

CAPLINE SYSTEM

CRUDE OIL PROPERTIES AND QUALITY INDICATORS

Approved Assay List

03/01/02

Group	Foot- Acronym notes	Crude Name	Country	Assay Date	Density (API@60)	RVP (psia)	Sulfur (%)	Pour (degF)	(a) Carbon Residue (%)	Viscosity (SSU)			H2S (ppm)	Metals (ppm)				TAN E (mg KOH/g)	SALT (lb/MB)	Organic Chlorides (ppm)	
										@60 F	@80 F	@100 F		Vanadium		Nickel				Whole	Naphtha
														Whole	Pitch	Whole	Pitch				
Swt-LMtls	BNL	-6 BONNY LIGHT	Nigeria	02/15/01	30.8	2.3	0.19	32.0	1.38	71.7	57.1	48.2	<1	1.0	7.8	4.7	36.0	0.33	35	<1	<1
Swt-LMtls	BSR	- BRASS RIVER	Nigeria	07/11/01	40.8	6.3	0.20	<-27.4	0.66	38.1	35.6	34.1	<1	1.8	19.0	1.4	6.0	0.23	15	<1	<1
Swt-LMtls	BRN	- BRENT	U. K.	01/06/01	39.5	6.3	0.32	10.4	1.60	47.0	42.4	36.7	<1	4.9	43.0	0.9	8.3	0.05	21	<1	<1
Swt-LMtls	CAB	(3) CABINDA	Angola	07/24/01	31.9	3.4	0.30	53.6	3.40	221	96.0	72.5	<1	3.9	17.0	13.0	57.0	0.07	15	<1	<1
Swt-LMtls	COCO	- COCODRIE CONDENSATE	USA	07/27/01	48.8	6.5	0.12	<-27.4	0.29				<1	0.6		0.5		0.16	93	<1	<1
Swt-LMtls	CUS	(3) CUSIANA	Columbia	07/14/01	36.3	4.5	0.19	37.4	1.20	48.2	42.5	38.4	<1	1.6	16.0	3.6	36.0	0.25	44	<1	1.2
Swt-LMtls	EKO	EKOFISK		07/15/01	36.3	4.8	0.39	<-27.4	1.58	49.5	44.9	40.2	<1	3.7	31.0	3.5	29.0	0.25	76	1.6	6.4
Swt-LMtls	ESC	- ESCRAVOS	Nigeria	07/21/01	36.4	5.2	0.18	42.8	1.30	68.0	44.1	39.1	<1	1.4	13.0	3.6	33.0	0.16	6	<1	<1
Swt-LMtls	FON	- FOINAVEN	U. K.	06/12/00	26.6	0.6	0.40	42.8	2.00	478.5	188.6	110.6	<1	4.6	18.8	2.7	10.3	0.16	8	<1	2.0
Swt-LMtls	FOR	- FORCADOS	Nigeria	07/12/01	29.8	2.7	0.15	<-27.4	0.89	68.1	51.1	46.9	<1	0.5	4.9	2.7	36.0	0.28	22	<1	<1
Swt-LMtls	GFAX	- GULLFAKS	Norway	07/23/01	36	3.65	0.176	-0.4	0.78	55.88	50.68	44.15	<1	0.6	7	2.8	40	0.34	6	<1	<1
Swt-LMtls	HPB	- HATTERS POND/LMS BLEND	USA	07/28/01	64.0	10.1	0.06	<-27.4	0.10				<1	0.2		0.1		0.03	50	<1	<1
Swt-LMtls	HLS	- HEAVY LA SWEET	USA	07/12/01	33.3	3.2	0.30	-27.4	1.50	61.5	50.5	43.9	<1	1.2	7.0	2.0	14.8	0.78	100	<1	<1
Swt-LMtls	JAY	- JAY	USA	07/18/01	48.3	6.0	0.34	<-27.4	0.75	33.5			7.4	0.7	16.0	0.3	10.0	0.04	34	<1	<1
Swt-LMtls	JSB	- JAY COND/LT MS SR BLEND (90/10)	USA	01/19/00	49.1	7.74	0.46	<-27.4	1.03	32.1	31.2	30.8	155	1.8	34	0.6	10	0.10	31	<1	<1
Swt-LMtls	LMS	(2) LA MISSISSIPPI SWEET	USA	04/26/01	42.0	4.3	0.15	5.0	1.00	43.1	37.0	35.6	<1	0.6	5.9	0.5	7.3	<1	47	<1	<1
Swt-LMtls	LLS	- LIGHT LOUISIANA SWEET	USA	07/11/01	39.9	4.2	0.25	0.0	0.70	66.7	53.8	37.9	<1	0.9	10.0	0.8	7.3	0.32	75	<1	<1
Swt-LMtls	LRP	- LIVERPOOL BAY	U. K.	06/07/99	44.9	4.7	0.21	21.2	0.94	-	36.7	34.5	<1	<0.1	0.9	<0.1	0.8	0.03	34	<1	1.1
