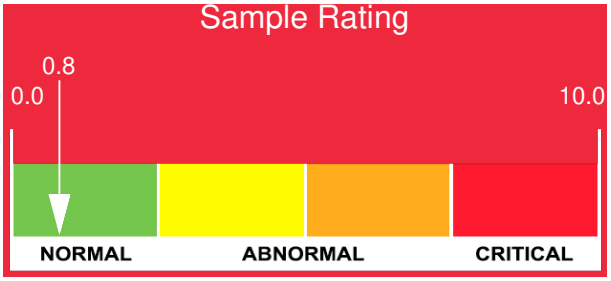
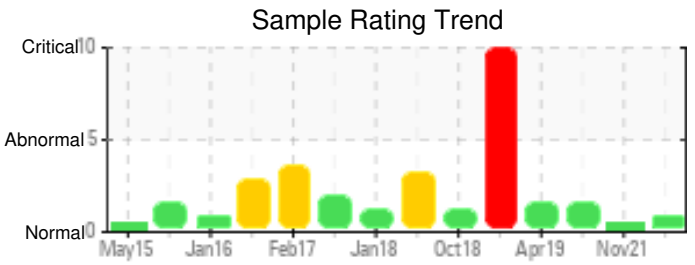




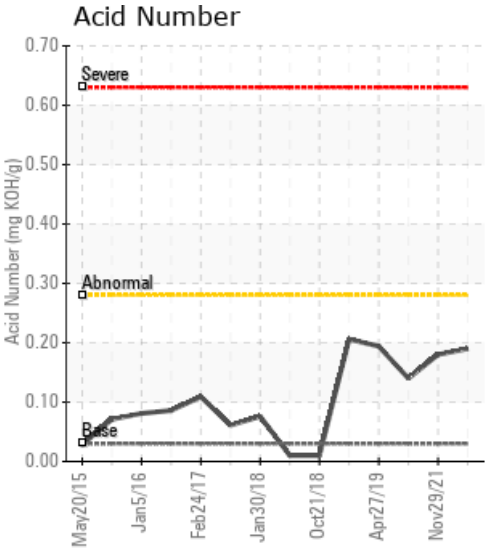
[LSD-3-36-65-6W6 Bilbo] H801

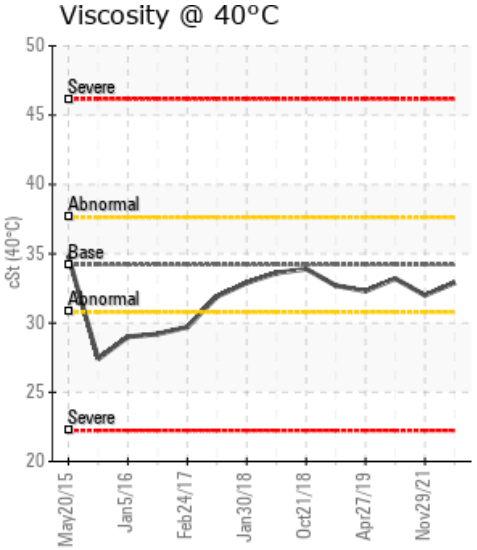
Customer: PTRHTF20245	System Information	Sample Information
NUVISTA ENERGY LTD RR 93 WEMBLY, AB T8W 0H6 Canada Attn: Eldon Weaver Tel: (780)831-5603 E-Mail: eweaver@nvaenergy.com	System Volume: 40000 gal Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: ALCOE	Lab No: 02544409 Analyst: Clinton Buhler Sample Date: 11/29/22 Received Date: 03/10/23 Completed: 03/13/23 Clinton Buhler Clinton.Buhler@HFSinclair.com

