

PROBLEM SUMMARY

Emulsified Water

Free Water

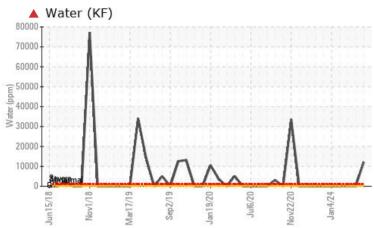
Area Aft Machinery Space [450296544]

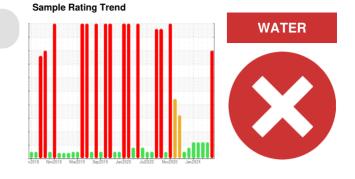
Thruster Aft Port - Seal Oil System (S/N Sample Tag CL-06002-S3)

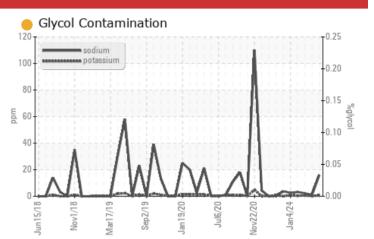
Sealing System

PETRO CANADA ENERGOL GR-XP ISO 150 (65 LTR)

COMPONENT CONDITION SUMMARY







RECOMMENDATION

We advise that you check for the source of water entry. Check seals and/or filters for points of contaminant entry. We recommend that you change the oil. We recommend an early resample to monitor this condition. NOTE: Test values may be askew due high concentration of free water present in sample.

PROBLEMATIC TEST RESULTS Sample Status SEVERE ATTENTION ABNORMAL Water ASTM D6304* **1.209** 0.003 % ppm Water ASTM D6304* 12096 33 ppm HEAVY NONE Precipitate scalar Visual* NONE NONE Appearance scalar Visual* NORML HAZY NORML NORML

.5%

5%

NEG

NEG

.2%

NEG

Visual

Visual*

scalar

scalar

Customer Id: TERHAM Sample No.: PC0081643 Lab Number: 02631778 Test Package: MAR 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Kevin Marson +1 (289)291-4644 x4644 <u>Kevin.Marson@wearcheck.com</u>

To change component or sample information: Gloria Gonzalez +1 (289)291-4643 x4643 <u>gloria.gonzalez@wearcheck.com</u>

RECOMMENDED ACTIONS								
Action	Status	Date	Done By	Description				
Change Fluid			?	We recommend that you change the oil.				
Resample			?	We recommend an early resample to monitor this condition.				
Alert			?	NOTE: Test values may be askew due high concentration of free water present in sample.				
Check Water Access			?	We advise that you check for the source of water entry.				
Check Seals			?	Check seals and/or filters for points of contaminant entry.				

HISTORICAL DIAGNOSIS



30 Mar 2024 Diag: Kevin Marson

We recommend you service the filters on this component. Resample at the next service interval to monitor.All component wear rates are normal. There is a light amount of silt (particulates < 14 microns in size) present in the fluid. The AN level is acceptable for this fluid. The condition of the fluid is suitable for further service.



26 Feb 2024 Diag: Kevin Marson

We recommend you service the filters on this component. We recommend an early resample to monitor this condition.All component wear rates are normal. There is a moderate amount of silt (particulates < 14 microns in size) present in the fluid. The water content is negligible. The AN level is acceptable for this fluid. The fluid is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.





29 Jan 2024 Diag: Kevin Marson

We recommend you service the filters on this component. We recommend an early resample to monitor this condition.All component wear rates are normal. There is a moderate amount of silt (particulates < 14 microns in size) present in the fluid. The AN level is acceptable for this fluid. The fluid is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.





OIL ANALYSIS REPORT

Area Aft Machinery Space [450296544] Thruster Aft Port - Seal Oil System (S/N Sample Tag CL-06002-S3) Sealing System

Fluid PETRO CANADA ENERGOL GR-XP ISO 150 (65 LTR)

DIAGNOSIS

Recommendation

We advise that you check for the source of water entry. Check seals and/or filters for points of contaminant entry. We recommend that you change the oil. We recommend an early resample to monitor this condition. NOTE: Test values may be askew due high concentration of free water present in sample.

