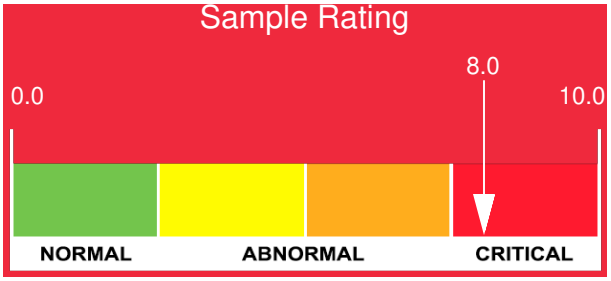
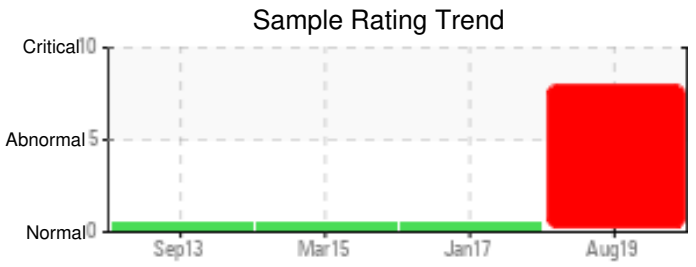




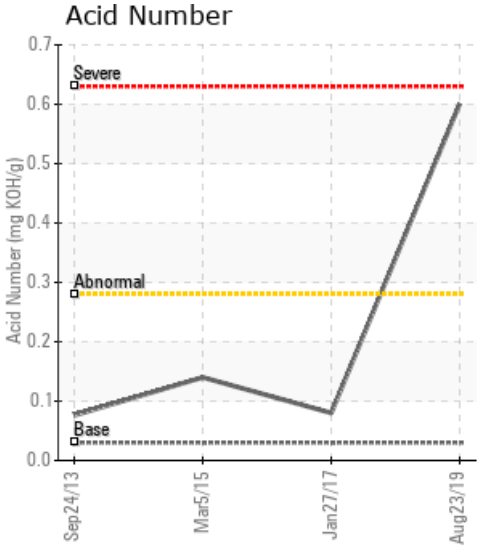
F1 HEATER

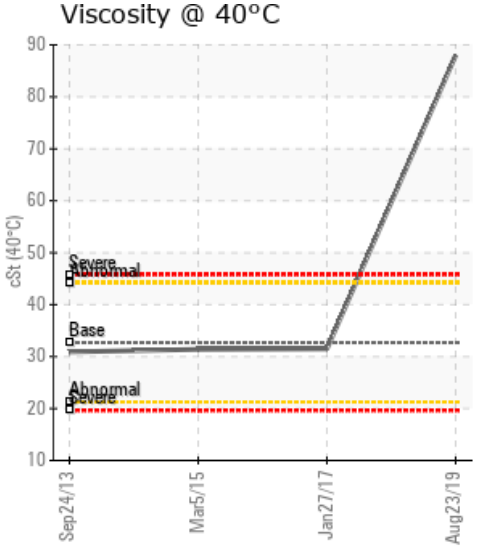
Customer: PTRHTF20128	System Information	Sample Information
Hexion Canada Inc. #305, 55202, SH825 Sturgeon County, AB T8L 5C1 Canada Attn: Amit Kumar Tel: (780)998-1222 E-Mail: amit.kumar2@hexion.com	System Volume: 1000 gal Bulk Operating Temp: 455F / 235C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: PERFORMANCE HEATER	Lab No: 02305297 Analyst: Gordon Susinski Sample Date: 08/23/19 Received Date: 08/28/19 Completed: 09/03/19

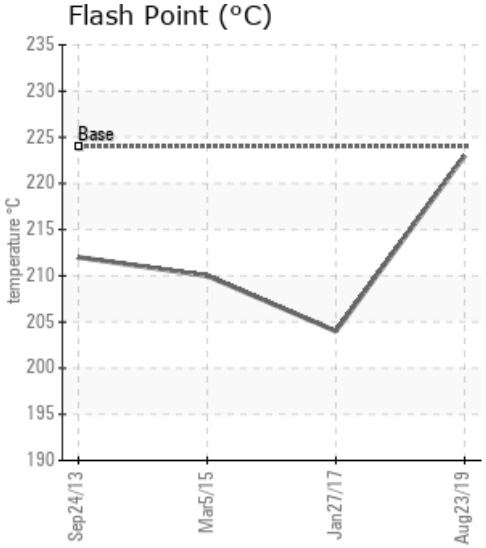
Recommendation: Based on the analysis results, it appears that the oil may have experienced thermal degradation, oil oxidation and contamination and is rated as Severe.Pentane Insolubles are severely high. This analysis is used to determine the amount of contaminants in the used heat transfer oils. The amount of insoluble materials contains materials such as oxidation by products, dirt, carbonaceous material, and system wear components. These contaminants as a group are called pentane insolubles. This result can be supported by high levels of Iron, Calcium, Zinc and Magnesium. The viscosity is also severely high. Viscosity is the fluids ability to resist flow. Increases in viscosity in a heat transfer system is normally attributed to the oxidation process but may also be due to a heavier fluid being added. The oxidation process increases the size of the molecules and increases the oils viscosity. A decrease in viscosity may be due to a lower viscosity oil being added, indicates that low boilers are present as a result of thermal degradation. This increase in viscosity is supported by the increase in the Acid Number indicating the oil may be oxidized, or a different product may have been added to the system which could also be supported by the presence of Calcium and Zinc. We suggest taking another sample, with care to ensure that proper sampling procedures are used and continue to monitor the system closely.

