

# **OIL ANALYSIS REPORT**

Sample Rating Trend



Area {UNASSIGNED} Machine Id 914035 Component

**Diesel Engine** 

PETRO CANADA DURON HP 15W40 (--- GAL)

Sample Number   Client Info   GFL0097801       Sample Date   Client Info   12 Feb 2024       Sample Date   Machine Age   hrs   Client Info   0       Machine Age   hrs   Client Info   583       Oil Age   hrs   Client Info   Changed       Oil Changed   Client Info   Changed       Sample Status   Machine Age			····)			Feb 2024		
Sample Date recommended recommended service interval to OII Age has     Sample Date Age has     Client Info     12 Feb 2024 or Sample Status		SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
recommended service interval to in Age     hrs     Client Info     0         Oil Age     hrs     Client Info     583         al,     CONTAMINATION     method     limit/base     current     history1     history1       level of silion s of dirt/seal     Water     WC Method     >0.2     NEG         Water     WC Method     >0.2     NEG          Water     WC Method     >0.2     NEG          Water     WC Method     >0.2     NEG          water     Water     WC Method     >0.2     NEG         So di dr/seal     ppm     ASTM05185m<>50     5           Silver     ppm     ASTM05185m<>22     c1          Auminum     ppm     ASTM05185m<>40     c1          Copper		Sample Number		Client Info		GFL0097801		
service interval to     Match line / ge     Ins     Client Into     G     Ins     Client Into       Oil Aga     Ciris     Client Into     Changed         sample Status     Client Into     Changed         sample Status     Client Into     Changed         Water     WC Method     >0.2     NEG         Water     WC Method     >0.2     NEG         Water     WC Method     >0.2     NEG         Water     WC Method     >0.2     44         Chromium     ppm     ASTM 0585m     >20     4         Nickel     ppm     ASTM 0585m     >20     4         Aluminum     ppm     ASTM 0585m     >20     4         Aluminum     ppm     ASTM 0585m     >15     3         Vanadium     ppm	of sampling has			Client Info		12 Feb 2024		
Initial and the set of the set	s recommended	Machine Age	hrs	Client Info		0		
Cill Changed     Cilent Info     Changed         Sample Status     I     Imit/base     current     ABNORMAL         CONTAMINATION     method     Imit/base     current     history1     history1       sof dirt/seal     Glycol     WC Method     >0.2     NEG         Mater     WC Method     NEG	service interval to	Oil Age	hrs	Client Info		583		
Sample Status   Sample Status   Method   Imit/base   current   Niskory1   Niskory1     level of silicon s of dirifyea   Water   WC Method   >0.2   NEG       atl. The BN result inity remaining   To   ppm   ASTM 0518m   >2.0   44       Nickel   ppm   ASTM 0518m   >2.0   44        Nickel   ppm   ASTM 0518m   >2.0   44        Nickel   ppm   ASTM 0518m   >2.0   44 <td></td> <td>-</td> <td></td> <td>Client Info</td> <td></td> <td>Changed</td> <td></td> <td></td>		-		Client Info		Changed		
CONTAMINATION   method   limit/base   current   history1   history2     level of silicon s of dirl/seal   Water   WC Method   >0.2   NEG       MEG    MEG          WEAR METALS   method   Imit/base   current   history1   history1   history1     Nation   ppm   ASTM D5185m   >20   2        Nickel   ppm   ASTM D5185m   >20   44        Nickel   ppm   ASTM D5185m   >20   4        Nickel   ppm   ASTM D5185m   >20   4		-				-		
