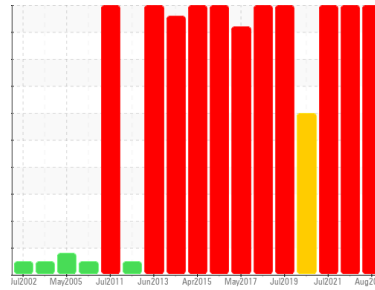




PROBLEM SUMMARY

Sample Rating Trend



CONTAMINANT



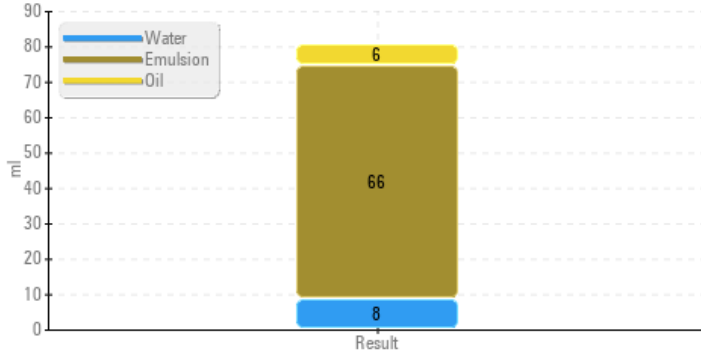
Machine Id
A2 - Thrust Bearing

Component
Thrust Bearing

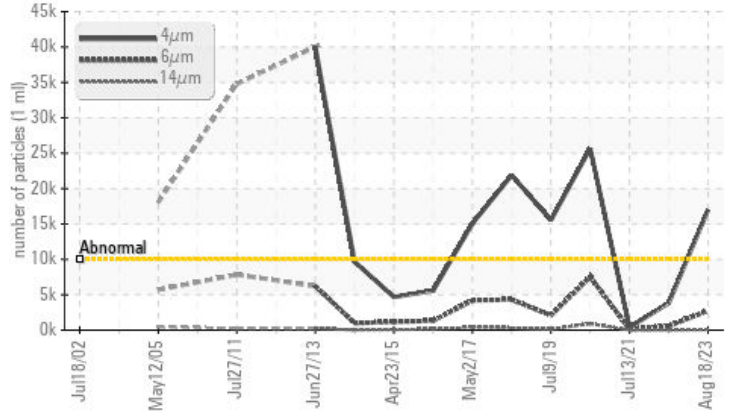
Fluid
PETRO CANADA TURBOFLO R&O 46 (5705 LTR)

COMPONENT CONDITION SUMMARY

Water Separability



Particle Trend



RECOMMENDATION

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 recommend you service the filters on this component. We recommend an early resample to monitor this condition.

PROBLEMATIC TEST RESULTS

Sample Status		SEVERE	SEVERE	SEVERE	
Separability	oil/h2o/em	ASTM D1401* 41/39/0	6/8/66 (30)	3/11/66 (30)	38/32/10 (30)
Foam Tendency	I/II/III	ASTM D892* 10	470/50/460	520/50/500	510/50/490
PrtFilter					

Customer Id: CHUCHU
 Sample No.: WC0786882
 Lab Number: 02604627
 Test Package: AOM 3



To manage this report scan the QR code

To discuss the diagnosis or test data:
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To change component or sample information:
 Gloria Gonzalez +1 (289)291-4643 x4643
gloria.gonzalez@wearcheck.com

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Change Filter	---	---	?	We recommend you service the filters on this component.
Resample	---	---	?	We recommend an early resample to monitor this condition.
Filter Fluid	---	---	?	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.

