
WSB		WILLIAMS SUGARLAND BLEND	82573	USA	07/14/01	40.9	6.4	0.20	37.4	0.7	38.5	36.4	34.3	<1	1.2	22.0	0.8	19.0	0.19	39	<1	1.1
XIK	<input checked="" type="checkbox"/>	XIKOMBA	82982	Angola	04/03/04	33.7	4.4	0.39	37.4	3.4	84.2	60.2	49.3	<1	5.3	23.0	12.0	55.0	0.23	75	<1	<1
ZUASW		ZUATA SWEET	82576	Angola	07/14/03	30.4	3.2	0.14	<-27.4	<0.1	63.9	49.4	44.6	<1	0.3	-	<0.1	-	<0.05	1	<1	<1
<b>Sweet - High Metals Group</b>																						
CUS	<input checked="" type="checkbox"/>	CUSIANA	82419	Columbia	12/13/03	42.5	8.8	0.15	37.4	0.8	37.6	34.5	32.7	<1	7.5	125.0	2.1	42.0	0.05	4	<1	<1
KWI	<input checked="" type="checkbox"/>	QUA IBOE	82339	Nigeria	10/14/03	36.3	4.5	0.14	32.0	1.2	-	40.7	37.4	<1	2.4	37.0	4.4	69.0	0.32	4	<1	<1
<b>Intermediate Group</b>																						
BS		BONITO SOUR	82743	USA	12/15/03	35.5	4.7	0.99	-22.0	2.3	60.1	49.9	44.4	<1	7.6	40.0	3.2	18.0	0.67	71	<1	<1
OMA		OLMECA	82385	Mexico	02/18/02	37.3	6.2	0.84	10.4	2.4	48.6	43.1	39.5	<1	11.0	66.0	5.0	26.0	0.15	10	<1	1.9
<b>Sour Group</b>																						
AXL		ARABIAN EXTRA LIGHT	82375	Saudi Arabia	03/19/03	39.4	5.1	1.09	<-27.4	1.9	42.5	38.8	36.1	<1	3.0	20.0	1.1	8.0	0.03	20	<1	<1
ABL		ARABIAN LIGHT	82376	Saudi Arabia	10/11/03	32.8	3.7	1.97	-5.8	4.5	68.7	55.6	41.2	<1	18.0	98.0	5.2	28.0	0.05	2	<1	<1
BASLI		BASRAH LT/MESA 30 BLEND (35/65)	82671	Iraq/USA	02/08/01	30.5	3.5	1.63	<-27.4	5.0	92.8	75.5	54.2	<1	39.0	181.0	9.6	43.0	0.09	4	<1	<1
EIC		EUGENE ISLAND	82725	USA	03/16/04	34.3	3.4	1.18	<-27.4	3.2	65.3	52.4	45.6	<1	14.0	70.0	5.0	26.0	0.44	44	<1	<1
FUR		FURRIAL	82374	Venezuela	03/19/02	30.0	2.8	1.06	<-27.4	4.3	93.5	69.0	53.6	<1	38.0	179.0	8.2	35.0	0.09	3	<1	<1
MARS		MARS BLEND	82754	USA	03/18/04	30.3	4.0	1.91	-22.0	5.0	111.9	78.2	64.5	<1	53.0	161.0	21.0	69.0	0.53	60	<1	<1
MMB		MARS/MESA BLEND (40/60)	82428	Loop	09/08/00	30.1	3.1	1.65	-22.0	5.1	100.0	70.9	57.6	<1	48.0	156.0	14.0	49.0	0.27	85	<1	<1
MSA		MESA 30	82369	Venezuela	05/10/03	30.2	2.8	1.06	<-27.4	4.5	88.0	66.2	53.9	<1	39.0	194.0	8.2	41.0	0.05	3	<1	1.0
ORI		ORIENTE	82388	Ecuador	01/05/01	24.1	2.8	1.51	5.0	9.3	652.6	356.4	201.0	<1	167.0	240.0	66.0	240.0	0.13	61	<1	<1
PSD		POSEIDON	82749	USA	03/17/04	30.7	3.4	1.62	<-27.4	3.7	94.5	70.6	57.6	<1	30.0	101.0	12.0	38.0	0.89	15	<1	<1
URA		URALS	82370	C.I.S. Euro	05/23/02	32.6	4.7	1.09	-11.2	3.1	88.2	61.4	52.1	<1	42.0	202.0	13.0	63.0	0.66	7	<1	1.4
VAS	<input checked="" type="checkbox"/>	VASCONIA	82237	Colombia	02/09/02	24.5	1.9	1.01	37.4	6.0	440.8	229.5	130.6	<1	144.0	349.0	67.0	171.0	0.78	6	<1	<1

