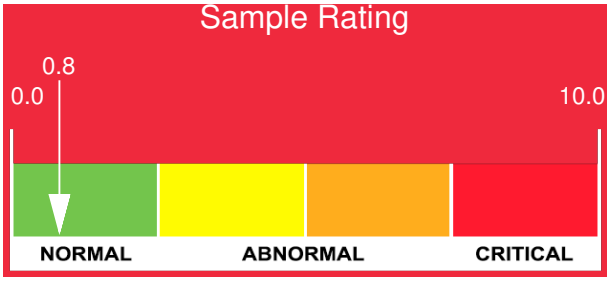
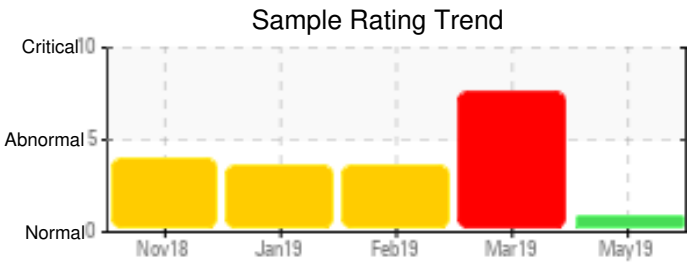




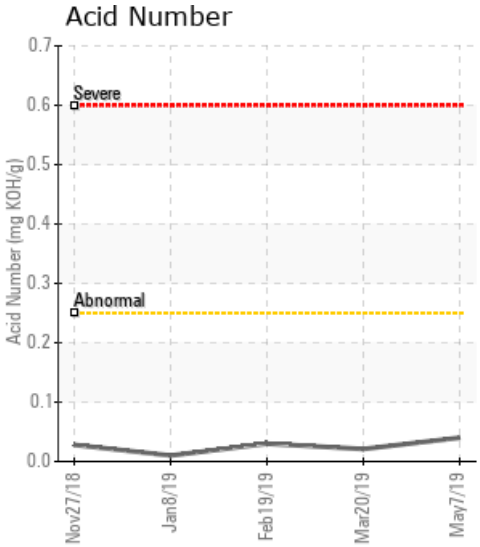
[/ 7-11-064-03W6 /] HEATER 2

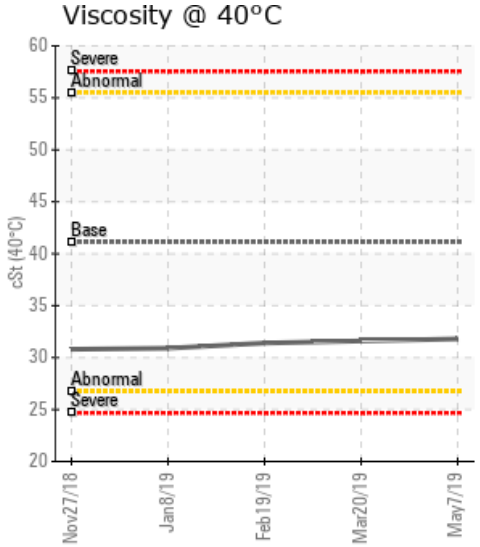
Customer: PTRHTF20207	System Information	Sample Information
SEVEN GENERATIONS ENERGY LTD 7-11-064-03W6 GRANDE PRAIRIE, AB T8V 8H7 Canada Attn: Justin Dery Tel: (587)435-4480 E-Mail: Justin.dery@7genergy.com	System Volume: 140000 ltr Bulk Operating Temp: 518F / 270C Heating Source: Blanket: Fluid: CHEVRON HEAT TRANSFER OIL 46 Make: PETRO TECH	Lab No: 02285244 Analyst: Clinton Buhler Sample Date: 05/07/19 Received Date: 05/15/19 Completed: 05/23/19

