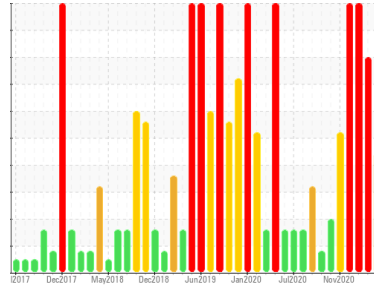


# PROBLEM SUMMARY

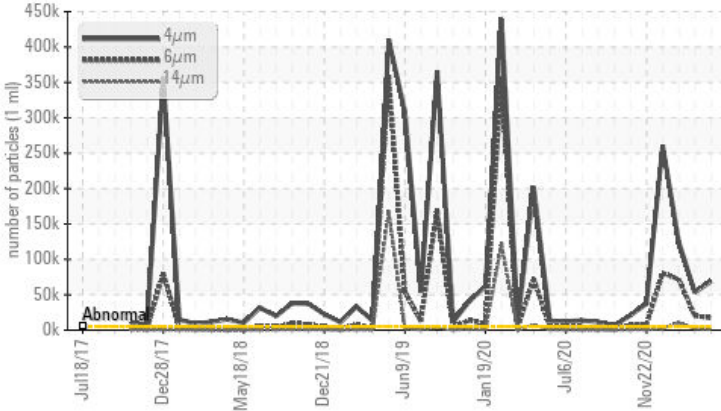
Area  
**Aft Machinery Space [450204421]**  
 Machine Id  
**Thruster Aft Center - Seal Oil System (S/N Sample Tag CL-06001-S3)**  
 Component  
**Sealing System**  
 Fluid  
**PETRO CANADA ENERGOL GR-XP ISO 150 (65 LTR)**

Sample Rating Trend



## COMPONENT CONDITION SUMMARY

Particle Trend



## RECOMMENDATION

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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. Resample in 30-45 days to monitor this situation.

## PROBLEMATIC TEST RESULTS

Sample Status			SEVERE	SEVERE	SEVERE
Particles >4µm	ASTM D7647	>5000	69020	53288	124763
Particles >6µm	ASTM D7647	>1300	17397	20211	71826
Particles >14µm	ASTM D7647	>160	1143	2241	10767
Particles >21µm	ASTM D7647	>40	239	710	3153
Oil Cleanliness	ISO 4406 (c)	>19/17/14	23/21/17	23/22/18	24/23/21

Customer Id: TERHAM  
 Sample No.: PC  
 Lab Number: 02585054  
 Test Package: MAR 2



To manage this report scan the QR code

To discuss the diagnosis or test data:  
 Bill Quesnel CLS,OMA II,MLA-III,LLA-I +1  
 (289)291-4641 x4641  
[Bill.Quesnel@wearcheck.com](mailto:Bill.Quesnel@wearcheck.com)

To change component or sample information:  
 Gloria Gonzalez +1 (289)291-4643 x4643  
[gloria.gonzalez@wearcheck.com](mailto:gloria.gonzalez@wearcheck.com)

## RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
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.
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

### 14 Aug 2023 Diag: Kevin Marson

ISO



We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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. Resample in 30-45 days to monitor this situation. All component wear rates are normal. There is a high amount of particulates (2 to 100 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



### 31 Mar 2023 Diag: Kevin Marson

ISO



We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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. Resample in 30-45 days to monitor this situation. All component wear rates are normal. There is a high amount of particulates (2 to 100 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



### 26 Feb 2023 Diag: Kevin Marson

ISO

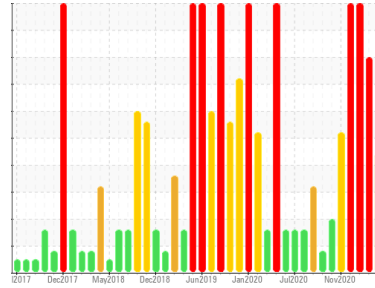


Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. We advise that you follow the water drain-off procedure for this component. The air breather requires service. If unrated, we recommend that you replace with a suitable 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. Resample in 30-45 days to monitor this situation. All component wear rates are normal. Particles >14µm are severely high. Particles >6µm are severely high. Oil Cleanliness are severely high. Particles >4µm are severely high. Particles >4µm are severely high. Silicon ppm levels are abnormally high. Silicon ppm levels are abnormally high. Particles >21µm are abnormally high. Water contamination levels are marginally high. Water contamination levels are marginally high. ppm Water contamination levels are marginally high. There is a moderate concentration of water present in the fluid. Excessive free water present. Elemental level of silicon (Si) above normal indicating ingress of seal material. 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 [450204421]**  
Machine Id  
**Thruster Aft Center - Seal Oil System (S/N Sample Tag CL-06001-S3)**  
Component  
**Sealing System**  
Fluid  
**PETRO CANADA ENERGOL GR-XP ISO 150 (65 LTR)**



**DIAGNOSIS**

**Recommendation**

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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. Resample in 30-45 days to monitor this situation.