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Mnmn	See Foot- notes	Crude Name	Product Code	Country	Assay Date	Density	RVP	Sulfur	a)Pour Point	Carbon Residue	Viscosity (SSU)			b) H2S	Metals (ppm)				TAN E	SALT	Organic Chlorides (ppm)	
						(API@60)	(psia)	(%)	(degF)	(%)	@60 F	@80 F	@100 F	(ppm)	Vanadium	Nickel	Whole	Pitch	Whole	Pitch	(mg KOH/g)	(lb/MB)
<b>High Sulfur Sour Group</b>																						
ABH		ARABIAN HEAVY	82378	Saudi Arabia	05/19/01	27.7	4.3	2.87	<-27.4	7.8	226.2	145.8	99.6	<1	49.0	181.0	15.0	59.0	<0.10	6	<1	<1
ABM		ARABIAN MEDIUM	82377	Saudi Arabia	06/20/03	30.4	3.5	2.57	<-27.4	6.1	104.8	77.1	61.3	<1	41.0	136.0	13.0	41.0	0.25	2	<1	<1
BAS		BASRAH LIGHT	82383	Iraq	04/23/03	30.5	5.4	2.90	<-27.4	6.2	92.2	73.0	60.7	<1	45.0	163.0	12.0	45.0	0.37	14	<1	<1
EMX	<input checked="" type="checkbox"/>	EAST MS MIX	82521	USA	09/03/03	30.9	3.0	2.10	15.8	7.3	106.7	78.5	57.3	23	23.0	87.0	8.0	31.0	0.26	250	<1	<1
KIR		KIRKUK	82384	IRAQ	03/11/03	33.9	4.6	2.26	-0.4	4.9	62.9	52.3	45.6	<1	31.0	128.0	13.0	53.0	0.12	75	<1	<1
KUW		KUWAIT	82380	Kuwait	10/09/03	30.0	4.1	2.62	-5.8	6.5	123.2	82.2	75.5	<1	42.0	149.0	15.0	51.0	0.15	17	<1	<1
<b>Section II. Crudes Approved, Moved, Pending Capline Assay</b>																						
<b>Sweet - Low Metals Group</b>																						
AME	<input checked="" type="checkbox"/>	AMENAM BLEND	82985	Nigeria	11/17/03	36.3	5.5	0.11	55.4	-	48.5	42.7	39.4	<1	0.5	-	4.4	-	0.43	65	-	-
LLC		CUSIANA/LLS BLEND	82756	Colombia	05/15/00	39.9	5.8	0.23	23.9	0.8	42.2	38.2	35.8	<1	1.0	17.2	0.4	5.2	0.17	44	<1	<1
MARB	<input checked="" type="checkbox"/>	MARIB LIGHT (ALIF)	82352	North Yem	05/12/98	48.9	8.6	0.07	-22.0	0.6	32.1	31.4	30.4	<1	1.0	<1	1.0	<1	0.16	<1	<1	<1
ODU		ODUDU	82110	Nigeria	11/27/98	30.5	3.3	0.15	<-27.4		60.8	51.1	44.0	<1	1.2	8.9	6.7	59.0	0.77	65	8.0	<1
OKON	<input checked="" type="checkbox"/>	OKONO	82584	Nigeria	02/09/02	41.9	7.7	0.06	64.4	0.4	39.0	35.0	33.0	-	<2	4.0	2.0	57.0	0.34	13	-	-
PSOYO	<input checked="" type="checkbox"/>	PALANCA/SOYO	82460	Angola	01/01/99	37.8	7.8	0.16	45.0	1.5	48.7	42.7	40.5	<1	1.7	15.4	1.5	13.1	0.05	27	<1	<1
UKPOK	<input checked="" type="checkbox"/>	UKPOKITI	82577	Nigeria	02/01/01	41.7	4.9	0.08	53.7	0.4	31.3	30.5	29.2	-	<2	<2	<2	20.0	0.30	28	-	-
<b>Sour Group</b>																						
BCSR	<input checked="" type="checkbox"/>	BAYOU CHOCTAW - SOUR	82174	USA	05/01/98	32.2	3.6	1.43	11.0	4.0	76.8	57.0	47.3	100	40.3	240.0	11.1	66.0	0.13	<50	<0.1	
<b>Section III. Crudes Approved, Not Moved</b>																						
<b>Sweet - Low Metals Group</b>																						
ESP		ESPOIR	82983	Ivory Coast	01/01/02	33.0	6.3	0.30	33.3	1.5	66.0	54.0	47.0	-	1.1		4.0		0.17	25	-	-
KUMK	<input checked="" type="checkbox"/>	KUMKOL	82908	Azerbaijan	01/01/01	40.9	4.4	0.08	75.0	1.5	50.0	44.0	39.5	<2	0.2	-	3.8	-	0.17	18	-	-
YOHO	<input checked="" type="checkbox"/>	YOHO CRUDE	82810	Nigeria	06/11/03	39.6	4.8	0.12	64.0	0.7	39.2	36.5	34.2	<2	0.1	0.5	1.8	5.7	0.34	4	-	-
<b>High Sulfur Sour Group</b>																						
ABL17		ARABIAN LIGHT / SEG 17 BLEND	82987	USA	02/03/04	33.0	4.6	2.10	-5.0	5.2	73.0	58.0	49.0	<1	23.9	97.8	6.8	28.6	0.13	2	-	-

