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## Machine Id Ship Service Generator #3 (S/N 15501188) **Diesel Engine** PETRO CANADA DURON HP 15W40 (62 LTR)

## RECOMMENDATION

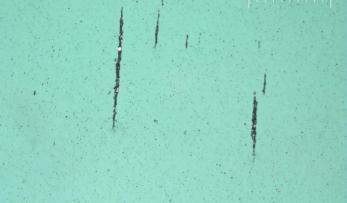
Resample at the next service interval to monitor. Please specify the component make and model with your next sample.

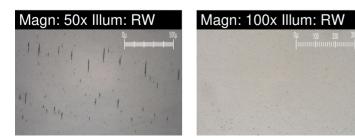
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Magn: 200x Illum: BC

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

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0772120	WC0700696	
Sample Date		Client Info		21 Oct 2023	26 Feb 2023	
Machine Age	hrs	Client Info		52337	50475	
Oil Age	hrs	Client Info		329	511	
Filter Age	hrs	Client Info		329	511	
Oil Changed		Client Info		Not Changd	Changed	
Filter Changed		Client Info		Not Changd	Changed	
Sample Status				NORMAL	NORMAL	
PQ		ASTM D8184*		0	0	
Iron	ppm	ASTM D5185(m)	>100	9	18	
Chromium	ppm	ASTM D5185(m)	>20	0	<1	
Nickel	ppm	ASTM D5185(m)	>4	0	<1	
Titanium	ppm	ASTM D5185(m)		0	<1	
Silver	ppm	ASTM D5185(m)	>3	<1	0	
Aluminum	ppm	ASTM D5185(m)	>20	<1	1	
Lead	ppm	ASTM D5185(m)	>40	2	1	
Copper	ppm	ASTM D5185(m)	>330	76	3	
Tin	ppm	ASTM D5185(m)	>15	<1	<1	
Vanadium	ppm	ASTM D5185(m)		0	0	
Large Particles		DR-Ferr*		3.9	7.2	
Small Particles		DR-Ferr*		1.6	5.7	
<b>Total Particles</b>		DR-Ferr*	>	5.5	12.9	
Large Particles Percentage	%	DR-Ferr*		41.8	11.6	
Severity Index		DR-Ferr*		9	11	
Ferrous Rubbing	Scale 0-10	ASTM D7684*		2	1	
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		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*				
				$\smile$		





Report Id: GRIFFON [WCAMIS] 02591344 (Generated: 05/10/2024 10:59:46) Rev: 1

## CONTAMINANTS

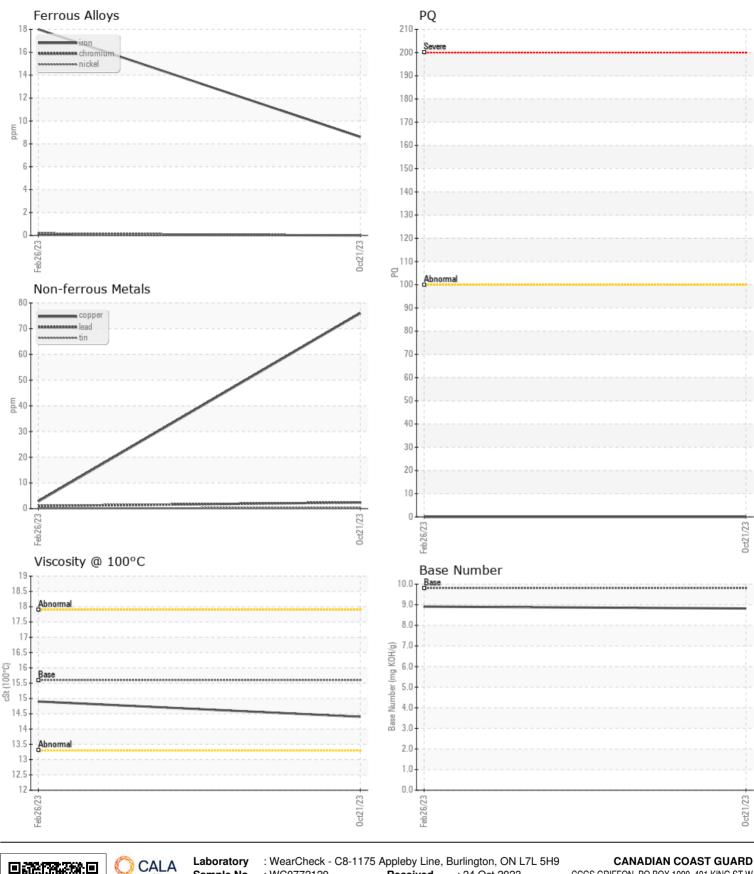
There is no indication of any contamination in the oil.