Swt-LMtls	NKS	- N'KOSSA		03/23/00	47.5	8.8	0.12	<-27.4	0.23	3.1	2.5	2.3	<1	1.5	21.0	0.7	8.7	0.04	8	<1	<1
Swt-LMtls	NBA	- NEMBA	Angola	06/27/00	38.6	6.2	0.19	-11.2	1.35	45.3	42.2	38.7	<1	2.3	18.0	2.0	15.0	0.07	106	<1	<1
Swt-LMtls	NOR	- NORNE	Norway	11/08/99	32.2	1.9 (a)	0.17	69.9	0.85	-	75.0	47.0	<1	0.5	4.5	0.8	7.9	0.10	61	<1	<1
Swt-LMtls	ODU	- ODUDU	Nigeria	12/04/98	30.5	3.3	0.15	<-27.4	1.44	60.8	51.1	44.0	<1	1.2	8.9	1.2	59.0	0.77	65	<1	<1
Swt-LMtls	OSB	- OSEBERG	Norway	06/08/99	36.8	5.0	0.25	10.4	1.93	49.2	41.5	31.0	<1	1.3	8.6	1.1	8.6	0.14	17	<1	<1
Swt-LMtls	OSO	(5) OSO CONDENSATE	Nigeria	04/05/01	45.1	7.4	0.30	10.4	0.60	94.3	38.2	32.5	<1	0.6	14.0	0.5	13.0	<1	23	<1	<1
Swt-LMtls	KWI	(4) QUA IBOE	Nigeria	07/24/01	37.0	5.1	0.23	42.8	1.20	61.9	43.7	39.0	<1	1.8	17.0	3.1	32.0	2.10	100	<1	<1
Swt-LMtls	SAH	SAHARAN BLEND		11/18/2001	44.4	6.89	0.12	<-27.4	0.9	36.89	34.62	21.91	<1	0.6	8.9	0.4	6.7	0.05	13	<1	<1
Swt-LMtls	SCH	SCHIEHALLION	UK-NORTH SEA	02/12/01	26.5	0.9	0.48	26.6	2.60	238.7	140.5	88.7	<1	6.3	33.0	3.8	18.0	0.07	3	<1	<1
Swt-LMtls	SOY	- SOYO BLEND	Angola	11/15/01	37	4.0	0.26	-37.4	1.70	54.8	46.9	40.5	<1	6.6	69.0	2.2	18.0	0.15	30	<1	<1
Swt-LMtls	STF	- STATFJORD	Norway	10/19/99	38.4	6.7	0.23	21.2	1.50	68.3	41.4	38.0	<1	1.9	9.8	0.9	5.5	0.09	18	<1	<1
Swt-LMtls	TRI	- TRINIDAD	Trinidad	07/06/99	37.7	3.2	0.25	21.2	0.38	47.1	39.5	36.5	<1	<1	10.0	<1	8.3	0.31	209	<1	<1
Swt-LMtls	WSB	WILLIAMS SWEET BLEND		07/14/01	40.9	6.4	0.20	37.4	0.65	38.5	36.4	34.3	<1	1.2	22.0	0.8	19.0	0.19	39	<1	1.1
Swt-HMtls	ZFR	- ZAFIRO	Eq. New Guinea	10/15/97	29.9	4.9	0.28	-22.0	2.94	90.3	66.6	53.7	<1	1.6	25.0	9.6	84.4	1.00	40	<1	<1
Int	AXL	- ARABIAN EXTRA LIGHT	Saudi Arabia	07/12/01	37.1	4.4	0.70	-27.4	2.60	48.7	43.0	39.3	<1	8.0	40.0	2.6	12.0	0.26	>150	<1	1.3
Int	BS	- BONITO SOUR	USA	07/10/01	37.9	4.3	0.78	-11.2	1.50	49.1	43.9	40.1	<1	5.7	32.0	2.6	14.0	0.46	35	<1	<1
Int	CAN	- CANO LIMON	Colombia	05/17/99	29.5	1.1	0.52	-27.4	5.30	196.3	105.4	75.8	<1	13.0	62.0	36.0	172.0	0.15	6	<1	<1
Int	EIC	- EUGENE ISLAND CRUDE	USA	07/23/01	36.1	4.4	0.51	<-27.4	2.10	52.8	48.0	41.3	<1	8.9	48.0	4.0	22.0	0.55	20	<1	<1
Int	OMA	- OLMECA	Mexico	03/26/01	38.6	5.3	0.86	<-27.4	1.95	43.3	39.6	36.8	7.0	6.3	72.0	2.5	23.0	0.26	14	3.2	797.0
Int	ORI	- ORIENTE	Ecuador	09/10/01	25.7	2.8	0.38	-11.0	8.60	436.9	250.0	139.6	<1	116.0	315.0	35.0	82.0	0.31	106	<1	1.2
Int	STB	- SANTA BARBARA	Venezuela	11/27/00	38.1	5.0	0.52	<-27.4	0.60	43.1	38.8	36.4	2.3	3.1	30.0	0.9	8.5	0.14	6	<1	<1

