

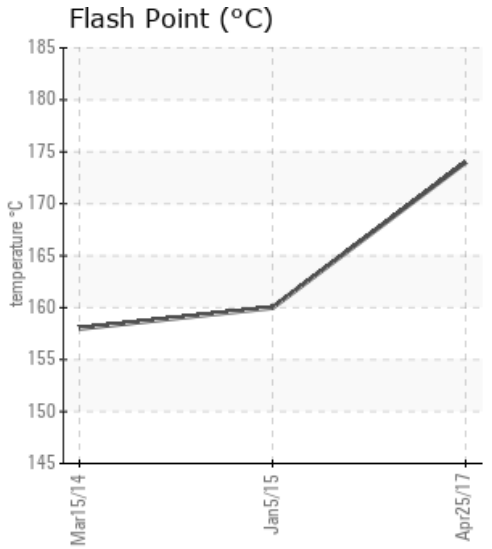
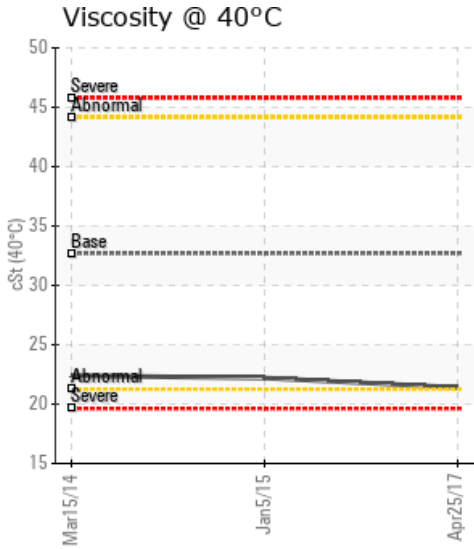
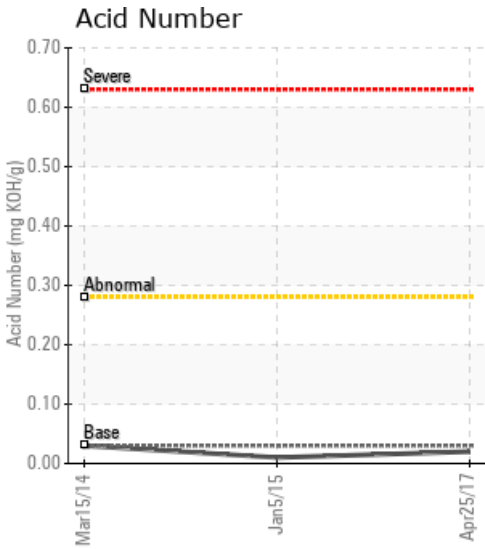
## AUTOLIV BOILER #1

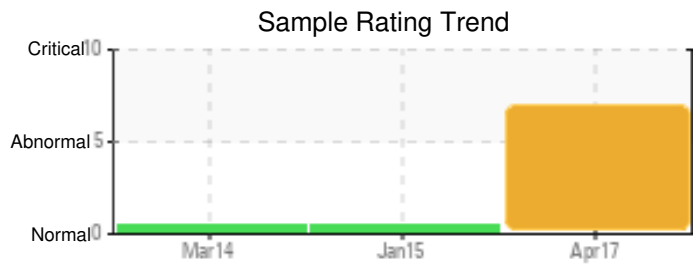
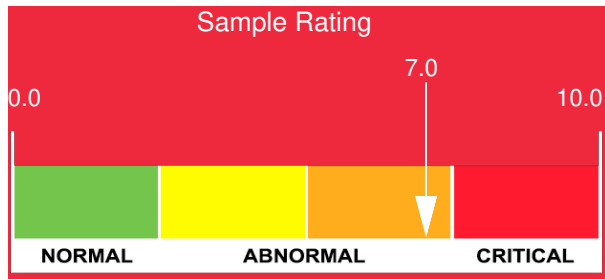
Customer: PTRHTF30004	System Information	Sample Information
AUTOLIV CANADA 20 AUTOLIV DRIVE P.O. BOX 1090 TILBURY, ON N0P 2L0 Canada Attn: Jill Stevenson Tel: (519)682-1083 E-Mail:	System Volume: 4000 ltr Bulk Operating Temp: 518F / 270C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: VAPOUR POWER	Lab No: 02147900 Analyst: Behshad Sabah Sample Date: 04/25/17 Received Date: 05/26/17 Completed: 06/16/17 Behshad Sabah behshad.sabah@HFSinclair.com

Recommendation: Viscosity of the Calflo AF has been reduced. 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 after 3 months to confirm if venting has reduced low boilers and viscosity has increased.

