

[2-11-80-16W6M] 5500-2

Customer: PTRHTF20156
 TOURMALINE OIL
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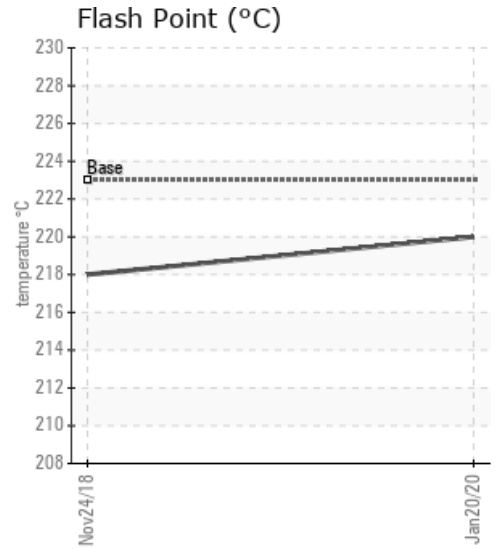
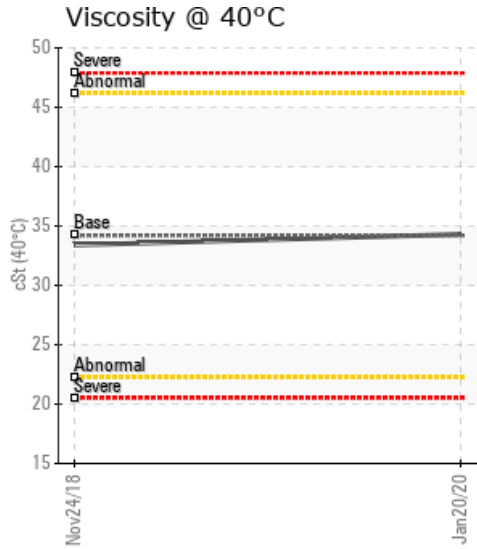
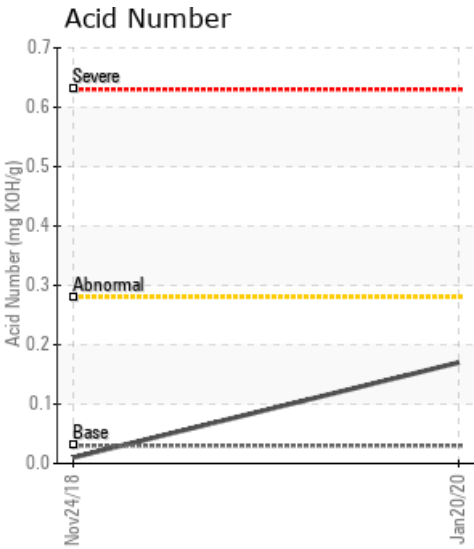
System Information
 System Volume: 15000 ltr
 Bulk Operating Temp: 345F / 174C
 Heating Source:
 Blanket:
 Fluid: PETRO CANADA PETRO-THERM
 Make:

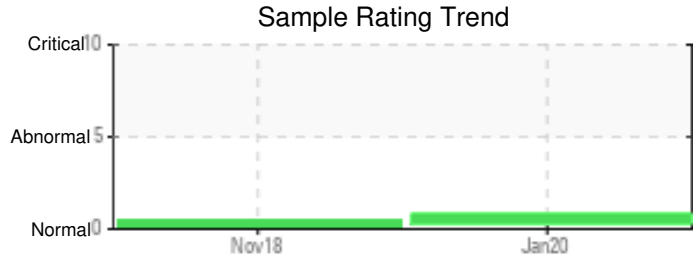
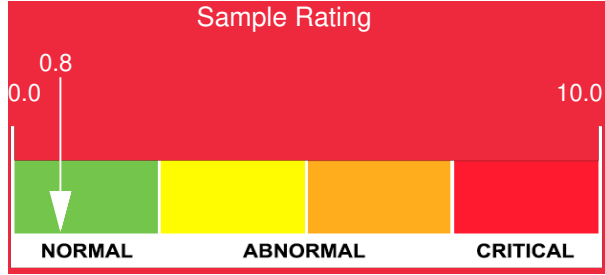
Sample Information
 Lab No: 02353744
 Analyst: Clinton Buhler
 Sample Date: 01/20/20
 Received Date: 05/13/20
 Completed: 05/20/20
 Clinton Buhler
 Clinton.Buhler@PetroCanadaLSP.com

Recommendation: Sample results indicate that the fluid is suitable for continued service. However, solids content has increased to 0.422%, up from 0.044% on the last analysis. This often is associated to degradation byproducts experienced with oxidation or thermal degradation, but the other fluid parameters in this report do not suggest that this is excessive. Acid Number has increased since last sample which may suggest some level of oxidation. Please re-sample within 6 months- please ensure that the sample is taken from a turbulent flow zone (pump discharge is ideal) and that the sample valve and piping is thoroughly purged out before taking the sample. This will help ensure that the solids content measurements are accurate and not just solids that have collected in a low lying area. To combat oxidation of the fluid, please ensure that blanket gas is in operation.

