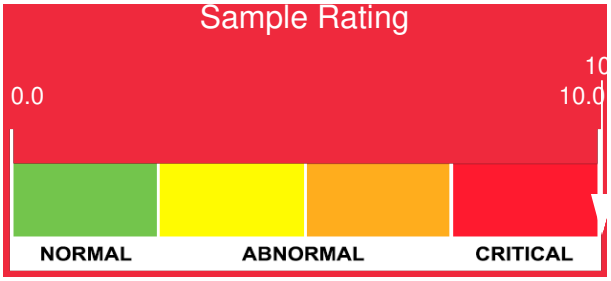
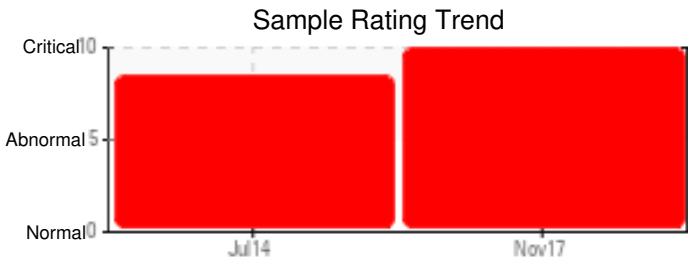




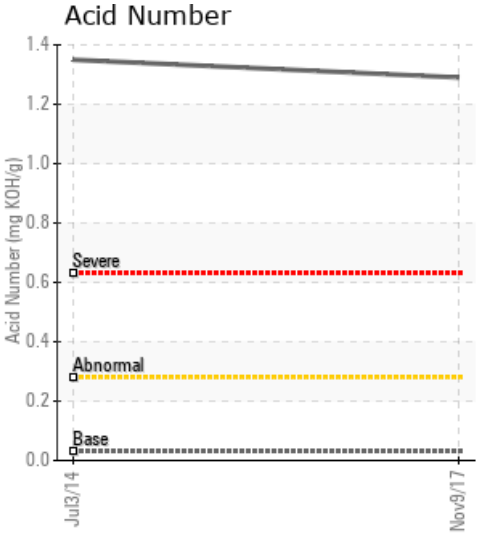
SHEPARD (CALGARY)

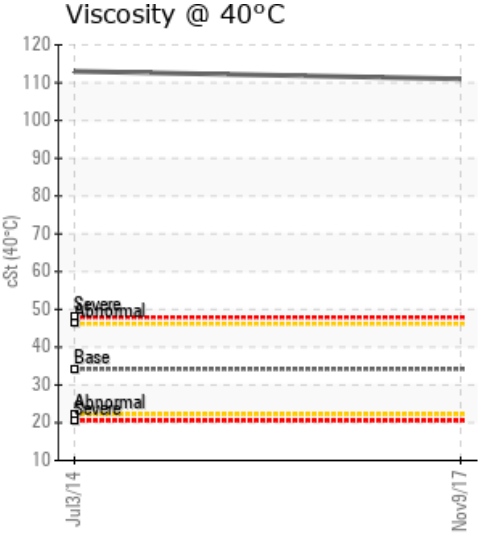
Customer: PTRHTF20056	System Information	Sample Information
COLASPHALT 26222 TOWNSHIP ROAD 530A ACHESON, AB T7X 5A7 Canada Attn: Luis Salinas Tel: (780)699-2447 E-Mail: lsalinas@mcasphalt.com	System Volume: 10000 ltr Bulk Operating Temp: 400F / 204C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: HEATER	Lab No: 02185301 Analyst: Gordon Susinski Sample Date: 11/09/17 Received Date: 12/01/17 Completed: 12/05/17

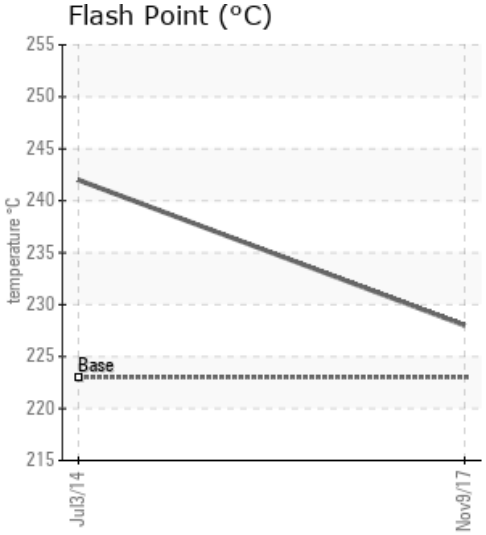
Recommendation: Based on the analysis results, it appears that the oil may have experienced one or more of the following deteriorating conditions: Particulate contamination, Oxidation and Thermal Degradation. This may be due in part to the length of service on the oil (9 years indicated). It is our recommendation that system maintenance be undertaken to optimize the system operation.Particulate Contamination: PQ levels, Iron (Fe) and Pentane insolubles all indicate particulate in the system. Please note the wear element iron (Fe) typically comes from the system components. Pentane Insolubles is used in the determination of the amount of insoluble materials such as oxidation by products, dirt, carbonaceous material, and system wear components. These contaminants as a group are called pentane insolubles.Oxidation: Products associated with oxidation processes are: Acid number: The acid number is a measure of the acidic compounds in the oil. Increases in the acid number are likely due to the formation of oxidation by products in the oil. This value will increase exponentially once the process begins. Tendencies are for sludge and deposits to increase and corrosion to occur if the fluid continues to be utilized beyond its limits. Viscosity is the fluids ability to resist flow. Increases in viscosity in a heat transfer system are 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.Thermal Degradation: Higher than normal readings on the 10%, 50% and 90% boiling points indicate that carbonaceous deposits could be in the system that can foul heat exchanger surfaces or plug small lines and as such aid the thermal degradation of the heat transfer oil by increasing the amount of heat required to generate the same amount of energy. These higher than normal readings also indicate the removal of lower boiling components of the heat transfer fluid and may also indicate the heat transfer oil may have reached the end of its useful life.