HISTORICAL DIAGNOSIS

01 Apr 2022 Diag: Bill Quesnel

CONTAMINANT



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 recommend an early resample to monitor this condition. All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. Water Separability results (ASTM D1401) are poor and indicate that the oil will form emulsions with water. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. Foaming Tendency (ASTM D892) results are abnormal indicating a tendency for oil foaming. The AN level is acceptable for this fluid.

view report



13 Jul 2021 Diag: Bill Quesnel

CONTAMINANT



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 recommend an early resample to monitor this condition. All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. MPC (Membrane Patch Colorimetry) test indicates acceptable levels of varnish present. Water Separability results (ASTM D1401) are poor and indicate that the oil will form emulsions with water. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. Foaming Tendency (ASTM D892) results are abnormal indicating a tendency for oil foaming. The Air Release Value (ASTM D3427) indicates that the oil has good deaeration properties. Linear Sweep Voltammetry (RULER – ASTM D6971) testing indicates normal levels of anti-oxidants present in the oil. 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.

view report



08 May 2020 Diag: Bill Quesnel

ISO



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 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. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. Particles >21µm are severely high. Separability (Emulsion) % is abnormally high. Separability (Water) % is abnormally low. Particles >14µm are abnormally high. Particles >4µm are abnormally high. Particles >38µm are abnormally high. Particles >6µm are abnormally high. MPC (Membrane Patch Colorimetry) test indicates acceptable levels of varnish present. Water Separability results (ASTM D1401) are poor and indicate that the oil will form emulsions with water. The water content is negligible. The Air Release Value (ASTM D3427) indicates that the oil has good deaeration properties. Foaming Tendency and Stability (ASTM D892) results all within normal range. Linear Sweep Voltammetry (RULER – ASTM D6971) testing indicates normal levels of anti-oxidants present in the oil. 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.

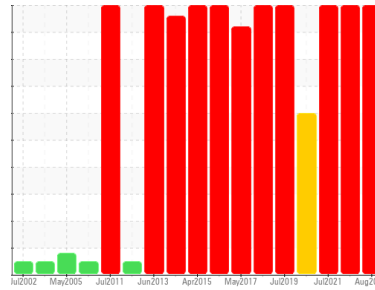
view report





OIL ANALYSIS REPORT

Sample Rating Trend



CONTAMINANT



Machine Id
A2 - Thrust Bearing

Component
Thrust Bearing

Fluid
PETRO CANADA TURBOFLO R&O 46 (5705 LTR)

DIAGNOSIS

Recommendation

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 recommend you service the filters on this component. We recommend an early resample to monitor this condition.

Wear

All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.

Contaminants

There is a light amount of silt (particulates < 14 microns in size) present in the oil. Water Separability results (ASTM D1401) are poor and indicate that the oil will form emulsions with water. The water content is negligible.

Oil Condition

Foaming Tendency (ASTM D892) results are abnormal indicating a tendency for oil foaming. Rust Prevention test (ASTM D665) indicates the oil retains good anti-corrosion properties. The AN level is acceptable for this fluid.

Particle Filter (Magn: 200 x)



SAMPLE INFORMATION

	method	limit/base	current	history1	history2
Sample Number	Client Info		WC0786882	WC0679959	WC0575659
Sample Date	Client Info		18 Aug 2023	01 Apr 2022	13 Jul 2021
Machine Age	hrs	Client Info	0	0	0
Oil Age	hrs	Client Info	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) >85	<1	<1	<1
Chromium	ppm	ASTM D5185(m) >20	0	0	0
Nickel	ppm	ASTM D5185(m) >20	<1	0	<1
Titanium	ppm	ASTM D5185(m)	0	0	0
Silver	ppm	ASTM D5185(m)	0	0	0
Aluminum	ppm	ASTM D5185(m) >40	<1	<1	0
Lead	ppm	ASTM D5185(m) >60	<1	<1	<1
Copper	ppm	ASTM D5185(m) >7	<1	<1	<1
Tin	ppm	ASTM D5185(m) >40	0	0	<1
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)	0	<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)	<1	<1	0
Calcium	ppm	ASTM D5185(m) 0	<1	0	<1
Phosphorus	ppm	ASTM D5185(m) 3	6	6	3
Zinc	ppm	ASTM D5185(m) 0	1	<1	1
Sulfur	ppm	ASTM D5185(m)	135	130	116
Lithium	ppm	ASTM D5185(m)	<1	<1	<1

CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m) >20	<1	<1	<1
Sodium	ppm	ASTM D5185(m)	0	0	0
Potassium	ppm	ASTM D5185(m) >20	0	0	<1
Water	%	ASTM D6304* >2	0.001	0.001	0.00
ppm Water	ppm	ASTM D6304*	6	13.5	0.00