Comments:

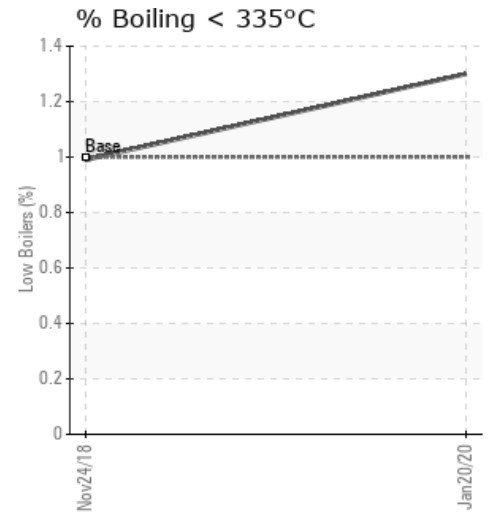
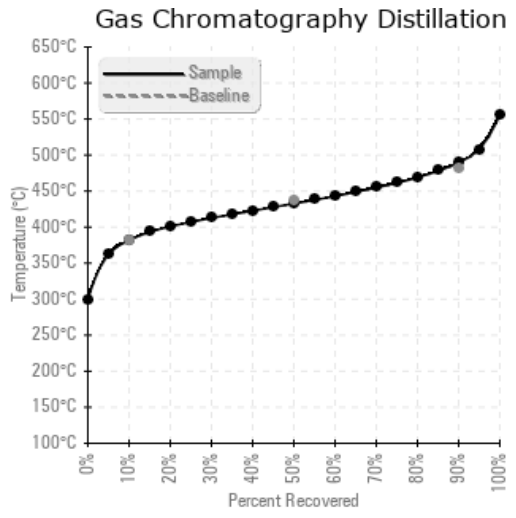
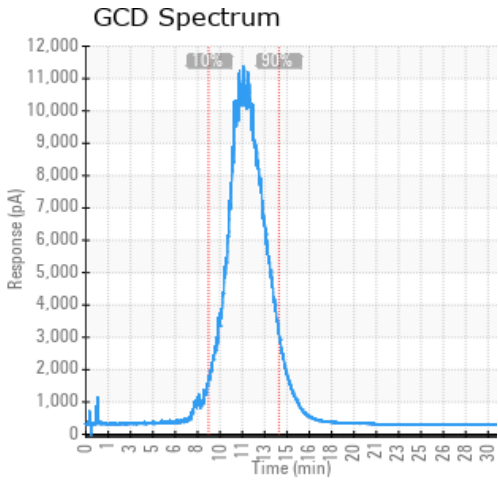
| Sample Date | Received Date | Fluid Age | Sample Location | Flash Point (COC) | Water (KF) | Viscosity (40°C) | Acid Number | Solids | GCD 10% | GCD 50% | GCD 90% | GCD % < 335°C |
|---------------|---------------|-----------|-----------------|-------------------|------------|------------------|-------------|--------|-----------|-----------|-----------|---------------|
| | mm/dd/yy | | | °F/°C | ppm | cSt | mg/KOH/g | %wt | °F/°C | °F/°C | °F/°C | % |
| 01/20/20 | 05/13/20 | 48m | DISCHARGE | 428 / 220 | 19.0 | 34.3 | 0.17 | 0.422 | 719 / 382 | 811 / 433 | 913 / 490 | 1.30 |
| 11/24/18 | 12/18/18 | 3m | | 424 / 218 | 123.3 | 33.4 | 0.01 | 0.044 | 720 / 382 | 807 / 431 | 910 / 488 | 0.99 |
| 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 | |
|---------------|------|----------|--------|----------|--------|------|-----|---------|--------|----------|---------|--------|-----------|----------|------------|----------|-----------|---------|-------|-----------|---------|--------|------------|------|---|
| 01/20/20 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 6 | 0 | |
| 11/24/18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 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

| | |
|----------|---|
| 11/24/18 | The fluid is in excellent condition and suitable for further use. Please re-sample in 6 months. |
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| | |

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