Wear

All component wear rates are normal.

Contamination

There is a high concentration of water present in the fluid. Excessive free water present. Abnormal water content and sodium(Na) level indicate possible sea water contamination.

Fluid Condition

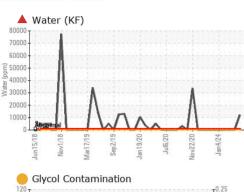
The white residue present in the sample is fluid additive precipitate. The AN level is acceptable for this fluid. The fluid is no longer serviceable due to the presence of contaminants.

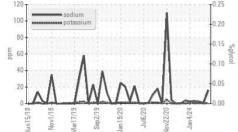


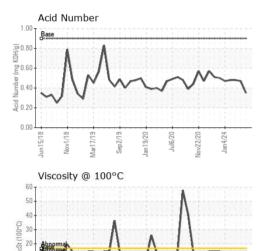
Sample NumberSample DateIMachine AgehrsOil AgehrsOil ChangedISample StatusIWEAR METALSPQIronppChromiumppNickelppNickelppAluminumppCopperppTinppAntimonyppBerylliumppBoronppBariumppMolybdenumppMagnesiumppMagnesiumppCalciumpp <td< th=""><th>S Client Info Client Info Client Info ASTM D8184* ASTM D5185(m) ASTM D5185(m)</th><th>>3 >8 >3 >3</th><th>PC0081643 31 Mar 2024 0 N/A SEVERE 0 Current 0 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3</th><th>PC 30 Mar 2024 0 N/A ATTENTION ATTENTION 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</th><th>PC 26 Feb 2024 0 N/A ABNORMAL ABNORMAL 0 0 3 0 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3</th></td<>	S Client Info Client Info Client Info ASTM D8184* ASTM D5185(m) ASTM D5185(m)	>3 >8 >3 >3	PC0081643 31 Mar 2024 0 N/A SEVERE 0 Current 0 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	PC 30 Mar 2024 0 N/A ATTENTION ATTENTION 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PC 26 Feb 2024 0 N/A ABNORMAL ABNORMAL 0 0 3 0 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
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Oil ChangedSample StatusIWEAR METALSPQppIronppChromiumppChromiumppSilverppAluminumppLeadppCopperppTinppAntimonyppBerylliumppCadmiumppBoronppBariumppManganeseppMagnesiumppCalciumpp	Client Info	>100 >3 >8 >3 >3 >3	N/A SEVERE 0 8 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	N/A ATTENTION 0 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	N/A ABNORMAL 0 0 7 0 0 3 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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WEAR METALS PQ Iron pp Chromium pp Nickel pp Titanium pp Silver pp Aluminum pp Lead pp Copper pp Antimony pp Vanadium pp Beryllium pp Cadmium pp Boron pp Molybdenum pp Manganese pp Calcium pp	ASTM D8184* ASTM D5185(m) ASTM D5185(m)	>100 >3 >8 >3 >3 >3	Current 0 8 <1 <1 0 0 0 0 0 <1 0 0 0 0 0 0 0 0 0 0 0 0 0	history1 0 6 0 11	history2 0 7 0 <1
PQIronppChromiumppChromiumppNickelppTitaniumppSilverppAluminumppLeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppBoronppBariumppMolybdenumppMagnesiumppCalciumpp	ASTM D8184* ASTM D5185(m) ASTM D5185(m)	>100 >3 >8 >3 >3 >3	0 8 	0 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 7 0 <1 0 0 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
IronppChromiumppChromiumppNickelppTitaniumppSilverppAluminumppLeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppBoronppBariumppMolybdenumppMaganeseppCalciumpp	ASTM D5185(m)	>3 >8 >3 >3	8 <1 <1 0 0 0 0 <1 0 0 0 0 0 0 0 0 0 0 0	6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7 0 <10 0 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
ChromiumppNickelppNickelppTitaniumppSilverppAluminumppLeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppBoronppBariumppMolybdenumppMaganeseppCalciumpp	ASTM D5185(m) MM ASTM D5185(m)	>3 >8 >3 >3	<1 <1 0 0 0 0 0 <1 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1	0 <1 0 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 1 3
NickelppNickelppTitaniumppSilverppAluminumppLeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppBoronppBariumppMolybdenumppMaganeseppCalciumpp	ASTM D5185(m)	>8 >3 >3	<1 0 0 0 0 <1 0 0 0 0 0 0 0 0 0 0 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1	<1 0 0 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
NickelppTitaniumppSilverppAluminumppLeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppBoronppBariumppMolybdenumppMaganeseppCalciumpp	ASTM D5185(m) MM ASTM D5185(m)	>3 >3	0 0 0 <1 0 0 0 0 0 0 0 0 0 0 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1	0 0 <1 0 0 0 0 0 0 0 0 0 0 13
TitaniumppSilverppAluminumppLeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppBoronppBariumppMalganeseppMagnesiumppCalciumpp	ASTM D5185(m)	>3	0 0 2 1 0 0 0 0 0 0 0 0 0 0 0 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1	0 <1 0 0 0 0 0 0 0 0 0 0 0 0 13
SilverppAluminumppLeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppBoronppBariumppMalganeseppMagnesiumppCalciumpp	ASTM D5185(m)	>3	0 0 <1 0 0 0 0 0 0 0 0 0 0 1	0 0 0 0 0 0 0 0 0 0 0 0 0 11	<1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 3 1 3
AluminumppLeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppBoronppBariumppMolybdenumppMaganeseppCalciumpp	ASTM D5185(m)	>3	0 <1 0 0 0 0 0 0 0 2 0 1	0 0 0 0 0 0 0 0 0 history1 11	0 0 0 0 0 0 0 0 0 13
LeadppCopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppADDITIVESBoronppBariumppMolybdenumppManganeseppMagnesiumppCalciumpp	ASTM D5185(m) M ASTM D5185(m)	>3	<1 0 0 0 0 0 0 0 0 1	0 0 0 0 0 0 0 history1 11	0 0 0 0 0 0 0 history2 13
CopperppTinppAntimonyppVanadiumppBerylliumppCadmiumppADDITIVESBoronppBariumppMolybdenumppMaganeseppCalciumpp	ASTM D5185(m)		0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 history1 11	0 0 0 0 0 0 0 history2 13
Tin pp Antimony pp Vanadium pp Beryllium pp Cadmium pp ADDITIVES Boron pp Barium pp Molybdenum pp Manganese pp Magnesium pp Calcium pp	ASTM D5185(m)		0 0 0 0 current 1	0 0 0 0 history1 11	0 0 0 0 history2 13
Antimony pp Vanadium pp Beryllium pp Cadmium pp ADDITIVES Boron pp Barium pp Molybdenum pp Manganese pp Magnesium pp Calcium pp	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) Mathematical Astronomy ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)		0 0 0 current 1	0 0 0 history1 11	0 0 0 0 history2 13
Vanadium pp Beryllium pp Cadmium pp ADDITIVES Boron pp Barium pp Molybdenum pp Manganese pp Magnesium pp Calcium pp	ASTM D5185(m) Im ASTM D5185(m)		0 0 current 1	0 0 history1 11	0 0 history2 13
Beryllium pp Cadmium pp ADDITIVES Boron pp Barium pp Molybdenum pp Manganese pp Magnesium pp Calcium pp	ASTM D5185(m) Im ASTM D5185(m) method Mathematical ASTM D5185(m) Im ASTM D5185(m) Im ASTM D5185(m)		0 current 1	0 history1 11	0 0 history2 13
CadmiumppADDITIVESBoronppBariumppMolybdenumppManganeseppMagnesiumppCalciumpp	m ASTM D5185(m) method m ASTM D5185(m) m ASTM D5185(m)		current 1	history1 11	history2 13
BoronppBariumppMolybdenumppManganeseppMagnesiumppCalciumpp	ASTM D5185(m) ASTM D5185(m)	limit/base	1	11	13
BariumppMolybdenumppManganeseppMagnesiumppCalciumpp	ASTM D5185(m)				
Molybdenum pp Manganese pp Magnesium pp Calcium pp			0	0	
ManganeseppMagnesiumppCalciumpp	ASTM D5185(m)			0	0
Magnesium pp Calcium pp			0	0	0
Calcium pp	ASTM D5185(m)		0	0	0
	ASTM D5185(m)		3	<1	0
	ASTM D5185(m)		2	<1	4
Phosphorus pp	ASTM D5185(m)		128	166	172
Zinc pp	ASTM D5185(m)		6	5	6
Sulfur pp	ASTM D5185(m)		7787	7969	8580
Lithium pp	ASTM D5185(m)		<1	<1	<1
CONTAMINANTS	method	limit/base	current	history1	history2
Silicon pp	ASTM D5185(m)	>25	2	1	3
Sodium pp	ASTM D5185(m)		🦲 16	1	2
Potassium pp	ASTM D5185(m)	>20	<1	<1	<1
Water %	ASTM D6304*		1.209		0.003
ppm Water pp	ASTM D6304*		12096		33
FLUID CLEANLINI	ESS method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647	>5000		9280	1 7970
Particles >6µm	ASTM D7647	>1300		1818	A 3168
Particles >14µm	ASTM D7647	>160		58	85
Particles >21µm	ASTM D7647	>40		14	16
Particles >38µm	ASTM D7647	>10		2	4
Particles >71µm					0
	ASTM D7647	>3		1	2

