

## [LSD / C-46-C/94-H-4] BLACK SWAN NIG CREEK

**Customer: PTRHTF20046**  
 QUADRA CHEMICALS  
 12925 146TH STREET  
 EDMONTON, AB T5L 2H6 CANADA  
 Attn: Quadra Samples  
 Tel:  
 E-Mail: quadra\_samples@quadra.ca

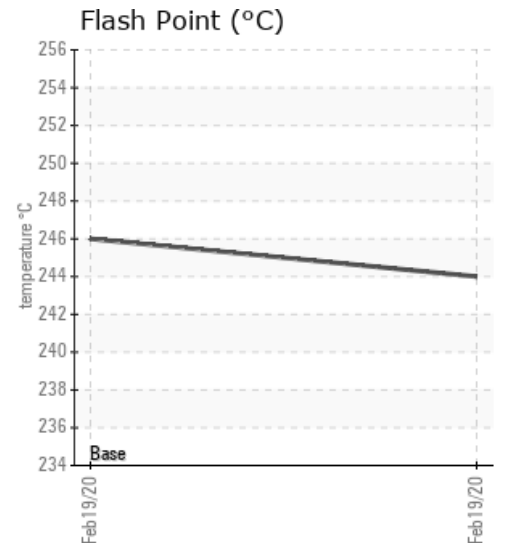
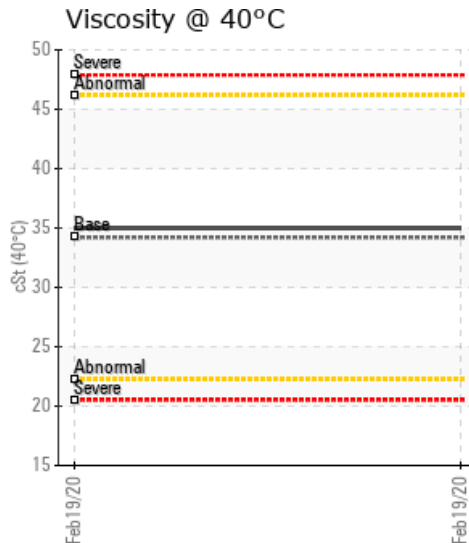
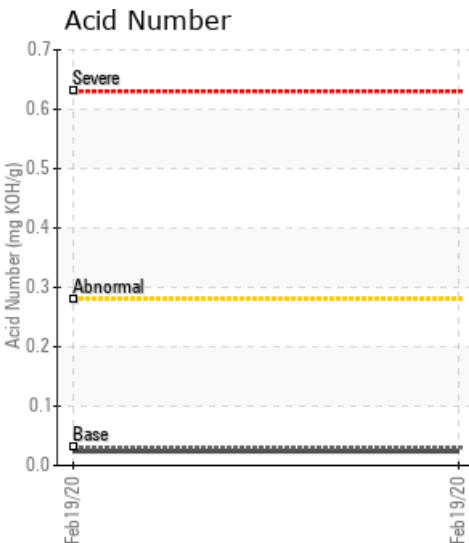
**System Information**  
 System Volume: 180000 ltr  
 Bulk Operating Temp: Not Specified  
 Heating Source:  
 Blanket:  
 Fluid: PETRO CANADA PETRO-THERM  
 Make: HEAT TEACH

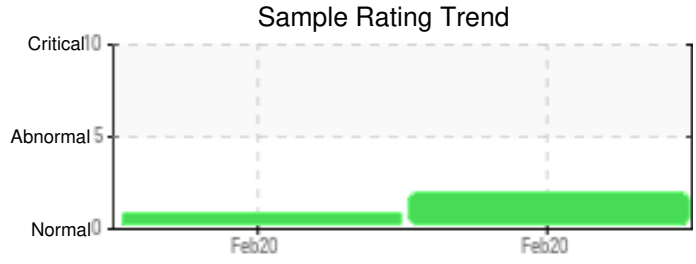
**Sample Information**  
 Lab No: 02341089  
 Analyst: Peter Hartevelde  
 Sample Date: 02/19/20  
 Received Date: 03/03/20  
 Completed: 03/17/20  
 Peter Hartevelde  
 peter.hartevelde@petrocanadalsp.com

Recommendation: The fluid is in a good condition and suitable for further use. 90% GCD temperature is high and so is the distillation curve as a whole. Flash Point is high as well. This is no problem but is either an indication of the presence of a heavier fluid (which is not supported by viscosity) or the onset of fluid oxidation (which is not supported by AN). More trending data is required to make a better evaluation of fluid condition. Please re-sample in 3 months and in the mean time check proper operation of the blanket gas system.

