



PROBLEM SUMMARY

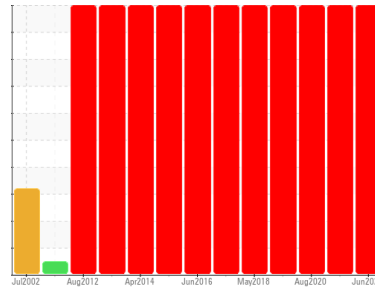
Area
[02437560]

Machine Id
A9 - Thrust Bearing

Component
Thrust Bearing

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

Sample Rating Trend

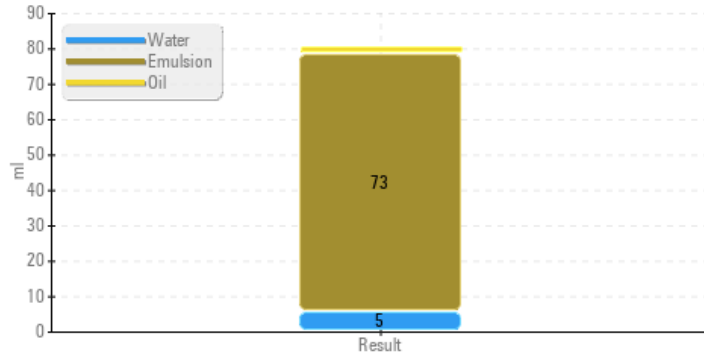


CONTAMINANT

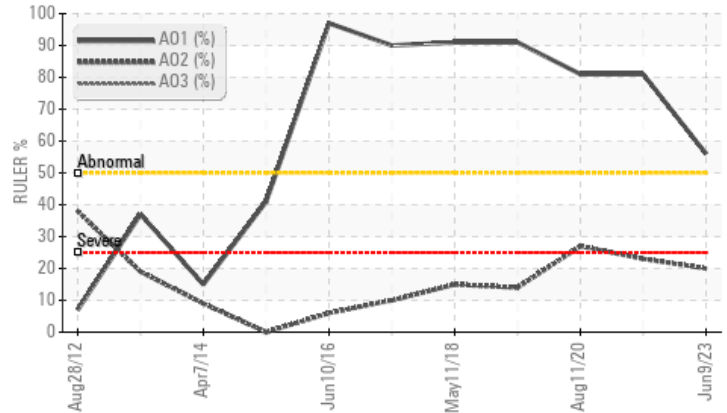


COMPONENT CONDITION SUMMARY

Water Separability



Remaining Life (RULER)



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 an early resample to monitor this condition. No other corrective action is recommended at this time.

PROBLEMATIC TEST RESULTS

Sample Status			SEVERE	SEVERE	SEVERE
Ferrous Rolling	Scale 0-10	ASTM D7684*	▲ 2	▲ 1	▲ 1
Anti-Oxidant 2	%	ASTM D6971*	▲ 20	▲ 23	27
Separability	oil/h2o/em	ASTM D1401*	● 2/5/73 (30)	● 3/11/66 (30)	▲ 42/38/0 (20)
Foam Tendency	I/II/III	ASTM D892*	▲ 450/40/420	430/30/310	▲ 540/120/510
PrtFilter					

Customer Id: CHUCHU
Sample No.: WC0786876
Lab Number: 02580001
Test Package: AOM 3



To manage this report scan the QR code

To discuss the diagnosis or test data:
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gloria.gonzalez@wearcheck.com

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
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

05 Aug 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 (test was repeated to confirm poor results - original result: 1/9/70 (30)). The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The AN level is acceptable for this fluid.

