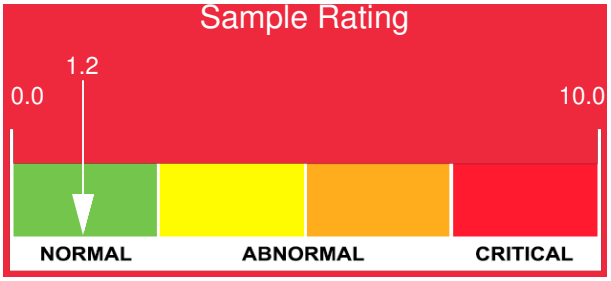
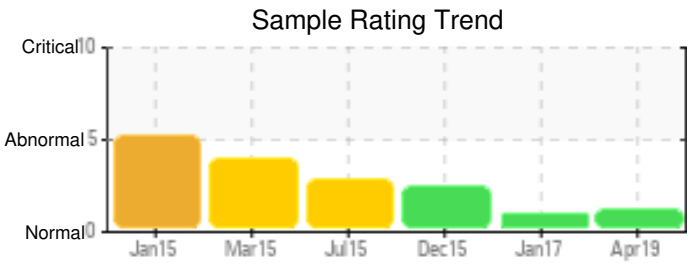
PETRO-CANADA LUBRICANTS





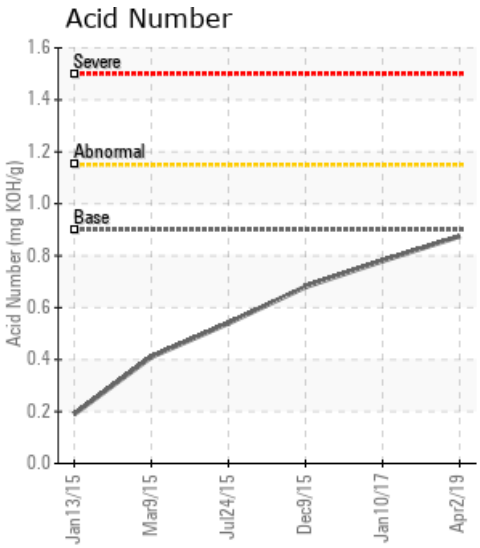
#4 COOKER (I-854-1-0145)

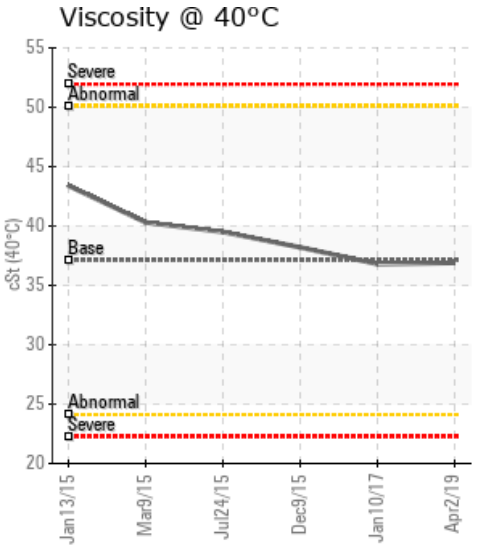
Customer: PTRHTF10156	System Information	Sample Information
INGREDION 1515 SOUTH DROVER ST INDIANAPOLIS, IN 46221 USA Attn: Randy Ward Tel: (317)656-2247 E-Mail: Randy.Ward@ingredion.com	System Volume: 200 gal Bulk Operating Temp: 400F / 204C Heating Source: Blanket: Fluid: PETRO CANADA PURITY FG HEAT TRANSFER FLUID Make: HEAT EXCHANGE/TRAN	Lab No: 02292381 Analyst: Yvette Trzcinski Sample Date: 04/02/19 Received Date: 06/20/19 Completed: 06/25/19

