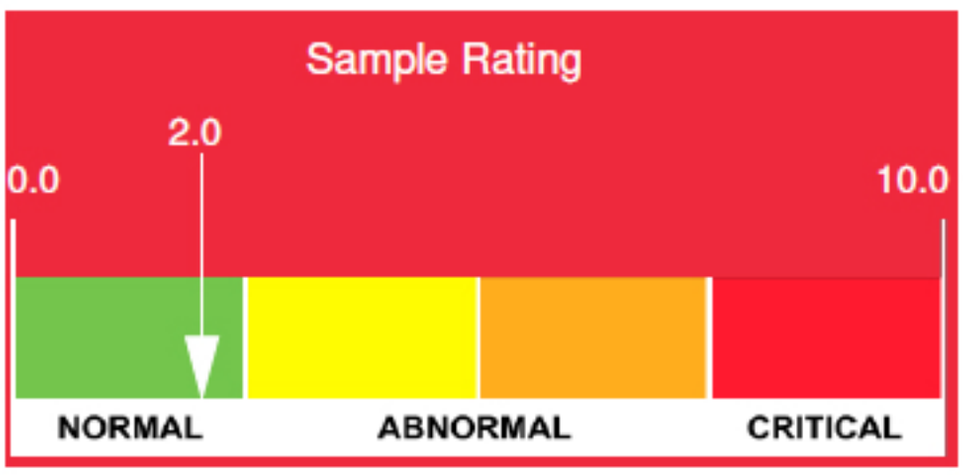
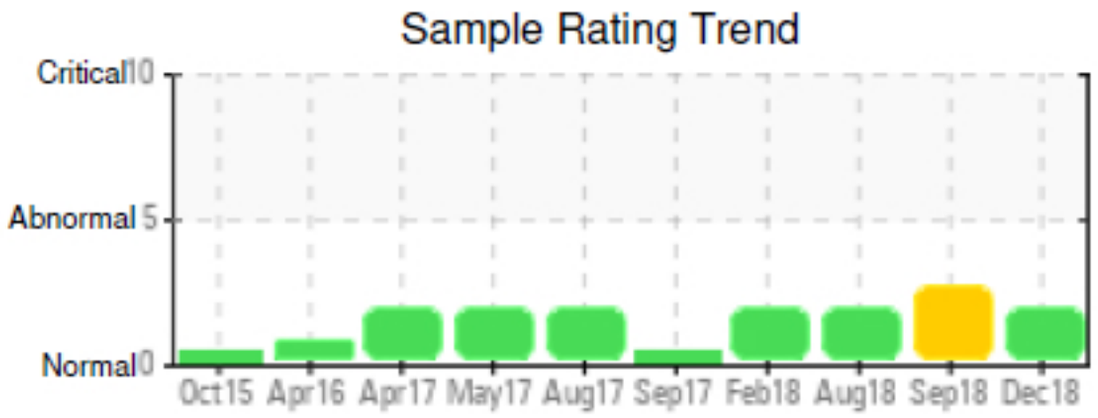
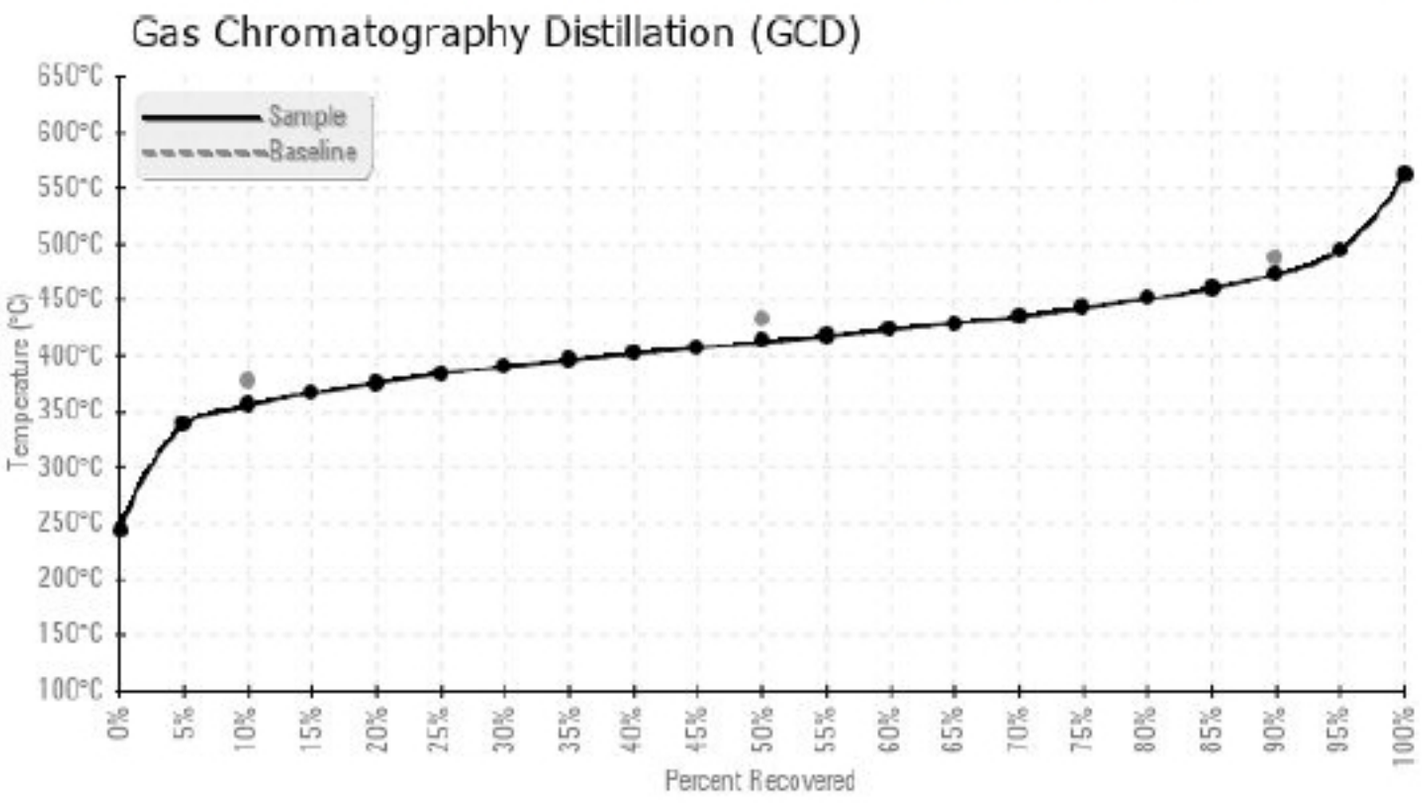
PETRO-CANADA LUBRICANTS

