

# [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  
 Attn: Trevor Ip  
 Tel: (403)724-3349  
 E-Mail: treip@statoil.com

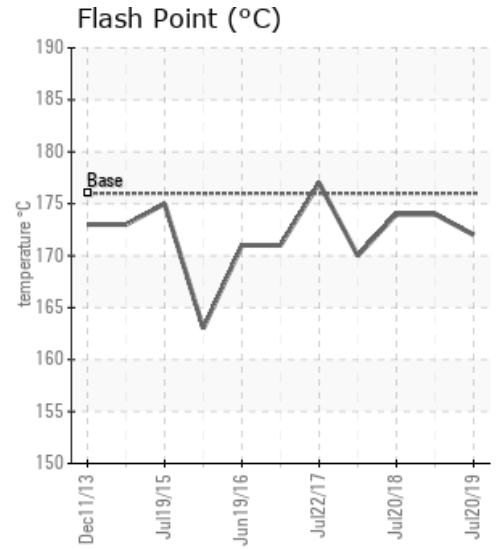
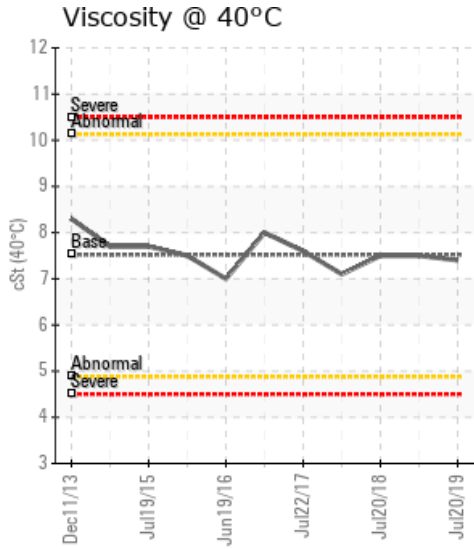
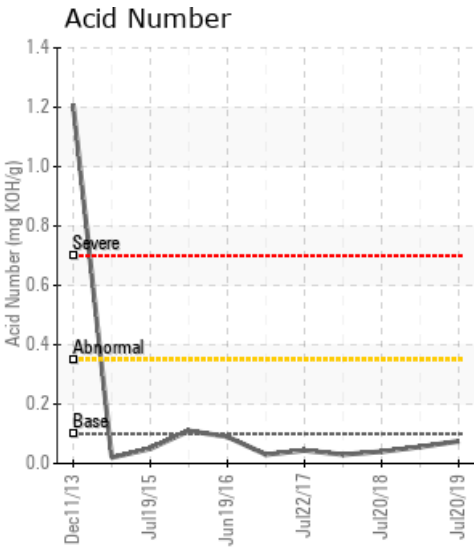
**System Information**  
 System Volume: 8000 ltr  
 Bulk Operating Temp: 212F / 100C  
 Heating Source:  
 Blanket:  
 Fluid: PETRO CANADA CALFLO LT  
 Make: TORNADO TECHNOLOGIES

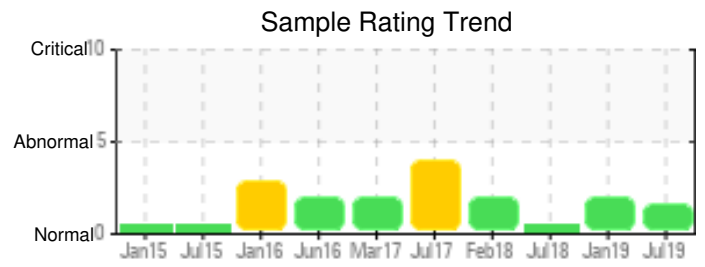
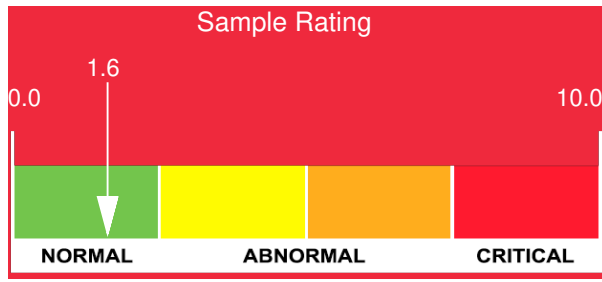
**Sample Information**  
 Lab No: 02301904  
 Analyst: Benjamin Latorre  
 Sample Date: 07/20/19  
 Received Date: 08/09/19  
 Completed: 08/19/19

Recommendation: Elevated water level (628.6 ppm). 1. Ensure temperature in the expansion tank is above 100 deg. C. to prevent vapor condensation. If it is normally below this value, avoid prolonged high temperatures in order to prevent oil oxidation. 2. Check if adding nitrogen to the expansion tank headspace is feasible. This removes water vapor from the tank as they are generated. 3. Once pump suction is above 100 deg.C and system is stable, check for water at all low point drains in the expansion tank. 4. Resample for water.