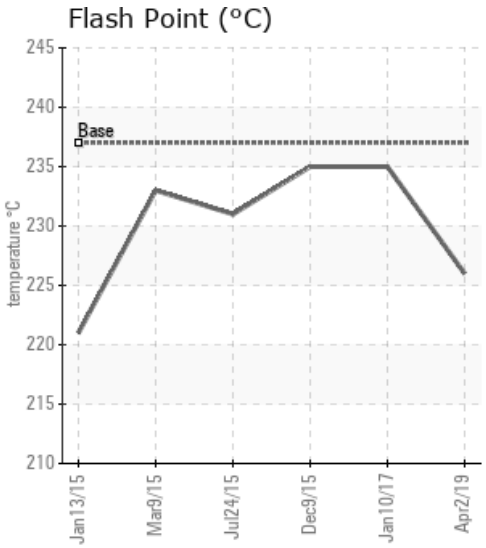
Recommendation: sample dated April 2 2019 - seeing 516 ppm zinc contamination and water level has increased to 107 ppm - need to determine whether zinc contamination is from the wrong top up fluid used or from galvanized components in the system

Comments: Zinc ppm levels are severely 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	%
04/02/19	06/20/19	0m	SAMPLE PORT 3-966892	439 / 226	107.7	36.9	0.875	0.052	710 / 377	780 / 416	886 / 474	1.39
01/10/17	01/23/17	6m		455 / 235	40.7	36.8	0.78	0.032	736 / 391	826 / 441	925 / 496	0.11
12/09/15	04/19/16	6m	HOT OIL HEAT EXCHNGR	455 / 235	7.5	38.2	0.68	0.059	773 / 411	843 / 451	941 / 505	0.00
07/24/15	08/06/15	0m	PAST THE STRAINER	448 / 231	0.00	39.5	0.54	0.041	744 / 396	872 / 467	1003 / 540	0.00
03/09/15	03/20/15	0m	SUCTION SIDE OF PUMP	451 / 233	14.0	40.3	0.41	0.163	748 / 398	893 / 479	1003 / 540	0.00
01/13/15	01/30/15	0m	AT PUMP	430 / 221	21.2	43.4	0.19	0.052	785 / 418	929 / 498	1047 / 564	0.00
Baseline Data				459 / 237		37.12	0.90		721 / 383	807 / 431	892 / 478	1.5







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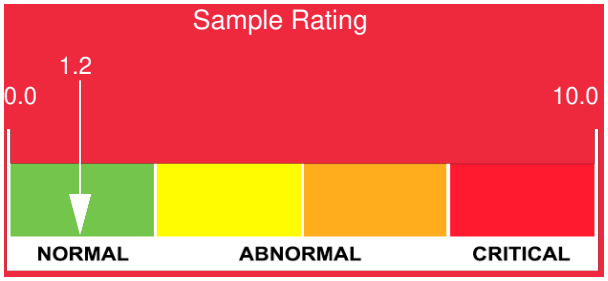
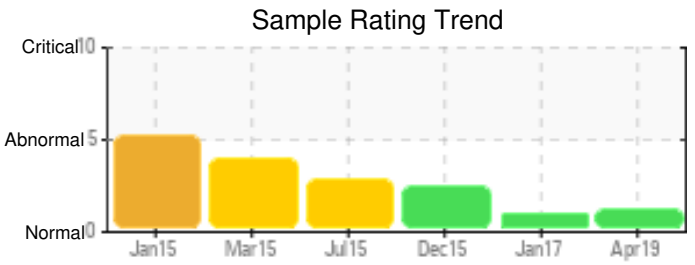
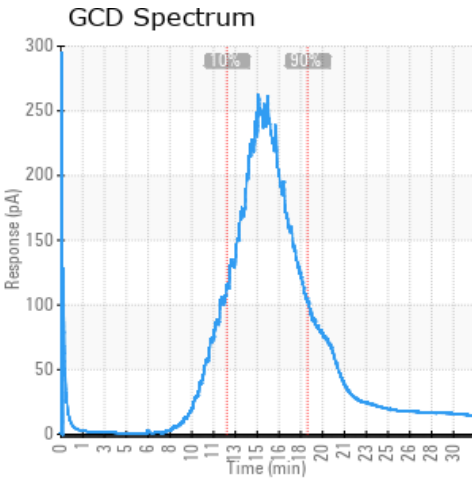
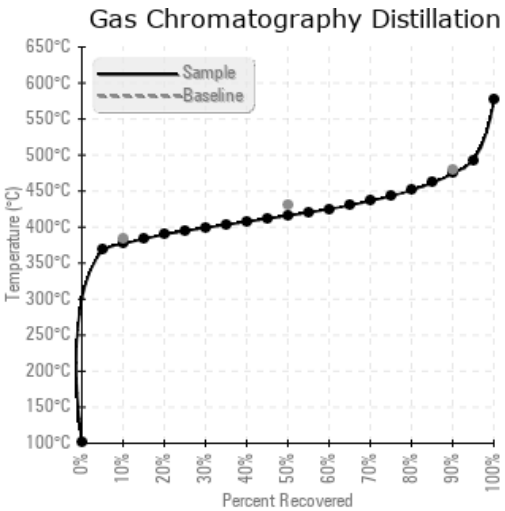