view report



11 Aug 2020 Diag: Bill Quesnel

OFF SPEC



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. Check seals and/or filters for points of contaminant entry. 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. 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 you service the filters on this component. Resample in 30-45 days to monitor this situation. No other corrective action is recommended at this time. All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. Particles >4µm are severely high. Particles >6µm are abnormally high. Separability (Water) % is marginally low. MPC Varnish Potential contamination levels are marginally high. MPC (Membrane Patch Colorimetry) test indicates a light concentration of varnish present. The water content is negligible. Water Separability results (ASTM D1401) indicate good water shedding properties. Foaming Stability (ASTM D892) results are abnormal indicating an oil foaming problem that could lead to erratic operation. 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. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

view report



10 Sep 2019 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. Check seals and/or filters for points of contaminant entry. 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. 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 you service the filters on this component. Resample in 30-45 days to monitor this situation. No other corrective action is recommended at this time. Wear particle analysis indicates that the nonferrous rolling particles are marginal. All other component wear rates are normal. Particles >4µm are severely high. Particles >6µm are abnormally high. MPC Varnish Potential contamination levels are marginally high. MPC (Membrane Patch Colorimetry) test indicates a light concentration of varnish present. The water content is negligible. Water Separability results (ASTM D1401) indicate good water shedding 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 Air Release Value (ASTM D3427) indicates that the oil has good deaeration properties. 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.

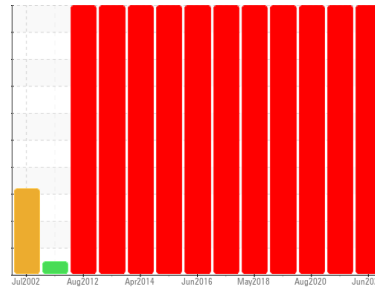
view report





OIL ANALYSIS REPORT

Sample Rating Trend



CONTAMINANT



Area
[02437560]

Machine Id
A9 - 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 an early resample to monitor this condition. No other corrective action is recommended at this time.

Wear

Wear particle analysis indicates that the ferrous rolling particles are marginal. All other component wear rates are normal.

Contaminants

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.

Oil Condition

Foaming Tendency stage I (ASTM D892) result is abnormal indicating a tendency for oil foaming. Linear Sweep Voltammetry (RULER- ASTM D6971) testing indicates a low amount of one of the anti-oxidants present in the oil, however, the other anti-oxidant(s) are still performing adequately. Rust Prevention test (ASTM D665) indicates the oil retains good anti-corrosion properties. The AN level is acceptable for this fluid.

SAMPLE INFORMATION

	method	limit/base	current	history1	history2
Sample Number	Client Info		WC0786876	WC	WC
Sample Date	Client Info		09 Jun 2023	05 Aug 2022	11 Aug 2020
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	2	2	2
Chromium	ppm	ASTM D5185(m) >20	0	0	0
Nickel	ppm	ASTM D5185(m) >20	<1	0	0
Titanium	ppm	ASTM D5185(m)	0	0	0
Silver	ppm	ASTM D5185(m)	0	0	0
Aluminum	ppm	ASTM D5185(m) >40	0	0	2
Lead	ppm	ASTM D5185(m) >60	8	7	3
Copper	ppm	ASTM D5185(m) >7	<1	0	<1
Tin	ppm	ASTM D5185(m) >40	0	0	0
Antimony	ppm	ASTM D5185(m)	0	<1	<1
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)	<1	<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	0	0
Calcium	ppm	ASTM D5185(m) 0	<1	0	<1
Phosphorus	ppm	ASTM D5185(m) 3	5	5	2
Zinc	ppm	ASTM D5185(m) 0	2	<1	<1
Sulfur	ppm	ASTM D5185(m)	140	143	113
Lithium	ppm	ASTM D5185(m)	<1	<1	<1

CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m) >20	0	0	2
Sodium	ppm	ASTM D5185(m)	<1	0	0
Potassium	ppm	ASTM D5185(m) >20	<1	<1	<1
Water	%	ASTM D6304* >2	0.001	0.002	0.001
ppm Water	ppm	ASTM D6304*	13.3	24.4	1.9

