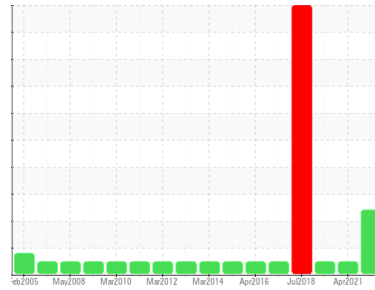




# PROBLEM SUMMARY

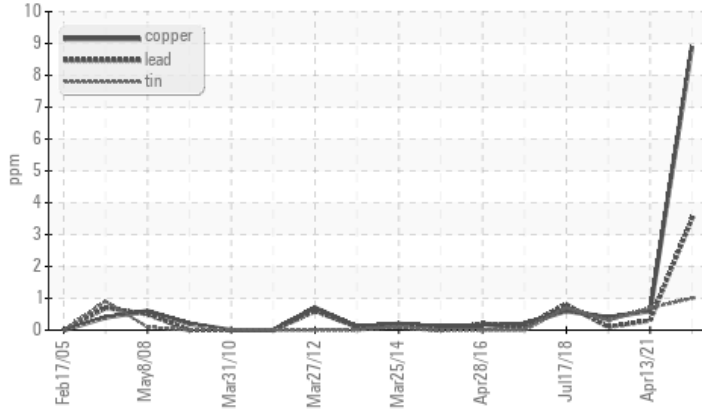
Area  
**CARIBOU FALLS GS**  
 Machine Id  
**FP4G2**  
 Component  
**Thrust Bearing**  
 Fluid  
**ESSO TERESSO ISO 46 (--- GAL)**

Sample Rating Trend

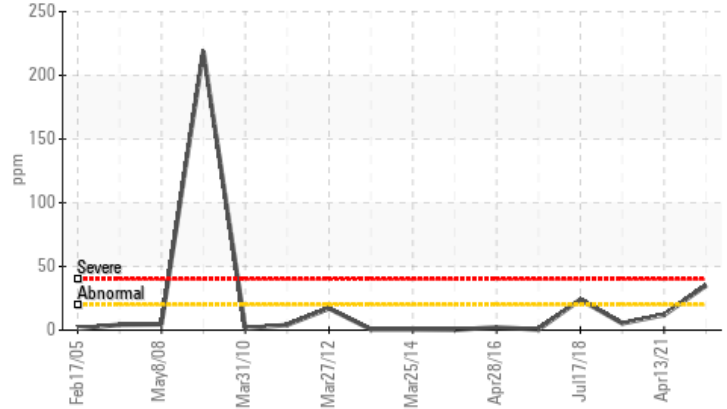


## COMPONENT CONDITION SUMMARY

### ▲ Non-ferrous Metals



### ▲ Silicon (ppm)



## RECOMMENDATION

Check seals and/or filters for points of contaminant entry. 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 recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

## PROBLEMATIC TEST RESULTS

Sample Status				ABNORMAL	NORMAL	NORMAL
Copper	ppm	ASTM D5185(m)	>7	▲ 9	<1	<1
Silicon	ppm	ASTM D5185(m)	>20	▲ 35	12	5
PrtFilter						

Customer Id: ONTKEE  
 Sample No.: WC0686293  
 Lab Number: 02499228  
 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data:  
 Kevin Marson +1 (289)291-4644 x4644  
[Kevin.Marson@wearcheck.com](mailto:Kevin.Marson@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
Resample	MISSED	May 24 2023	?	We recommend an early resample to monitor this condition.
Information Required	MISSED	May 24 2023	?	NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.
Check Breathers	MISSED	May 24 2023	?	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 Seals	MISSED	May 24 2023	?	Check seals and/or filters for points of contaminant entry.

## HISTORICAL DIAGNOSIS

### 13 Apr 2021 Diag: Kevin Marson

NORMAL



Resample at the next service interval to monitor. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report



### 08 Jul 2020 Diag: Kevin Marson

NORMAL



Resample at the next service interval to monitor. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report



### 17 Jul 2018 Diag: Bill Quesnel

DEGRADATION



We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability. We advise that you check all areas where dirt can enter the system. We recommend that you investigate the system for introduction of a surfactant to the reservoir. Some potential surfactants include incorrect oil make-up with an oil containing emulsifying agents (engine oil, compressor oil, gear oil), or soaps entering the system after wash down. We recommend that you sweeten the oil by draining off half the system oil (50%) and replacing with new oil. 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. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. MPC (Membrane Patch Calorimetry) test indicates acceptable levels of varnish present. There is a moderate concentration of dirt present in the oil. The water content is negligible. Water Separability results (ASTM D1401) indicate good water shedding properties. The Air Release Value (ASTM D3427) indicates the oil has poor deaeration properties. Foaming Stability (ASTM D892) results are abnormal indicating an oil foaming problem that could lead to erratic operation. Linear Sweep Voltammetry (RULER – ASTM D6971) testing indicates one of the anti-oxidants present in the oil will soon be depleted. The Rotating Pressure Vessel Oxidation Test (RPVOT – ASTM D2272) result indicates suitable amounts of anti-oxidant(s) present in the oil. The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

