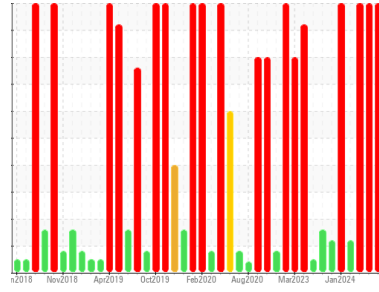
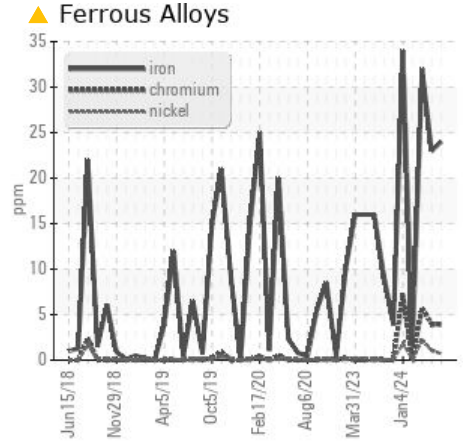
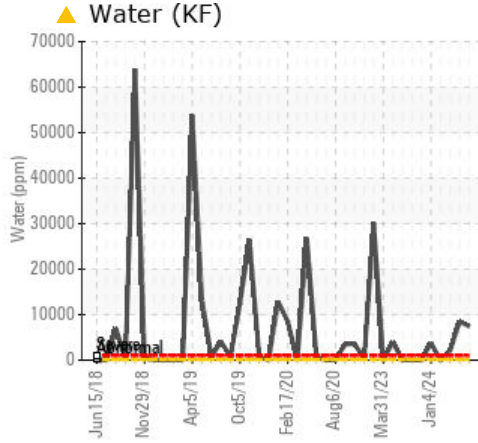
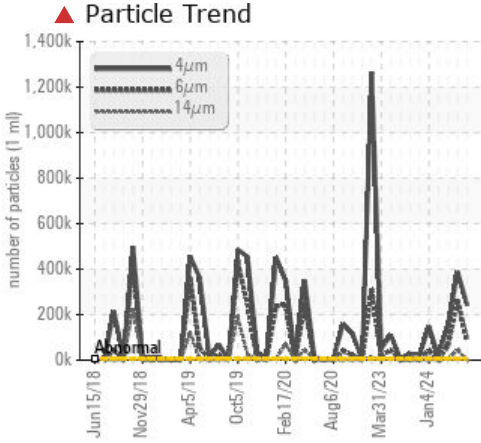




Area
Aft Machinery Space
Machine Id
Thruster Aft Starboard - Seal Oil System (S/N Sample Tag CL-06003-S3)
Component
Sealing System
Fluid
PETRO CANADA ENERGOL GR-XP ISO 150 (65 LTR)



COMPONENT CONDITION SUMMARY



RECOMMENDATION

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We advise that you use off-line filtration with water adsorbent filters to attempt to remove the water from this fluid. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. We recommend that you change the oil. Resample in 30-45 days to monitor this situation.

PROBLEMATIC TEST RESULTS

Sample Status				SEVERE	SEVERE	SEVERE
Chromium	ppm	ASTM D5185(m)	>3	▲ 4	▲ 4	▲ 6
Water	%	ASTM D6304*		▲ 0.746	▲ 0.846	▲ 0.207
ppm Water	ppm	ASTM D6304*		▲ 7461	▲ 8469	▲ 2075
Particles >4µm		ASTM D7647	>5000	▲ 241773	▲ 387454	▲ 154564
Particles >6µm		ASTM D7647	>1300	▲ 86675	▲ 262293	▲ 63227
Particles >14µm		ASTM D7647	>160	▲ 3172	▲ 42037	▲ 4563
Particles >21µm		ASTM D7647	>40	▲ 350	▲ 10195	▲ 466
Oil Cleanliness		ISO 4406 (c)	>19/17/14	▲ 25/24/19	▲ 26/25/23	▲ 24/23/19
Precipitate	scalar	Visual*	NONE	▲ MODER	▲ MODER	NONE
Appearance	scalar	Visual*	NORML	▲ WGOIL	▲ HAZY	▲ LAYRD
Emulsified Water	scalar	Visual*		▲ .5%	▲ .5%	▲ 1%
Free Water	scalar	Visual*		▲ >10%	▲ 5%	▲ >10%