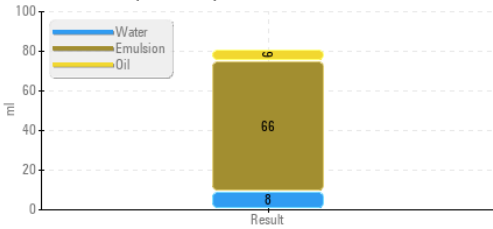
INFRA-RED

	method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*	0	0	0
Nitration	Abs/cm	ASTM D7624*	1.5	1.7	1.6
Sulfation	Abs/1mm	ASTM D7415*	10.7	11.8	11.1

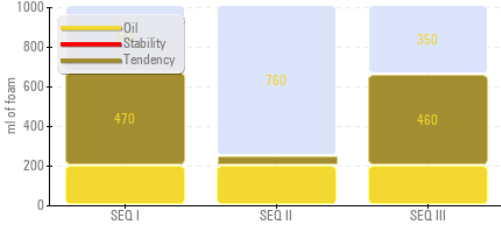


OIL ANALYSIS REPORT

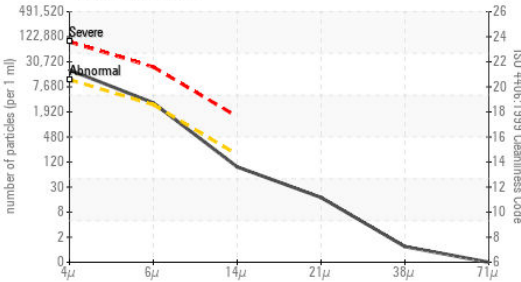
Water Separability



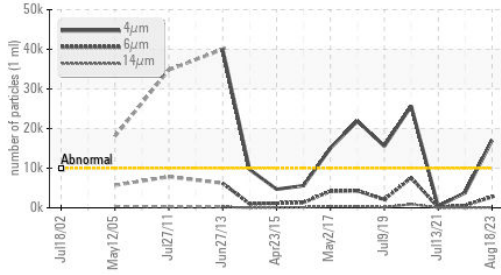
Foaming SEQ I/II/III



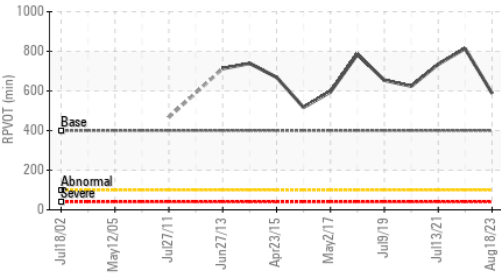
Particle Count



Particle Trend



RPVOT



FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647	>10000	▲ 17000	3832	394
Particles >6µm	ASTM D7647	>2500	▲ 2765	583	120
Particles >14µm	ASTM D7647	>160	81	33	19
Particles >21µm	ASTM D7647	>40	15	7	6
Particles >38µm	ASTM D7647	>10	1	0	0
Particles >71µm	ASTM D7647	>3	0	0	0
Oil Cleanliness	ISO 4406 (c)	>20/18/14	▲ 21/19/14	19/16/12	16/14/11

FLUID DEGRADATION	method	limit/base	current	history1	history2
Oxidation	Abs./1mm	ASTM D7414*	2.3	2.9	2.6
Acid Number (AN)	mg KOH/g	ASTM D974*	0.11	0.07	0.10
Anti-Oxidant 1	%	ASTM D6971*	<25	95	81
Anti-Oxidant 2	%	ASTM D6971*	<25	57	38
MPC Varnish Potential	Scale	ASTM D7843(m)*	>15	6	1