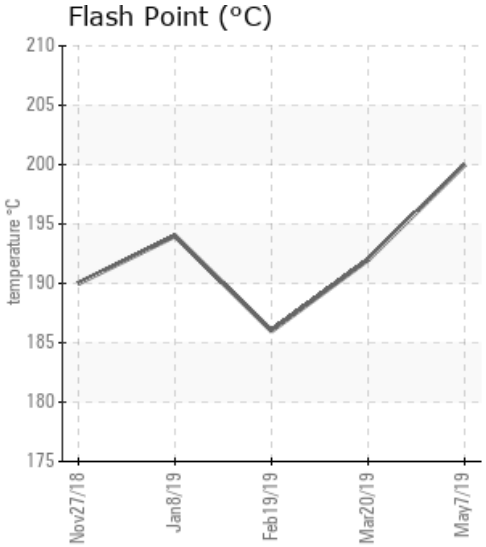
Recommendation: Sample results indicate an improvement from March' results as it relates to water content.Distillation values have improved which may indicate that the water in the previous sample had a bearing on this. Fluid appears to be suitable for continued service.Re-sample per scheduled interval.

Comments: COC Flash Point is marginally low.

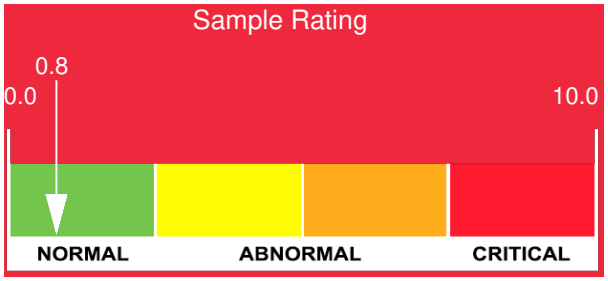
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
05/07/19	05/15/19	2y	RETURN HEADER	392 / 200	242.3	31.8	0.040	0.032	724 / 384	833 / 445	924 / 495	2.99
03/20/19	03/28/19	2y		378 / 192	1123.5	31.6	0.021	0.087	679 / 359	814 / 435	907 / 486	7.30
02/19/19	02/28/19	1y	RETURN HEADS	367 / 186	229.1	31.4	0.030	0.084	693 / 367	803 / 429	897 / 481	4.91
01/08/19	01/15/19	1y		381 / 194	156.5	30.9	0.01	0.051	695 / 369	804 / 429	896 / 480	4.31
11/27/18	12/07/18	1y		374 / 190	475.0	30.8	0.028	0.096	718 / 381	828 / 442	918 / 492	4.17
Baseline Data				464 / 240		41.1			727 / 386	828 / 442	932 / 500	1.4

