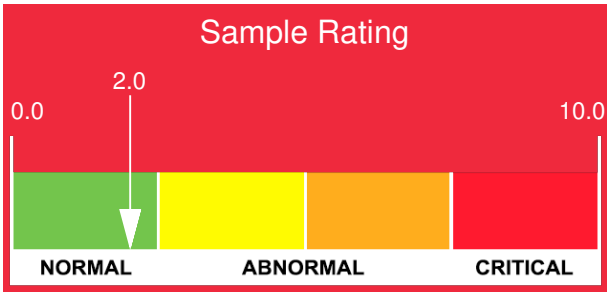
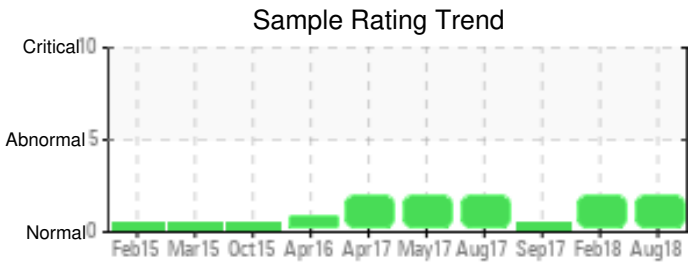
PETRO-CANADA LUBRICANTS





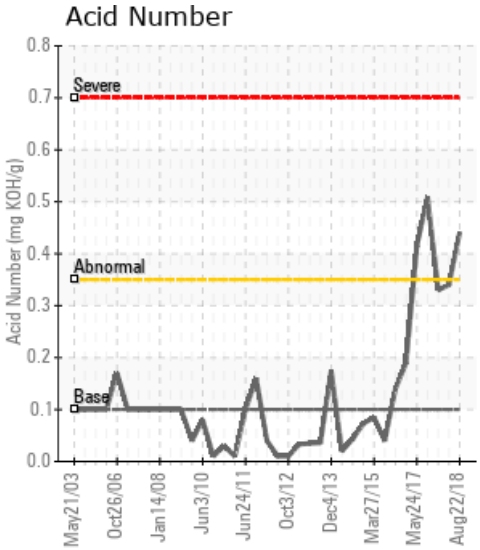
FREMONT RPG

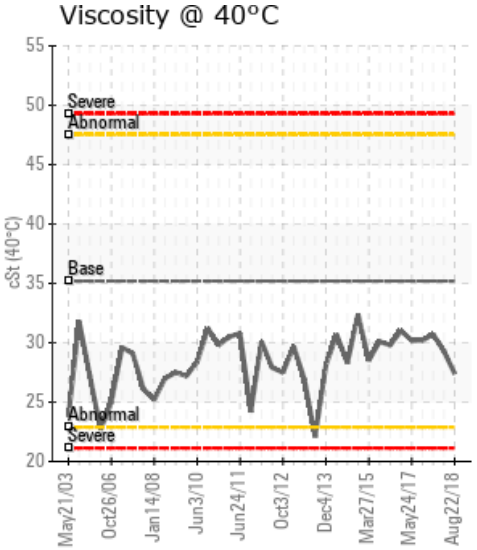
Customer: PTRHTF10036	System Information	Sample Information
CERTAINTEED - SAINT GOBAIN 6400 STEVENSON BLVD FREMONT, CA 94538-2468 USA Attn: Dan Arata Tel: (510)490-0890 E-Mail: dan.d.arata@saint-gobain.com	System Volume: 5000 gal Bulk Operating Temp: 450F / 232C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO HTF Make: FIRST THERMAL	Lab No: 02237099 Analyst: Steven Slanker Sample Date: 08/22/18 Received Date: 08/31/18 Completed: 09/04/18 To discuss this report contact Steven Slanker at (951)225-2115

