

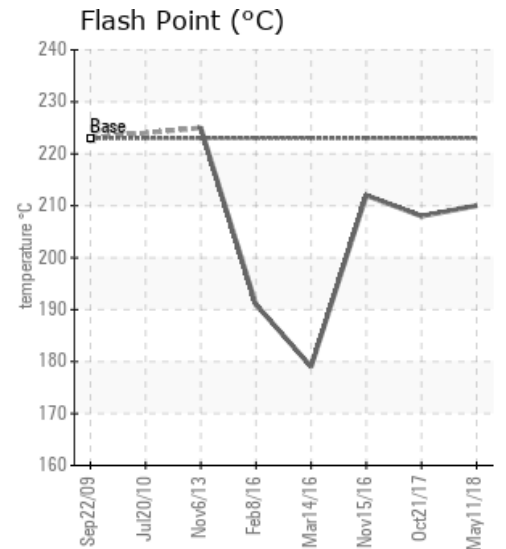
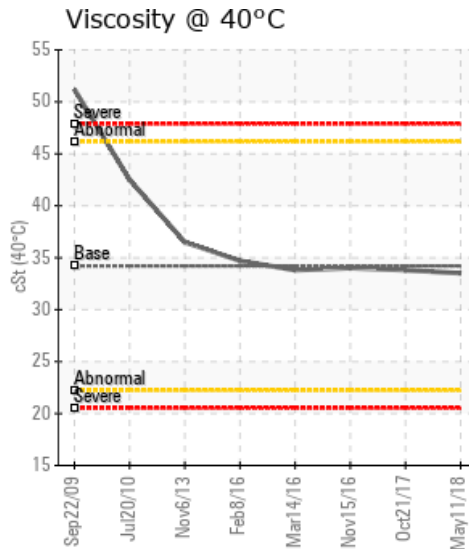
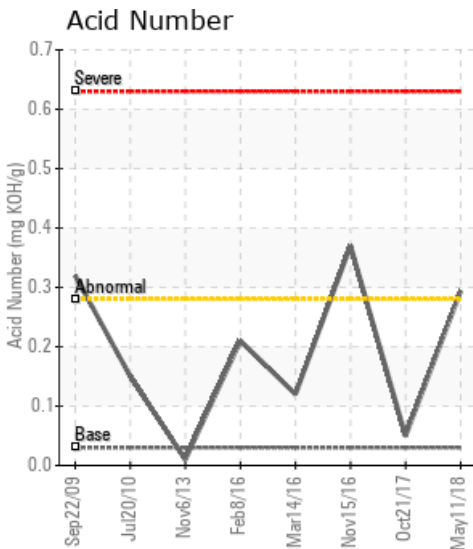
[PEYTO WILDHAY / LSD 4-21-55-23-W5M] HEAT TRANSFER SYSTEM

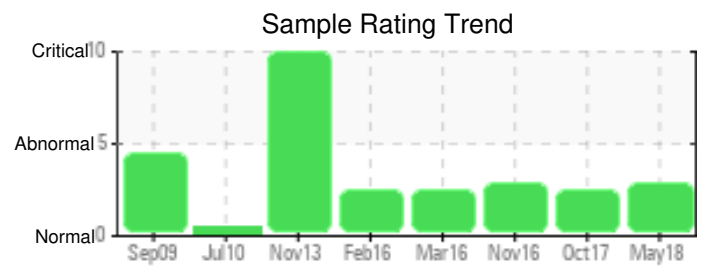
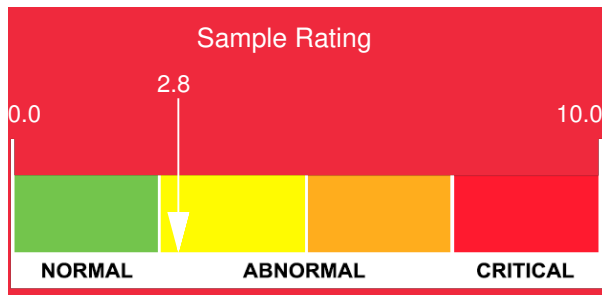
Customer: PTRHTF20089	System Information	Sample Information
PEYTO ENERGY TRUST - WILDHAY WILDHAY 4-21-55-23 , AB T4E 1V4 Canada Attn: STEVE WARREN Tel: (780)712-5616 E-Mail: swarren@peyto.com	System Volume: 15000 ltr Bulk Operating Temp: 342F / 172C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: ALCO OIL AND GAS	Lab No: 02219732 Analyst: Peter Harteveld Sample Date: 05/11/18 Received Date: 05/31/18 Completed: 06/05/18 To discuss this report contact Peter Harteveld at (780)967-4234