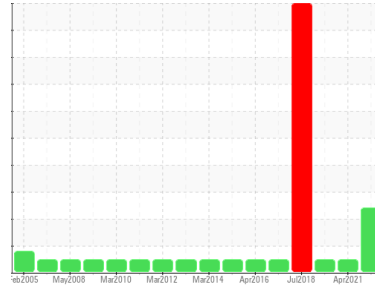
view report





# OIL ANALYSIS REPORT

Sample Rating Trend



Area  
**CARIBOU FALLS GS**  
 Machine Id  
**FP4G2**  
 Component  
**Thrust Bearing**  
 Fluid  
**ESSO TERESSO ISO 46 (--- GAL)**

## DIAGNOSIS

**Recommendation**  
 Check seals and/or filters for points of contaminant entry. 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 recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

**Wear**  
 Copper ppm levels are abnormal. Bearing wear is indicated.

**Contamination**  
 Elemental level of silicon (Si) above normal indicating ingress of seal material.

**Fluid Condition**  
 The AN level is acceptable for this fluid. The oil 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	<b>WC0686293</b>	WC0560604	WC0475096
Sample Date	Client Info	<b>11 Jul 2022</b>	13 Apr 2021	08 Jul 2020
Machine Age	hrs	0	0	0
Oil Age	hrs	0	0	0
Oil Changed	Client Info	<b>N/A</b>	N/A	N/A
Sample Status		<b>ABNORMAL</b>	NORMAL	NORMAL

## CONTAMINATION

method	limit/base	current	history1	history2
Water	WC Method >2	<b>NEG</b>	NEG	NEG

## WEAR METALS

method	limit/base	current	history1	history2
Iron	ppm ASTM D5185(m) >85	<b>1</b>	3	2
Chromium	ppm ASTM D5185(m)	<b>0</b>	0	0
Nickel	ppm ASTM D5185(m)	<b>0</b>	0	0
Titanium	ppm ASTM D5185(m)	<b>0</b>	0	0
Silver	ppm ASTM D5185(m)	<b>0</b>	<1	<1
Aluminum	ppm ASTM D5185(m) >40	<b>&lt;1</b>	<1	<1
Lead	ppm ASTM D5185(m) >60	<b>4</b>	<1	<1
Copper	ppm ASTM D5185(m) >7	<b>9</b>	<1	<1
Tin	ppm ASTM D5185(m) >40	<b>1</b>	<1	<1
Antimony	ppm ASTM D5185(m)	<b>&lt;1</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

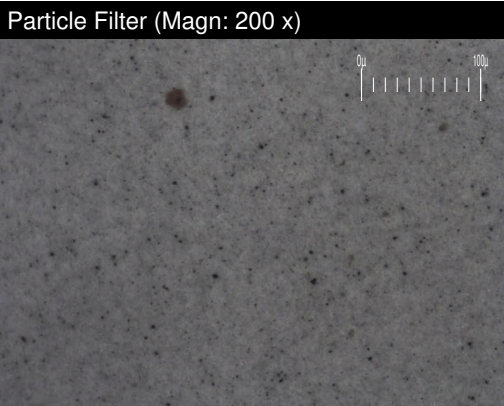
method	limit/base	current	history1	history2
Boron	ppm ASTM D5185(m) 0	<b>&lt;1</b>	<1	0
Barium	ppm ASTM D5185(m)	<b>0</b>	0	0
Molybdenum	ppm ASTM D5185(m) 0	<b>0</b>	0	0
Manganese	ppm ASTM D5185(m)	<b>0</b>	0	0
Magnesium	ppm ASTM D5185(m) 0	<b>0</b>	<1	<1
Calcium	ppm ASTM D5185(m) 0	<b>0</b>	<1	0
Phosphorus	ppm ASTM D5185(m) 2.4	<b>1</b>	<1	0
Zinc	ppm ASTM D5185(m) 0	<b>3</b>	1	<1
Sulfur	ppm ASTM D5185(m)	<b>1975</b>	2006	2014
Lithium	ppm ASTM D5185(m)	<b>&lt;1</b>	<1	<1