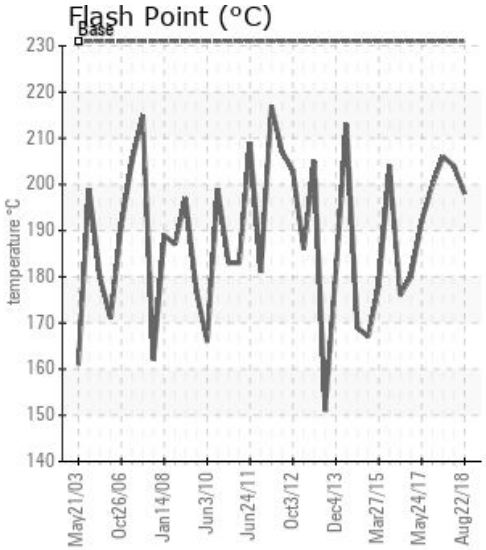
Recommendation:

Comments: Flash Point is low and acid number high. Recommend venting to reduce low boilers thereby reducing the low flash point issues. Replace 50% of the fluid to bring the acid number down. Check the pumping system to insure the flow is high enough to minimize thermal cracking in the heater. Thermal cracking generates low boilers and reduces the flash point of the fluid. It also generates high boilers that obstruct downstream piping and elbows.Check the nitrogen blank to insure it is working. By minimizing the presence of oxygen will greatly reduce the oxidation process thereby extending fluid life.

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	%
08/22/18	08/31/18	6y	MAIN SUPPLY	388 / 198	9.1	27.4	0.441	0.083	699 / 371	795 / 424	905 / 485	0.70
02/21/18	03/02/18	0y		399 / 204	5.6	29.3	0.34	0.030	688 / 365	781 / 416	869 / 465	2.08
09/22/17	10/11/17	0y		403 / 206	11.1	30.7	0.33	0.075	697 / 369	806 / 430	912 / 489	3.06
08/17/17	08/30/17	4y	MAIN SUPPLY HTR AFTR	392 / 200	21.3	30.2	0.509	0.052	687 / 364	802 / 428	911 / 488	4.24
05/24/17	06/05/17	0y	VALVE BY DAY TANK	378 / 192	31.4	30.2	0.415	0.042	688 / 364	806 / 430	922 / 495	4.25
04/10/17	04/21/17	10y	VALVE PORT WALL SIDE	356 / 180	2.5	31.0	0.19	0.100	688 / 365	815 / 435	940 / 504	4.51
Baseline Data				448 / 231		35.20	.1		712 / 378	810 / 432	910 / 488	1.75