Comments: Water contamination levels are abnormally high. ppm Water contamination levels are abnormally high.

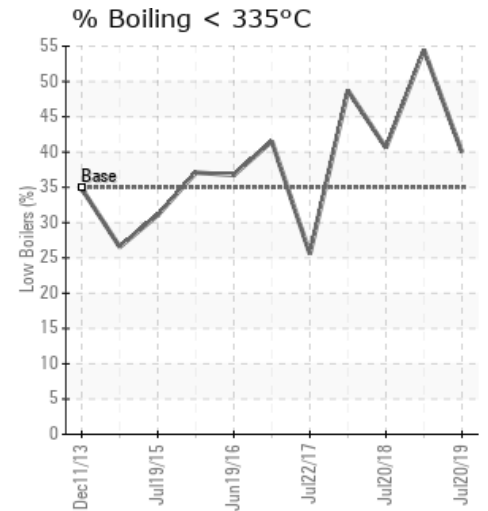
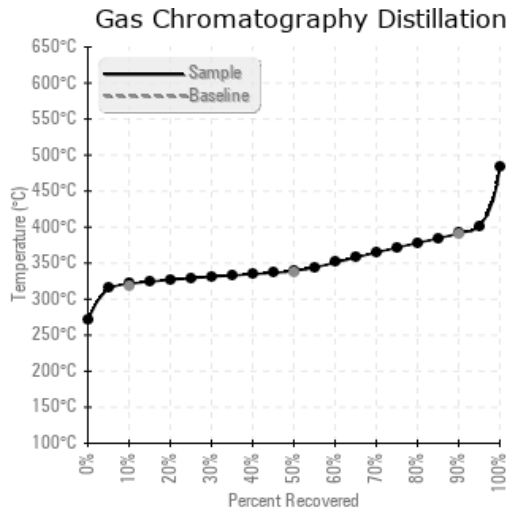
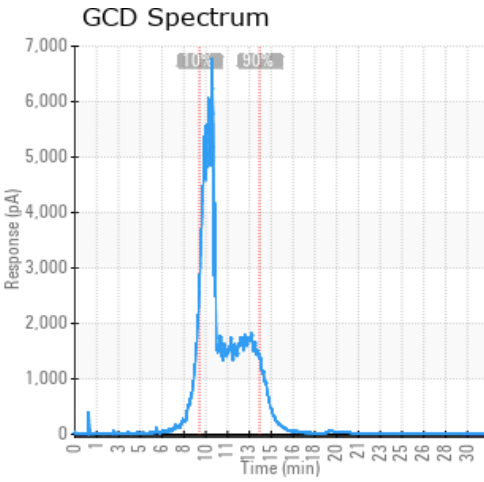
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
07/20/19	08/09/19	0y		342 / 172	628.6	7.4	0.075	0.060	610 / 321	642 / 339	737 / 391	39.98
01/20/19	02/08/19	0y		345 / 174	6.0	7.5	0.056	0.007	593 / 312	625 / 330	718 / 381	54.47
07/20/18	08/10/18	3y	+/- 100M FROM HEATER	345 / 174	5.9	7.5	0.04	0.014	613 / 323	642 / 339	737 / 392	40.62
02/01/18	02/21/18	3y		338 / 170	4.8	7.1	0.03	0.004	608 / 320	635 / 335	727 / 386	48.72
07/22/17	08/08/17	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	24y		340 / 171	0.00	8.0	0.03	0.043	609 / 321	642 / 339	744 / 396	41.52
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
07/20/19	10	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	185	0
01/20/19	11	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	188	0
07/20/18	10	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	204	0
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
Baseline Data			0	0						0		0	0					0					270	

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



### Historical Comments

01/20/19	Results normal. Resample at next interval. Wear levels low/normal. Contamination levels low. (GCD) % < 335°C is marginally high.
07/20/18	The fluid is in good condition and suitable for further use. The low boiler vapor content has decreased from 48.72% to 40.62%. Still slightly high but improved. Venting of these low boiler vapors on a regular basis is recommended. Please re-sample in 6 months.
02/01/18	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. (GCD) % < 335°C is abnormally high.
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.

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