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

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	44.4	45.0	45.1
Visc @ 100°C	cSt	ASTM D7279(m)	6.72	6.8	6.9
Viscosity Index (VI)	Scale	ASTM D2270*	104	105	108
Separability	oil/h2o/em	ASTM D1401*	41/39/0	6/8/66 (30)	3/11/66 (30)
Air Release Time	min	ASTM D3427*	3.5	5.80	6.80
Foam Tendency	I/II/III	ASTM D892*	10	470/50/460	520/50/500
Foam Stability	I/II/III	ASTM D892*	0	0/0/0	0/0/0
ASTM Color	scalar	ASTM D1500*	0.5	1.0	1.0
Rust Prevention	PASS/FAIL	ASTM D665*	PASS	PASS	PASS
Oxidation Test (RPVOT)	minutes	ASTM D2272*	400	588	814

SEDIMENT	method	limit/base	current	history1	history2
Pentane Insolubles	%	ASTM D893(m)*	0.184	0.038	0.100
Toluene Insolubles	%	ASTM D893(m)*	0.014	0.010	0.072

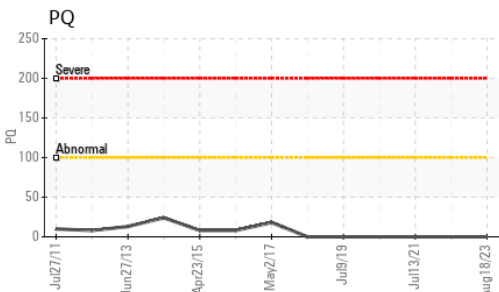
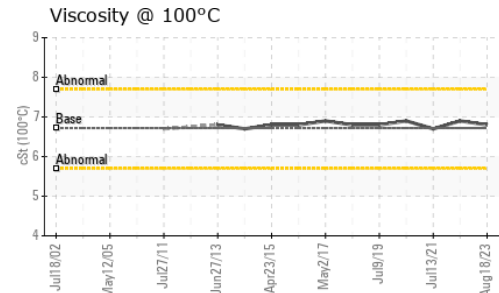
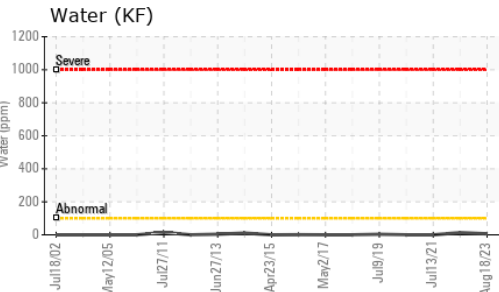
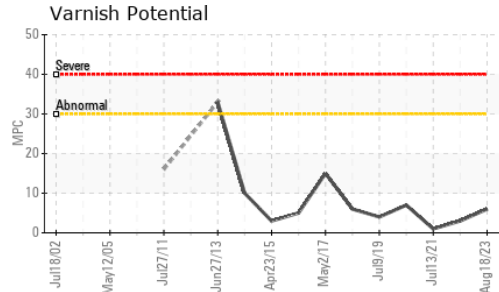
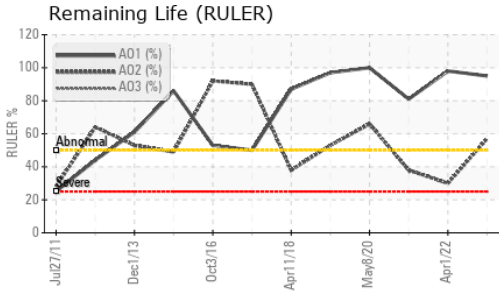


Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0786882
Lab Number : 02604627
Unique Number : 5697712
Test Package : AOM 3 (Additional Tests: BottomAnalysis, FilterPatch, PrtFilter, Tollnsol)