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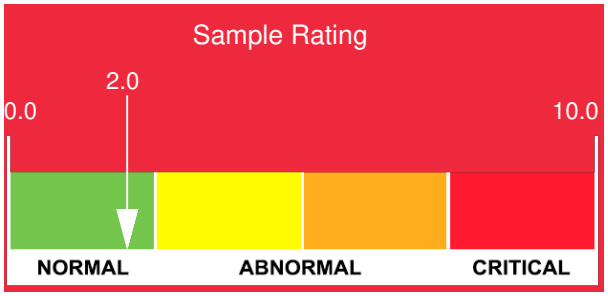
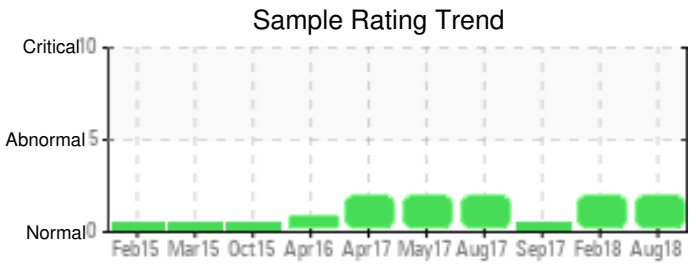
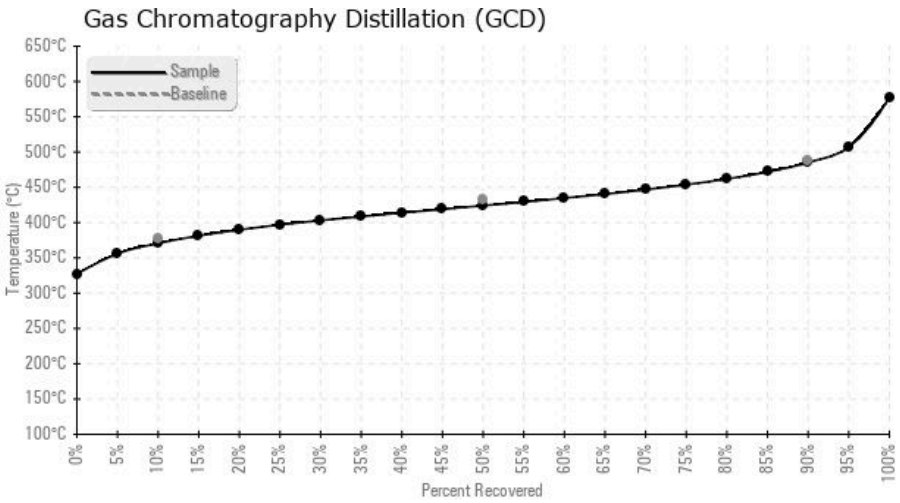
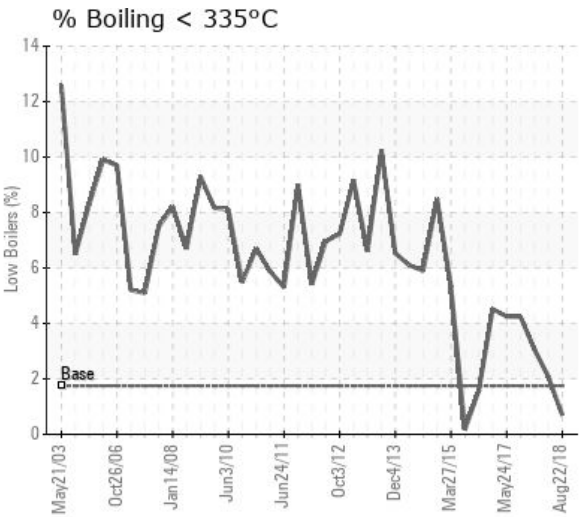




Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
08/22/18	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	0
02/21/18	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	134	0
09/22/17	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	116	0
08/17/17	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	138	0
05/24/17	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	131	0
04/10/17	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	122	0
Baseline Data			0	0						0			0	0					0				280	

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





Historical Comments

02/21/18	The fluid condition resembles the previous samples. We will keep monitoring the acid number before it keeps rising. Other properties look normal. No action needed at this time, other than re-sample at next scheduled interval.
09/22/17	The Acid Number is going down which is surprising, unless new oil was added to dilute the previous high results. Everything is now normal with no data flagged. Sample at next scheduled interval.
08/17/17	The high Acid Number appears to be the new normal as it is still high, indicating the oil is getting oxidized. The main cause for oil oxidation is hot oil getting in contact with air, hence the previous comment about checking if the nitrogen blanket is operational and in good working condition. We suggest to keep sampling quarterly and if this oxidation trend continues over the next 6 months, we will recommend, at some point, to partially replace the system fluid (30-40%) instead of letting it oxidize until a full cleaning and flushing is required. Acid Number (AN) is abnormally high. COC Flash Point is marginally low.
05/24/17	The Acid Number which normally measures oxidation has risen quite a bit in only 1 month. It could be a testing anomaly or perhaps the hot fluid was allowed to circulate through the expansion tank in direct contact with atmosphere, which would cause accelerated oxidation. Check to make sure the expansion tank has nitrogen blanker working fine and the hot fluid is not circulating through the expansion. you can re-sample in 3 months to monitor this situation. Acid Number (AN) is abnormally high. COC Flash Point is marginally low.
04/10/17	The Acid Number is starting to rise, indicating the oil is starting to oxidize. Based on the trend the oil won't degrade rapidly but in order to stop the Acid Number from rising, it's better to adopt a proactive approach than let the oil degrade until it fouls the system and forces a full system cleaning and flushing. If you have a shut-down in the coming months, we would advise to consider replacing a portion (example 20%) of the fluid with fresh Calflo to maintain a healthy oil. COC Flash Point is abnormally low.