Insert of solition s of dirt/seal     Water Citycol     WC Method     >0.2     NEG         Sigeod     WC Method     MEG           WEAR METALS     method     Imit/base     current     history1     history1       Initiative remaining in inity remaining in inity remaining in     ron     ppm     ASTM D5185n     >20     2 <td>nal.</td> <td></td> <td>ION</td> <td>method</td> <td>limit/base</td> <td>current</td> <td>historv1</td> <td>history2</td>	nal.		ION	method	limit/base	current	historv1	history2
s of dirt/seal     Giycol     WC Method     NEG         WEAR METALS     method     limit/base     current     history1     history1       nal. The BN result linity remaining in     Iron     ppm     ASTM 05186m     >20     2         Nickel     ppm     ASTM 05186m     >20     2          Nickel     ppm     ASTM 05186m     >20     2          Silver     ppm     ASTM 05186m     >20     4          Silver     ppm     ASTM 05186m     >20     4          Copper     ppm     ASTM 05186m     >15     3          Qanadium     ppm     ASTM 05186m     110          ADDITIVES     method     limit/base     current     history1     history1        Admain     ppm     ASTM 05186m     133     -	level of silicon			WC Method	>0.2			
WEAR METALS     method     limit/base     current     history1     history1       al. The BN result inity remaining in     fron     ppm     ASTM 05185m     >20     2         Nickel     ppm     ASTM 05185m     >5     6          Nickel     ppm     ASTM 05185m     >2     2          Silver     ppm     ASTM 05185m     >2     2          Aluminum     ppm     ASTM 05185m     >20     4					20.L			
al. The BN result   Iron   ppm   ASTM D5185m   >12.0   44       Nickel   ppm   ASTM D5185m   >20   2       Nickel   ppm   ASTM D5185m   >2   6        Silver   ppm   ASTM D5185m   >2   2        Aluminum   ppm   ASTM D5185m   >20   4        Aluminum   ppm   ASTM D5185m   >20   4 <td></td> <td></td> <td>~</td> <td></td> <td>11 11 11</td> <td>_</td> <td></td> <td></td>			~		11 11 11	_		
Inity remaining in     Chromium     ppm     ASTM D5185m     >20     2         Nickel     ppm     ASTM D5185m     >5     6         Silver     ppm     ASTM D5185m     >2     <1							history1	history
Nickel     ppm     ASTM D5185n     >5     6         Titanium     ppm     ASTM D5185n     >2     2         Silver     ppm     ASTM D5185n     >2     2         Lead     ppm     ASTM D5185n     >40     -1         Copper     ppm     ASTM D5185n     >300     224         Tin     ppm     ASTM D5185n     >40     -1         Cadmium     ppm     ASTM D5185n     >41          ADDITIVES     method     limit/base     current     history1     history1       Barium     ppm     ASTM D5185n     112         Molybdenum     ppm     ASTM D5185n     112         Maganesium     ppm     ASTM D5185n     1338         Magnesium     ppm     ASTM D5185n     2816								
Titanium   ppm   ASTM D5185m   >2   <1	inity remaining in		ppm					
Silver   ppm   ASTM D5185m   >2   2       Aluminum   ppm   ASTM D5185m   >20   4       Lead   ppm   ASTM D5185m   >40   <1		Nickel	ppm					
Aluminum     ppm     ASTM D5185m     >20     4         Lead     ppm     ASTM D5185m     >40     <1		Titanium	ppm	ASTM D5185m	>2			
Lead   ppm   ASTM D5185m   >40   <1			ppm					
Cooper     ppm     ASTM D5185m     >330     224         Tin     ppm     ASTM D5185m     >15     3         Vanadium     ppm     ASTM D5185m     <1		Aluminum	ppm	ASTM D5185m	>20	4		
Tin     ppm     ASTM D5185m     >15     3         Vanadium     ppm     ASTM D5185m     <1		Lead	ppm	ASTM D5185m	>40			