INFRA-RED

	method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*	0	0	0
Nitration	Abs/cm	ASTM D7624*	1.8	1.6	1.6
Sulfation	Abs/.1mm	ASTM D7415*	12.0	11.6	11.1

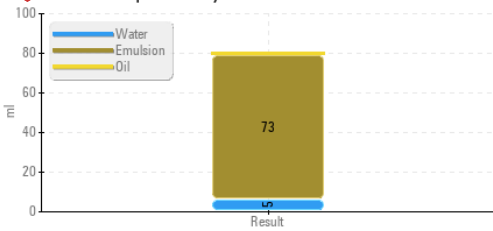
Particle Filter (Magn: 200 x)



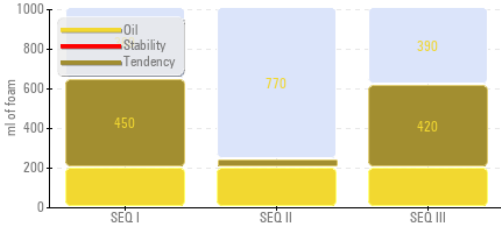


OIL ANALYSIS REPORT

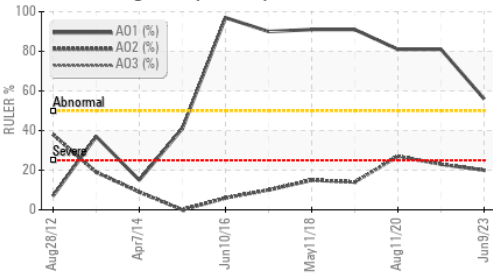
Water Separability



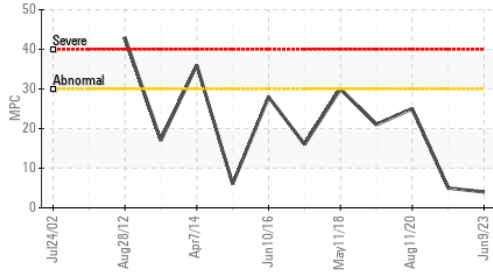
Foaming SEQ I/II/III



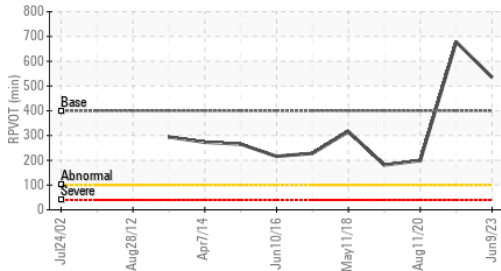
Remaining Life (RULER)



Varnish Potential



RPVOT



FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647	>10000	946	3502	102958
Particles >6µm	ASTM D7647	>2500	156	397	17033
Particles >14µm	ASTM D7647	>160	10	16	88
Particles >21µm	ASTM D7647	>40	2	4	14
Particles >38µm	ASTM D7647	>10	0	0	0
Particles >71µm	ASTM D7647	>3	0	0	0
Oil Cleanliness	ISO 4406 (c)	>20/18/14	17/14/10	19/16/11	24/21/14

FLUID DEGRADATION	method	limit/base	current	history1	history2
Oxidation	Abs./1mm ASTM D7414*		2.4	2.8	2.4
Acid Number (AN)	mg KOH/g ASTM D974*	0.12	0.06	0.08	0.07
Anti-Oxidant 1	% ASTM D6971*	<25	56	81	81
Anti-Oxidant 2	% ASTM D6971*	<25	20	23	27
MPC Varnish Potential	Scale ASTM D7843(m)*	>15	4	5	25