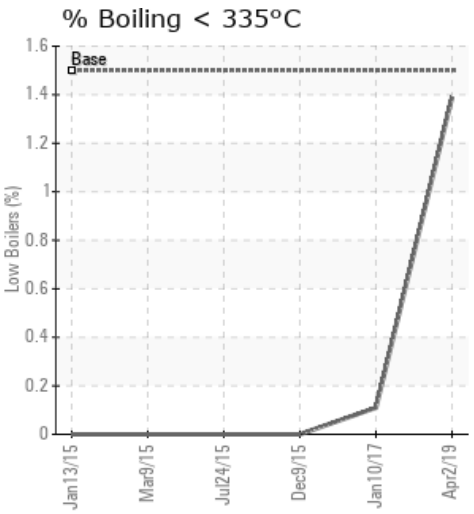


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
04/02/19	147	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	211	516
01/10/17	6	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	219	0
12/09/15	46	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	178	1
07/24/15	41	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	142	1
03/09/15	76	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	111	1
01/13/15	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	1
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

01/10/17	The color change seem to indicate the oil has been changed since the last sample. Plus the iron went down significantly and the properties now more closely resemble Purity FG HTF. The flash point remains strong. No action deemed necessary at this time, just re-sample in 6 months for normal monitoring. (GCD) 90% Distillation Point is abnormally high.
12/09/15	The sample is dated Dec 9 2015, so a fresh sample would provide more insight into the current fluid condition. The amount of Purity FG HTF is slowly increasing in this system. Flash point is increasing and the low boilers are reduced. Please keep monitoring every 6 months considering how critical these cookers are. (GCD) 90% Distillation Point is severely high. (GCD) 10% Distillation Point is abnormally high. (GCD) 50% Distillation Point is marginally high.
07/24/15	There is a steady change in properties to show the increasing amount of Purity FG HTF in the system. The overall condition of the fluid appears to be good based on the results with metals, water and insoluble solids at low levels. Please re-sample at next scheduled interval. (GCD) 90% Distillation Point is severely high. (GCD) 50% Distillation Point is abnormally high.
03/09/15	We can see the boiling curve shifting closer towards Purity FG HTF. Same with phosphorous, rising to where it's about 40% of Purity FG HTF at present. There is a bit more solids and variety of metals, as if a partial oil replacement may have been performed on this system. Nothing alarming to report at this time, so we suggest to sample at 3 to 4 months interval to monitor oil condition (GCD) 50% Distillation Point is severely high. (GCD) 90% Distillation Point is severely high.
01/13/15	The sample shows some red flags and I suspect it's because the current oil looks different than Purity FG HTF. The software is trying to compare the results against fresh Purity FG HTF data. Based on the phosphorous amount of 56 ppm, it appears there is some (~25%) of Purity FG HTF in this system. The GCD distillation data confirms the profile is different than Purity FG HTF although results confirm it's the system with the most Purity FG HTF in it. We don't see the level of degradtion in this one as we see in other systems. We'd suggest to re-sample in 4 months to monitor fluid condition. (GCD) 50% Distillation Point is severely high. (GCD) 90% Distillation Point is severely high. (GCD) 10% Distillation Point is abnormally high. Visc @ 40°C is abnormally high.