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The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SiliconppmASTM D5185(m)>2052PotassiumppmASTM D5185(m)>20IIIIIFuelWC Method>5I<1.0I<1.0IIWaterQWC Method>0.2NEGNEGIIGlycolWC Method>0.2NEGNEGIISoot %%ASTM D7844*>30IIIINitrationAbs/cmASTM D7844*>30IIIISulfationAbs/cmASTM D7844*>30IIIIISulfationAbs/cmASTM D7684*>0.0IIIIIISulfationAbs/cmASTM D7684*>0.0II<
FuelWC Method>5 $< 1.0$ $< 1.0$ $< 1.0$ $<$ WaterWC Method>0.2NEG $< I.0$ $<$ GlycolWC Method>0.2NEG $< I.EG$ $< I.EG$ $<$ Soot %%ASTM D7844*>3 $O$ $O.1$ $<$ NitrationAbs/cmASTM D7624*>20 $G.3$ $7.7$ $$ SulfationAbs/lmASTM D7624*>20 $G.3$ $7.7$ $$ SulfationAbs/lmASTM D7624*>20 $I.EG$ $NEG$ $$ SulfationAbs/lmASTM D7684*>0.2 $NEG$ $NEG$ $$ Sand/DirtScale 0.10ASTM D7684*>0.2 $I.EG$ $NEG$ $$ FibresScale 0.10ASTM D7684* $I.E$ $I.EG$ $I.EG$ $$ SpheresScale 0.10ASTM D7684* $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ SodiumppmASTM D5185(m) $O$ $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ BoronppmASTM D5185(m) $O$ $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ MolybdenumppmASTM D5185(m) $O$ $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ MaganesiappmASTM D5185(m) $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ MagnesiumppmASTM D5185(m) $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ $I.E$ Magnesium
WaterWC Method>0.2 $\mathbb{NEG}$
GlycolWC MethodNEGNEGSoot %%ASTM D7844'>3 $\overline{I}$
Soot % % ASTM D7844* >3 0 0.1    Nitration Abs/cm ASTM D7624* >20 6.3 7.7    Sulfation Abs/lm ASTM D7624* >20 6.3 7.7    Sulfation Abs/lm ASTM D7624* >20 Image: Sige 0.10 ASTM D7624* >0 Image: Sige 0.10 NEG    Carbonaceous Materia Scale 0.10 ASTM D7684* Image: Sige 0.10 ASTM D7684* Image: Sige 0.10 NEG  Image: Sige 0.10 </th
NitrationAbs/cmASTM D7624*>20 <b>6.3</b> 7.7SulfationAbs/.1mmASTM D715*>30 <b>1</b> 9.623.2Emulsified WaterscalarVisual*>0.2NEGNEGCarbonaceous MaterialScale 0.10ASTM D7684*IIIISand/DirtScale 0.10ASTM D7684*IIIIIFibresScale 0.10ASTM D7684*IIIIIISpheresScale 0.10ASTM D7684*IIIIIIISodiumppmASTM D7684*IIIIIIIIIBoronppmASTM D5185(m)0II </th
Sulfation Abs/. Imm ASTM D7415* >30 19.6 23.2    Emulsified Water scalar Visual* >0.2 NEG NEG    Carbonaceous Material Scale 0-10 ASTM D7684* I I I I   Sand/Dirt Scale 0-10 ASTM D7684* I I I I I   Fibres Scale 0-10 ASTM D7684* I I I I I   Spheres Scale 0-10 ASTM D7684* I <
Emulsified WaterscalarVisual*>0.2NEGNEGCarbonaceous MaterialScale 0:10ASTM D7684*IIIISand/DirtScale 0:10ASTM D7684*IIIIFibresScale 0:10ASTM D7684*IIIISpheresScale 0:10ASTM D7684*IIIIOtherScale 0:10ASTM D7684*IIIISodiumppmASTM D7684*IIIIBoronppmASTM D5185(m)0IIIIBariumppmASTM D5185(m)0IIIIMalganesaeppmASTM D5185(m)0IIIIMagnesiumppmASTM D5185(m)1010IIIIMagnesiumppmASTM D5185(m)1010IIIIMagnesiumppmASTM D5185(m)1010IIIIMagnesiumppmASTM D5185(m)1010IIIIMagnesiumppmASTM D5185(m)1010IIIIMagnesiumppmASTM D5185(m)1010IIIIMagnesiumppmASTM D5185(m)1010IIIIMagnesiumppmASTM D5185(m)IIIIIIMagnesiumppmASTM D5185
