

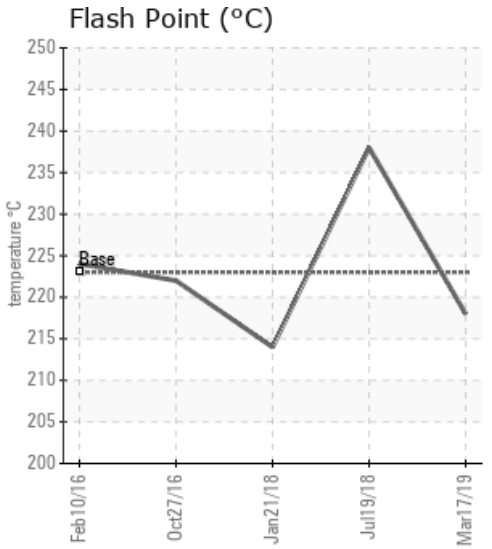
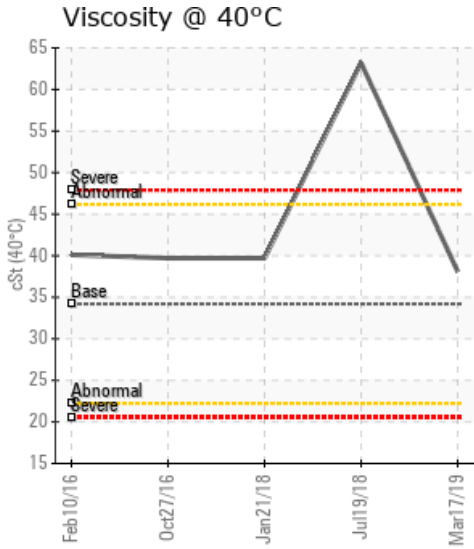
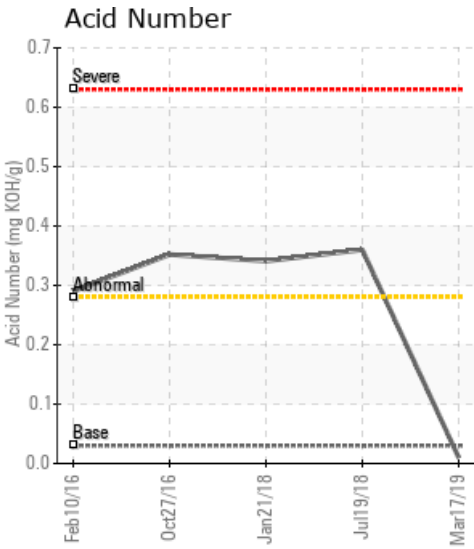
[PEYTO EXPLORTATION / 11-21-55-20W5M] 11-21-55-20W5M H-1210 PLANT 2 HEAT

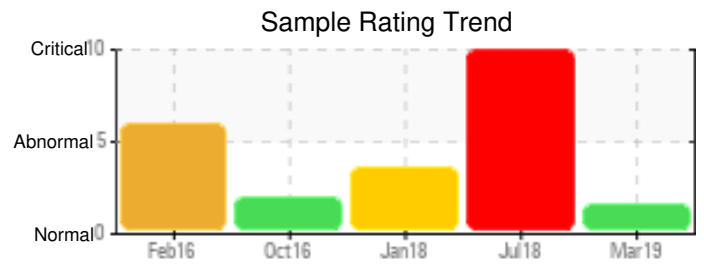
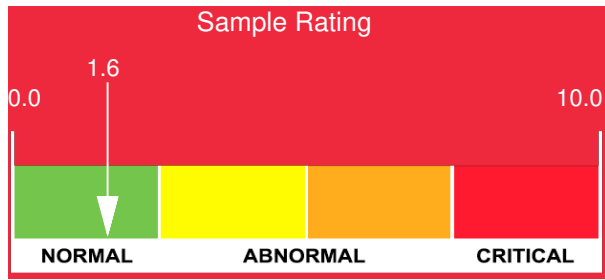
Customer: PTRHTF20124	System Information	Sample Information
PEYTO EXPLORATION 11-17-55-21W5 BOX 7198 EDSON, AB T7E 1V4 Canada Attn: Logan Pillage Tel: (780)712-9444 E-Mail: lpillage@peyto.com	System Volume: 26000 ltr Bulk Operating Temp: 320F / 160C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: ALCO	Lab No: 02273672 Analyst: Peter Harteveld Sample Date: 03/17/19 Received Date: 03/18/19 Completed: 05/27/19

Recommendation: The fluid is in a good condition but the Pentane Insoluble (solids) content is high. It is recommended to start filtration of the fluid and re-sample when filtration is completed.