Vanadium     ppm     ASTM D5185m     <1         ADDITIVES     method     limit/base     current     history1     history1       Boron     ppm     ASTM D5185m     223         Boron     ppm     ASTM D5185m     0         Barium     ppm     ASTM D5185m     0         Molybdenum     ppm     ASTM D5185m     112         Magnesium     ppm     ASTM D5185m     727         Calcium     ppm     ASTM D5185m     784         Calcium     ppm     ASTM D5185m     784         Vufur     ppm     ASTM D5185m     2816         Sulfur     ppm     ASTM D5185m     >25     83         Sulfur     ppm     ASTM D5185m     >25     83         Sulfur     ppm     ASTM D5185m		Copper	ppm	ASTM D5185m	>330			
Cadmium     ppm     ASTM D5185m     <1         ADDITIVES     method     limit/base     current     history1     history1       Boron     ppm     ASTM D5185m     223         Barium     ppm     ASTM D5185m     223         Molybdenum     ppm     ASTM D5185m     112         Magnesium     ppm     ASTM D5185m     727         Magnesium     ppm     ASTM D5185m     724         Calcium     ppm     ASTM D5185m     784         Vifur     ppm     ASTM D5185m     2816         Suffur     ppm     ASTM D5185m     2816         Suffur     ppm     ASTM D5185m     20     83         Suffur     ppm     ASTM D5185m     20     83         Sodium     ppm     ASTM D5185m     20		Tin	ppm	ASTM D5185m	>15	3		
ADDITIVESmethodlimit/basecurrenthistory1history1BoronppmASTM D5185m223BariumppmASTM D5185m0MolybdenumppmASTM D5185m112MagneseeppmASTM D5185m727MagnesiumppmASTM D5185m727CalciumppmASTM D5185m784PhosphorusppmASTM D5185m784ZincppmASTM D5185m2816SulfurppmASTM D5185m>25833SoliumppmASTM D5185m>208PotassiumppmASTM D5185m>208Fuel%ASTM D5185m>208INFRA-REDmethodlimit/basecurrenthistory1history1Soot %%*ASTM D7844>40.4NitrationAbs/tmm*ASTM D7624>209.3FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/tmm*ASTM D7844>40.4NitrationAbs/tmm*ASTM D7624>209.3OxidationAbs/tmm*ASTM D7844>40.4 <td>Vanadium</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td>&lt;1</td> <td></td> <td></td>		Vanadium	ppm	ASTM D5185m		<1		
Boron   ppm   ASTM D5185m   223       Barium   ppm   ASTM D5185m   0       Molybdenum   ppm   ASTM D5185m   112       Manganese   ppm   ASTM D5185m   112       Magnesium   ppm   ASTM D5185m   727       Calcium   ppm   ASTM D5185m   784       Phosphorus   ppm   ASTM D5185m   850       Sulfur   ppm   ASTM D5185m   2816       Sulfur   ppm   ASTM D5185m   >25   833       Sulfur   ppm   ASTM D5185m   >20   8       Sodium   ppm   ASTM D5185m   >20   8       Sodium   ppm   ASTM D5185m   >20   8       Sodium   ppm   ASTM D5185m   >20   8       Fuel   %		Cadmium	ppm	ASTM D5185m		<1		
Barium   ppm   ASTM D5185m   0       Molybdenum   ppm   ASTM D5185m   112       Manganese   ppm   ASTM D5185m   4       Magnesium   ppm   ASTM D5185m   727       Calcium   ppm   ASTM D5185m   727       Calcium   ppm   ASTM D5185m   784       Phosphorus   ppm   ASTM D5185m   784       Zinc   ppm   ASTM D5185m   2816       Sulfur   ppm   ASTM D5185m   >25   83       Sodium   ppm   ASTM D5185m   >20   8       Sodium   ppm   ASTM D5185m   >20   8       Fuel   %   ASTM D5185m   >20   8       Sodium   ppm   ASTM D5185m   >20   8       Fuel		ADDITIVES		method	limit/base	current	history1	history