Comments: (GCD) 90% Distillation Point is severely high.

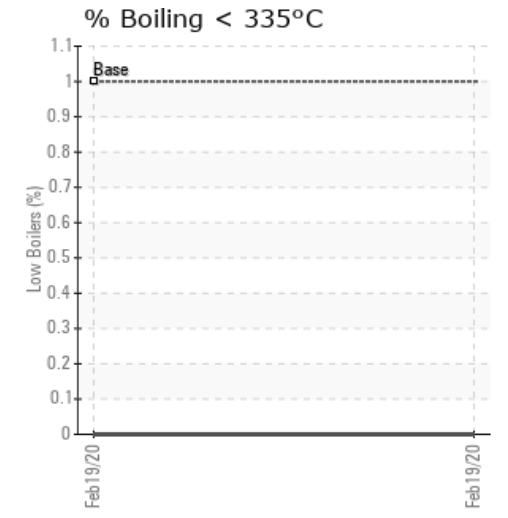
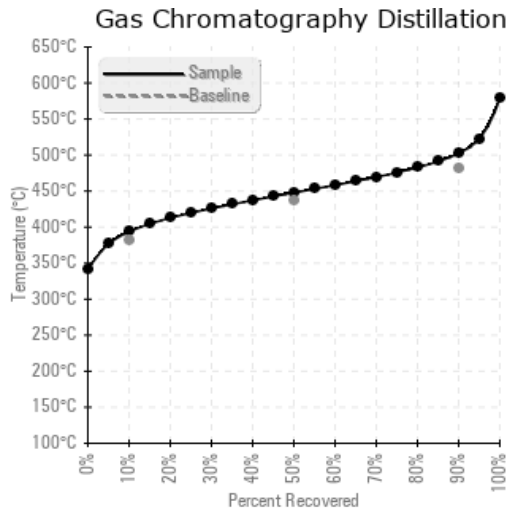
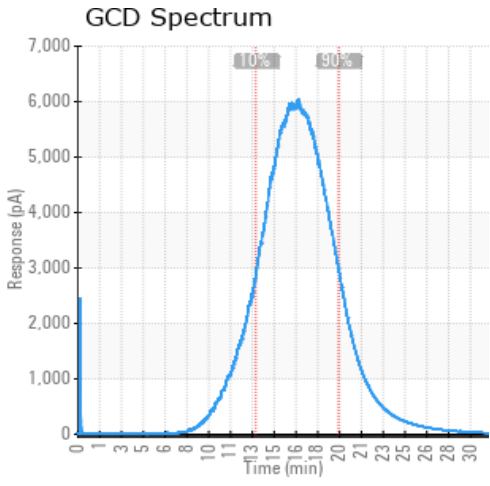
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
02/19/20	03/03/20	5m	PHM	471 / 244	0.003	35.0	0.024	0.123	740 / 394	838 / 448	936 / 502	0.00
02/19/20	03/03/20	5m	UHM	475 / 246	0.001	35.0	0.024	0.102	739 / 393	837 / 447	936 / 502	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
02/19/20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/19/20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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%]



Historical Comments	
02/19/20	The fluid is in a good condition and suitable for further use. 90% GCD temperature is high and so is the distillation curve as a whole. Flash Point is high as well. This is no problem but is either an indication of the presence of a heavier fluid (which is not supported by viscosity) or the onset of fluid oxidation (which is not supported by AN). More trending data is required to make a better evaluation of fluid condition. Please re-sample in 3 months and in the mean time check proper operation of the blanket gas system. (GCD) 90% Distillation Point is abnormally high.

Petro-Canada makes no representation or warranty of any kind, either express or implied, as to the accuracy or completeness of the analysis and assumes no responsibility and shall have no liability whatsoever with respect to such analysis, or a party's use of it. Petro-Canada is a division of HollyFrontier Corporation.