

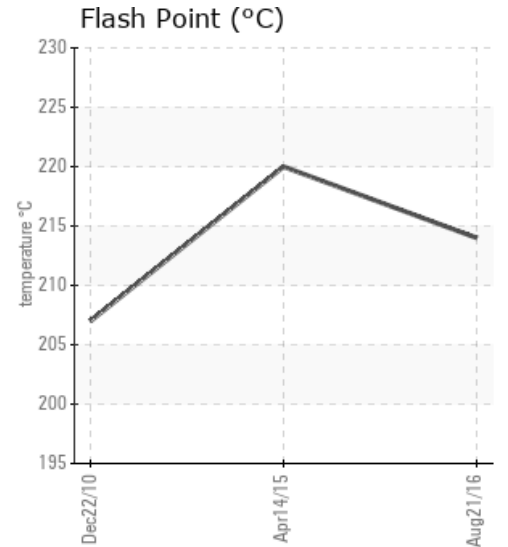
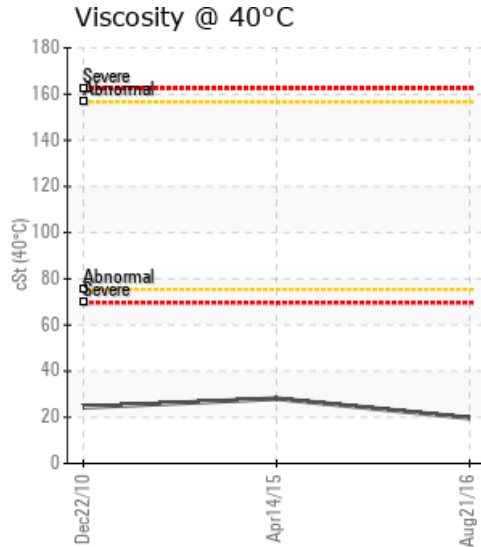
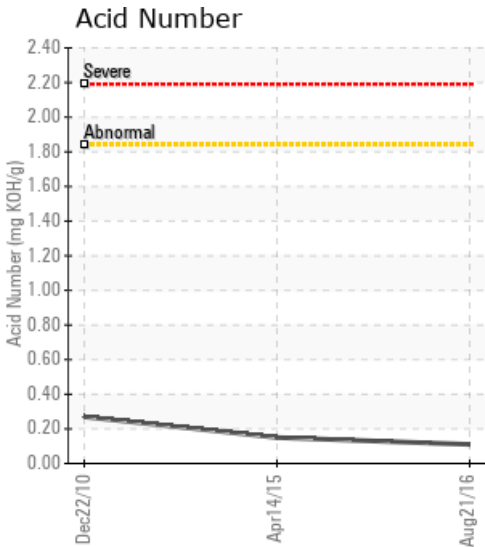
## ATLANTIC STATES

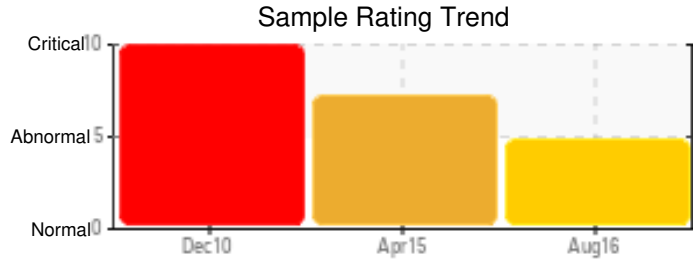
Customer: PTRHTF10041	System Information	Sample Information
<b>KUTTNER LLC.</b> 211 N FRANKLIN ST PORT WASHINGTON, WI 53074 USA Attn: DAVID ZINKY Tel: (262)284-4483 E-Mail: d.zinky@kuttnerna.com	System Volume: 7000 gal Bulk Operating Temp: 540F / 282C Heating Source: Blanket: Fluid: N/A Make: WUERZ	Lab No: 02098246 Analyst: Neil Buchanan Sample Date: 08/21/16 Received Date: 09/19/16 Completed: 09/26/16 Neil Buchanan neil.buchanan@HFSinclair.com

Recommendation: No reference fluid available. Viscosity at 40C appears low compared to previous samples. High Sodium and calcium contamination. TAN is acceptable.

