MAR III

WEAR CHECK

OIL ANALYSIS REPORT

WEAR	SEVERE
CONTAMINANTS	SEVERE
OIL CONDITION	NORMAL

Machine Id
EGR-23144 CPP
Component
Port Hydraulic System
Fluid
SHELL TELLUS S2 VX 46 (1000 LTR)

RECOMMENDATION

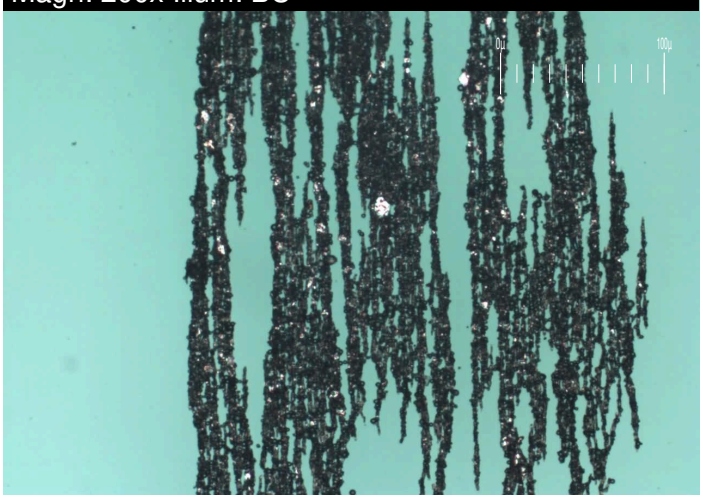
Check seals and/or filters for points of contaminant entry. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend you service the filters on this component. Re-sampling is suggested to confirm test results prior to significant maintenance activities being performed. Please indicate that this is a resample on your Sample Information Form (SIF). Resample in 30-45 days to monitor this situation.

WEAR

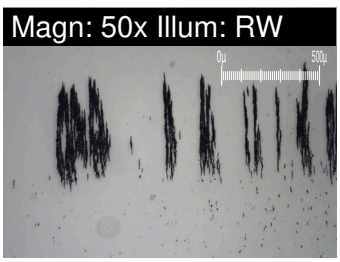
Severity Index levels are severe. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0574861	WC0494653	WC0494656
Sample Date		Client Info		30 Aug 2023	21 Sep 2022	31 Jul 2022
Machine Age	hrs	Client Info		80193	79186	78974
Oil Age	hrs	Client Info		1006	8625	8413
Filter Age	hrs	Client Info		1006	0	0
Oil Changed		Client Info		Not Changd	Changed	Not Changd
Filter Changed		Client Info		Not Changd	Not Changd	Not Changd
Sample Status				SEVERE	ABNORMAL	SEVERE
PQ		ASTM D8184*		0	0	0
Iron	ppm	ASTM D5185(m)	>20	6	4	5
Chromium	ppm	ASTM D5185(m)	>10	0	0	0
Nickel	ppm	ASTM D5185(m)	>10	<1	<1	<1
Titanium	ppm	ASTM D5185(m)		0	0	0
Silver	ppm	ASTM D5185(m)		0	0	0
Aluminum	ppm	ASTM D5185(m)	>10	1	1	2
Lead	ppm	ASTM D5185(m)	>20	0	1	<1
Copper	ppm	ASTM D5185(m)	>20	3	21	20
Tin	ppm	ASTM D5185(m)	>10	0	0	0
Vanadium	ppm	ASTM D5185(m)		0	0	0
White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Large Particles		DR-Ferr*		77.5	40.6	64.2
Small Particles		DR-Ferr*		46.7	24.0	42.2
Total Particles		DR-Ferr*	>---	124.2	64.6	106.4
Large Particles Percentage	%	DR-Ferr*		24.8	25.7	20.7
Severity Index		DR-Ferr*		▲ 2387	674	1412
Ferrous Rubbing	Scale 0-10	ASTM D7684*		3	4	4
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		1	2	2
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*		1	2	3
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*				

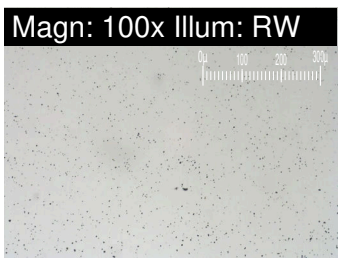
Magn: 200x Illum: BC



Magn: 50x Illum: RW



Magn: 100x Illum: RW



CONTAMINANTS

There is a high amount of silt (particulates < 14 microns in size) present in the oil.