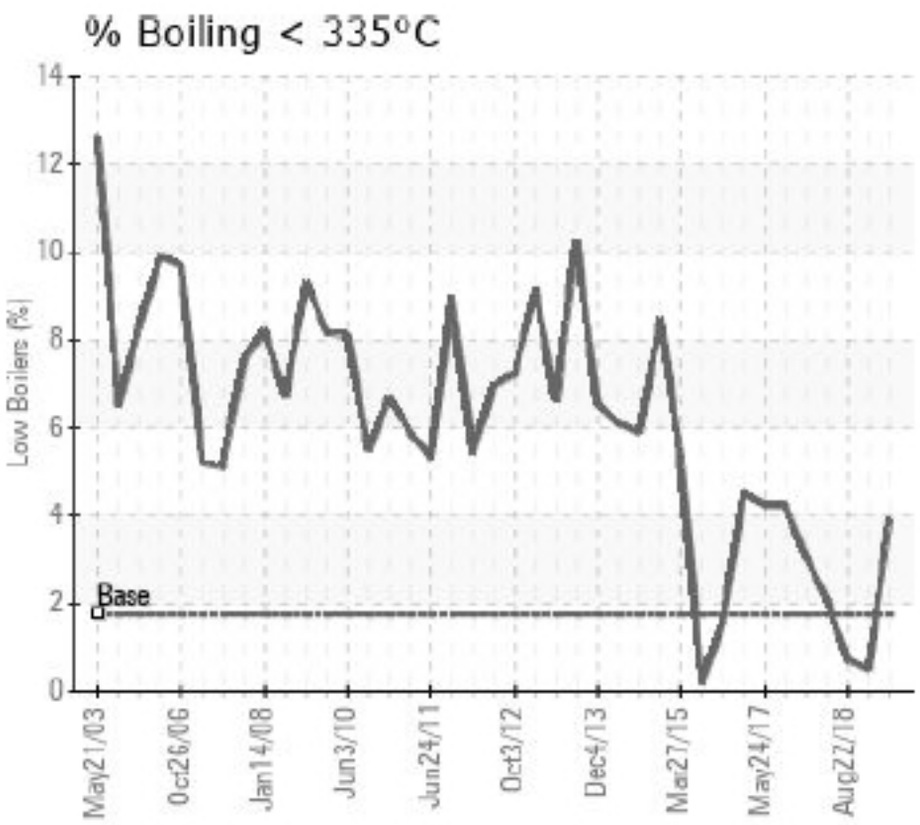




Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
12/19/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	92	0
09/19/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129	0
08/22/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	0
02/21/18	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	134	0
09/22/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	116	0
08/17/17	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138	0
Baseline Data			0	0						0			0	0					0				280	

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





Historical Comments

09/19/18	The Acid Number remains high at 0.44. It was always a bit elevated but it might be best to dilute these degradation products by replacing a part of the fluid with fresh oil, so that this fluid charge can be run for many more years. Replacing 20% will bring down the Acid Number to below 0.4 which is sort of our initial warning limit. Moreover, we suggest to look into the possible causes of the high Acid Number and oil oxidation. Make sure the nitrogen blanket works and that the fluid is not allowed to boil off for days on end because that's when the hot oil gets in contact with air and accelerates its oxidation. Acid Number (AN) is abnormally high. (GCD) 90% Distillation Point is abnormally low.
08/22/18	Flash Point is low and acid number high. Recommend venting to reduce low boilers thereby reducing the low flash point issues. Replace 50% of the fluid to bring the acid number down. Check the pumping system to insure the flow is high enough to minimize thermal cracking in the heater. Thermal cracking generates low boilers and reduces the flash point of the fluid. It also generates high boilers that obstruct downstream piping and elbows.Check the nitrogen blank to insure it is working. By minimizing the presence of oxygen will greatly reduce the oxidation process thereby extending fluid life.
02/21/18	The fluid condition resembles the previous samples. We will keep monitoring the acid number before it keeps rising. Other properties look normal. No action needed at this time, other than re-sample at next scheduled interval.
09/22/17	The Acid Number is going down which is surprising, unless new oil was added to dilute the previous high results. Everything is now normal with no data flagged. Sample at next scheduled interval.
08/17/17	The high Acid Number appears to be the new normal as it is still high, indicating the oil is getting oxidized. The main cause for oil oxidation is hot oil getting in contact with air, hence the previous comment about checking if the nitrogen blanket is operational and in good working condition. We suggest to keep sampling quarterly and if this oxidation trend continues over the next 6 months, we will recommend, at some point, to partially replace the system fluid (30-40%) instead of letting it oxidize until a full cleaning and flushing is required. Acid Number (AN) is abnormally high. COC Flash Point is marginally low.