Molybdenum   ppm   ASTM D5185m   112       Manganese   ppm   ASTM D5185m   4       Magnesium   ppm   ASTM D5185m   727       Calcium   ppm   ASTM D5185m   1338       Phosphorus   ppm   ASTM D5185m   784       Zinc   ppm   ASTM D5185m   784       Sulfur   ppm   ASTM D5185m   850       Sulfur   ppm   ASTM D5185m   2816       Sodium   ppm   ASTM D5185m   >25   83       Sodium   ppm   ASTM D5185m   >20   8       Fuel   %   ASTM D5185m   >20   8.3       Sodium   ppm   ASTM D5185m   >20   8.3       Fuel   %   ASTM D5185m   >20   8.3       Soot %   %		Boron	ppm	ASTM D5185m		223		
Manganesse   ppm   ASTM D5185m   4      Magnesium   ppm   ASTM D5185m   727       Calcium   ppm   ASTM D5185m   1338       Phosphorus   ppm   ASTM D5185m   784       Zinc   ppm   ASTM D5185m   850       Sulfur   ppm   ASTM D5185m   2816       Sulfur   ppm   ASTM D5185m   >25   83       Sodium   ppm   ASTM D5185m   >20   8       Potassium   ppm   ASTM D5185m   >20   8       Fuel   %   ASTM D5185m   >20   8       NFRA-RED   method   limit/base   current   history1   history1     Nitration   Abs/cm   *ASTM D524   >3.0   0.4       Soot %   %   *ASTM D7644   >4   0.4       Nitration <td< td=""><td></td><td>Barium</td><td>ppm</td><td>ASTM D5185m</td><td></td><td>0</td><td></td><td></td></td<>		Barium	ppm	ASTM D5185m		0		
MagnesiumppmASTM D5185m727CalciumppmASTM D5185m1338PhosphorusppmASTM D5185m784ZincppmASTM D5185m850SulfurppmASTM D5185m2816SulfurppmASTM D5185m>25<		Molybdenum	ppm	ASTM D5185m		112		
Calcium   ppm   ASTM D5185m   1338       Phosphorus   ppm   ASTM D5185m   784       Zinc   ppm   ASTM D5185m   850       Sulfur   ppm   ASTM D5185m   2816       CONTAMINANTS   method   limit/base   current   history1   history1     Silicon   ppm   ASTM D5185m   >25   & 83       Sodium   ppm   ASTM D5185m   >25   & 83       Potassium   ppm   ASTM D5185m   >20   8   83       Fuel   %   ASTM D5185m   >20   8        Sootium   ppm   ASTM D5185m   >20   8       Fuel   %   ASTM D5185m   >20   8       Soot %   %   *ASTM D7844   >4   0.4       Nitration   Abs/.1mm   *ASTM D7624		Manganese	ppm	ASTM D5185m		4		
PhosphorusppmASTM D5185m784ZincppmASTM D5185m850SulfurppmASTM D5185m2816CONTAMINANTSmethodlimit/basecurrenthistory1history1SiliconppmASTM D5185m>2583SodiumppmASTM D5185m>208PotassiumppmASTM D5185m>208Fuel%ASTM D5185m>208INFRA-REDmethodlimit/basecurrenthistory1history1Soot %%*ASTM D7844>40.4NitrationAbs/cm*ASTM D7844>209.3SulfationAbs/1mm*ASTM D7415>3024.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/1mm*ASTM D7414>2521.8		Magnesium	ppm	ASTM D5185m		727		
ZincppmASTM D5185m850SulfurppmASTM D5185m2816CONTAMINANTSmethodlimit/basecurrenthistory1history1SiliconppmASTM D5185m>25833SodiumppmASTM D5185m>208PotassiumppmASTM D5185m>208Fuel%ASTM D3524>3.00.4INFRA-REDmethodlimit/basecurrenthistory1history1Soot %%*ASTM D7844>40.4NitrationAbs/cm*ASTM D7624>209.3FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/.1mm*ASTM D7414>2521.8		Calcium	ppm	ASTM D5185m		1338		
SulfurppmASTM D5185m2816CONTAMINANTSmethodlimit/basecurrenthistory1history1SiliconppmASTM D5185m>25833SodiumppmASTM D5185m>208PotassiumppmASTM D5185m>208Fuel%ASTM D5185m>208INFRA-REDmethodlimit/basecurrenthistory1history1Soot %%*ASTM D7844>40.4NitrationAbs/cm*ASTM D7624>209.3FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/.1mm*ASTM D7414>2521.8		Phosphorus	ppm	ASTM D5185m		784		
CONTAMINANTSmethodlimit/basecurrenthistory1history1SiliconppmASTM D5185m>25▲ 83SodiumppmASTM D5185m0PotassiumppmASTM D5185m>208Fuel%ASTM D3524>3.00.4INFRA-REDmethodlimit/basecurrenthistory1history1Soot %%*ASTM D7844>40.4NitrationAbs/cm*ASTM D7624>209.3SulfationAbs/1mm*ASTM D7415>3024.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/1mm*ASTM D7414>2521.8		Zinc	ppm	ASTM D5185m		850		
