

[ATHABASCA OIL CORP / 16-21-078-10W4M] L1 (PAD A) LIESMER

Customer: PTRHTF20133
 ATHABASCA OIL CORP.
 LEISMER DEMONSTRATION PLANT
 LSD2-79-10-W4M
 NEAR CONKLIN, AB Canada
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 E-Mail: gball@atha.com

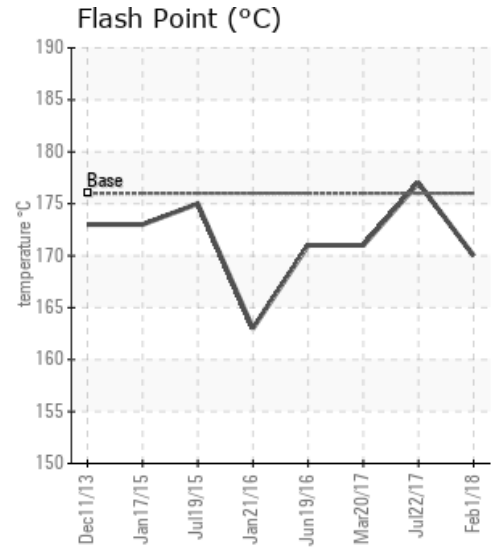
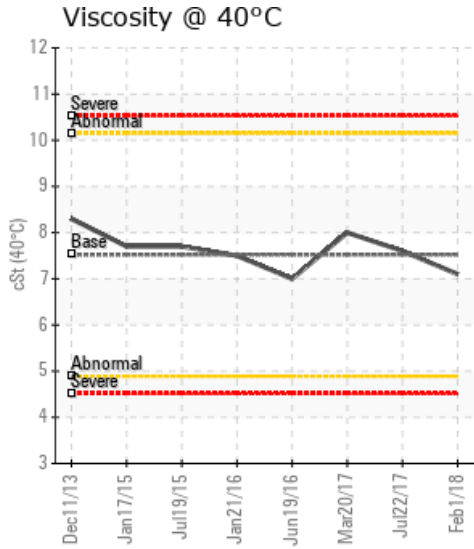
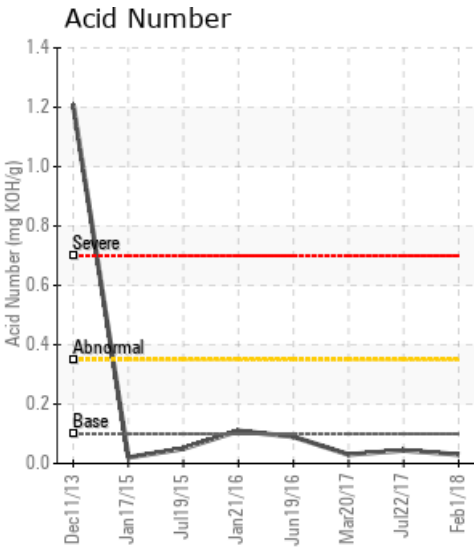
System Information
 System Volume: 8000 ltr
 Bulk Operating Temp: 212F / 100C
 Heating Source:
 Blanket:
 Fluid: PETRO CANADA CALFLO LT
 Make: TORNADO TECHNOLOGIES

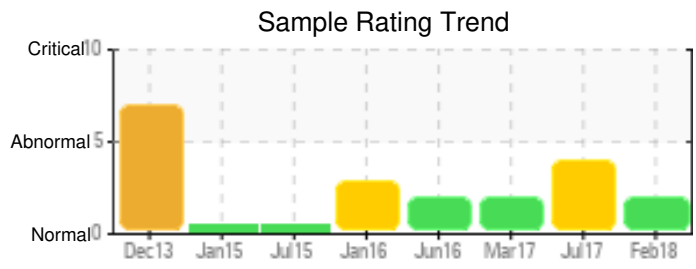
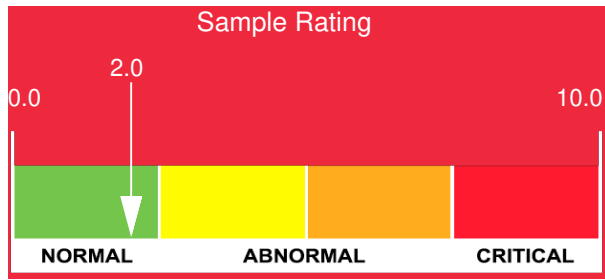
Sample Information
 Lab No: 02199769
 Analyst: Peter Harteveld
 Sample Date: 02/01/18
 Received Date: 02/21/18
 Completed: 02/27/18
 Peter Harteveld
 peter.harteveld@HFSinclair.com

Recommendation: The fluid is in good condition and suitable for further use. Low boiler vapor content is high (GCD% <335C = 48.72%). For fresh Calflo LT this is 35%. This is a result of normal thermal degradation of the fluid and can be rectified by venting low boiler vapor to atmosphere. Please re-sample in 6 months.

