

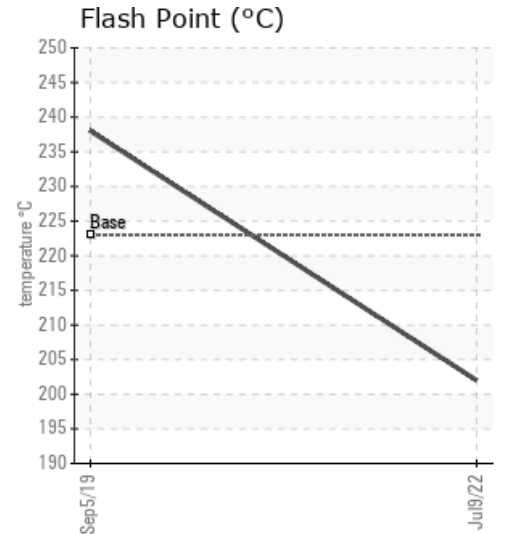
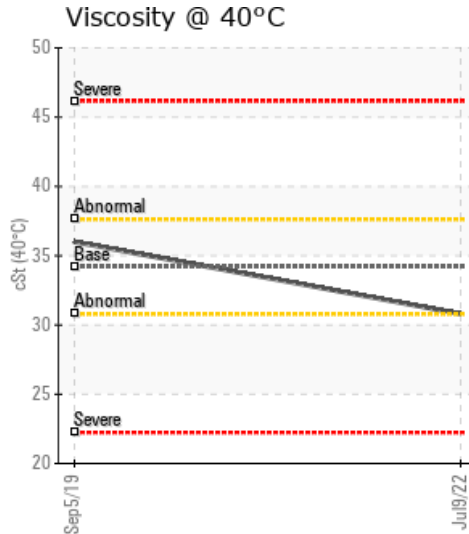
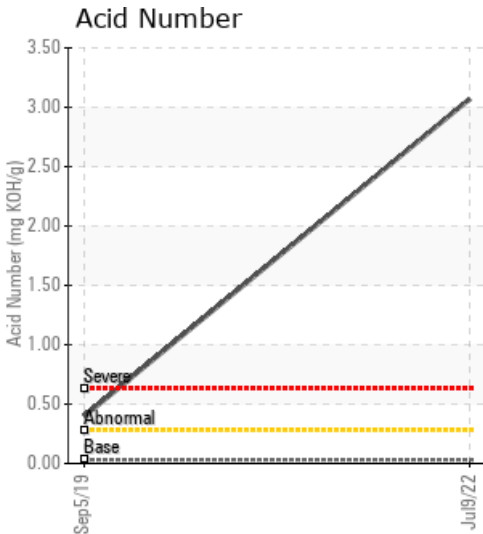
## [LSD / 09-15-084-14W5] TIDEWATER SEAL LAKE

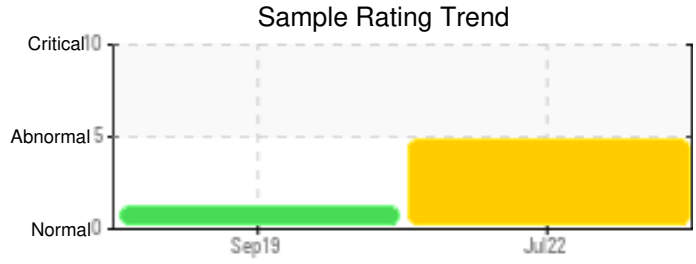
Customer: PTRHTF20224	System Information	Sample Information
Tidewater Midstream 09-15-084-14W5 Slave Lake, AB T0G 2A4 Canada Attn: Loni Van der Lee Tel: (403)512-9847 E-Mail: lvanderlee@tidewatermidstream.com	System Volume: 0 gal Bulk Operating Temp: Not Specified Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: PROPAK	Lab No: 02501866 Analyst: Clinton Buhler Sample Date: 07/09/22 Received Date: 07/25/22 Completed: 07/27/22 Clinton Buhler Clinton.Buhler@hollyfrontier.com

Recommendation: Sample results indicate the fluid is degraded (oxidized) with an Acid Number of 3.07 which is 3X the limit of 1. Solids content is also elevated at 0.890 and can indicate system fouling; associated with the level of oxidation observed. Low boiling vapor content is also elevated at 5.60%, indicating potential thermal degradation which can also contribute to the solids content. System needs to be cleaned and refilled with fresh fluid. Please contact Petro-Canada Lubricant's Technical Services to discuss further.