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										@60 F	@80 F	@100 F		Vanadium		Nickel				Whole	Pitch	Whole	Pitch	Whole	Naphtha
														Whole	Pitch	Whole	Pitch								
Sr	ABL	- ARABIAN LIGHT	Saudi Arabia	07/12/01	33.3	3.9	1.79	<-27.4	4.30	76.0	58.9	48.3	<1	19.0	(122.0)	5.7	38.0	0.05	17	<1	1.0				
Sr	BASLI	- BASRAH LT/MESA 30 BLEND	USA	02/08/01	30.5	3.5	1.63	<-27.4	5.00	92.8	75.5	54.2	<1	39	181	9.6	43	0.09	4	<1	<1				
Sr	FUR	- FURRIAL	Venezuela	08/21/99	29.8	4.1	1.01	<-27.4	4.57	95.2	68.2	55.1	<1	33.0	191.0	8.3	43.0	0.11	13	<1	<1				
Sr	ITM	- ISTHMUS	Mexico	07/01/97	33.8	3.7	1.30	-33.0	4.00	71.6	56.1	48.2	<1	37.0	129.0	7.7	27.0	0.33	2	<1	1.0				
Sr	KIR	- KIRKUK	IRAQ	08/08/01	32.7	4.4	1.01	-27.4	4.72	71.5	56.5	48.4	<1	30.0	203.0	12.0	89.0	0.26	(>150)	<1	3.5				
Sr	MARS	- MARS BLEND	USA	07/16/01	29.9	4.0	1.93	<-27.4	4.94	117.5	81.1	62.6	<1	44.0	134.0	17.0	49.0	0.52	(<150)	<1	4.5				
Sr	MMB	- MARS/MESA BLEND	Loop	09/08/00	30.1	3.1	1.65	-22.0	5.12	100.0	70.9	57.6	<1	48.0	156.0	14.0	49.0	0.27	(85)	<1	1.0				
Sr	MSA	- MESA	Venezuela	08/06/00	30.1	3.5	1.09	<-27.4	4.56	98.2	67.5	55.4	<1	42.0	159.0	10.0	36.0	0.09	14	<1	<1				
Sr	PSD	- POSEIDON	USA	07/13/01	32.1	4.0	1.49	<-27.4	3.50	85.2	63.8	54.1	<1	11.5	83.0	6.3	30.0	0.74	(137)	<1	4.0				
Sr	SG10	- SEGREGATION 10 (MSA)	Loop	03/01/99	30.1	3.6	1.09	-0.4	4.55	21.1	12.9	9.1	<1	40.0	1980.0	8.8	46.0	0.22	13	<1	<1				
Sr	SEG11	SEGREGATION 11	Loop	08/07/96	24.0	3.2	1.80	-22.0	7.47	686.3	253.6	147.6	<1	108.0	457.0	28.0	126.0	0.66	15	<1	<1				
Sr	TROL	- TROLL EXPORT	Norway	01/24/01	27.3	1.4	0.28	<-27.4	1.74	148.1	91.6	67.4	<1	0.9	5.3	1.0	5.6	(1.16)	10	<1	<1				
Sr	VAS	- VASCONIA	Colombia	08/04/99	26	2.3	1.05	-27.4	6.32	477.8	182.1	111.6	<1	81.0	337.0	40.0	161.0	0.47	46	<1	<1				
HSr	ABH	- ARABIAN HEAVY	SAUDI ARABIA	05/19/01	27.7	4.3	2.87	<-27.4	7.84	226.2	145.8	99.6	<1	49.0	181.0	15.0	59.0	<1	6	<1	<1				
HSr		ARABIAN MEDIUM		07/13/01	30.9	3.8	2.28	<-27.4	5.90	104.5	43.0	57.6	<1	31.0	109.0	11.0	35.0	0.20	28	(2.7)	(11.7)				
HSr	BAS	- BASRAH LIGHT	Iraq	07/13/01	31.8	4.3	2.50	<-27.4	5.60	87.3	67.4	56.5	<1	29.0	150.0	8.9	46.0	0.02	11	<1	3.2				
HSr	KUW	- KUWAIT	Kuwait	07/13/01	30.8	3.7	2.51	<-27.4	6.20	138.2	91.6	60.5	<1	32.0	122.0	10.0	39.0	0.13	5	<1	<1				
HSr	MOB	- MAYA/OLMECA BLEND	MEXICO	04/14/00	26.5	3.2	2.64	<-27.4	8.89	279.1	175.2	108.3	<1	154.0	495.0	16.0	85.0	0.19	26	<1	3.2				
HSr	SG17	- SEGREGATION 17 (ABM)	Loop	06/04/97	31.0	4.6	2.50	-22.0	6.03	110.2	78.8	60.6	<1	34.0	148.0	9.3	38.2	0.27	2	<1	<1				