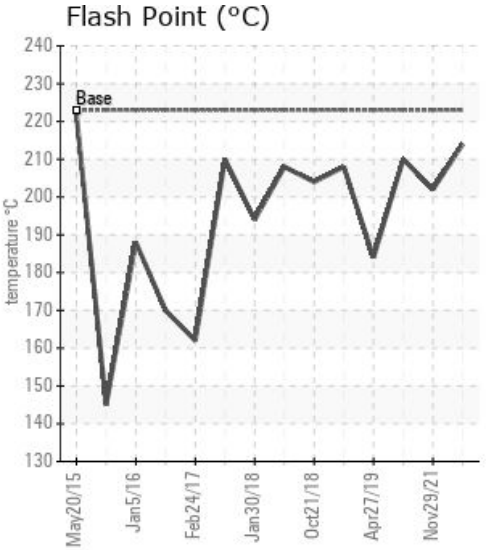
Recommendation: Sample results indicate the fluid is in suitable condition for continued service. Low boiling vapor content remains just at 4.23% which can be associated with thermal degradation. Please vent expansion tank to help release the low boilers. Please re-sample in 12 months

Comments:

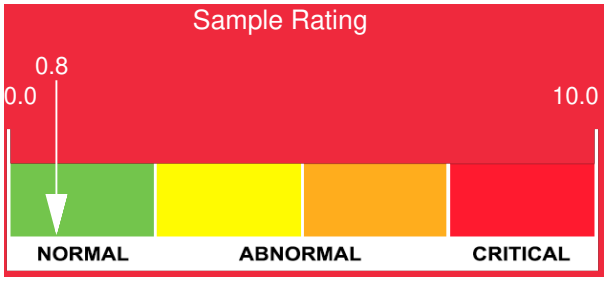
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/29/22	03/10/23	8.0y		417 / 214	84.3	32.9	0.19	0.299	703 / 373	811 / 433	920 / 493	4.23
11/29/21	01/06/22	0.0y	at pump	396 / 202	19.6	32.0	0.18	0.367	703 / 373	810 / 432	917 / 492	4.38
10/10/20	01/14/21	7.0y	PUMP OUTLET	410 / 210	5.8	33.2	0.14	0.503	713 / 378	812 / 433	919 / 493	2.81
04/27/19	05/09/19	5.0y		363 / 184	13.5	32.3	0.194	0.077	723 / 384	820 / 438	928 / 498	1.63
01/22/19	02/04/19	0.0y	BOTTOM OF VESSEL	406 / 208	5425.7	32.7	0.206	0.465	676 / 358	786 / 419	899 / 481	5.33
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