Silicon   ppm   ASTM D5185m   >25   83       Sodium   ppm   ASTM D5185m   0       Potassium   ppm   ASTM D5185m   >20   8       Fuel   %   ASTM D5185m   >20   8       Fuel   %   ASTM D5185m   >20   8       INFRA-RED   method   limit/base   current   history1   history1     Soot %   %   *ASTM D7844   >4   0.4       Nitration   Abs/cm   *ASTM D7624   >20   9.3       FLUID DEGRADATION   method   limit/base   current   history1   history1     Oxidation   Abs/.1mm   *ASTM D7414   >25   21.8		Sulfur	ppm	ASTM D5185m		2816		
Sodium     ppm     ASTM D5185m     0         Potassium     ppm     ASTM D5185m     >20     8         Fuel     %     ASTM D3524     >3.0     0.4         INFRA-RED     method     limit/base     current     history1     history1       Soot %     %     *ASTM D7844     >4     0.4         Nitration     Abs/cm     *ASTM D7624     >20     9.3         Sulfation     Abs/.1mm     *ASTM D7415     >30     24.2         FLUID DEGRADATION     method     limit/base     current     history1     history1       Oxidation     Abs/.1mm     *ASTM D7414     >25     21.8		CONTAMINAN	ITS	method	limit/base	current	history1	history
Potassium     ppm     ASTM D5185m     >20     8         Fuel     %     ASTM D3524     >3.0     0.4         INFRA-RED     method     limit/base     current     history1     history1       Soot %     %     *ASTM D7844     >4     0.4         Nitration     Abs/cm     *ASTM D7844     >4     0.4         Sulfation     Abs/rm     *ASTM D7624     >20     9.3         FLUID DEGRADATION     method     limit/base     current     history1     history1       Oxidation     Abs/.1mm     *ASTM D7414     >25     21.8		Silicon	ppm	ASTM D5185m	>25	▲ 83		
Fuel%ASTM D3524>3.00.4INFRA-REDmethodlimit/basecurrenthistory1history1Soot %%*ASTM D7844>40.4NitrationAbs/cm*ASTM D7624>209.3SulfationAbs/.1mm*ASTM D7415>3024.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/.1mm*ASTM D7414>2521.8		Sodium	ppm	ASTM D5185m		0		
INFRA-REDmethodlimit/basecurrenthistory1history1Soot %%*ASTM D7844>40.4NitrationAbs/cm*ASTM D7624>209.3SulfationAbs/1mm*ASTM D7415>3024.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/1mm*ASTM D7414>2521.8		Potassium	ppm	ASTM D5185m	>20	8		
Soot %     %     *ASTM D7844     >4     0.4         Nitration     Abs/cm     *ASTM D7624     >20     9.3         Sulfation     Abs/.1mm     *ASTM D7415     >30     24.2         FLUID DEGRADATION     method     limit/base     current     history.     history.       Oxidation     Abs/.1mm     *ASTM D7414     >25     21.8		Fuel	%	ASTM D3524	>3.0	0.4		
Nitration     Abs/cm     *ASTM D7624     >20     9.3         Sulfation     Abs/.1mm     *ASTM D7415     >30     24.2         FLUID DEGRADATION     method     limit/base     current     history1     history       Oxidation     Abs/.1mm     *ASTM D7414     >25     21.8		INFRA-RED		method	limit/base	current	history1	history
NitrationAbs/cm*ASTM D7624>209.3SulfationAbs/.1mm*ASTM D7415>3024.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/.1mm*ASTM D7414>2521.8		Soot %	%	*ASTM D7844	>4	0.4		
Sulfation   Abs/.1mm   *ASTM D7415   >30   24.2       FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   21.8								
Oxidation     Abs/.1mm     *ASTM D7414     >25     21.8								
				and the second	line it de la la		biotoput	history
		FLUID DEGRAI	DATION	method	limit/base	current	riistory i	Thistory