- (a) Pour points do not represent the pour point of virgin crude. The crude tested for this assay may have been pour point depressed.
- (2) EFFECTIVE 10/1/94 LMS & MSS were commingled and designated as LMS.
- (3) MUST have pour depressant added during winter months to meet the 35 F maximum pour point requirement.
- (4) Acid number suspect. Will be repeated on next sample.
- (5) OSO Condensate, due to the high RVP, must be shipped on a case by case basis and approved prior to each nomination.
- (6) Crude heavier than Bonny Light usual - came in through LOCAP

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Group	Criteria		
Swt - LMtIs	Sulfur (%) < 0.50 and V+Ni Metals in Pitch (ppm) <= 100	TAN <= 1.0	Salt <= 75 lbs
Swt - HMTIs	Sulfur (%) < 0.50 and V+Ni Metals in Pitch (ppm) <= 250	TAN <= 1.0	Salt <= 75 lbs
Int	Sulfur (%) >= 0.50 and <= 1.00 and V+Ni Metals in Pitch (ppm) <= 550	TAN <= 1.0	Salt <= 75 lbs
Sr	Sulfur (%) > 1.00 and <= 2.00 V+Ni Metals in Pitch (ppm) <= 1200	TAN <= 1.5	Salt <= 75 lbs
HSr	Sulfur (%) > 2.00 and V+Ni Metals in Pitch (ppm) <= 1200	TAN <= 2.0	Salt <= 75 lbs
Crude Type		Count	
Swt - LMtIs		31	
Swt - HMTIs		1	
Int		7	
Sr		13	
HSr		6	
Total		58	
<p>Crudes not moved within three (3) years will be removed from the list.</p>		<p><u>Pour Point</u> Summer (Start on or after April 1 - Clear by September 30) <= +55F Winter (Start October 1 - March 31) <= +35F</p> <p><u>RVP</u> RVP of 8.6 or less will be accepted year-round Winter (Start on or after October 1 - Clear by April 30) <= 9.6 Winter RVP > 9.6 Subject to Management Approval</p> <p style="text-align: center;">○ = Review criteria limits</p>	