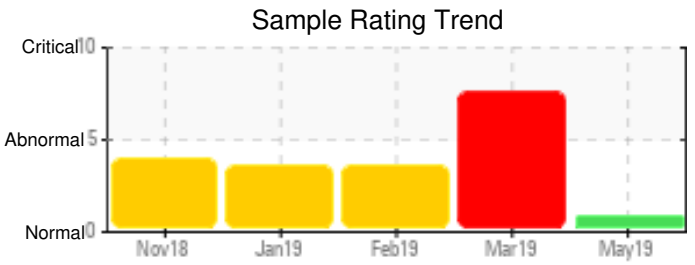






PETRO-CANADA LUBRICANTS

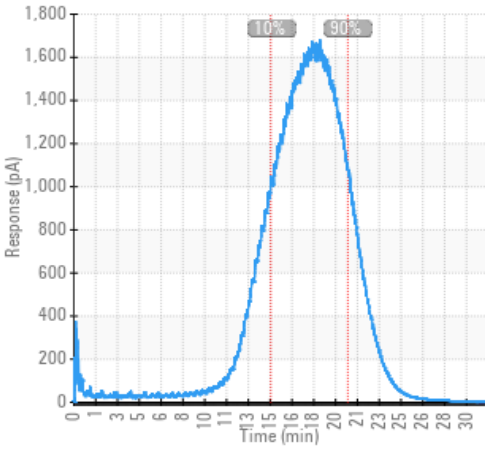




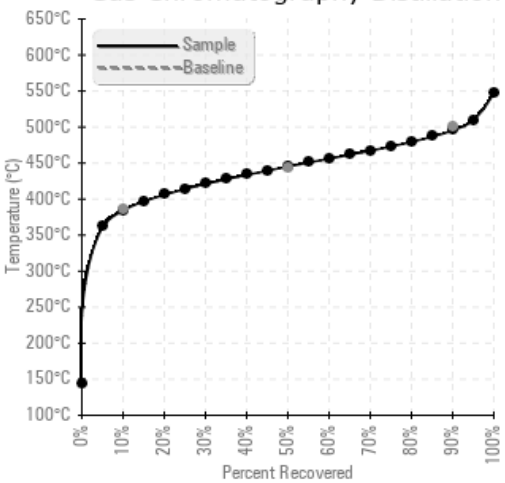
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
05/07/19	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
03/20/19	3	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	1	0	1	0	0	0
02/19/19	3	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0
01/08/19	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0
11/27/18	7	0	0	0	0	0	0	0	0	0	2	11	0	0	0	0	0	0	1	0	2	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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

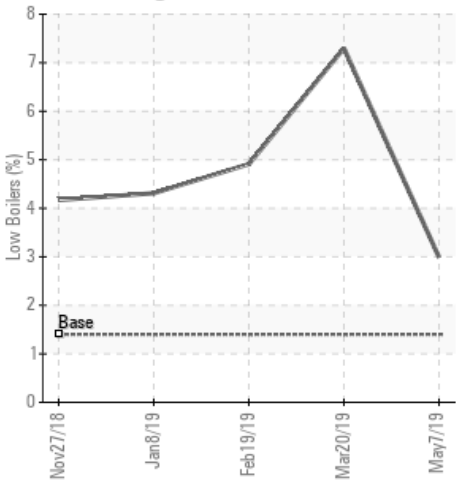
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments

03/20/19	Sample results indicate an increase in water contamination. Water >1000ppm poses a greater risk for fluid boil over. If this sample is representative, in that the sample valve and piping was thoroughly purged at pump discharge, then the water vapor needs to be safely vented if safe to do so. Water can be a catalyst for oxidation and can cause corrosion. Venting of the system is also beneficial to the increased volume of low boiling vapors (note the increase to 7.3% boil-off and reduced 10% distillation temperature). Please re-sample at next interval; please ensure sample point is thoroughly purged and take measures to keep water out of the system.
02/19/19	Sample results indicate that the fluid is suitable for continued service. There still appears to be the presence of low boiling vapors that should be vented to help restore the fluid's % boil-off, distillation points, flash point and the viscosity. Results appear to be consistent with the last two analysis.Please re-sample once able to safely vent low boiling vapors.
01/08/19	Sample results indicate that the fluid condition has remained relatively similar to previous analysis on Nov 27, 2018.Flash point and viscosity are steady and % boil-off very similar.10, 50 and 90% distillation values are lower than last analysis.Venting of low boiling vapors is required to help restore distillation values. This can also help restore flash point results.Once safe venting of low boilers has been performed, please re-sample in ~ 6 months.
11/27/18	Sample results indicate that the heat transfer fluid is suitable for continued service. Please note reduced flash point and increased % boil-off (GCD % < 335C). That, and also the fluid's viscosity is 30.8 cSt vs 41cSt of new fluid can indicate a mixture of different fluids, but it can also indicate thermal degradation.Depending on system design, that is, if a high blanket gas pressure is not required to provide the circulation pumps positive suction head pressure, it is recommended to perform regular venting of the expansion tank to remove the low boiling vapors from the system. This can help restore distillation values as well as flash point. Water level is not ideal. This may be an indication of where the sample was drawn from. Venting will also assist in removing water from the system if results are representative. Once venting (if safe to do so) has been completed thoroughly, please re-sample in 6 months. Water contamination levels are marginally high. COC Flash Point is abnormally low. (GCD) 90% Distillation Point is marginally low.