## CONTAMINANTS

method	limit/base	current	history1	history2
Silicon	ppm ASTM D5185(m) >20	<b>35</b>	12	5
Sodium	ppm ASTM D5185(m)	<b>0</b>	0	0
Potassium	ppm ASTM D5185(m) >20	<b>0</b>	<1	0

## FLUID CLEANLINESS

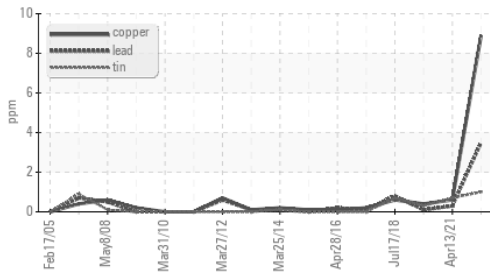
method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647 >10000	<b>308</b>	310	651
Particles >6µm	ASTM D7647 >2500	<b>42</b>	94	67
Particles >14µm	ASTM D7647 >160	<b>6</b>	10	3
Particles >21µm	ASTM D7647 >40	<b>1</b>	4	1
Particles >38µm	ASTM D7647 >10	<b>0</b>	0	0
Particles >71µm	ASTM D7647 >3	<b>0</b>	0	0
Oil Cleanliness	ISO 4406 (c) >20/18/14	<b>15/13/10</b>	15/14/10	17/13/9



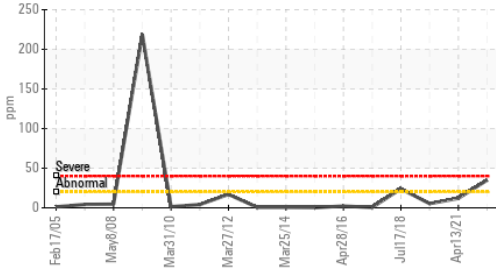


# OIL ANALYSIS REPORT

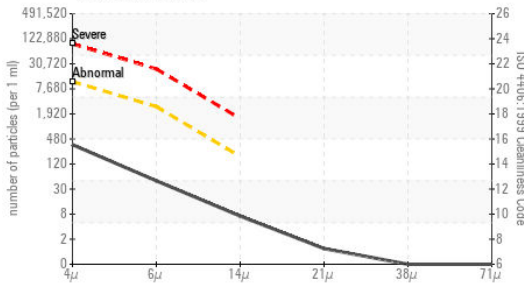
## Non-ferrous Metals



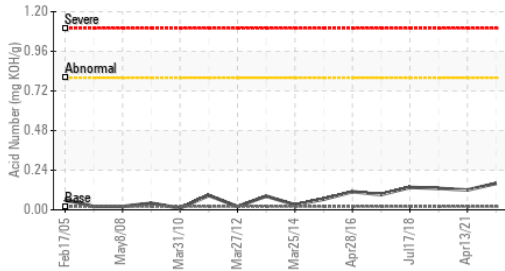
## Silicon (ppm)



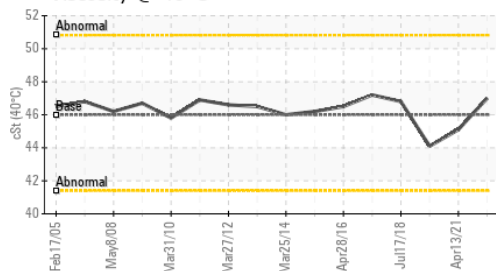
## Particle Count



## Acid Number



## Viscosity @ 40°C



FLUID DEGRADATION	method	limit/base	current	history1	history2	
Acid Number (AN)	mg KOH/g	ASTM D974*	0.02	<b>0.16</b>	0.12	0.13

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>	NONE	NONE
Debris	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
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*	>2	<b>NEG</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)	46	<b>47.0</b>	45.1	44.1

SAMPLE IMAGES	method	limit/base	current	history1	history2
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Color			
Bottom			
PrtFilter			
MPC	no image	no image	no image



ISO 17025:2017  
Accredited  
Laboratory

Laboratory

Sample No.

Lab Number

Unique Number

Test Package

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9

: WC0686293

: 02499228

: 5424188

: IND 2 ( Additional Tests: BottomAnalysis, FilterPatch, PrtCount, TAN Man )

Received : 12 Jul 2022

Diagnosed : 14 Jul 2022

Diagnostician : Kevin Marson

Ontario Power Generation

KENORA PRODUCTION CENTRE, 200-60 FOURTEENTH ST N.

KENORA, ON

CA P9N 4M9

Contact: Josh Robinson

josh.robinson@opg.com

T:

F:

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.