Nalcor Energy - Churchill Falls
 PO Box 310
 Churchill Falls, NL
 CA A0R 1A0
 Contact: Robert Noel
 robertnoel@nlh.nl.ca
 T: (709)925-8294
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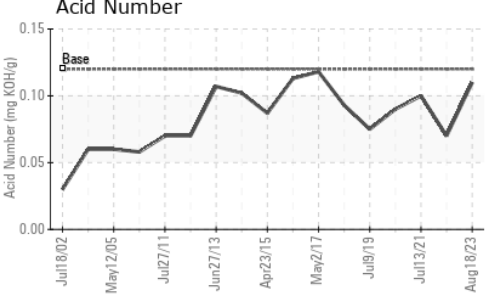
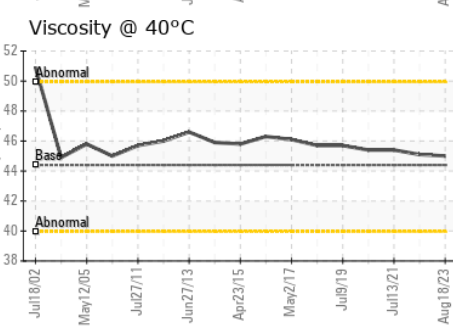
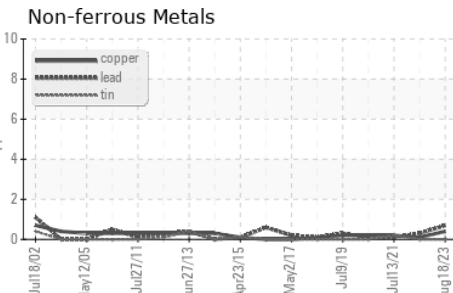
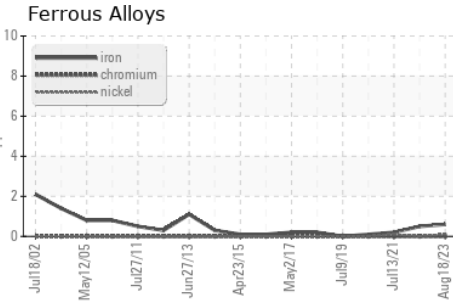
To discuss this sample report, contact Customer Service at 1-800-268-2131.
 Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
 Validity of results and interpretation are based on the sample and information as supplied.

OIL ANALYSIS REPORT



SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					
PrtFilter					
MPC					

GRAPHS



Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0786882 **Received** : 21 Dec 2023
Lab Number : 02604627 **Diagnosed** : 09 Jan 2024
Unique Number : 5697712 **Diagnostician** : Bill Quesnel
Test Package : AOM 3 (Additional Tests: BottomAnalysis, FilterPatch, PrtFilter, Tollnsol)

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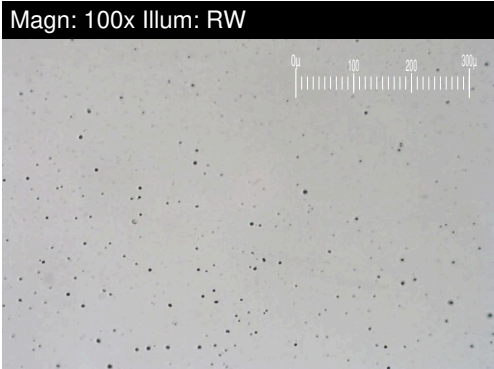
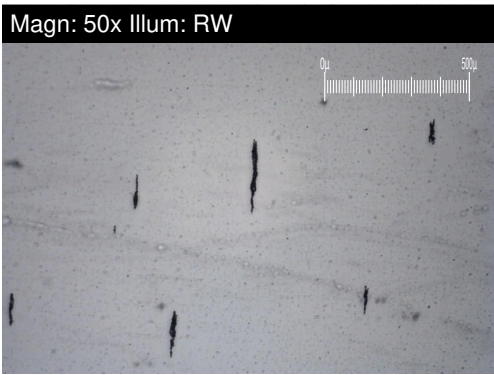
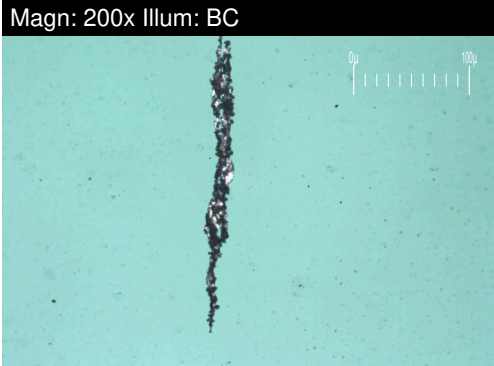
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FERROGRAPHY REPORT

