

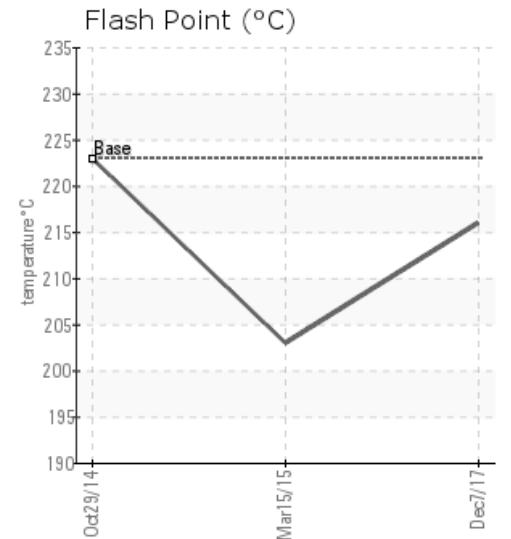
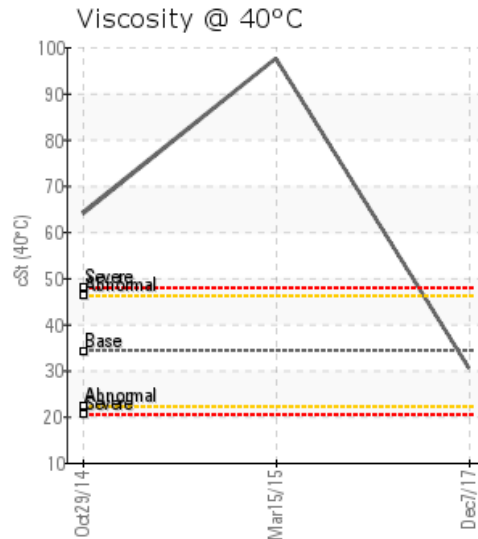
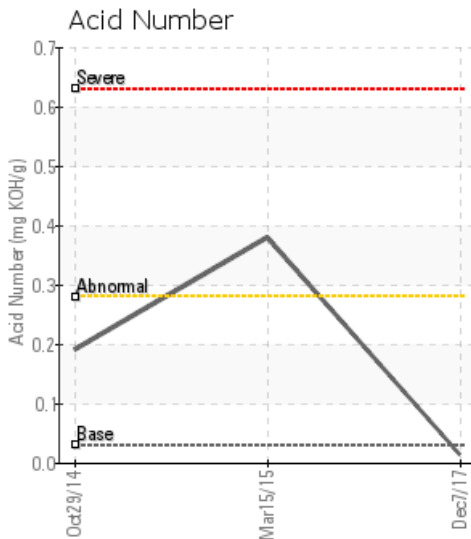
## [PROGRESS ENERGY] 059 HEAT MEDIUM B-88-I/94-B-1

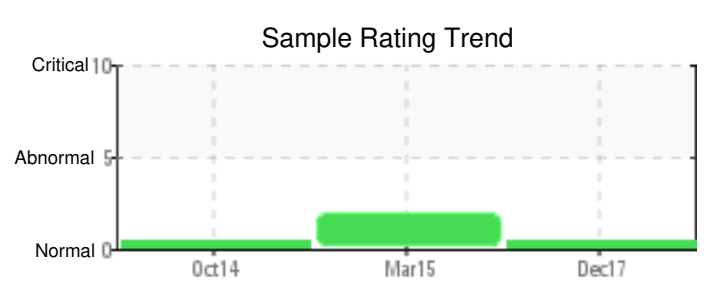
Customer: PTRHTF20039	System Information	Sample Information
BRENNTAG CANADA INC 3124-54TH AVENUE SE CALGARY, AB T2A 0A8 CANADA Attn: Ghassan Mahran Tel: (403)720-5656 E-Mail: gmahran@brenntag.ca	System Volume: 0 gal Bulk Operating Temp: 392F / 200C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: PROPAK	Lab No: 02188564 Analyst: Clinton Buhler Sample Date: 12/07/17 Received Date: 12/15/17 Completed: 01/12/18 To discuss this report contact Clinton Buhler at 780-516-9920

Recommendation: Sample results indicate that the heat transfer fluid is suitable for continued service. Slightly reduced viscosity and slightly reduced GCD temperatures can possibly indicate the onset of minimal amounts of thermal degradation or contamination with another fluid or excessive blanket gas pressure (from the heat transfer fluid standpoint, a blanket gas pressure of 2-3 psi is optimal). Continue to monitor system operation. Re-sample in 12 months.