Customer Id: TERHAM
Sample No.: PC
Lab Number: 02634782
Test Package: MAR 2



To manage this report scan the QR code

To discuss the diagnosis or test data:
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Kevin.Marson@wearcheck.com


To change component or sample information:
Gloria Gonzalez +1 (289)291-4643 x4643
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RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Change Fluid	---	---	?	We recommend that you change the oil.
Change Filter	---	---	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.
Resample	---	---	?	Resample in 30-45 days to monitor this situation.
Check Breathers	---	---	?	The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather.
Check Dirt Access	---	---	?	We advise that you check all areas where contaminants can enter the system.
Check Seals	---	---	?	Check seals and/or filters for points of contaminant entry.
Filter Fluid	---	---	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.


HISTORICAL DIAGNOSIS

ISO




30 Mar 2024 Diag: Kevin Marson
 Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We advise that you use off-line filtration with water adsorbent filters to attempt to remove the water from this fluid. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. We recommend that you change the oil. Resample in 30-45 days to monitor this situation. Chromium ppm levels are abnormal. There is a high amount of particulates (2 to 100 microns in size) present in the fluid. There is a moderate concentration of water present in the fluid. Free water present. 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 as a result of the abnormal and/or severe wear.

view report




ISO




26 Feb 2024 Diag: Kevin Marson
 Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We advise that you use off-line filtration with water adsorbent filters to attempt to remove the water from this fluid. We advise that you follow the water drain-off procedure for this component. Resample in 30-45 days to monitor this situation. Chromium ppm levels are abnormal. There is a high amount of particulates (2 to 100 microns in size) present in the fluid. There is a moderate concentration of water present in the fluid. Excessive free water present. The AN level is acceptable for this fluid. The fluid is no longer serviceable as a result of the abnormal and/or severe wear.

view report




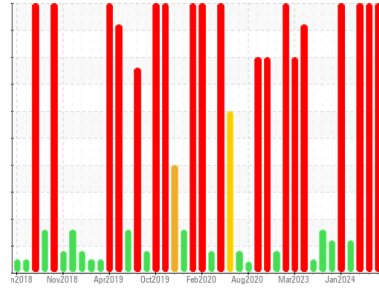
ISO



05 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.

view report





Area

Aft Machinery Space

Machine Id

Thruster Aft Starboard - Seal Oil System (S/N Sample Tag CL-06003-S3)

Component

Sealing System

Fluid

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

DIAGNOSIS

▲ Recommendation

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We advise that you use off-line filtration with water adsorbent filters to attempt to remove the water from this fluid. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. We recommend that you change the oil. Resample in 30-45 days to monitor this situation.

▲ Wear

Chromium ppm levels are abnormal.

▲ Contamination

There is a high amount of particulates (2 to 100 microns in size) present in the fluid. There is a moderate concentration of water present in the fluid. Free water present.

▲ 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 as a result of the abnormal and/or severe wear.

