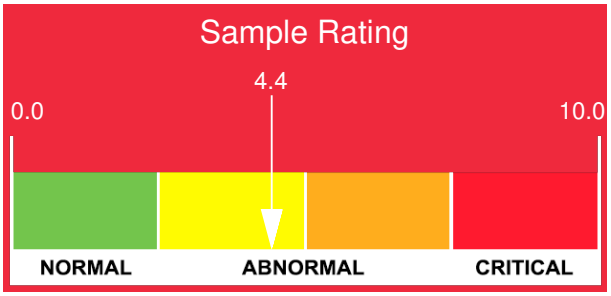
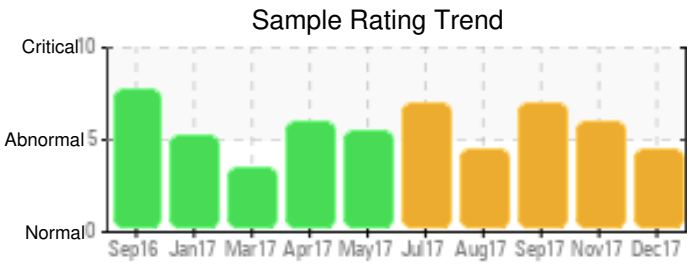
PETRO-CANADA



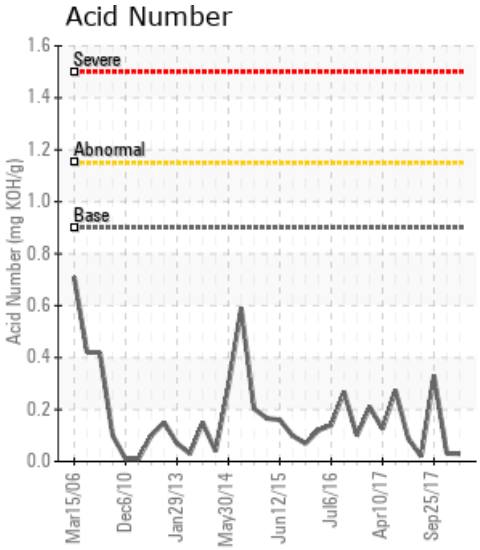

# WEST HOT OIL SYSTEM

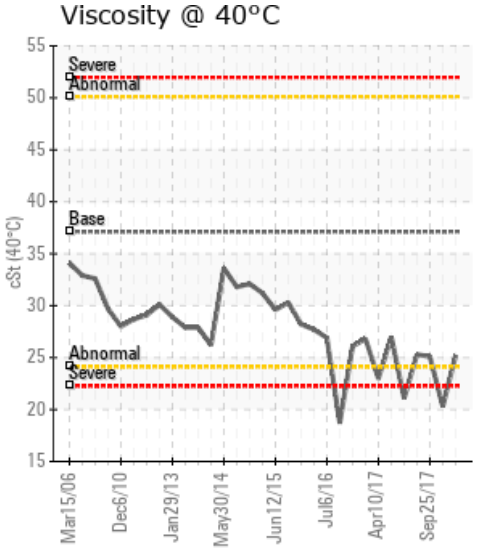
| Customer: PTRHTF10004 | System Information | Sample Information |
|---|---|---|
| ADM VITAMIN E PLANT<br>3700 EAST DIVISION STREET<br>DECATUR, IL 62526 USA<br>Attn: Rick Cluck<br>Tel: (217)451-7770<br>E-Mail: ricky.cluck@adm.com | System Volume: 2200 gal<br>Bulk Operating Temp: 550F / 288C<br>Heating Source:<br>Blanket:<br>Fluid: PETRO CANADA PURITY FG HEAT TRANSFER FLUID<br>Make: AMERICAN | Lab No: 02190113<br>Analyst: Joe Goecke<br>Sample Date: 12/18/17<br>Received Date: 12/27/17<br>Completed: 04/10/18<br>To discuss this report contact Joe Goecke at (859)543-0092 |

