

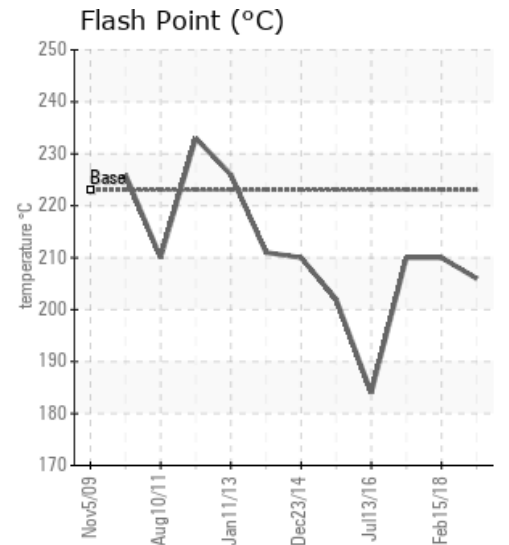
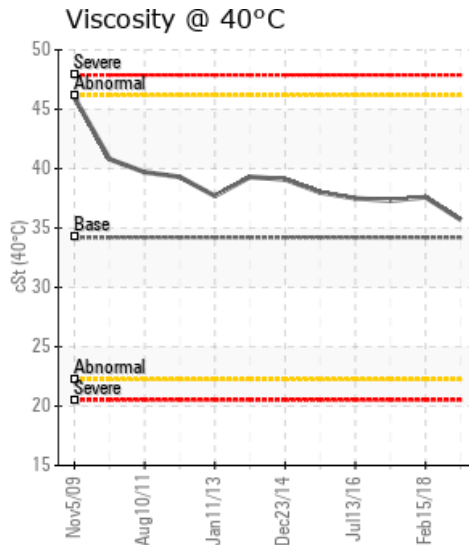
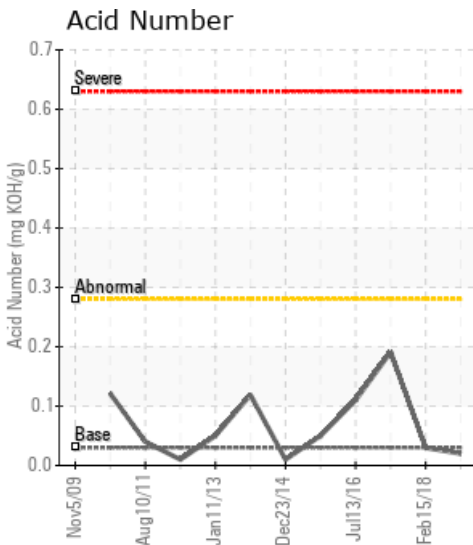
API BOILER

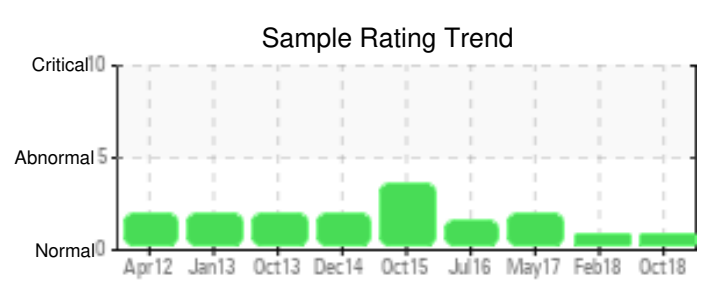
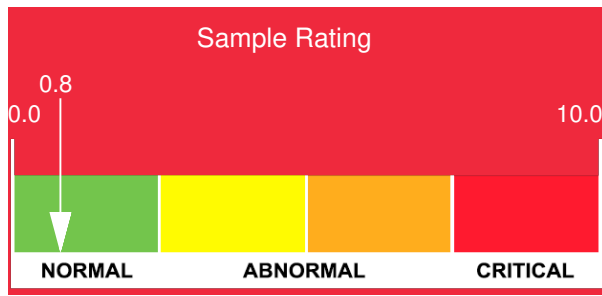
| Customer: PTRHTF30020 | System Information | Sample Information |
|--|--|---|
| IKO INDUSTRIES HAWKESBURY 1451 SPENCE ROAD HI-PARTS-HAWK YARD HAWKESBURY, ON K6A 3T4 Canada Attn: FLORENTIN TOPA Tel: (613)632-8581 E-Mail: florentin.topa@iko.com | System Volume: 25000 ltr Bulk Operating Temp: 518F / 270C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: INDUSTRIAL | Lab No: 02245904 Analyst: Pierre Castagne Sample Date: 10/15/18 Received Date: 10/18/18 Completed: 10/22/18 To discuss this report contact Pierre Castagne at 905-285-8278 |

Recommendation: Les fractions Lourdes (GCD @90%) sont élevées, les fractions lourdes augmentent la viscosité, favorise les dépôts de carbone.

Comments: (GCD) 90% Distillation Point is abnormally high.