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	NONE	NONE	NONE
Silt	scalar Visual*	NONE	NONE	NONE	NONE
Debris	scalar Visual*	NONE	VLITE	NONE	NONE
Sand/Dirt	scalar Visual*	NONE	NONE	NONE	NONE
Appearance	scalar Visual*	NORML	NORML	NORML	NORML
Odor	scalar Visual*	NORML	NORML	NORML	NORML
Emulsified Water	scalar Visual*	>2	NEG	NEG	NEG
Free Water	scalar Visual*		NEG	NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt ASTM D7279(m)	44.4	45.0	45.1	45.0
Visc @ 100°C	cSt ASTM D7279(m)	6.72	6.8	6.9	6.7
Viscosity Index (VI)	Scale ASTM D2270*	104	105	108	101
Separability	oil/h2o/em ASTM D1401*	41/39/0	2/5/73 (30)	3/11/66 (30)	42/38/0 (20)
Air Release Time	min ASTM D3427*	3.5	4.60	4.80	7.80
Foam Tendency	I/II/III ASTM D892*	10	450/40/420	430/30/310	540/120/510
Foam Stability	I/II/III ASTM D892*	0	0/0/0	0/0/0	160/0/60
ASTM Color	scalar ASTM D1500*	0.5	L0.5	0.5	>1.5
Rust Prevention	PASS/FAIL ASTM D665*	PASS	PASS	PASS	PASS
Oxidation Test (RPVOT)	minutes ASTM D2272*	400	535	678	199

SEDIMENT	method	limit/base	current	history1	history2
Pentane Insolubles	% ASTM D893(m)*		0.037	0.029	0.037
Toluene Insolubles	% ASTM D893(m)*		0.013	0.014	0.014



ISO 17025:2017
Accredited
Laboratory

Laboratory

Sample No.

Lab Number

Unique Number

Test Package

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

: WC0786876

: **02580001**

: 5633061

: AOM 3 (Additional Tests: BottomAnalysis, FilterPatch, PrtFilter, Tollnsol)

Received : 01 Sep 2023

Diagnosed : 18 Sep 2023

Diagnostician : Bill Quesnel

Nalcor Energy - Churchill Falls

PO Box 310

Churchill Falls, NL

CA A0R 1A0

Contact: Robert Noel

robertnoel@nlh.nl.ca

T: (709)925-8294

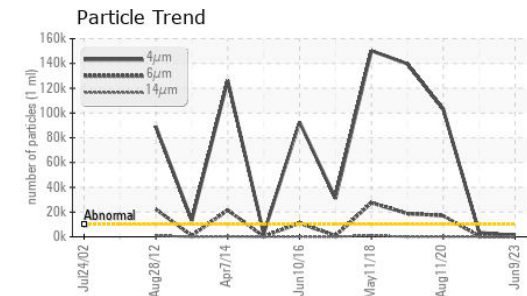
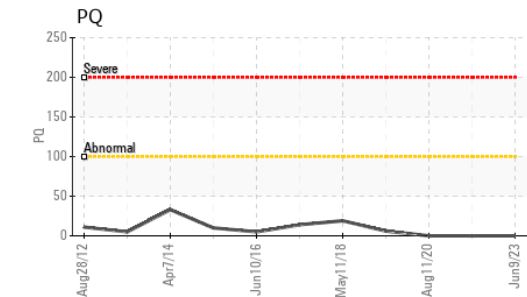
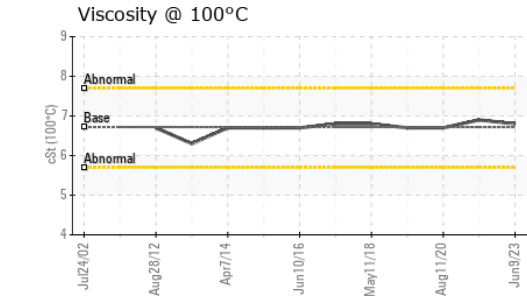
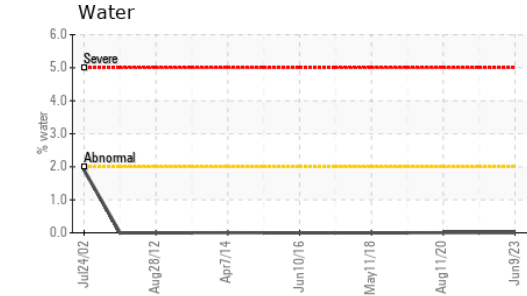
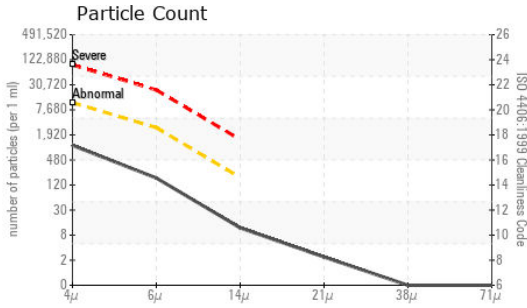
F: (709)925-8220