Recommendation: The fluid is in reasonable condition but shows signs of thermal degradation. Fluid is suitable for further use. The low boiler vapor content is high (% boil-off <335C.) and the GCD 10% temperature is low. Pentane Insolubles (solids content) is high at 2x the limit (= 0.5%). It is recommended to vent off the low boiler vapors to atmosphere and start filtration of the fluid to lower the solids content. Please re-sample in 6 months.

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is abnormally 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	%
05/11/18	05/31/18	0w	DISCHARGE SIDE PUMP	410 / 210	23.7	33.5	0.294	1.04	686 / 364	802 / 428	887 / 475	4.67
10/21/17	10/30/17	0w	DOWNSTREAM OF PUMP	406 / 208	6.1	33.8	0.05	1.15	694 / 368	811 / 433	900 / 482	4.19
11/15/16	12/23/16	0w	DOWNSTREAM OF PUMP	414 / 212	0.7	34.0	0.370	0.879	688 / 365	808 / 431	898 / 481	4.66
03/14/16	03/15/16	0w	DISCHRG SIDE OF PUMP	354 / 179	8.7	33.8	0.12	0.926	681 / 360	802 / 428	897 / 480	5.34
02/08/16	02/16/16	0w	DISCHARGE OFF PUMP	376 / 191	15.2	34.7	0.21	1.39	686 / 363	805 / 429	897 / 481	4.99
11/06/13	11/21/13	1w	PUMP DISCHARGE	437 / 225	1310.6	36.5	0.01	0.042	726 / 386	818 / 437	917 / 491	0.00
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