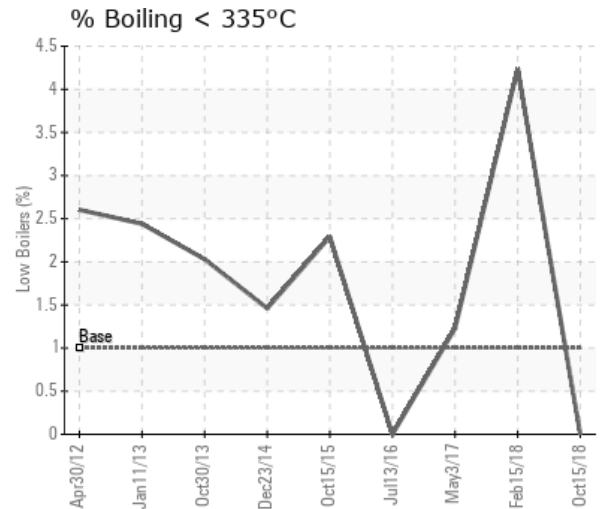
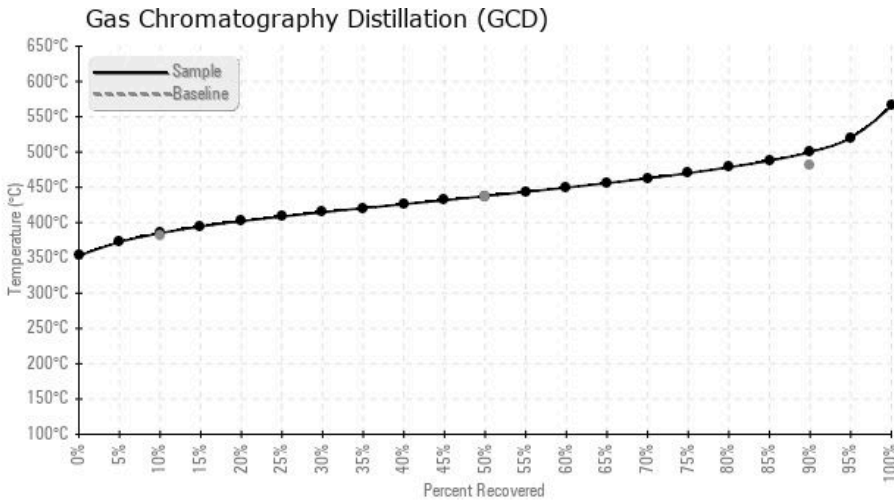
| Sample Date | Received Date | Fluid Age | Sample Location | Flash Point (COC) | Water (KF) | Viscosity (40°C) | Acid Number | Solids | GCD 10% | GCD 50% | GCD 90% | GCD % < 335°C |
|---------------|---------------|-----------|--------------------|-------------------|------------|------------------|-------------|--------|-----------|-----------|-----------|---------------|
| | mm/dd/yy | | | °F/°C | ppm | cSt | mg/KOH/g | %wt | °F/°C | °F/°C | °F/°C | % |
| 10/15/18 | 10/18/18 | 10y | | 403 / 206 | 16.7 | 35.7 | 0.02 | 0.035 | 725 / 385 | 820 / 438 | 932 / 500 | 0.00 |
| 02/15/18 | 02/22/18 | 10y | | 410 / 210 | 6.8 | 37.6 | 0.03 | 0.075 | 693 / 367 | 809 / 432 | 931 / 500 | 4.24 |
| 05/03/17 | 05/11/17 | 10y | HOT OIL BOILER | 410 / 210 | 8.8 | 37.3 | 0.191 | 0.064 | 714 / 379 | 820 / 438 | 976 / 525 | 1.23 |
| 07/13/16 | 07/18/16 | 10y | API HOT OIL HEATER | 363 / 184 | 0.00 | 37.5 | 0.110 | 0.065 | 712 / 378 | 800 / 427 | 925 / 496 | 0.00 |
| 10/15/15 | 10/28/15 | 10y | API HOT OIL HEATER | 396 / 202 | 0.3 | 38.0 | 0.05 | 0.943 | 705 / 374 | 814 / 434 | 948 / 509 | 2.29 |
| 12/23/14 | 12/24/14 | 10y | API HOT OIL HEATER | 410 / 210 | 4.0 | 39.1 | 0.01 | 0.072 | 711 / 377 | 823 / 439 | 952 / 511 | 1.46 |
| 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 |
|----------------------|------|----------|--------|----------|--------|------|-----|---------|--------|----------|---------|--------|-----------|----------|------------|----------|-----------|---------|-------|-----------|---------|--------|------------|------|
| 10/15/18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02/15/18 | 18 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05/03/17 | 13 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 07/13/16 | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 10/15/15 | 26 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 |
| 12/23/14 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Baseline Data | | | 0 | 0 | | | | | | 0 | | | 0 | 0 | | | | | 0 | | | | 0 | |

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



| Historical Comments | |
|---------------------|--|
| 02/15/18 | High boilers (GCD @90%), increase oil viscosity, and carbon deposit. Deposit, settle in low flow/disturbance areas and foul heat exchange surfaces. Looking at the curves, it appears that a mixture of another oil with lower viscosity could have been introduced in the system. (GCD) 90% Distillation Point is abnormally high. |
| 05/03/17 | The sample has trace of Vanadium, the Low boilers GCD @10% are within specification (this could be the result of topping-up the oil) although the flash point is lower than the Petro-Therm oil specification (210°C versus 225°C specification), this suggests some oil cracking is taking place. The High boilers GCD @ 90% are higher than the specification (524.6 versus 482 specifications); this normally causes the viscosity of the oil to increase and carbon deposits. (GCD) 90% Distillation Point is severely high. |
| 07/13/16 | (GCD) 90% Distillation Point is marginally high. COC Flash Point is significantly low. (GCD) 90% Distillation Point is marginally high. COC Flash Point is marginally low. |
| 10/15/15 | The oil is in good condition and can stay in service until next sample. The GDC 90% Distillation Point is abnormally high. Some high boilers are present in the oil. Oxidation should be monitored closely over the next set of samples. We recommend to submit a new sample in 12 months Pentane Insolubles levels are severely high. (GCD) 90% Distillation Point is severely high. |
| 12/23/14 | The oil is in good condition and can stay in service until next sample. The GDC 90% Distillation Point is abnormally high. Some high boilers are present in the oil. Oxidation should be monitored closely over the next set of samples. We recommend to sample in the next 12 months. (GCD) 90% Distillation Point is severely 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.