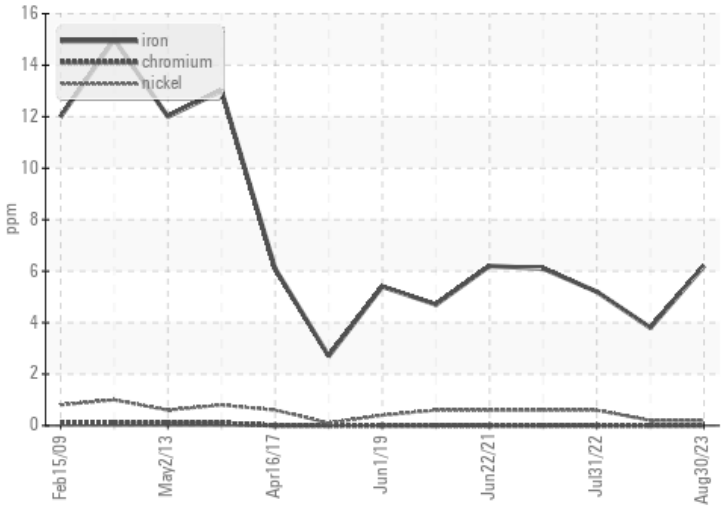
Silicon	ppm	ASTM D5185(m)	>15	**2**	2	2
Potassium	ppm	ASTM D5185(m)	>20	**<1**	1	0
Water		WC Method	>0.05	**NEG**	NEG	NEG
Particles >4µm		ASTM D7647	>5000	▲ **105623**	▲ 36289	▲ 80209
Particles >6µm		ASTM D7647	>1300	▲ **16767**	929	● 2157
Particles >14µm		ASTM D7647	>160	**46**	16	3
Particles >21µm		ASTM D7647	>40	**6**	5	1
Particles >38µm		ASTM D7647	>10	**0**	1	0
Particles >71µm		ASTM D7647	>3	**0**	0	0
Oil Cleanliness		ISO 4406 (c)	>19/17/14	▲ **24/21/13**	▲ 22/17/11	▲ 24/18/9
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*	>0.05	**NEG**	NEG	NEG
Carbonaceous Material	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**	2	2

OIL CONDITION

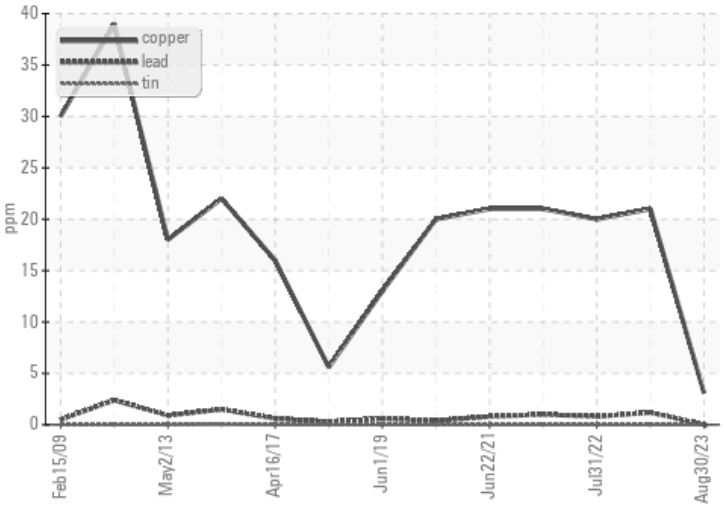
The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

Sodium	ppm	ASTM D5185(m)		**2**	4	4
Boron	ppm	ASTM D5185(m)		**<1**	<1	<1
Barium	ppm	ASTM D5185(m)		**<1**	<1	<1
Molybdenum	ppm	ASTM D5185(m)		**0**	0	0
Manganese	ppm	ASTM D5185(m)		**<1**	1	1
Magnesium	ppm	ASTM D5185(m)		**60**	5	5
Calcium	ppm	ASTM D5185(m)		**31**	45	45
Phosphorus	ppm	ASTM D5185(m)		**312**	295	279
Zinc	ppm	ASTM D5185(m)		**380**	311	325
Sulfur	ppm	ASTM D5185(m)		**744**	1017	1069
Acid Number (AN)	mg KOH/g	ASTM D974*		**0.32**	0.28	0.30
Visc @ 40°C	cSt	ASTM D7279(m)	46	**45.8**	44.9	45.5
Lubricant Degradation	Scale 0-10	ASTM D7684*				