Comments: Iron ppm levels are abnormal. Pentane Insolubles levels are severely high. Calcium ppm levels are severely high. Zinc ppm levels are severely high. Visc @ 40°C is severely high. Acid Number (AN) is abnormally high. Magnesium ppm levels are abnormally high. (GCD) 90% Distillation Point is marginally low.

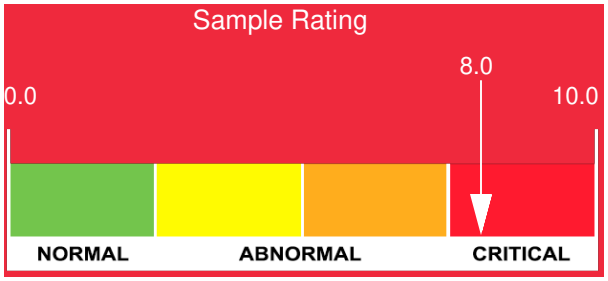
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
08/23/19	08/28/19	5y		433 / 223	74.7	88.0	0.601	1.88	696 / 369	784 / 418	869 / 465	0.00
01/27/17	02/07/17	58y	HEATER INLET	399 / 204	11.2	31.5	0.08	0.103	701 / 372	796 / 424	891 / 477	1.05
03/05/15	03/10/15	36y	HEATER INLET	410 / 210	7.6	31.4	0.14	0.245	693 / 367	789 / 420	886 / 475	1.32
09/24/13	10/04/13	1y		414 / 212	3.1	30.9	0.076	0.088	699 / 371	797 / 425	888 / 476	1.20
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5

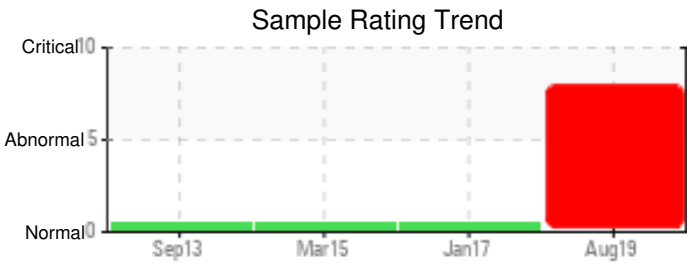






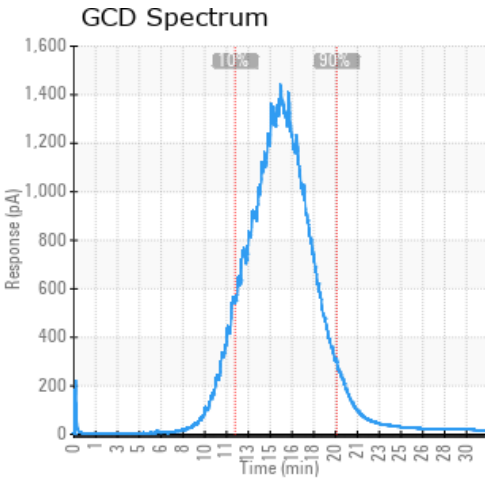
PETRO-CANADA LUBRICANTS

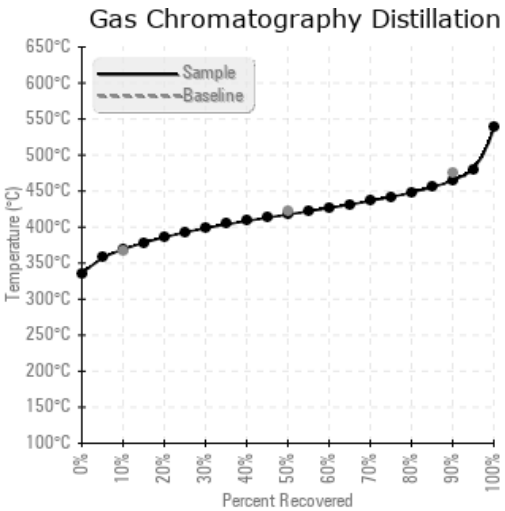


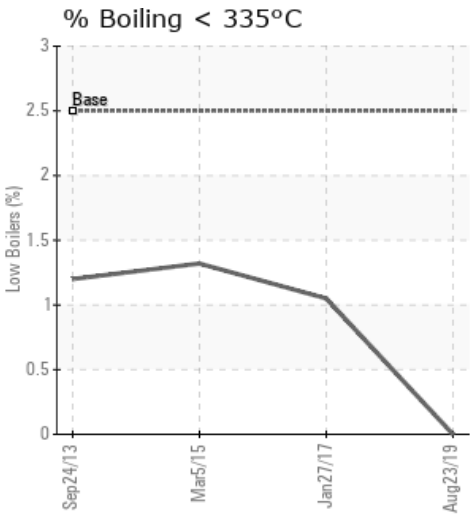


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
08/23/19	127	0	0	0	0	6	0	0	0	0	1	0	0	0	3	0	2	0	1	39	52	0	196	65
01/27/17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	147	1
03/05/15	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	134	0
09/24/13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	121	0
Baseline Data			0	0						0			0	0					0				270	

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







Historical Comments

01/27/17	Results are normal. Resample at the next PM interval.
03/05/15	Results are normal. Resample next period and continue to monitor the system.
09/24/13	The oil is in near new condition and suitable for further use. Please sample on an annual basis to monitor the condition of the oil.