Comments: PQ levels are severe. Iron ppm levels are abnormal. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. (GCD) 50% Distillation Point is severely high. (GCD) 90% Distillation Point is severely high. Visc @ 40°C is abnormally high. (GCD) 10% Distillation Point is marginally high.

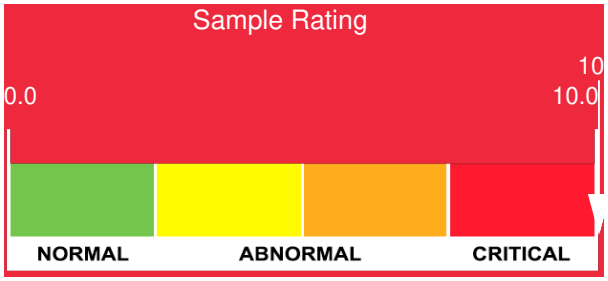
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/09/17	12/01/17	9y		442 / 228	108.1	111	1.29	0.600	759 / 404	898 / 481	1008 / 542	0.22
07/03/14	07/24/14	4y	INLET TO HEATER	468 / 242	65.5	113	1.35	0.328	769 / 409	906 / 486	1010 / 543	0.26
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

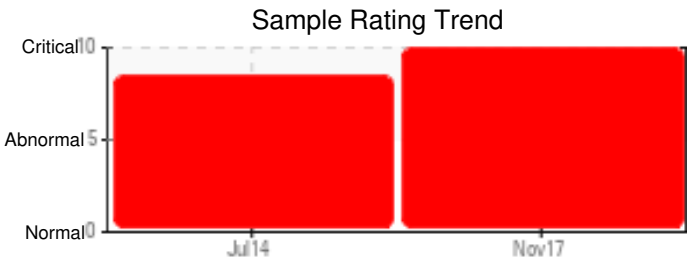






PETRO-CANADA LUBRICANTS

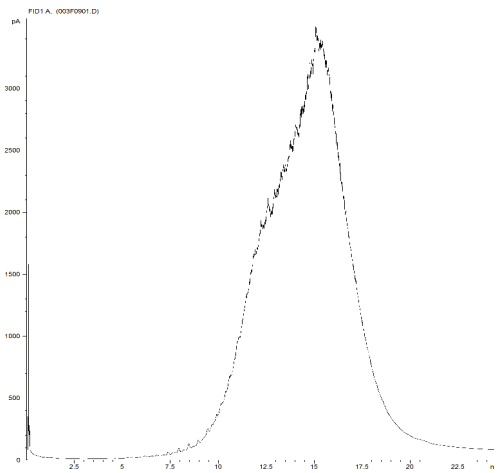


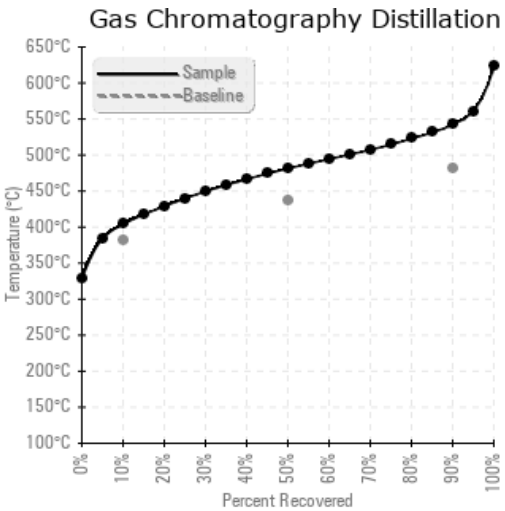


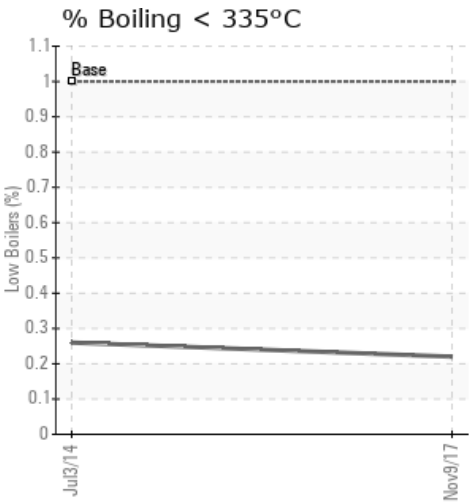
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
11/09/17	215	0	0	0	0	0	0	0	0	0	5	3	1	0	0	0	3	0	0	0	8	0	2	2
07/03/14	82	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	1	0	0	0	6	0	3	2
Baseline Data			0	0						0			0	0					0				0	

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

GCD Spectrum







Historical Comments

07/03/14	We are seeing severe oxidation of this fluid which is going to lead to decreased efficiency of the heat transfer system. It appears as this system is being pushed very hard, contributing to the excess oxidation of the fluid. Please sample again in 4 months time and you will need to consider changing the fluid in the near future if the oxidation continues at this rate. Acid Number (AN) is severely high. (GCD) 50% Distillation Point is severely high. (GCD) 90% Distillation Point is severely high. (GCD) 10% Distillation Point is abnormally high. Visc @ 40°C is abnormally high.