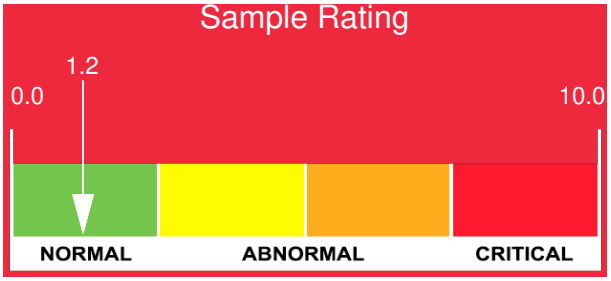
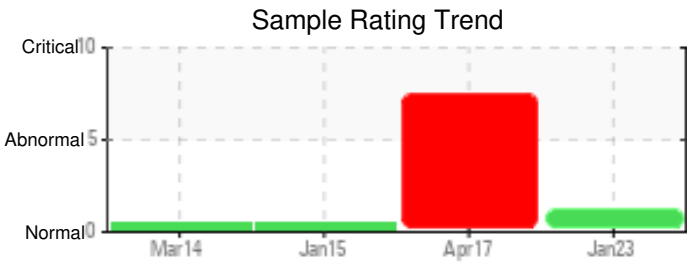




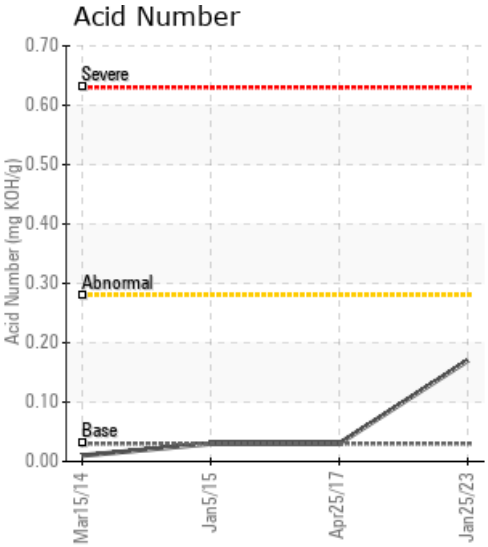
AUTOLIV BOILER #2

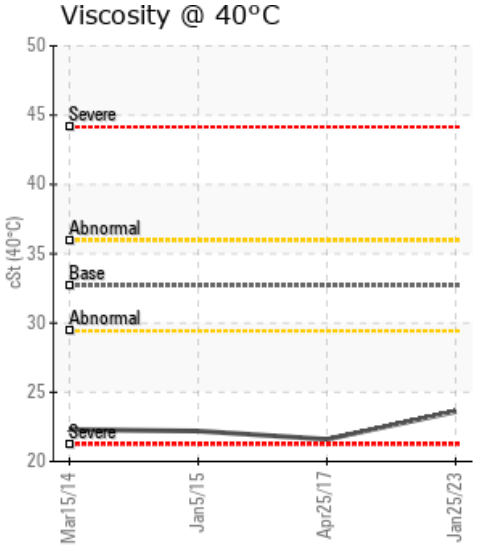
Customer: PTRHTF30004	System Information	Sample Information
AUTOLIV CANADA 20 AUTOLIV DRIVE P.O. BOX 1090 TILBURY, ON N0P 2L0 Canada Attn: Jill Stevenson Tel: (519)682-1083 E-Mail:	System Volume: 4000 ltr Bulk Operating Temp: 518F / 270C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: VAPOUR POWER	Lab No: 02539195 Analyst: Yen Garcia Sample Date: 01/25/23 Received Date: 02/13/23 Completed: 02/24/23 Yen Garcia yen.garcia@HFSinclair.com

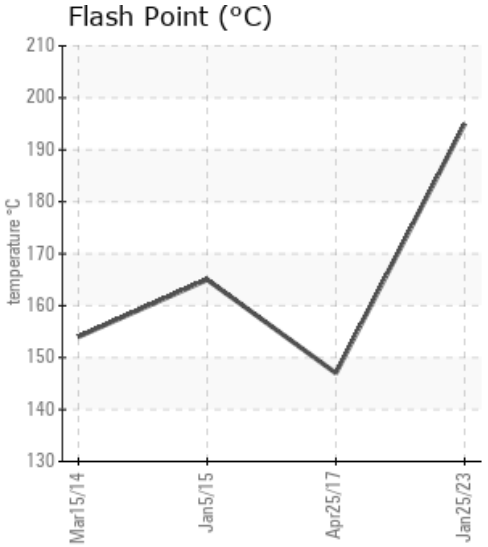
Recommendation: We can review this during our March 1st visit. Phosphorus and Sulfur levels are not normal, could there have been a top up of another product? Oil Condition: Visc @ 40°C is abnormally low. (GCD) 90% Distillation Point is marginally high.

Comments: Visc @ 40°C is abnormally low. (GCD) 90% Distillation Point is marginally high.