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.

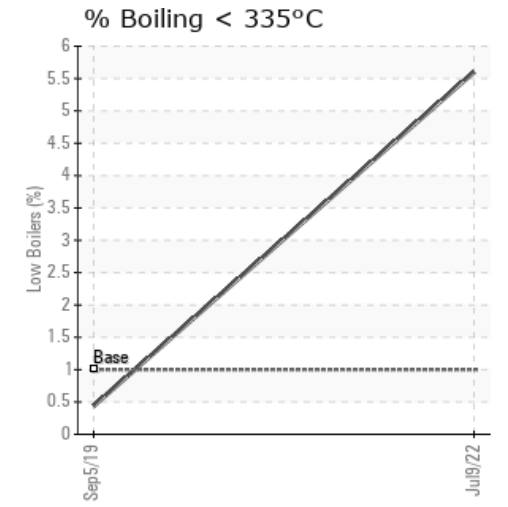
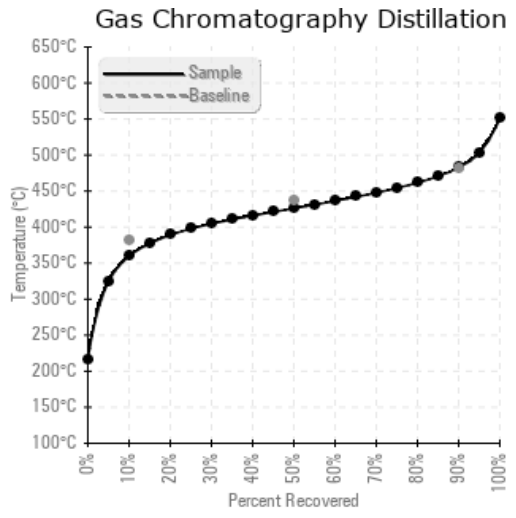
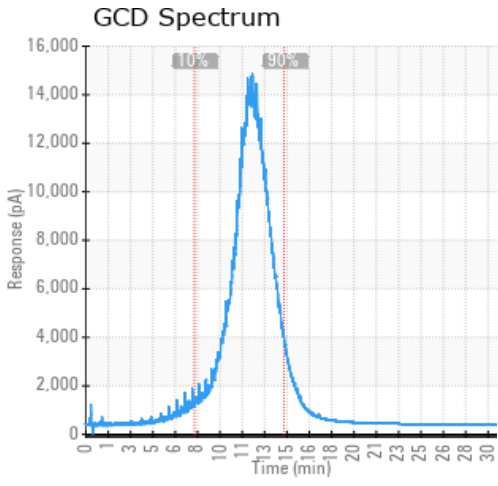
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
07/09/22	07/25/22	3.0y		396 / 202	111.8	30.8	3.07	0.890	679 / 360	799 / 426	901 / 483	5.60
09/05/19	09/13/19	5.0y	LEVEL CONTROL PORT	460 / 238	0.00	36.0	0.397	0.049	721 / 383	792 / 422	884 / 473	0.44
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00





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
07/09/22	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/05/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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



Historical Comments	
09/05/19	The fluid is in good condition and suitable for further use. Acid Number is elevated but since the AN test is not the most accurate, the condition of a fluid can't be judged on AN alone. The Fe content is low which means there is no corrosive wear ongoing. Please re-sample in 6 months. When sending in the next sample please list system volume and operating temperature of the fluid on the analysis request form. Acid Number (AN) is abnormally high.

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