Comments:

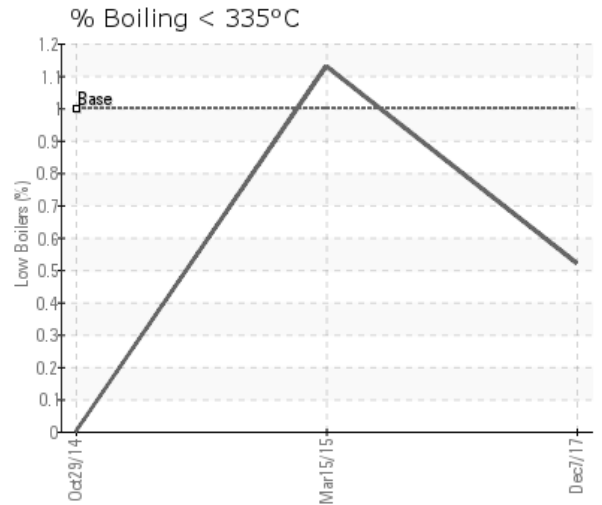
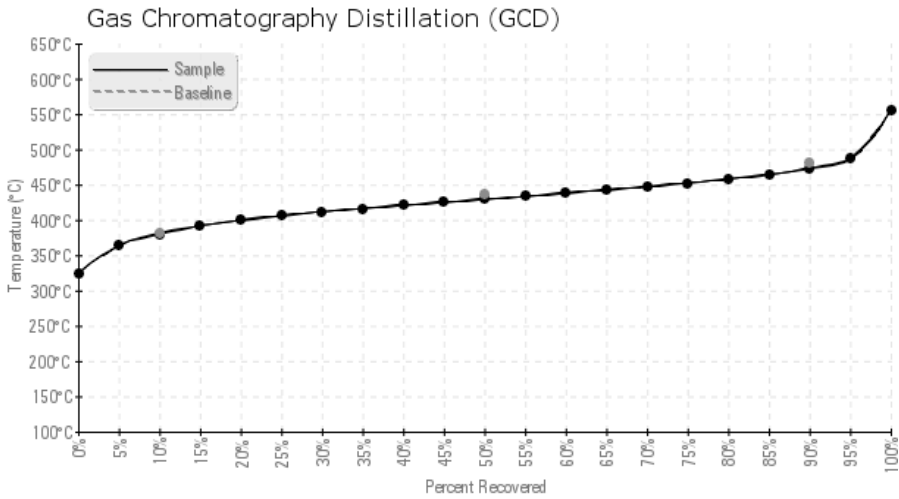
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/07/17	12/15/17	2y		421 / 216	0.00	30.6	0.013	0.194	717 / 380	805 / 429	883 / 473	0.52
03/15/15	04/15/15	34y	BOTTOM OF SIGHT GLAS	397 / 203	32.6	97.5	0.38	2.91	717 / 381	813 / 434	909 / 487	1.13
10/29/14	11/11/14	0y	OUT OF LOW LEVEL PIP	433 / 223	132.3	64.1	0.19	2.91	724 / 385	803 / 429	909 / 487	0.00
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
12/07/17	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
03/15/15	30	0	0	0	0	0	5	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0
10/29/14	27	0	0	1	0	0	5	1	0	0	1	0	0	0	0	0	1	0	1	0	1	0	0	1
<b>Baseline Data</b>			0	0						0			0	0					0				0	

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



Historical Comments	
03/15/15	No product name is attached to this sample however assuming it is Petro-Therm, the viscosity is greatly elevated at 97.5 cSt and the TAN is moderately high at 0.38. More information is required to do a proper interpretation. Pentane Insolubles levels are severely high. Acid Number (AN) is abnormally high. Visc @ 40°C is abnormally high.
10/29/14	Viscosity is even higher then previous sample, this oil has seen some oxidation thickening. Consideration should be given for change out. Check to ensure Nitrogen blanket is in working order. Pentane Insolubles levels are severely high. Visc @ 40°C is abnormally high.

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.