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.

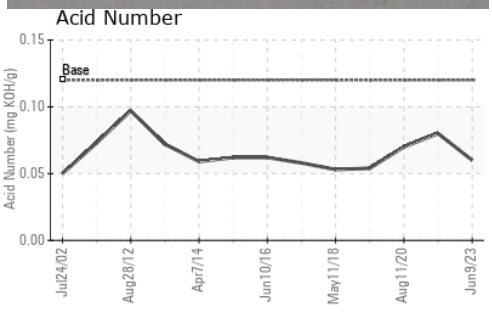
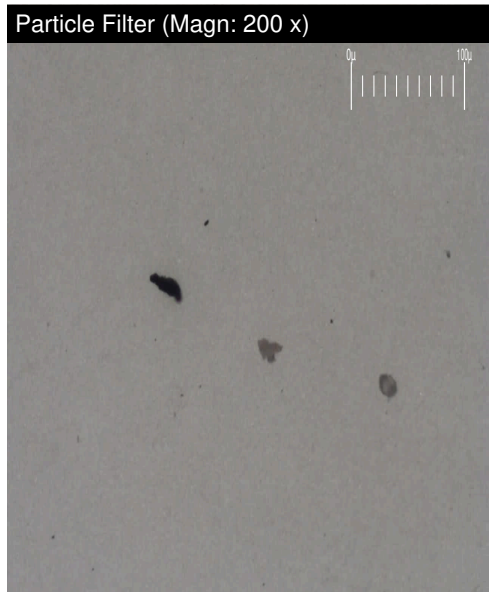
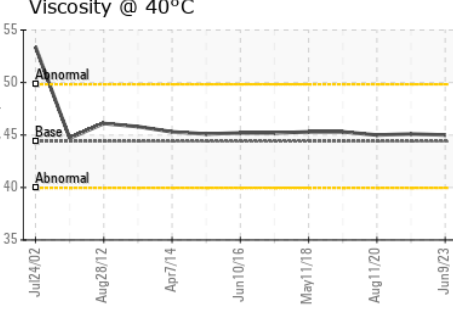
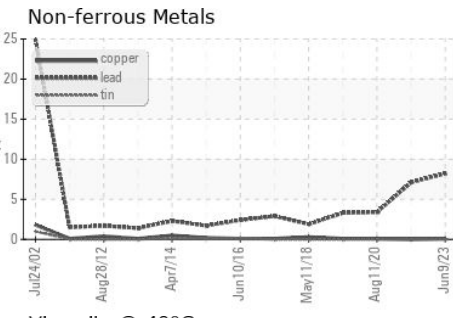
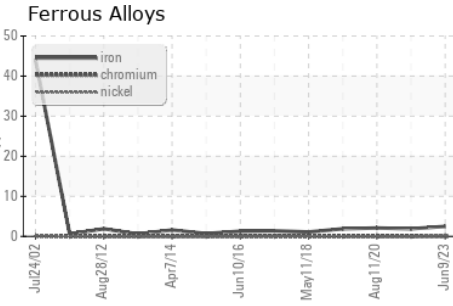
Validity of results and interpretation are based on the sample and information as supplied.