Comments: (GCD) 10% Distillation Point is severely low. (GCD) % < 335°C is abnormally high. COC Flash Point is abnormally 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	%
04/25/17	05/26/17	7.0y		345 / 174	4.2	21.4	0.02	0.200	596 / 314	776 / 413	893 / 478	13.80
01/05/15	01/13/15	6.0y		320 / 160	16.9	22.2	0.01	0.080	597 / 314	772 / 411	880 / 471	13.95
03/15/14	01/13/15	5.0y		316 / 158	15.6	22.4	0.03	0.059	602 / 317	778 / 414	885 / 474	13.05
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5

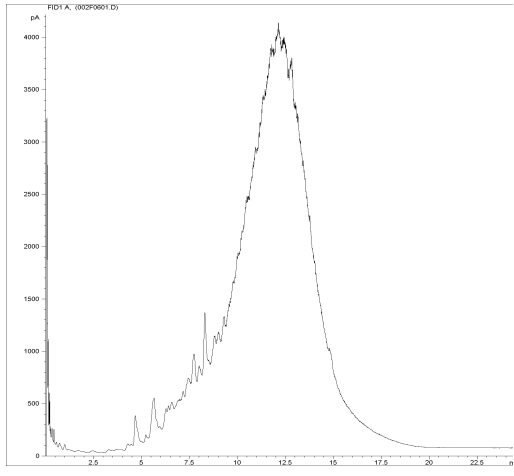




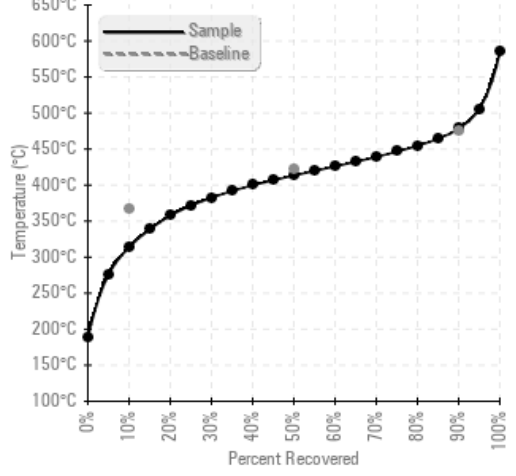
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc	
04/25/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	0	
01/05/15	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	64	0
03/15/14	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	72	0
Baseline Data			0	0						0			0	0					0					270	

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

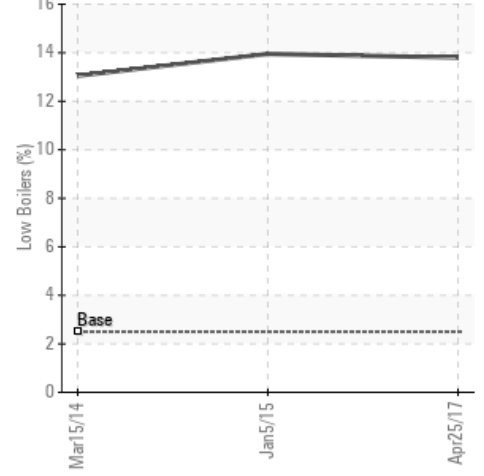
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments	
01/05/15	There is an indication of thermal cracking as the oil seems to have abnormal 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 that we re-sample the oil in this unit. The results are similar to the previous sample from 3/15/2014. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. (GCD) % < 335°C is abnormally high.
03/15/14	There is an indication of thermal cracking as the oil seems to have abnormal 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 that we re-sample the oil in this unit. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. (GCD) % < 335°C is abnormally high.

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