Carbonaceous MaterialScale 0-10ASTM D7684*Image: Carbonaceous MaterialScale 0-10ASTM D7684*Image: Carbonaceous MaterialImage: Carbonaceous MaterialImage: Carbonaceous MaterialScale 0-10ASTM D7684*Image: Carbonaceous MaterialImage: Carbonaceous MaterialImage: Carbonaceous MaterialImage: Carbonaceous MaterialImage: Carbonaceous MaterialScale 0-10ASTM D7684*Image: Carbonaceous MaterialImage: Carbonaceous Material </th
Sand/DirtScale 0-10ASTM D7684*IIIFibresScale 0-10ASTM D7684*IIIIIISpheresScale 0-10ASTM D7684*IIIIIIIIOtherScale 0-10ASTM D7684*II </th
FibresScale 0-10ASTM D7684*II
SpheresScale 0-10ASTM D7684*II
OtherScale 0-10ASTM D7684*IIISodiumppm $ASTM D5185(m)$ $2$ $2$ $$ Boronppm $ASTM D5185(m)$ 0 $3$ $3$ $3$ $$ Bariumppm $ASTM D5185(m)$ 0 $0$ $0$ $0$ $$ Molybdenumppm $ASTM D5185(m)$ 0 $64$ $65$ $$ Manganeseppm $ASTM D5185(m)$ 0 $0$ $-1$ $$ Magnesiumppm $ASTM D5185(m)$ 0 $0$ $-1$ $$ Magnesiumppm $ASTM D5185(m)$ 1010 $998$ $1063$ $$ Calciumppm $ASTM D5185(m)$ 1070 $1099$ $1198$ $$
SodiumppmASTM D5185(m)22BoronppmASTM D5185(m)033BariumppmASTM D5185(m)000MolybdenumppmASTM D5185(m)60644655ManganeseppmASTM D5185(m)00<1MagnesiumppmASTM D5185(m)10109981063MagnesiumppmASTM D5185(m)107010991198
BoronppmASTM D5185(m)033BariumppmASTM D5185(m)000MolybdenumppmASTM D5185(m)60644655ManganeseppmASTM D5185(m)00<1MagnesiumppmASTM D5185(m)10109981063CalciumppmASTM D5185(m)107010991198
Barium   ppm   ASTM D5185(m)   0   0   0      Molybdenum   ppm   ASTM D5185(m)   60   64   65      Manganese   ppm   ASTM D5185(m)   0   0   <1      Magnesium   ppm   ASTM D5185(m)   0   0   <1      Calcium   ppm   ASTM D5185(m)   1010   998   1063
Molybdenum   ppm   ASTM D5185(m)   60   64   65      Manganese   ppm   ASTM D5185(m)   0   0   <1      Magnesium   ppm   ASTM D5185(m)   1010   998   1063      Calcium   ppm   ASTM D5185(m)   1070   1099   1198
Manganese   ppm   ASTM D5185(m)   0   0   <1
Magnesium   ppm   ASTM D5185(m)   1010   998   1063      Calcium   ppm   ASTM D5185(m)   1070   1099   1198
Calcium   ppm   ASTM D5185(m)   1070   1099   1198
Phosphorus   ppm   ASTM D5185(m)   1150   1024   1130
Zinc ppm ASTM D5185(m) 1270 1220 1288
Sulfur   ppm   ASTM D5185(m)   2060   2506   2628
Oxidation Abs/.1mm ASTM D7414* >25 15.3 16.1
Base Number (BN)   mg KOH/g   ASTM D2896*   9.8   8.82   8.91
Visc @ 100°C cSt ASTM D7279(m) 15.6 14.4 14.9
Lubricant Degradation Scale 0-10 ASTM D7684*



CALA Sample No. Received : 24 Oct 2023 CCGS GRIFFON, PO BOX 1000, 401 KING ST.W : WC0772120 Lab Number : 02591344 Tested Prescott, ON : 30 Oct 2023 ISO 17025:2017 Accredited Laboratory Diagnosed Unique Number : 5668423 : 30 Oct 2023 - Kevin Marson CA K6V 5T3 Test Package : MAR 3 Contact: Senior Engineer To discuss this sample report, contact Customer Service at 1-800-268-2131. griffonse@ccgs-ngcc.gc.ca Test denoted (\*) outside scope of accreditation, (m) method modified, (e) tested at external lab. T: (519)312-1045 F: (519)312-1045 Validity of results and interpretation are based on the sample and information as supplied.

Contact/Location: Senior Engineer - GRIFFON Page 3 of 4 This page left intentionally blank