Comments: Pentane Insolubles 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	%
03/17/19	03/18/19	0y	DISCHARGE OF THE PUM	424 / 218	12.5	38.1	0.01	1.11	702 / 372	798 / 426	896 / 480	1.66
07/19/18	08/08/18	2y	PUMP DISCHARGE	460 / 238	1507.7	63.2	0.36	1.20	717 / 381	799 / 426	890 / 477	0.00
01/21/18	01/24/18	0y		417 / 214	15.6	39.7	0.341	0.955	749 / 398	823 / 440	895 / 480	0.00
10/27/16	11/01/16	0y	PUMP DISCAHRGE	432 / 222	17.3	39.7	0.352	0.536	715 / 379	811 / 433	909 / 487	0.56
02/10/16	02/18/16	0y	DISCHARGE OF PUMP	435 / 224	1189.2	40.1	0.29	1.07	713 / 378	810 / 432	907 / 486	1.02
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

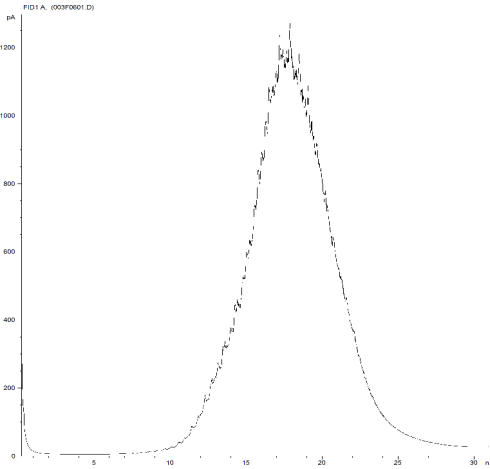




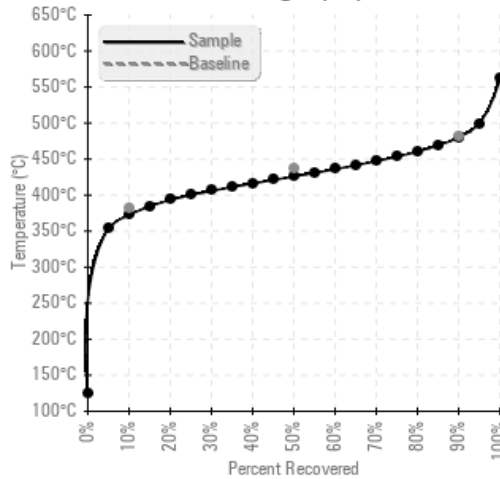
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
03/17/19	31	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
07/19/18	375	0	0	0	0	0	0	0	0	0	4	11	0	0	0	0	4	0	0	0	3	0	1	2
01/21/18	38	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
10/27/16	34	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0
02/10/16	52	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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

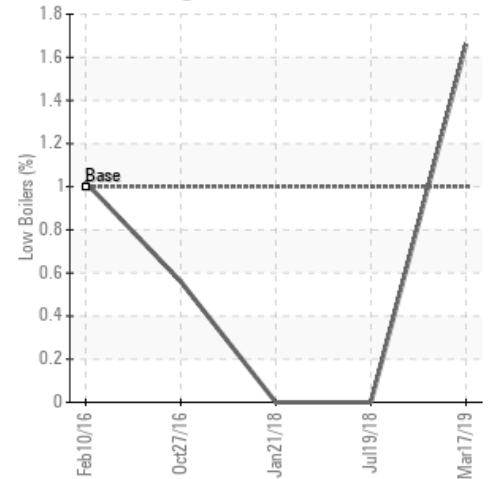
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments

07/19/18	The fluid is in a poor condition. The water content is too high which has resulted in a high Fe content as a result of corrosion. Viscosity is high. The Pentane Insoluble (solids) content is double that of the reportable limit which is 0.5%. If this sample was not taken from a low drain point in the system and thus representative for the fill of the system, it is recommended to clean/flush the system and fill with fresh Petro-Therm.PQ levels are severe. Iron ppm levels are abnormal. Water contamination levels are severely high. Water contamination levels are severely high. Pentane Insolubles levels are severely high. Visc @ 40°C is severely high. Acid Number (AN) is abnormally high.
01/21/18	The fluid is showing signs of degradation but is in a reasonable condition and suitable for further use. It is however recommended to start filtration of the fluid to lower the Pentane Insoluble (solids) content to a more acceptable level. The warning limit for solids is 0.5% and this sample contains almost twice the amount of solids. Pentane Insolubles levels are severely high. Acid Number (AN) is abnormally high. (GCD) 10% Distillation Point is marginally high.
10/27/16	The fluid is in good condition and suitable for further use. TAN and viscosity are elevated which is the result of normal degradation of the fluid. Pentane Insoluble (solids) content is at the limit. Future filtration has to be considered. Pentane Insolubles levels are abnormally high. Acid Number (AN) is abnormally high.
02/10/16	The water content of the fluid is high. TAN and viscosity are elevated. It is recommended to boil-off the water by venting to atmosphere. Pentane Insoluble (solids) content is high. It is recommended to filter the fluid. Please re-sample after boil-off and filtration. Indicate fluid service life at next sample. Water contamination levels are severely high. Water contamination levels are severely high. Pentane Insolubles levels are severely high. Acid Number (AN) is abnormally high.

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