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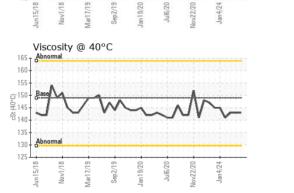
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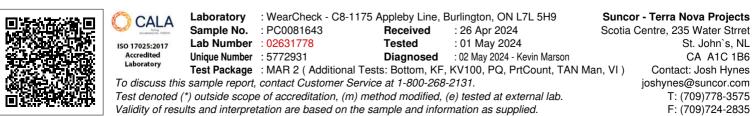


OIL ANALYSIS REPORT

VISUAL White Metal sc Yellow Metal sc Precipitate sc	g KOH/g calar calar	ASTM D974* method Visual*	0.9 limit/base	0.35 current	0.47 history1	0.48 history2
White MetalsoYellow MetalsoPrecipitateso		Visual*		current	history1	history2
Yellow Metal sc Precipitate sc			NONE			
Precipitate so	calar			NONE	NONE	NONE
		Visual*	NONE	NONE	NONE	NONE
Silt	calar	Visual*	NONE	🔺 HEAVY	NONE	NONE
0	calar	Visual*	NONE	NONE	NONE	NONE
Debris so	calar	Visual*	NONE	NONE	NONE	NONE
Sand/Dirt so	calar	Visual*	NONE	NONE	NONE	NONE
Appearance so	calar	Visual*	NORML	🔺 HAZY	NORML	NORML
Odor so	calar	Visual*	NORML	NORML	NORML	NORML
Emulsified Water so	calar	Visual*		. 5%	NEG	.2%
Free Water so	calar	Visual*		<mark>/</mark> 5%	NEG	NEG
FLUID PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 40°C cs	St	ASTM D7279(m)	149	143	143	143
Visc @ 100°C	St	ASTM D7279(m)	14.5	13.2	14.1	14.2
Viscosity Index (VI) So	cale	ASTM D2270*		83	95	96
SAMPLE IMAGES	S	method	limit/base	current	history1	history2
Color						Act Cont

Bottom





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Contact/Location: Josh Hynes - TERHAM

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