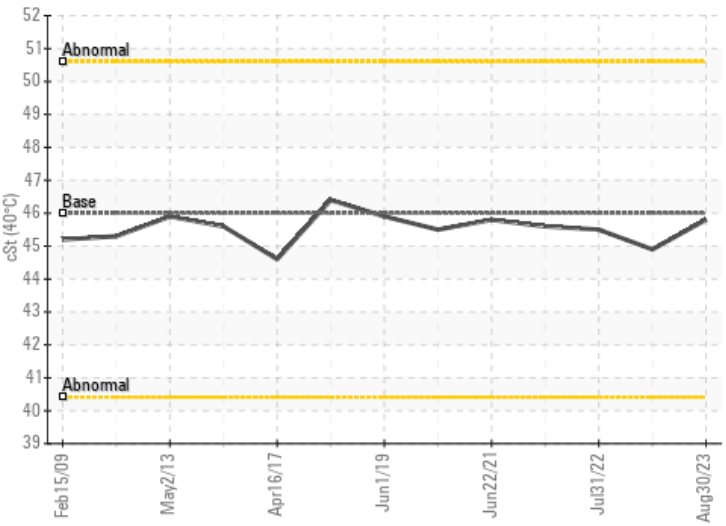
Ferrous Alloys



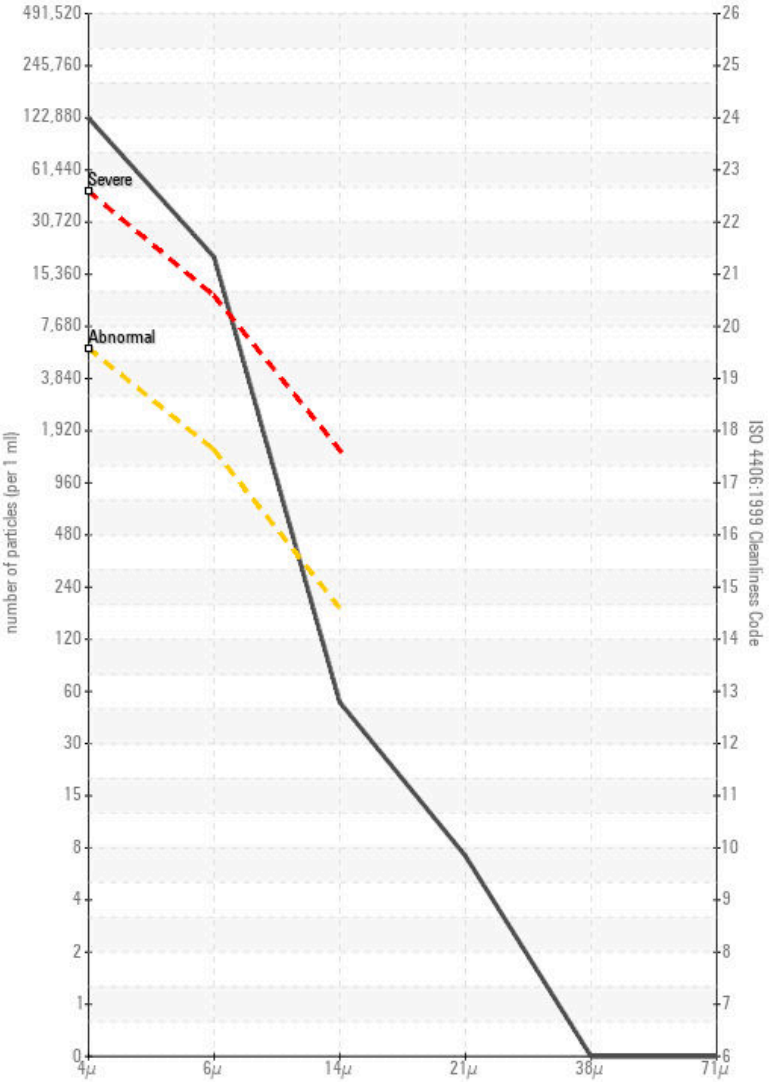
Non-ferrous Metals



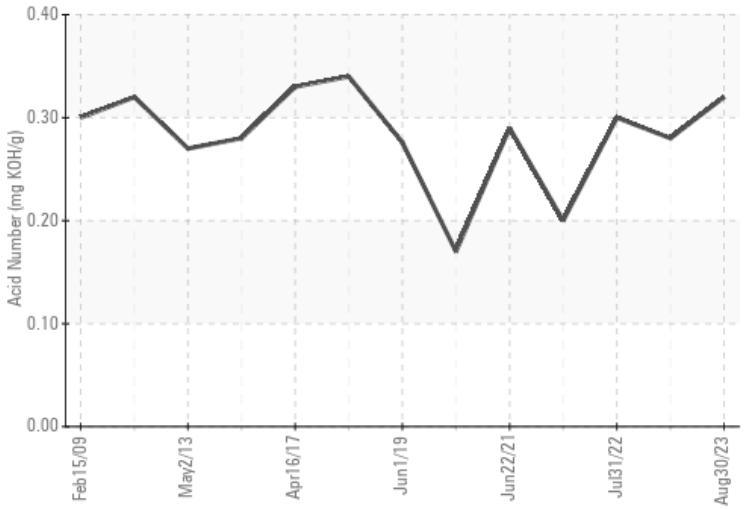
Viscosity @ 40°C



Particle Count



Acid Number



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0574861
Lab Number : 02581826
Unique Number : 5642891
Test Package : MAR 3

Received : 12 Sep 2023
Tested : 14 Sep 2023
Diagnosed : 15 Sep 2023 - Kevin Marson

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.

DFO, CCGS EARL GREY
PO BOX 1006, 1 CHALLENGER DR.
DARTMOUTH, NS
CA B2Y 4A2
Contact: Chief Engineer
earlgreyCE@EGR.ccgs-ngcc.gc.ca
T: (902)456-9285
F: (902)456-9285

This page left intentionally blank