OIL ANALYSIS REPORT



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

GRAPHS



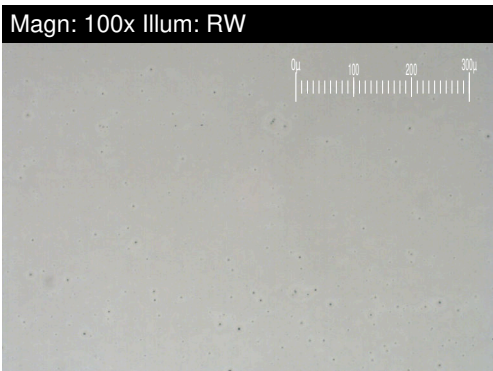
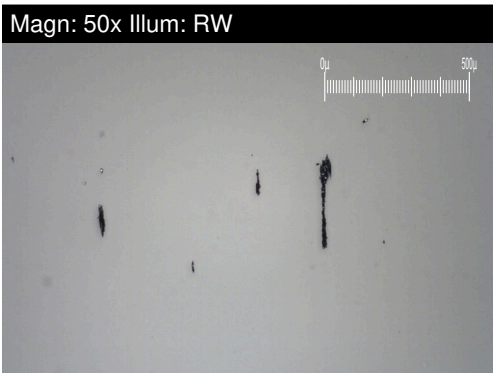
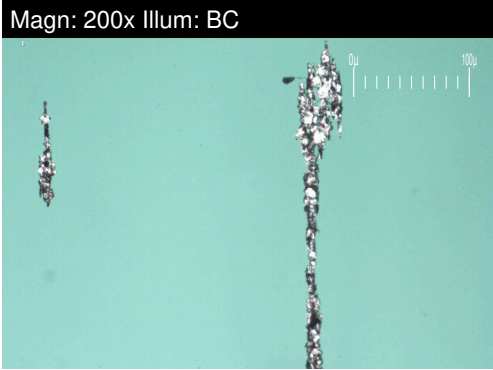
Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0786876
Lab Number : 02580001
Unique Number : 5633061
Test Package : AOM 3 (Additional Tests: BottomAnalysis, FilterPatch, PrtFilter, Tollnsol)

Nalcor Energy - Churchill Falls
 PO Box 310
 Churchill Falls, NL
 CA A0R 1A0
 Contact: Robert Noel
 robertnoel@nlh.nl.ca
 T: (709)925-8294
 F: (709)925-8220

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FERROGRAPHY REPORT

Area
[02437560]
 Machine Id
A9 - Thrust Bearing
 Component
Thrust Bearing
 Fluid
PETRO CANADA TURBOFLO R&O 46 (5705 LTR)

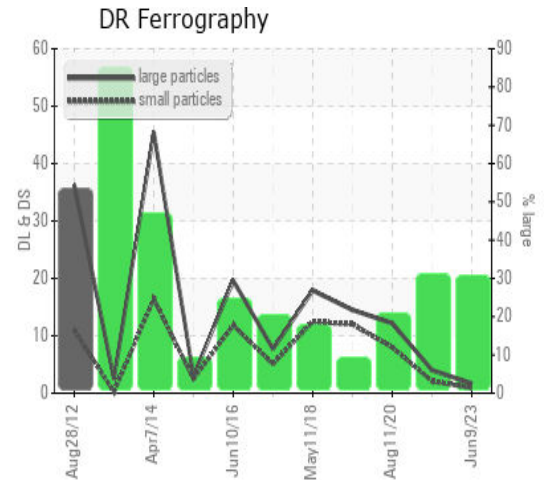


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		1.7	4.0	12.2
Small Particles		DR-Ferr*		0.9	2.1	8.0
Total Particles		DR-Ferr*	>---	2.6	6.1	20.2
Large Particles Percentage	%	DR-Ferr*		30.8	31.1	20.8
Severity Index		DR-Ferr*		1	8	51.2