Machine Id
A2 - Thrust Bearing

Component
Thrust Bearing

Fluid
PETRO CANADA TURBOFLO R&O 46 (5705 LTR)

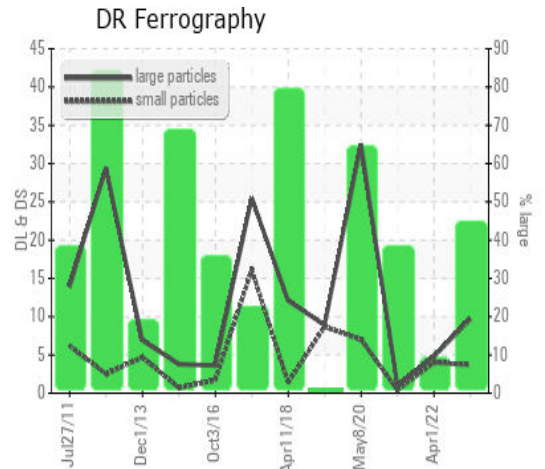


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		9.7	4.8	0.9
Small Particles		DR-Ferr*		3.7	4.0	0.4
Total Particles		DR-Ferr*	>---	13.4	8.8	1.3
Large Particles Percentage	%	DR-Ferr*		44.8	9.1	38.5
Severity Index		DR-Ferr*		58	4	0.5

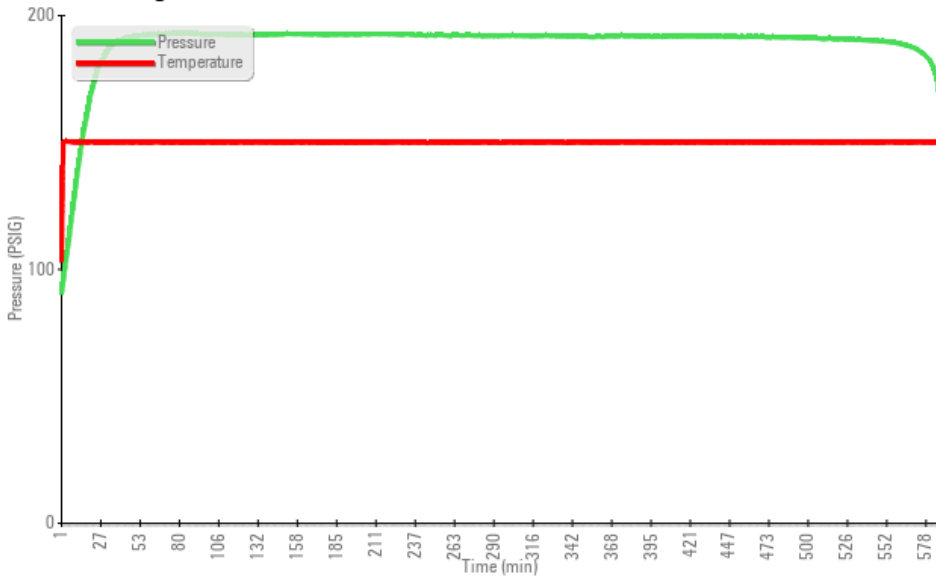
FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		2	1	1
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		1	1	1
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 0-10	ASTM D7684*				
Ferrous Black Oxides	Scale 0-10	ASTM D7684*		1		
Ferrous Red Oxides	Scale 0-10	ASTM D7684*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*				
Ferrous Other	Scale 0-10	ASTM D7684*				
Nonferrous Rubbing	Scale 0-10	ASTM D7684*				
Nonferrous Sliding	Scale 0-10	ASTM D7684*				
Nonferrous Cutting	Scale 0-10	ASTM D7684*				
Nonferrous Rolling	Scale 0-10	ASTM D7684*				
Nonferrous Other	Scale 0-10	ASTM D7684*				
Carbonaceous Material	Scale 0-10	ASTM D7684*				
Lubricant Degradation	Scale 0-10	ASTM D7684*				
Sand/Dirt	Scale 0-10	ASTM D7684*		1	1	
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		2	1	1