SAMPLE INFORMATION

method	limit/base	current	history1	history2
Sample Number	Client Info	PC	PC	PC0082719
Sample Date	Client Info	21 Apr 2024	30 Mar 2024	26 Feb 2024
Machine Age	hrs	0	0	0
Oil Age	hrs	0	0	0
Oil Changed	Client Info	N/A	N/A	N/A
Sample Status		SEVERE	SEVERE	SEVERE

WEAR METALS

method	limit/base	current	history1	history2	
PQ	ASTM D8184*	0	0	0	
Iron	ppm	ASTM D5185(m) >100	24	23	32
Chromium	ppm	ASTM D5185(m) >3	▲ 4	▲ 4	▲ 6
Nickel	ppm	ASTM D5185(m) >8	<1	1	2
Titanium	ppm	ASTM D5185(m)	0	0	0
Silver	ppm	ASTM D5185(m)	0	0	0
Aluminum	ppm	ASTM D5185(m) >3	0	0	<1
Lead	ppm	ASTM D5185(m)	0	0	0
Copper	ppm	ASTM D5185(m) >3	1	<1	1
Tin	ppm	ASTM D5185(m)	0	0	0
Antimony	ppm	ASTM D5185(m)	0	0	0
Vanadium	ppm	ASTM D5185(m)	0	0	0
Beryllium	ppm	ASTM D5185(m)	0	0	0
Cadmium	ppm	ASTM D5185(m)	0	0	0

ADDITIVES

method	limit/base	current	history1	history2	
Boron	ppm	ASTM D5185(m)	3	1	<1
Barium	ppm	ASTM D5185(m)	0	0	0
Molybdenum	ppm	ASTM D5185(m)	0	0	0
Manganese	ppm	ASTM D5185(m)	0	0	0
Magnesium	ppm	ASTM D5185(m)	5	3	3
Calcium	ppm	ASTM D5185(m)	5	3	5
Phosphorus	ppm	ASTM D5185(m)	120	128	134
Zinc	ppm	ASTM D5185(m)	9	6	8
Sulfur	ppm	ASTM D5185(m)	8115	8508	9073
Lithium	ppm	ASTM D5185(m)	<1	<1	<1

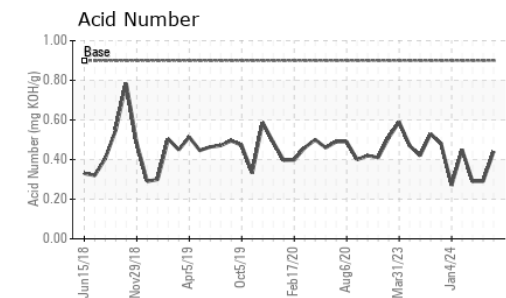
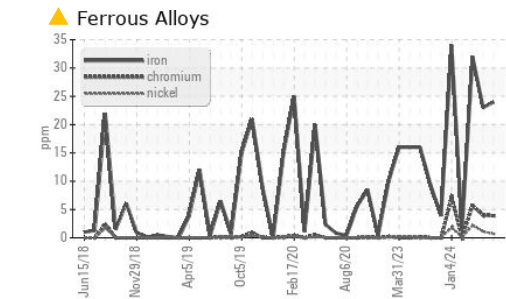
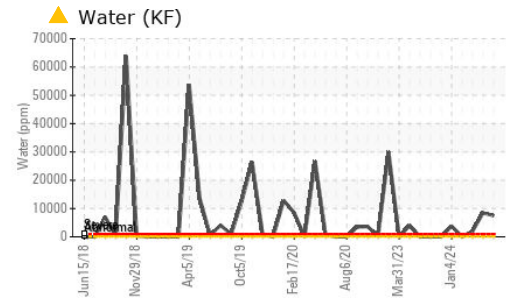
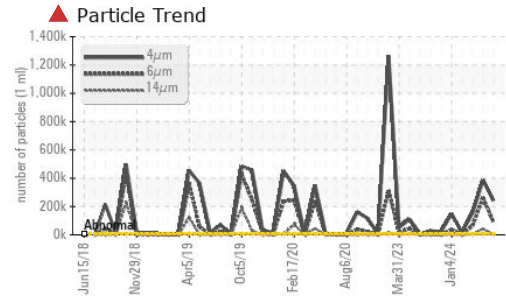
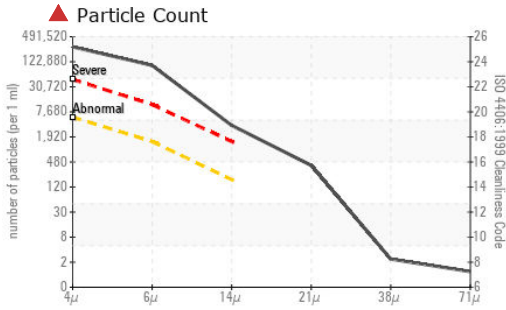
CONTAMINANTS