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CRUDES NOT FULLY APPROVED FOR ASSAY LISTING

Crude approved; moved, pending Capline assay and final approval

Group	Foot- Acronym notes	Crude Name	Country	Approval Date	Density (API@60)	RVP (psia)	Sulfur (%)	Pour (degF)	Carbon Residue (%)	Viscosity (SSU)			H2S (ppm)	Metals (ppm)				TAN E (mg KOH/g)	SALT (lb/MB)	Organic Chlorides (ppm)	
										@60 F	@80 F	@100 F		Vanadium		Nickel				Whole	Naphtha
														Whole	Pitch	Whole	Pitch				
Swt-LMtl's	CCB -	CABINDA/CUSIANA BLEND	USA	12/08/98	33.9	5.7	0.27	(54.0)	2.25	52.0	45.0	<1	3.4	22.3	8.9	60.4	0.09	4			
Swt-LMtl's	CFB -	CABINDA / FORCADOS BLEND	USA	09/26/99	31.5	3.11	0.22	26.6	2.08	97.6	66.6	52.5	<1	2.8	19.6	9.2	63.5	0.27	9		
Swt-LMtl's	LLC	CUSIANA/LLS BLEND		05/15/00	39.9	5.8	0.23	23.9	0.76	42.2	38.2	35.8	<1	1.0	17.2	0.4	5.2	0.17	44	<1	<1
Swt-LMtl's	HQB -	HLS/QUA IBOE BLEND (30:70)	USA	02/24/99	34.7	4.7	0.19	28.0	1.27	143.1	45.0	40.2	<1	2.0	17.0	4.0	58.0	0.48	19		
Swt-LMtl's	PAL -	PALANCA	ANGOLA	06/08/99	37.9	7.1	0.16	32.0	1.28	61.5	49.1	43.3	<3	1.1	10.0	0.5	5.0	0.13	32	<1	
Swt-LMtl's	WHSW -	WEST HACKBERRY SWEET	USA	10/10/00	37	5.27	0.29	-2	1.9	51.6	43.6	38.9	<2	4	35	2.6	23	0.09	45		
Sr	BCSR -	BAYOU CHOCTAW SOUR	USA	10/02/00	32.2	3.6	1.43	11	3.96	76.8	57.0	47.3	(75)	40.3	240	11.1	66	0.13	<50	<0.1	
Sr	CMB -	CABINDA/MARS BLEND (50:50)	USA	04/01/99	30.7	1.8	1.10	32.5	4.25	128.4	93.9	73.5	<1	14.0	121.4	13.0	74.8	0.27	13	<1	
Sr	URAL -	URALS	C.I.S. EUROPE	06/01/99	31.3	5.2	1.39	(40.0)	3.85	86.5	68.5	57.7	<1	46.0	228.5	16.0	81.6	0.08	<1		

Crude approved; not moved

Once the crude is approved, it must be shipped in six months
or the approval process must be reinstated

Group	Acronym	Crude Name	Country	Approval Date	Density (API@60)	RVP (psia)	Sulfur (%)	Pour (degF)	Carbon Residue (%)	Viscosity (SSU)			H2S (ppm)	Metals (ppm)				TAN E (mg KOH/g)	SALT (lb/MB)	Organic Chlorides (ppm)	
										@60 F	@80 F	@100 F		Vanadium		Nickel				Whole	Naphtha
														Whole	Pitch	Whole	Pitch				
Sr	EMX	EAST MS MIX	USA	1/16/2002	30.83	4.8	1.9	-22	0.6	62	50	48	0.38		6.88		242	0.341	4		
Int	MNB	MARS/NAPHTHA BLEND	USA	12/1/2001	45.4	5.3	0.98	-40	3.14	60.4	48.1	41.6	0	19	174.5	7.6	67.71	0.27			

A new crude will not be added to the Capline approved Crude Oil Assay Listing until it has been shipped by the nominating carrier and /or shipper and assayed by Capline.

Crudes removed as of this listing

Crude Type	Last Assay	Crude Type	Last Assay
CUSIANA/TROLL BLEND	11/23/1998*	JAY/LMS MIX	11/1/1998*
HIBERNIA	11/12/1998*		

* = Approval Date