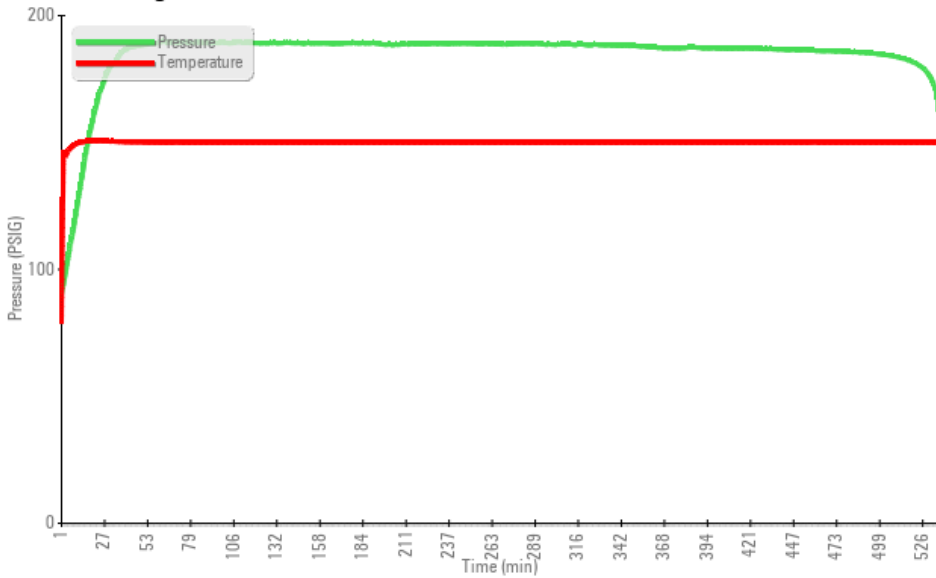
FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		3	2	3
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		2	1	1
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 0-10	ASTM D7684*				
Ferrous Black Oxides	Scale 0-10	ASTM D7684*				
Ferrous Red Oxides	Scale 0-10	ASTM D7684*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*				1
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	1
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		1	1	2

WEAR

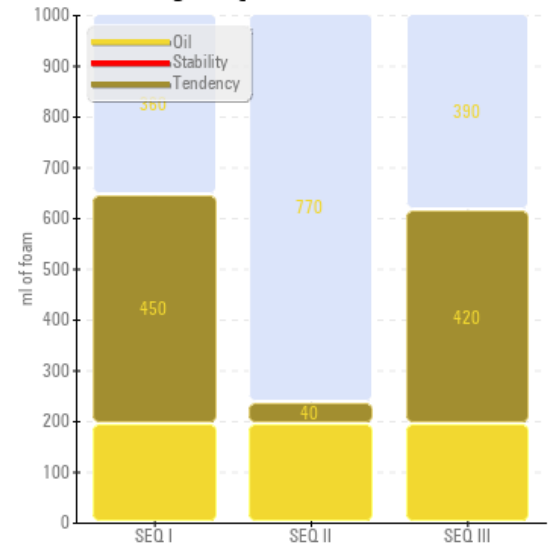
Wear particle analysis indicates that the ferrous rolling particles are marginal. All other component wear rates are normal.