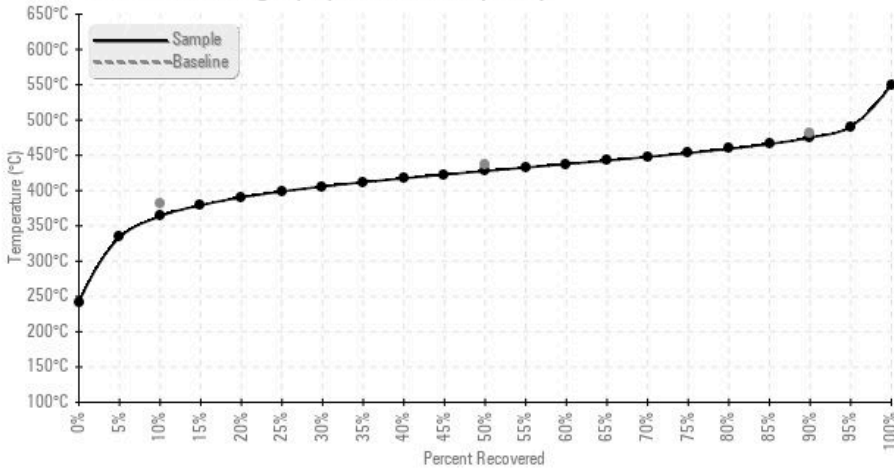




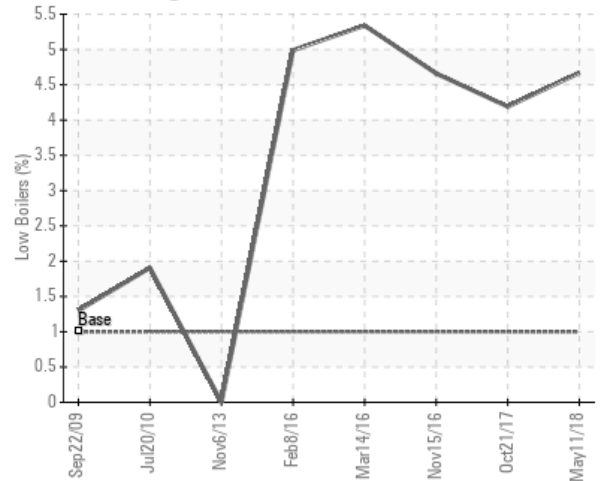
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
05/11/18	85	0	0	0	0	0	1	1	0	0	3	3	1	0	0	0	1	0	1	0	1	0	1	0
10/21/17	86	0	0	0	0	0	0	1	0	0	3	3	0	0	0	0	1	0	0	0	1	0	1	0
11/15/16	84	0	0	0	0	0	1	1	0	0	3	3	0	0	0	0	1	0	0	0	1	0	1	0
03/14/16	90	0	0	0	0	0	1	1	0	0	1	3	0	0	0	0	1	0	0	0	1	0	1	1
02/08/16	91	0	0	0	0	0	1	1	0	0	1	2	0	0	0	0	1	0	0	0	1	0	1	1
11/06/13	50	0	0	0	0	0	0	2	0	0	1	3	0	0	0	0	1	0	1	0	2	0	1	1
Baseline Data			0	0						0			0	0					0				0	

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

Gas Chromatography Distillation (GCD)



% Boiling < 335°C



Historical Comments

10/21/17	The fluid is in a reasonable condition and suitable for further use but shows signs of thermal degradation. Indications of this are: Elevated % boil-off below 335 degrees C, slightly low 10% GCD temperature and increase in Pentane Insoluble (solids) content. It is recommended to vent off low boiler vapors to atmosphere on a regular basis and start filtration to lower the solids content. Please re-sample in 6 months and list the service life of the fluid at that time. Pentane Insolubles levels are severely high.
11/15/16	Flash Point is good. TAN has increased. Percentage boil-off <335 degrees C. has remained about the same. The 10% GCD temperature still shows a slight decrease. These are all indications of thermal degradation. Pentane Insoluble (solids) content is high. Filtration of the fluid is required. Please re-sample after 6 months. Indicate oil service life at the next sample !!! Pentane Insolubles levels are severely high. Acid Number (AN) is abnormally high.
03/14/16	Flash Point of the fluid has decreased further. TAN shows a slight decrease. Percentage boil-off <335 degrees C. has remained about the same. The 10% GCD temperature still shows a slight decrease. These are all indications of thermal degradation. Pentane Insoluble (solids) content is high. Filtration of the fluid needs to be continued for a longer period of time. Please re-sample after 6 months. Indicate oil service life at the next sample !!! Pentane Insolubles levels are severely high. COC Flash Point is marginally low.
02/08/16	Flash Point of the fluid has decreased. TAN shows a slight increase. Percentage boil-off <335 degrees C. has increased. These are indications of thermal degradation. Pentane Insoluble (solids) content is high. It is recommended to filter the fluid. Please re-sample after filtration and indicate oil service life at the next sample. Pentane Insolubles levels are severely high. COC Flash Point is marginally low.
11/06/13	The fluid looks fine except the water content is excessive at 0.1%. Sometimes this much water could cause operational issues with pump cavitation and safety concerns with gurgling in the expansion tank. However, perhaps this sample is not a true representation of what circulates in the system because the sampling valve was not flushed with 3-4L of oil before collecting the sample. Improperly flushed sampling valve will often show a lot of water. Feel free to re-sample but as it is the sample looks concerning because of the water. Water contamination levels are severely high. Water contamination levels are severely high.. ppm Water contamination levels are severely high. (GCD) 90% Distillation Point is abnormally high.

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