Comments: COC Flash Point is severely high. Calcium ppm levels are severely high. Visc @ 40°C is severely low. Sodium 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	%
08/21/16	09/19/16	18.0m	PUMP INLET	417 / 214	130.5	19.7	0.11	0.092	710 / 376	791 / 421	877 / 469	0.37
04/14/15	06/05/15	2.0m	PUMP INLET	428 / 220	199.7	28.1	0.15	0.061	709 / 376	791 / 422	870 / 465	0.45
12/22/10	01/10/11		PUMP INLET	405 / 207	430	24.4	0.27	0.070	704 / 374	774 / 412	847 / 453	0.301
Baseline Data				32 / 0								

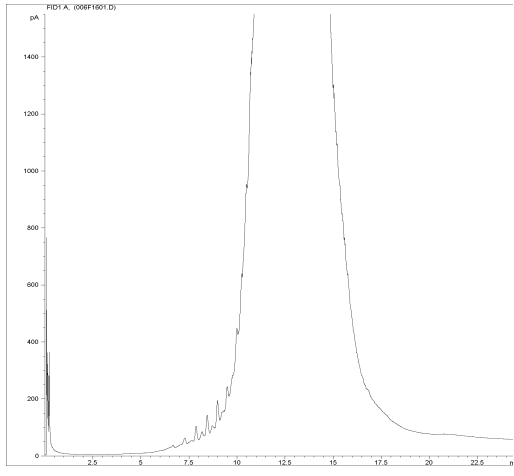




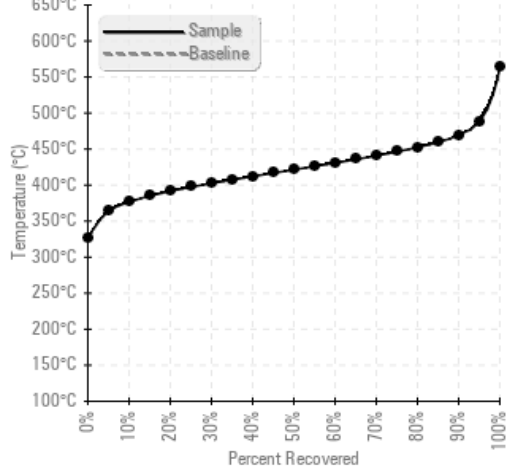
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
08/21/16	4	0	0	0	0	0	0	0	0	0	0	37	0	0	0	0	0	0	0	0	57	0	2	0
04/14/15	19	0	0	0	0	0	1	0	0	0	0	45	0	0	0	0	0	0	0	0	64	0	2	1
12/22/10	11	0	0	0	0	0	0	0	0	0	0	88	0	0	0	0	0	0	0	0	89	0	2	0
Baseline Data													0						0			0		

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

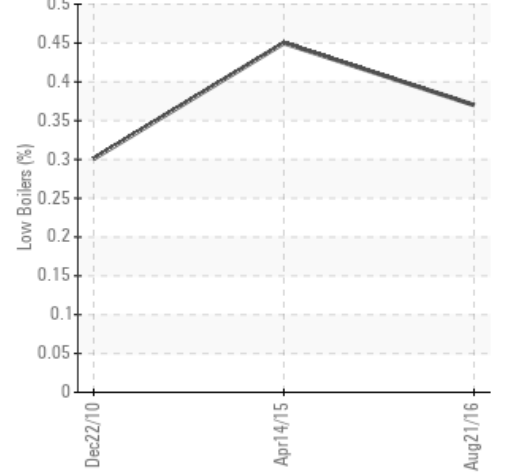
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments

04/14/15	Baseline and typical values not available. Product unknown so cannot make a complete diagnosis. TAN, Flash Pt, Insolubles, H2O, Fe, GCD all appear good. Na and Ca contamination. Sodium ppm levels are severely high. Calcium ppm levels are severely high.
12/22/10	The oil has some moisture in it, not dramatic but enough to be heard and cause some issues in some systems depending on the design. The oil also contains minerals like sodium and calcium, maybe salt water. Please try to prevent water ingress. Re-sample in 6-9 months.

Petro-Canada makes no representation or warranty of any kind, either express or implied, as to the accuracy or completeness of the analysis and assumes no responsibility and shall have no liability whatsoever with respect to such analysis, or a party's use of it. Petro-Canada is a division of HollyFrontier Corporation.