**Wear**

All component wear rates are normal.

**Contamination**

There is a high amount of particulates (2 to 100 microns in size) present in the fluid. The water content is negligible.

**Fluid Condition**

The AN level is acceptable for this fluid. The fluid is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

**SAMPLE INFORMATION**

method	limit/base	current	history1	history2
Sample Number	Client Info	<b>PC</b>	PC	PC
Sample Date	Client Info	<b>14 Sep 2023</b>	14 Aug 2023	31 Mar 2023
Machine Age	hrs Client Info	<b>0</b>	0	0
Oil Age	hrs Client Info	<b>0</b>	0	0
Oil Changed	Client Info	<b>N/A</b>	N/A	N/A
Sample Status		<b>SEVERE</b>	SEVERE	SEVERE

**WEAR METALS**

method	limit/base	current	history1	history2
PQ	ASTM D8184*	<b>0</b>	0	0
Iron	ppm ASTM D5185(m) >100	<b>36</b>	21	30
Chromium	ppm ASTM D5185(m) >3	<b>&lt;1</b>	<1	0
Nickel	ppm ASTM D5185(m) >8	<b>&lt;1</b>	<1	<1
Titanium	ppm ASTM D5185(m)	<b>0</b>	0	0
Silver	ppm ASTM D5185(m)	<b>&lt;1</b>	<1	0
Aluminum	ppm ASTM D5185(m) >3	<b>&lt;1</b>	<1	<1
Lead	ppm ASTM D5185(m)	<b>&lt;1</b>	0	0
Copper	ppm ASTM D5185(m) >3	<b>&lt;1</b>	<1	<1
Tin	ppm ASTM D5185(m)	<b>0</b>	0	0
Antimony	ppm ASTM D5185(m)	<b>0</b>	0	0
Vanadium	ppm ASTM D5185(m)	<b>0</b>	0	0
Beryllium	ppm ASTM D5185(m)	<b>0</b>	0	0
Cadmium	ppm ASTM D5185(m)	<b>0</b>	0	0

**ADDITIVES**

method	limit/base	current	history1	history2
Boron	ppm ASTM D5185(m)	<b>2</b>	3	3
Barium	ppm ASTM D5185(m)	<b>&lt;1</b>	0	0
Molybdenum	ppm ASTM D5185(m)	<b>0</b>	<1	<1
Manganese	ppm ASTM D5185(m)	<b>0</b>	<1	<1
Magnesium	ppm ASTM D5185(m)	<b>4</b>	<1	<1
Calcium	ppm ASTM D5185(m)	<b>7</b>	4	4
Phosphorus	ppm ASTM D5185(m)	<b>253</b>	314	328
Zinc	ppm ASTM D5185(m)	<b>14</b>	12	12
Sulfur	ppm ASTM D5185(m)	<b>9395</b>	9717	9763
Lithium	ppm ASTM D5185(m)	<b>&lt;1</b>	<1	<1