method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185(m) >25	5	2	4
Sodium	ppm	ASTM D5185(m)	31	13	17
Potassium	ppm	ASTM D5185(m) >20	2	<1	1
Water	%	ASTM D6304*	▲ 0.746	▲ 0.846	▲ 0.207
ppm Water	ppm	ASTM D6304*	▲ 7461	▲ 8469	▲ 2075

FLUID CLEANLINESS

method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647 >5000	▲ 241773	▲ 387454	▲ 154564
Particles >6µm	ASTM D7647 >1300	▲ 86675	▲ 262293	▲ 63227
Particles >14µm	ASTM D7647 >160	▲ 3172	▲ 42037	▲ 4563
Particles >21µm	ASTM D7647 >40	▲ 350	▲ 10195	▲ 466
Particles >38µm	ASTM D7647 >10	2	▲ 109	2
Particles >71µm	ASTM D7647 >3	1	0	1
Oil Cleanliness	ISO 4406 (c) >19/17/14	▲ 25/24/19	▲ 26/25/23	▲ 24/23/19

OIL ANALYSIS REPORT

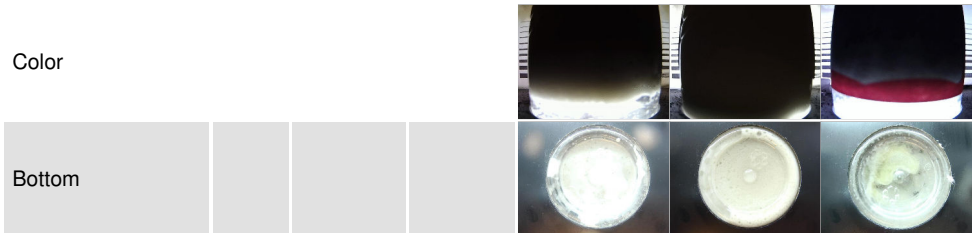


FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.9	0.44	0.29	0.29

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Precipitate	scalar	Visual*	NONE	▲ MODER	▲ MODER	NONE
Silt	scalar	Visual*	NONE	NONE	NONE	NONE
Debris	scalar	Visual*	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	Visual*	NONE	NONE	NONE	NONE
Appearance	scalar	Visual*	NORML	▲ WGOIL	▲ HAZY	▲ LAYRD
Odor	scalar	Visual*	NORML	NORML	NORML	NORML
Emulsified Water	scalar	Visual*		▲ .5%	▲ .5%	▲ 1%
Free Water	scalar	Visual*		▲ >10%	▲ 5%	▲ >10%

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	149	145	142	144
Visc @ 100°C	cSt	ASTM D7279(m)	14.5	12.9	13.7	24.8
Viscosity Index (VI)	Scale	ASTM D2270*		77	91	▲ 206

SAMPLE IMAGES		method	limit/base	current	history1	history2
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Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : PC
Lab Number : 02634782
Unique Number : 5775935
Test Package : MAR 2 (Additional Tests: Bottom, KF, KV100, PQ, PrtCount, TAN Man, VI)

Suncor - Terra Nova Projects
 Scotia Centre, 235 Water Street
 St. John's, NL
 CA A1C 1B6
 Contact: Josh Hynes
 joshynes@suncor.com
 T: (709)778-3575
 F: (709)724-2835

To discuss this sample report, contact Customer Service at 1-800-268-2131.
 Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
 Validity of results and interpretation are based on the sample and information as supplied.