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**HYDROCARBON**

**FOOTNOTES**

AMENAM	Must be monitored for pour point depression.
BAYOU CHOCTAW - SOUR	!! Due to Hydrogen Sulfide results- Take safety precautions !!
BRENT	Must be monitored for pour point depression.
CABINDA	Must be monitored for pour point depression. ! Viscosity at 60 and 80F not accurately measured - too close to pour point.
CUSIANA	Must be monitored for pour point depression. . Note: Cusiana continues to have HIGH Metals. Cusiana will be moved as a Sweet/ High Metals batch unless metals return to previous low levels. Due to RVP, to move in summer months, must be shipped on a case by case basis and approved prior to each nomination.
DJENO	Must be monitored for pour point depression.
EAST MS MIX	!! Due to Hydrogen Sulfide results- Take safety precautions !!
ESCRAVOS	Must be monitored for pour point depression.
FOINAVEN	Must be monitored for pour point depression.
FORTIES	RVP and Acid Number were much higher than expected based on assay received
HIBERNIA	Must be monitored for pour point depression.
KITINA	Must be monitored for pour point depression.
KUMKOL	Must be monitored for pour point depression.
LION	Must be monitored for pour point depression.
MARIB LIGHT	Due to RVP, to move in summer months, must be shipped on a case by case basis and approved prior to each nomination.
NEMBA	Must be monitored for pour point depression.
NORNE	Must be monitored for pour point depression.
OKONO	Must be monitored for pour point depression.
OSO CONDENSATE	Must be monitored for pour point depression. Due to RVP, must be shipped on a case by case basis and approved prior to each nomination.
PALANCA/SOYO BLEND	Must be monitored for pour point depression.
QUA IBOE	Must be monitored for pour point depression.
SAHARAN BLEND	Due to RVP, must be shipped on a case by case basis and approved prior to each nomination.
SCHIEHALLION	Must be monitored for pour point depression.
TROLL EXPORT	Acid number on Troll Export continues to be higher than usual. Will continue to move with Sweet Low Metals group and will monitor.
VASCONIA	Must be monitored for pour point depression.
XIKOMBA	Must be monitored for pour point depression.
YOHO CRUDE	Must be monitored for pour point depression.

a) **POUR POINT** may have been depressed in the sample taken for this assay.

b) **Due to loss of H<sub>2</sub>S in sampling and shipping, H<sub>2</sub>S is likely higher than stated in this assay. TAKE precautions with all crude oils - sour or sweet.**

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**NOTES**

**CRITERIA FOR GROUPING CRUDES ON CAPLINE**

Group	Criteria			
	Sulfur %w	Ni + V ppm	TAN mg KOH/g	Salt lb/1000 bbl
Sweet - Low Metals	< 0.5	<= 100	<= 1.0	<= 75
Sweet - High Metals	< 0.5	<= 250	<= 1.0	<= 75
Intermediate	0.5 - 1.0	<= 550	<= 1.0	<= 75
Sour	>1.0 - 2.0	<= 1200	<= 1.5	<= 75
High Sulfur Sour	> 2.0	<= 1200	<= 2.0	<= 75

**POUR POINT REQUIREMENTS**

**Summer** Start on or after April 1 and Clear of system by September 30 <= +55F  
**Winter** Start October 1 - March 31 <= +35F

**RVP LIMITATIONS**

**Year-Round** RVP of <= 8.6 psi accepted year-round  
**Winter** Start on or after October 1 and Clear of system by April 30 <= 9.6  
 NOTE: Winter RVP > 9.6 Subject to Management Approval

**CRUDES REMOVED AS OF THIS LISTING:**

Crude	Assay or Approval Date
N'KOSSA	3/23/2000
WEST HACKBERRY SWEET	10/10/2000

**Crudes not moved within three (3) years will be removed from the list.**  
**Newly approved crudes that have not moved within six (6) months will be removed from the list.**