Comments: (GCD) % < 335°C is abnormally high.

Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
02/01/18	02/21/18	2.5y		338 / 170	4.8	7.1	0.03	0.004	608 / 320	635 / 335	727 / 386	48.72
07/22/17	08/08/17	0.0y		351 / 177	0.00	7.6	0.044	0.011	614 / 323	728 / 387	803 / 428	25.59
03/20/17	04/05/17	24.0y		340 / 171	0.00	8.0	0.03	0.043	609 / 321	642 / 339	744 / 396	41.52
06/19/16	07/05/16	18.0y	FLOW LINE	340 / 171	0.00	7.0	0.09	0.011	611 / 322	646 / 341	750 / 399	36.74
01/21/16	02/11/16	0.0y		325 / 163	13.7	7.5	0.11	0.169	609 / 321	674 / 356	802 / 428	37.09
Baseline Data				349 / 176		7.52	0.1		604 / 318	640 / 338	734 / 390	35.0

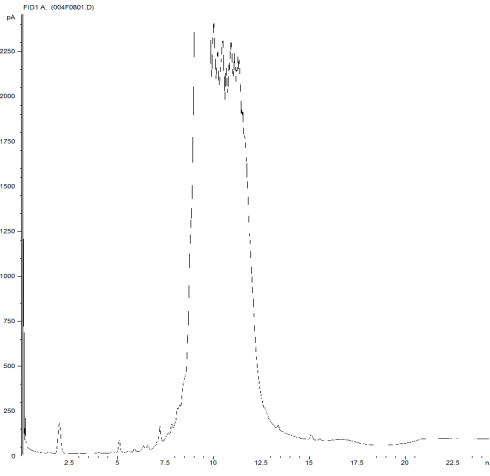




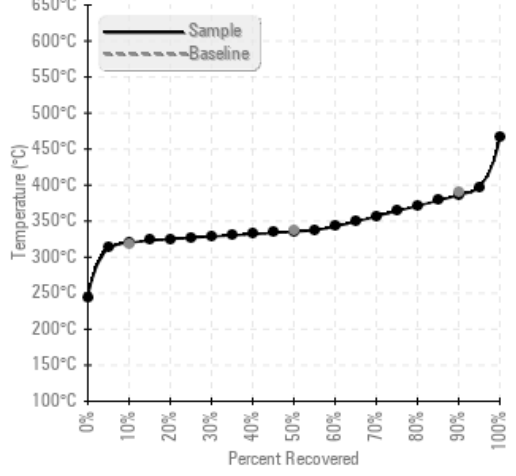
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
02/01/18	11	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	203	0
07/22/17	10	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	218	0
03/20/17	11	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	227	0
06/19/16	9	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	220	0
01/21/16	47	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	0	232	0
Baseline Data			0	0						0			0	0					0				270	

Elemental analysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]

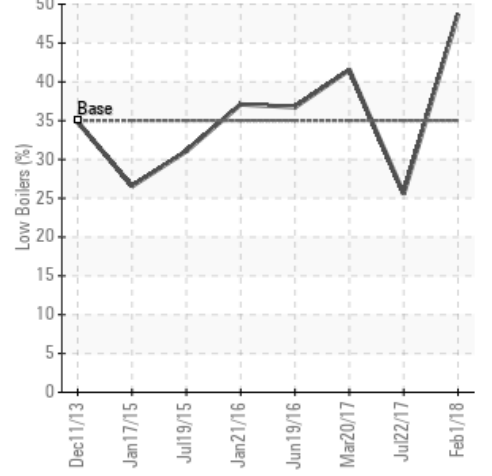
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments	
07/22/17	The fluid shows signs of degradation by oxidation. The 50% and 90% GCD temperatures are elevated. This can also be the result of adding a heavier fluid or ingress of process fluid. Ensure the blanket gas system is functional. The fluid is suitable for further use. Please re-sample in 6 months. (GCD) 50% Distillation Point is severely high. (GCD) 90% Distillation Point is severely high.
03/20/17	Percentage boil-off <335 degrees C has increased. This can be the result of thermal degradation or ingress of blanket gas when fuel gas is used as blanket gas. It is recommended to vent-off low boiler vapors to atmosphere. The content of low boiler vapors is at this moment not a problem but it is recommended to vent off regularly to prevent problems. The fluid is in good condition and suitable for further use. Please resample after 6 months. (GCD) % < 335°C is marginally high.
06/19/16	The fluid is in good condition and suitable for further use. Please re-sample in 12 months.
01/21/16	Oxidation has degraded the fluid slightly. Evidence of oxidation is an upwards shift in the distillation curve of the fluid. Also TAN and Pentane Insoluble (solids) content have increased. Please verify proper operation of the blanket gas system. The fluid is suitable for further use. Re-sample in 6 months. Please fill in oil service life next time. (GCD) 90% Distillation Point is severely high. (GCD) 50% Distillation Point is marginally high.

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