## DIAGNOSIS

### Recommendation

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

Fluid

### Wear

All component wear rates are normal.

#### Contamination

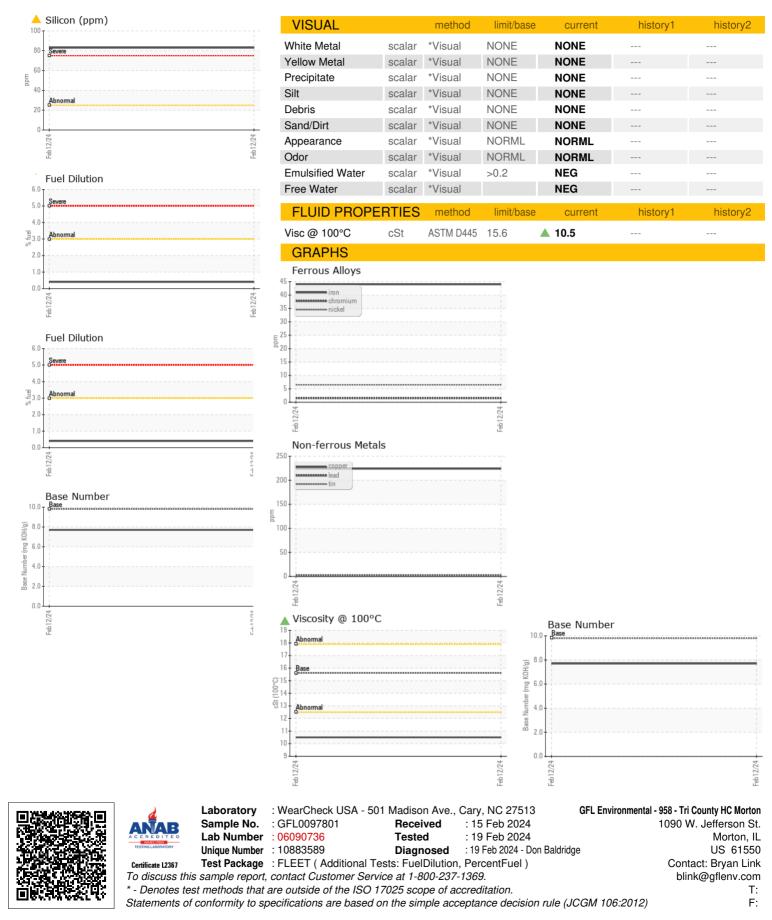
Fuel content negligible. Elemental level of silicon (Si) above normal indicating ingress of dirt/seal material.

#### Fluid Condition

The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.



# **OIL ANALYSIS REPORT**



Submitted By: Also GFL958,958A, 958B - Bryan Link