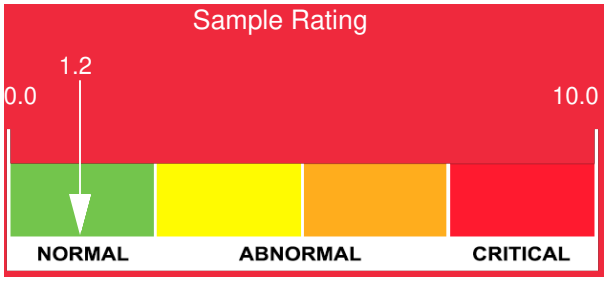
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
01/25/23	02/13/23	8.0y		383 / 195	2.0	23.6	0.17	0.079	651 / 344	798 / 426	906 / 486	8.33
04/25/17	05/26/17	7.0y		297 / 147	6.8	21.6	0.03	0.208	595 / 313	775 / 413	888 / 476	14.09
01/05/15	01/13/15	6.0y		329 / 165	40.2	22.2	0.03	0.060	601 / 316	778 / 415	885 / 474	13.24
03/15/14	01/13/15	5.0y		309 / 154	16.4	22.3	0.01	0.079	604 / 318	781 / 416	908 / 487	13.09
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5

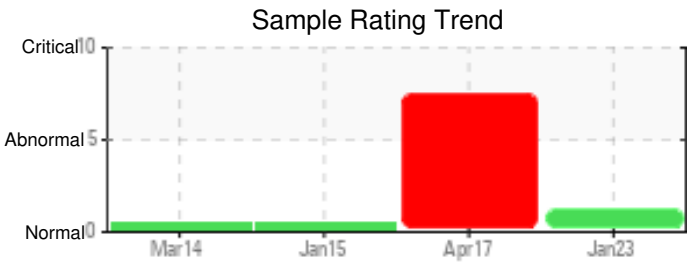






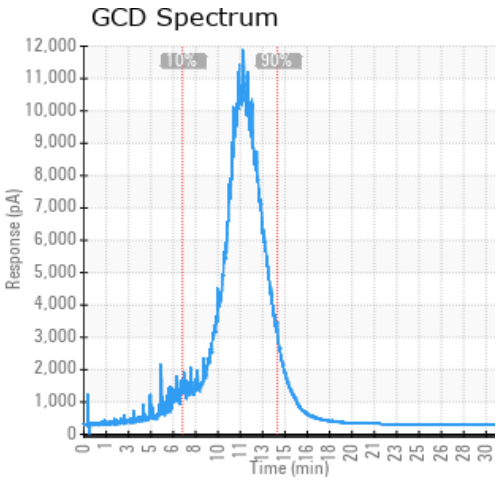
PETRO-CANADA LUBRICANTS

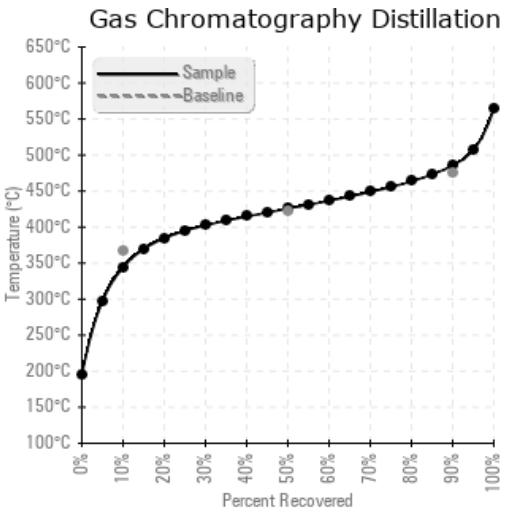


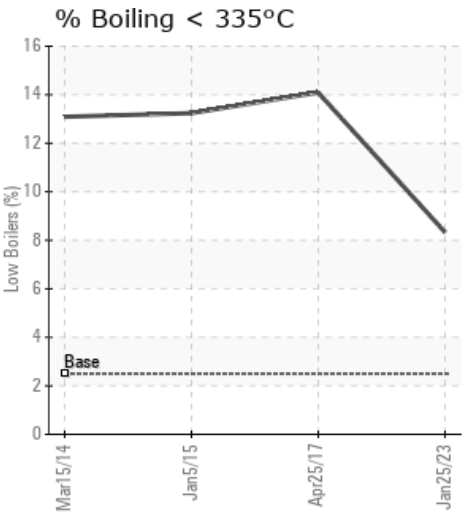


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
01/25/23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0
04/25/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	0
01/05/15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	65	0
03/15/14	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	72	0
Baseline Data			0	0						0			0	0					0				270	

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







Historical Comments

04/25/17	Viscosity of the Calflo AF has been reduced to 21.6 cSt @40°C from a typical of 32.3 cSt @ 40°C. Possible cracking of the fluid has occurred, or another product has been added. Percent of boilers <335°C is quite high @ 13.80% and 10% point has been reduced to 313.5°C from a typical of 365°C. Consider venting system to reduce light boilers. Consider bleeding off some fluid and sweetening with Calflo AF to increase viscosity of fluid. Sulphur and Phosphorus additive levels are not consistent with Calflo AF. Confirm that Calflo AF is being used and topped up.Resample at 3 months after venting to confirm if low boilers have been reduced. Consider bleeding off some fluid and sweetening with Calflo AF to increase flash point and reduce low boilers. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. (GCD) % < 335°C is abnormally high.
01/05/15	There is an indication of thermal cracking as the oil seems to have abnormall high light ends. If it is possible to vent the light ends out of the system through the expansion tank, then I would suggest that this be done. I would suggest tha we re-sample the oil in this unit. It is about the same as the sample from 3/5/2014 (GCD) 10% Distillation Point is severely low. (GCD) % < 335°C is abnormally high. COC Flash Point is abnormally low.
03/15/14	There is an indication of thermal cracking as the oil seems to have abnormall high light ends. If it is possible to vent the light ends out of the system through the expansion tank, then I would suggest that this be done. I would suggest tha we re-sample the oil in this unit COC Flash Point is severely low. (GCD) % < 335°C is abnormally high. (GCD) 10% Distillation Point is abnormally low. (GCD) 90% Distillation Point is marginally high.