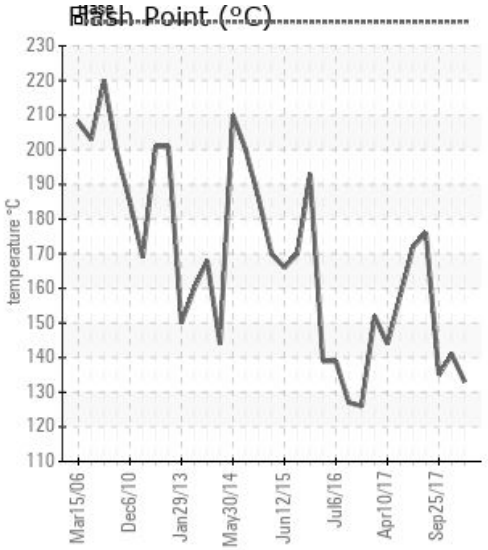
Recommendation: Sample remained very stable from last report. A slight drop in Flash point but a rise in viscosity indicates some stability. Low boilers had slight rise but less than 10. Continue to use and sample at next regular interval.

Comments: COC Flash Point is severely low. (GCD) 10% Distillation Point is abnormally low. (GCD) % < 335°C 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 | % |
| 12/18/17 | 12/27/17 | 0y | | 271 / 133 | 9.1 | 25.2 | 0.03 | 0.040 | 644 / 340 | 798 / 425 | 907 / 486 | 8.86 |
| 11/21/17 | 11/22/17 | 2y | | 286 / 141 | 7.3 | 20.3 | 0.031 | 0.036 | 656 / 347 | 798 / 425 | 907 / 486 | 7.89 |
| 09/25/17 | 10/02/17 | 0y | | 275 / 135 | 4.1 | 25.1 | 0.33 | 0.036 | 635 / 335 | 800 / 427 | 917 / 491 | 9.48 |
| 08/14/17 | 08/22/17 | 0y | EAST PUMP WEST UNIT | 349 / 176 | 21.2 | 25.3 | 0.02 | 0.045 | 632 / 334 | 796 / 425 | 907 / 486 | 9.71 |
| 07/05/17 | 07/11/17 | 0y | 24B H.O. PUMP | 342 / 172 | 19.3 | 21.1 | 0.089 | 0.033 | 627 / 331 | 798 / 426 | 910 / 488 | 10.04 |
| 05/22/17 | 05/26/17 | 0y | EAST PMP WEST UNIT | 316 / 158 | 27.8 | 27.0 | 0.274 | 0.065 | 656 / 347 | 805 / 429 | 911 / 488 | 7.91 |
| Baseline Data | | | | 459 / 237 | | 37.12 | 0.90 | | 721 / 383 | 807 / 431 | 892 / 478 | 1.5 |

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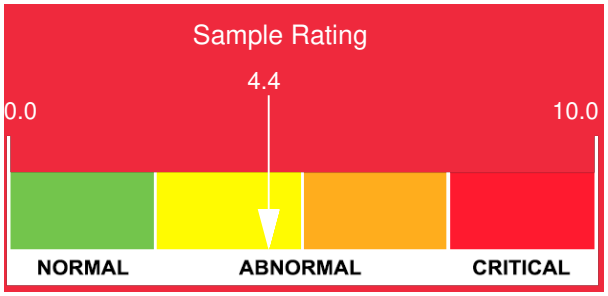
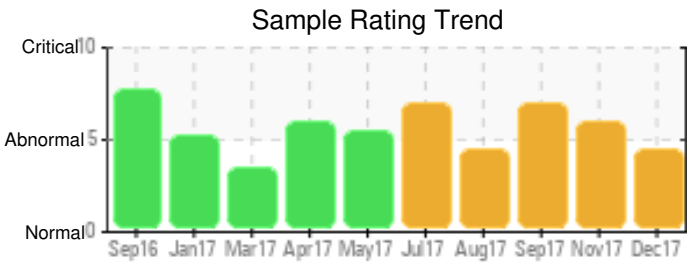
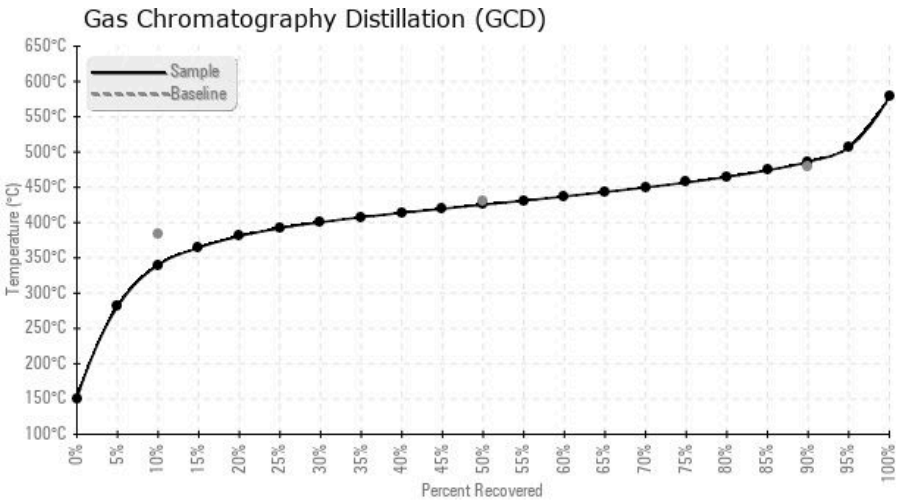
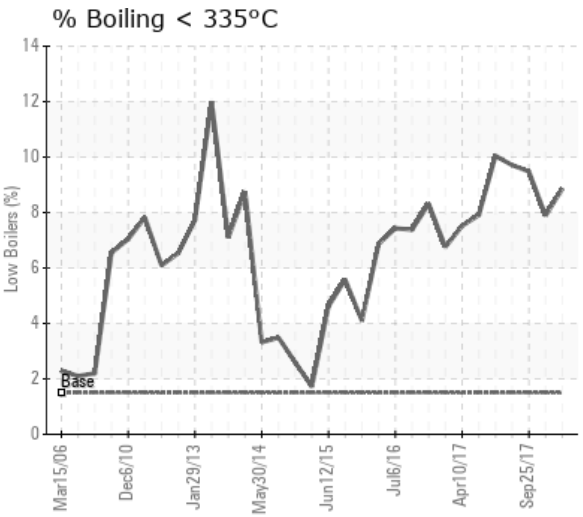