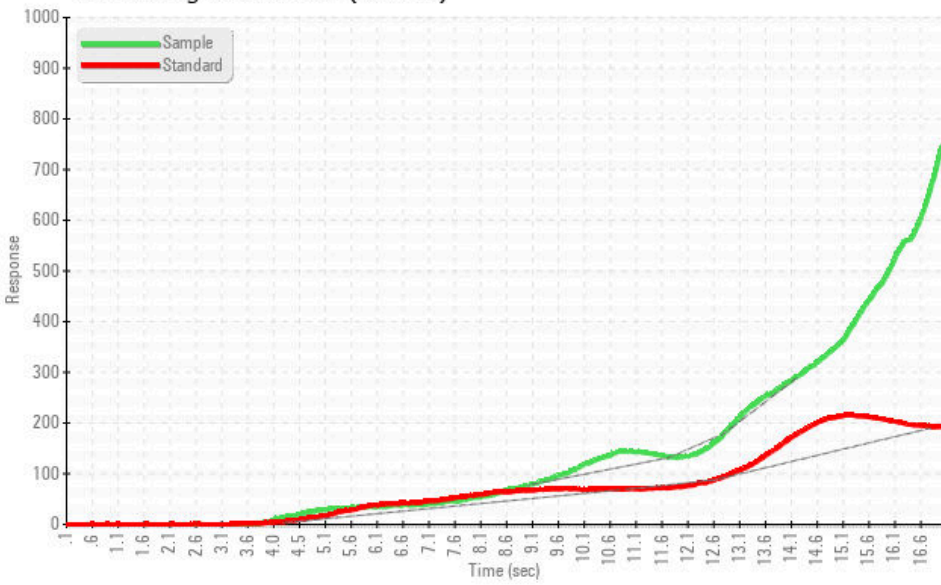
Rotating Pressure Vessel Oxidation Test



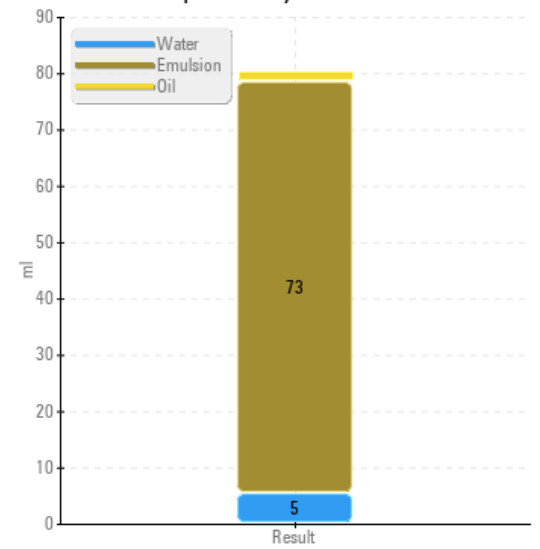
Foaming SEQ I/II/III



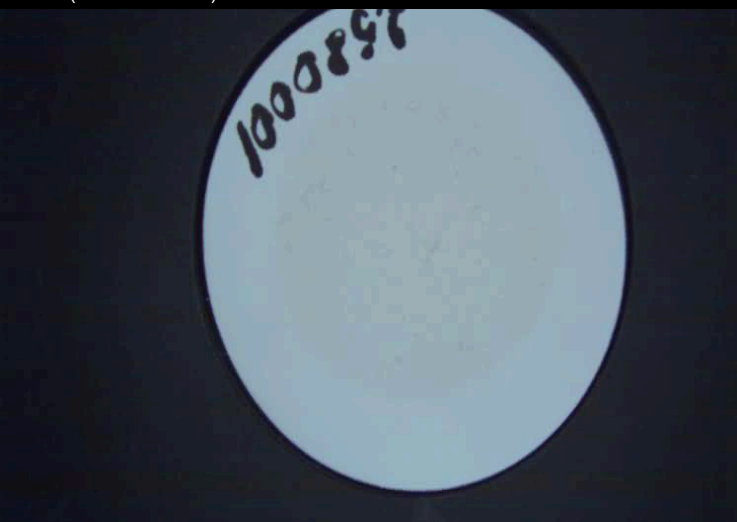
Remaining Useful Life (RULER)



Water Separability



MPC (Varnish Test)



Sample Color & Clarity



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