

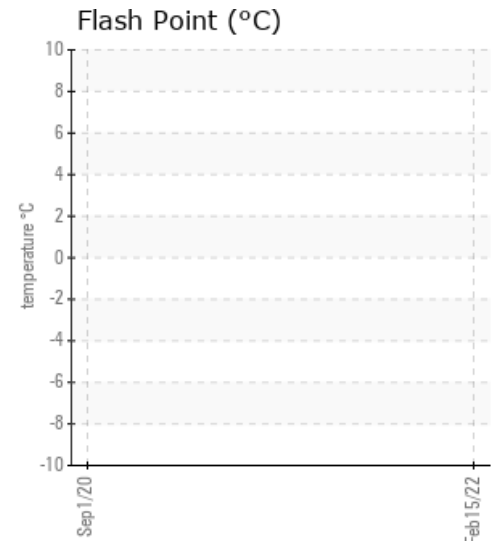
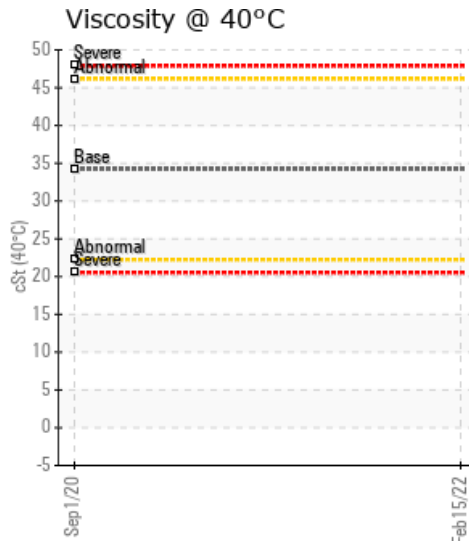
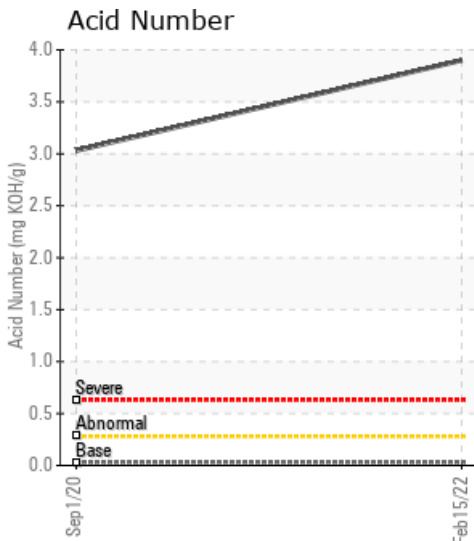
[Orlen Upstream Canada / 16-7-63-5W6] STABILIZER REBOILER 1350 sludge

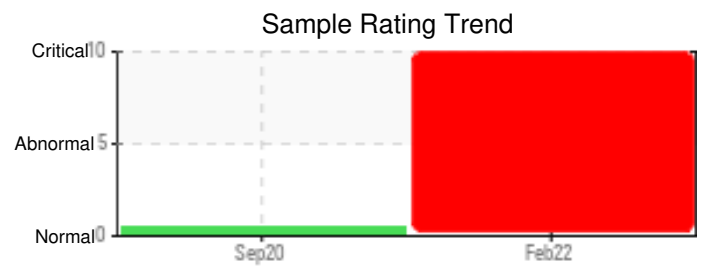
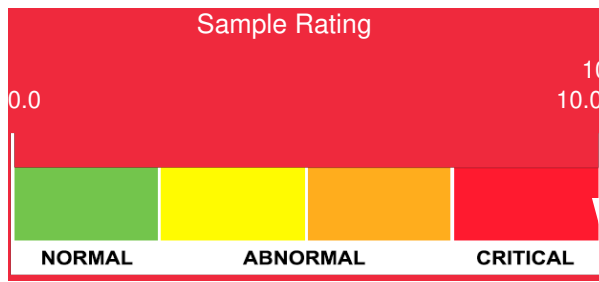
Customer: PTRHTF20262	System Information	Sample Information
Orlen upstream Canada Ltd. 850 2 St. SW Calgary, AB T2P 0R8 Canada Attn: Bret Elchyson Tel: E-Mail: Bret.Elchyson@orlenupstream.ca	System Volume: 20000 ltr Bulk Operating Temp: 365F / 185C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02474433 Analyst: Bill Quesnel CLS,OMA II,MLA-III,LLA-I Sample Date: 02/15/22 Received Date: 02/28/22 Completed: 03/25/22 Bill Quesnel CLS,OMA II,MLA-III,LLA-I

Recommendation: This fluid is oxi-polymerized and well beyond the point of serviceability. Likely the energy expenditure to provide the heating required has increased dramatically. It is worth draining, flushing and refilling this system to bring the heat transfer efficiency back to 100%. Contact your HF Sinclair Petro-Canada distributor to arrange a meeting to discuss properly flushing this system and filling with new thermal fluid.

Comments: Iron ppm levels are severe. PQ levels are severe. Aluminum ppm levels are abnormal. Silicon ppm levels are abnormally high. Acid Number (AN) is severely high. Zinc ppm levels are severely high. Calcium ppm levels are severely high. Manganese ppm 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	%
02/15/22	02/28/22	0.5m	Surge Tank				3.90					
09/01/20	09/08/20	0.0m					3.03					
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
02/15/22	1930	0	0	40	0	0	0	0	0	0	30	40	0	0	0	0	30	0	10	20	750	0	210	170
09/01/20	4210	3	5	28	7	7	3	6	2	2	19	96	12	1	1	0	47	0	15	13	52	0		49
Baseline Data			0	0						0			0	0					0				0	

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

GCD Spectrum

Historical Comments	
09/01/20	This is a baseline read-out on the submitted sample. Diagnostician's Note: This is heavily oxidized (oxy-polymerized) oil degradation products (sludge) containing high levels of iron from system corrosion. This thermal oil was either used past the point of suitability for service, or is being used at too high of a system temperature. {not applicable} {not applicable} {not applicable}

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