| Sample Date | Iron | Chromium | Nickel | Aluminum | Copper | Lead | Tin | Cadmium | Silver | Vanadium | Silicon | Sodium | Potassium | Titanium | Molybdenum | Antimony | Manganese | Lithium | Boron | Magnesium | Calcium | Barium | Phosphorus | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12/18/17 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 |
| 11/21/17 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 0 |
| 09/25/17 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| 08/14/17 | 7 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 17 |
| 07/05/17 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| 05/22/17 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 19 |
| Baseline Data | | | 0 | 0 | | | | | | 0 | | | 0 | 0 | | | | | 0 | | | | 230 | |

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




## Historical Comments

| | |
|---|---|
| 11/21/17 | Drop in viscosity from last sample of 5 cSt, Flash point relatively the same slight decrease in low boilers indicate a fairly stable sample from last sample. Should consider a planned change out during next quarter due to the repeated low viscosity and high flash point. Resample in 45 days to confirm trend. COC Flash Point is severely low. Visc @ 40°C is abnormally low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low. |
| 09/25/17 | Flash point has dropped by 40 degrees C and is extremely low. low boilers are steady from last sample and Viscosity remained unchanged. While the flash point is a concern I recommend resampling in 30 days with a possible plan to change in the next 60-90 days. COC Flash Point is severely low. (GCD) 10% Distillation Point is abnormally low. (GCD) % < 335°C is marginally high. (GCD) 90% Distillation Point is marginally high. |
| 08/14/17 | Sample looks very similar to last results. No action is required at this time. Although low boilers are approaching 10% they are slightly less than last month. Flash and viscosity slightly better than last month. Resample at planned interval, and I would still look at a change in the next 60-90 days. COC Flash Point is severely low. (GCD) 10% Distillation Point is abnormally low. (GCD) % < 335°C is marginally high. |
| 07/05/17 | Several Items need to be watched and system change out should be planned for the next quarter.Viscosity is low at 21 cSt, Low boilers have increased to 10% and Flash point although stable remains lower. To confirm trend resample in 30-45 days. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. Visc @ 40°C is severely low. (GCD) % < 335°C is marginally high. |
| 05/22/17 | Low boilers continue to be on a slow rise, but viscosity and flash point have risen slightly since last sample possibly due to fresh oil top-up. Acid number has doubled since last sample. We suggest resampling at 3 months to watch for rapid rise in low boilers and decrease in flash point with a possible change in third or fourth quarter this year. COC Flash Point is severely low. (GCD) % < 335°C is marginally high. (GCD) 90% Distillation Point is marginally high. (GCD) 10% Distillation Point is marginally low. |

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