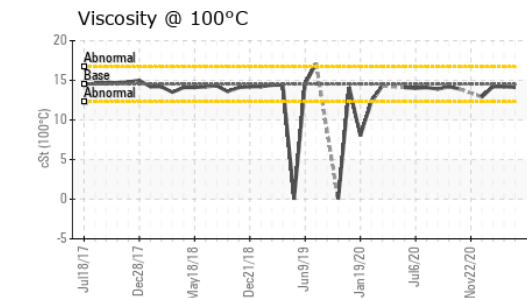
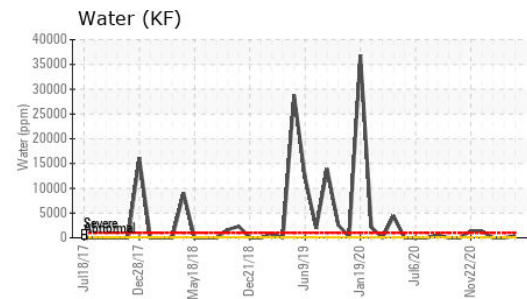
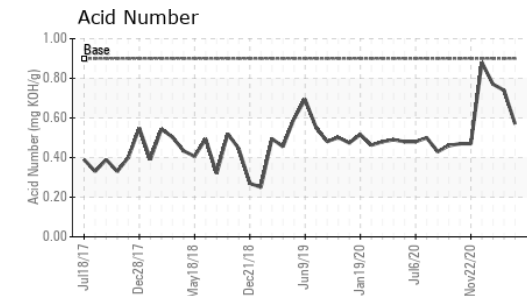
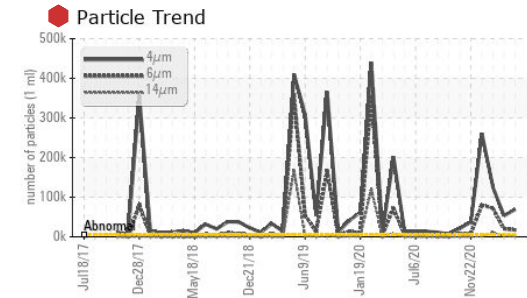
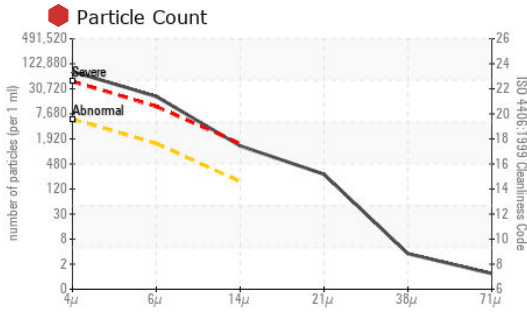
**CONTAMINANTS**

method	limit/base	current	history1	history2
Silicon	ppm ASTM D5185(m) >25	<b>16</b>	3	10
Sodium	ppm ASTM D5185(m)	<b>4</b>	1	2
Potassium	ppm ASTM D5185(m) >20	<b>&lt;1</b>	<1	<1
Water	% ASTM D6304*	<b>0.037</b>	---	---
ppm Water	ppm ASTM D6304*	<b>379.2</b>	---	---

**FLUID CLEANLINESS**

method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647 >5000	<b>69020</b>	53288	124763
Particles >6µm	ASTM D7647 >1300	<b>17397</b>	20211	71826
Particles >14µm	ASTM D7647 >160	<b>1143</b>	2241	10767
Particles >21µm	ASTM D7647 >40	<b>239</b>	710	3153
Particles >38µm	ASTM D7647 >10	<b>3</b>	20	126
Particles >71µm	ASTM D7647 >3	<b>1</b>	1	10
Oil Cleanliness	ISO 4406 (c) >19/17/14	<b>23/21/17</b>	23/22/18	24/23/21

# OIL ANALYSIS REPORT

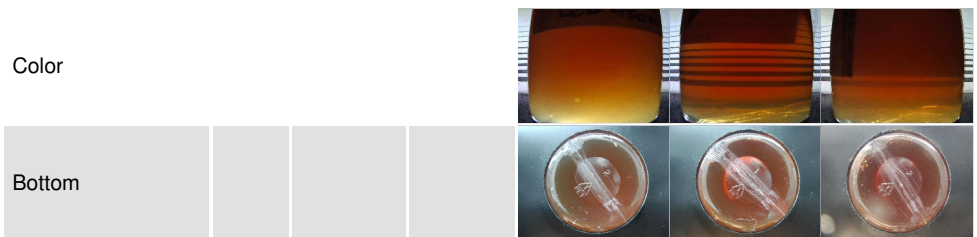


FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.9	<b>0.57</b>	0.74	0.77

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
Precipitate	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
Silt	scalar	Visual*	NONE	<b>NONE</b>	VLITE	VLITE
Debris	scalar	Visual*	NONE	<b>NONE</b>	VLITE	LIGHT
Sand/Dirt	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
Appearance	scalar	Visual*	NORML	<b>NORML</b>	NORML	NORML
Odor	scalar	Visual*	NORML	<b>NORML</b>	NORML	NORML
Emulsified Water	scalar	Visual*		<b>.2%</b>	NEG	NEG
Free Water	scalar	Visual*		<b>NEG</b>	NEG	NEG

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	149	<b>144</b>	144	145
Visc @ 100°C	cSt	ASTM D7279(m)	14.5	<b>14.1</b>	14.2	14.2
Viscosity Index (VI)	Scale	ASTM D2270*		<b>94</b>	95	94

## SAMPLE IMAGES



ISO 17025:2017  
Accredited  
Laboratory

**Laboratory** : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9  
**Sample No.** : PC  
**Lab Number** : **02585054**  
**Unique Number** : 5646119  
**Test Package** : MAR 2 ( Additional Tests: KF, KV100, PQ, PrtCount, TAN Man, VI )

**Suncor - Terra Nova Projects**  
 Scotia Centre, 235 Water Strret  
 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.