WEAR

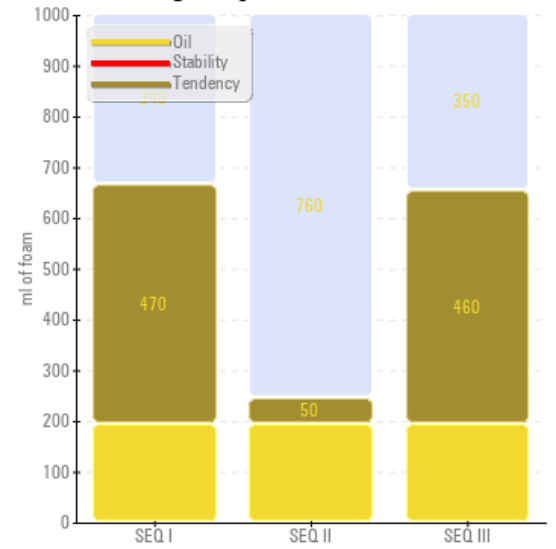
All component wear rates are normal.
The ferrography results are normal indicating no abnormal wear in the system.



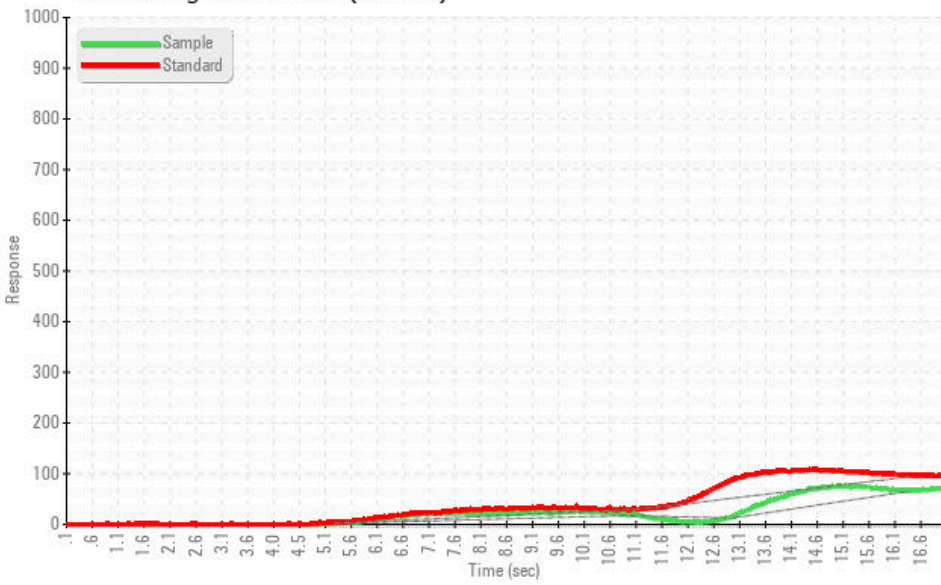
Rotating Pressure Vessel Oxidation Test



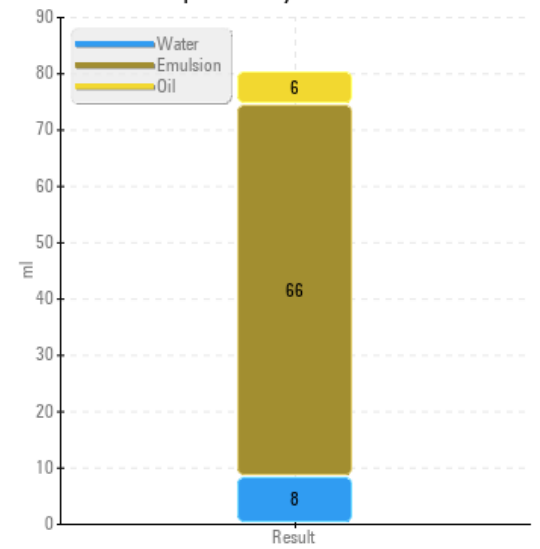
Foaming SEQ I/II/III



Remaining Useful Life (RULER)



Water Separability



MPC (Varnish Test)



Sample Color & Clarity



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