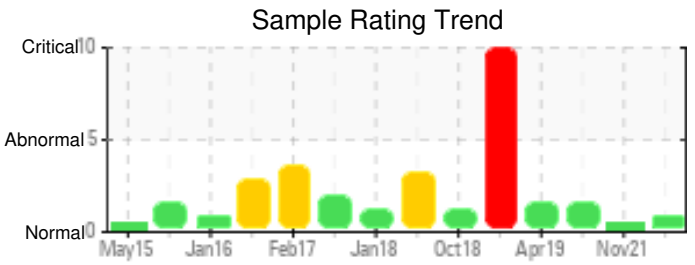






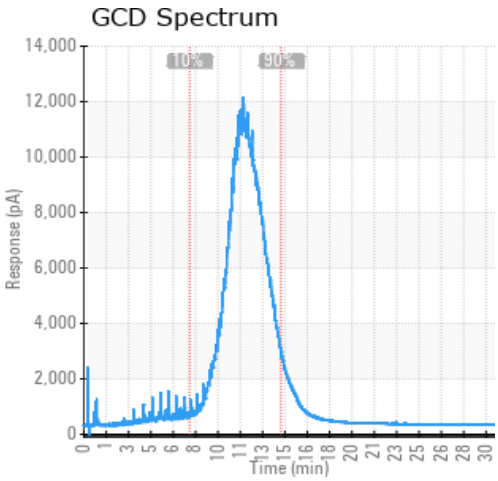
PETRO-CANADA LUBRICANTS

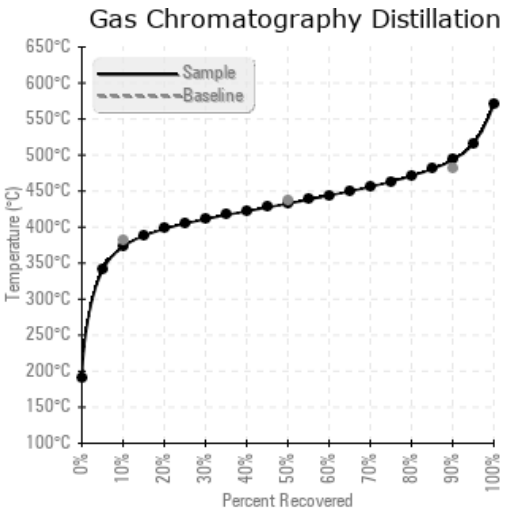


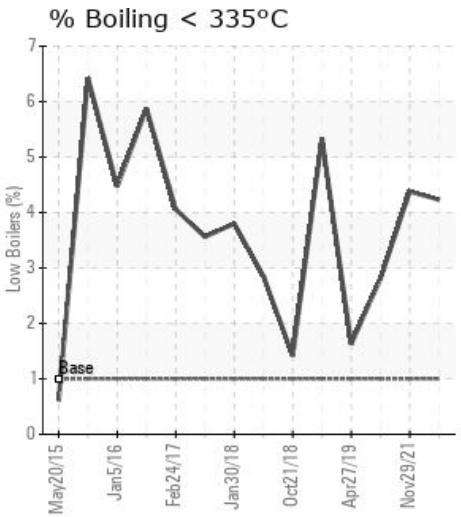


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
11/29/22	9	0	0	0	0	0	0	0	0	0	2	6	12	0	0	0	0	0	1	4	11	0	0	0
11/29/21	10	0	0	0	0	0	0	0	0	0	0	6	16	0	0	0	0	0	1	4	6	0	0	0
10/10/20	11	0	0	0	0	0	0	0	0	0	0	7	18	0	0	0	0	0	0	4	6	0	0	0
04/27/19	11	0	0	0	0	0	0	0	0	0	0	7	20	0	0	0	0	0	0	1	5	0	0	0
01/22/19	198	0	0	0	0	0	0	0	0	0	3	68	144	0	0	0	3	0	0	5	34	0	1	1
Baseline Data			0	0						0			0	0					0				0	

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







Historical Comments

11/29/21	Sample results indicate the fluid is in suitable condition for continued service. Low boiling vapor content has increased slightly to 4.38% which can be associated with mild thermal degradation. Please vent expansion tank to help release the low boilers. Please re-sample in 12 months
10/10/20	Fluid analysis results would appear to indicate that the heating fluid is in suitable condition for continued service. Remnants of sodium, potassium and calcium remain from previous contamination. Solids content up from last sample. Please ensure that sample valve and related tubing or piping is thoroughly purged prior to obtaining sample.Please re-sample in 6 months to monitor solids content. (GCD) 90% Distillation Point is abnormally high. COC Flash Point is marginally low.
04/27/19	Sample results are much improved compared to the previous analysis and indicate the fluid is suitable for continued service. This may indicate that the previous sample was drawn from a low spot in the system with little turbulence and the sampling piping and valves may not have been purged thoroughly.Continue periodic venting of expansion tank as part of good maintenance practices and ensure blanket gas in the expansion tank is operational except for while venting.Please re-sample in 6 months (GCD) 90% Distillation Point is abnormally high. COC Flash Point is marginally low.
01/22/19	Sample results are of concern. Iron has increased to 198ppm from 10. This, along with significant increase in Acid Number may indicate ongoing corrosion.Sodium, Potassium and Calcium have all increased along with an alarming increase in water- water at 5,425 ppm. This is a risk for fluid boil-over.Water needs to be removed from system. Venting, if safe to do so will help remove excess water. This water content may have also influenced the increase in % boil-off, now at 5.33. The excess water contamination likely has contributed to the increased AN and Iron levels.Please safely remove water from system and re-sample once venting is completed. Please ensure that sample port is near pump discharge and that a very thorough purge of the valve and related piping occurs before collecting the sample in the sample container.Please include time on oil with next sample