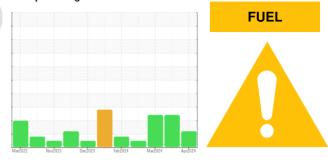


## **OIL ANALYSIS REPORT**

Sample Rating Trend



**Diesel Engine** PETRO CANADA DURON SHP 15W40 (--- GAL)

system.         Sample Date         Client Info         11 Apr 2024         15 Mar 2024         04 Mar 2024           g has interval         Machine Age         hrs         Client Info         2026         184909         1957           Oil Age         hrs         Client Info         600         0         600         0         600           Oil Changed         Client Info         Changed         N/A         Changed         SevERE         SEVERE           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >80         15         17         14           Chromium         ppm         ASTM D5185m         >2         0         <1         0           Silver         ppm         ASTM D5185m         >3         0         0         0         0           Copper         ppm         ASTM D5185m         >3         0         0         0         0         0         0		SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
g has interval       Machine Age Oil Age Oil Age Oil Changed Sample Status       hrs       Client Info       600       0       600       0       600         Oil Age Sample Status       I       Client Info       Changed ABNORMAL       SEVERE       SEVERE         CONTAMINATION       method       limit/base       current       history1       history2         Water       WC Method       >0.2       NEG       NEG       NEG         Wear       WC Method       >0.2       NEG       NEG       NEG         e       is       Wear       WC Method       NEG       NEG       NEG         Iron       ppm       ASTM D5185m<>80       15       17       14       0         Chromium       ppm       ASTM D5185m<>20       0       <1		Sample Number		Client Info		GFL0104472	GFL0104439	GFL0104287
interval         Oil Age Oil Age Sample Status         Into Client Info         Cole         Noto         Noto           Oil Age Sample Status         Client Info         Changed ABNORMALL         N/A         Changed Severe         SEVERE         SEVERE           CONTAMINATION         method         limit/base         current         history1         history2           e         Water         WC Method         >0.2         NEG         NEG         NEG           Wetar         WC Method         >0.2         NEG         NEG         NEG         NEG           in in the         WEAR METALS         method         limit/base         current         history1         history2           in the         WEAR METALS         method         limit/base         current         history1         history2           in the         ppm         ASTM D5185m         >80         15         17         14           Chromium         ppm         ASTM D5185m         >3         0         0         10           Nickel         ppm         ASTM D5185m         >30         0         1         1         0           Aumium         ppm         ASTM D5185m         30         0         0         0	n system.	Sample Date		Client Info		11 Apr 2024	15 Mar 2024	04 Mar 2024
Oil Age         Ins         Client Into         600         0	ling has ce interval	Machine Age	hrs	Client Info		20206	184909	19957
Sample Status         Method         Jemit/base         Current         History1         History2           Water         WC Method         >0.2         NEG         NEG         NEG           Giycol         WC Method         >0.2         NEG         NEG         NEG           e         Situ Osition         ppm         ASTM DS186         >80         15         17         14           Chronium         ppm         ASTM DS186         >6         4         1         <1		Oil Age	hrs	Client Info		600	0	600
CONTAMINATION         method         limit/base         current         history1         history2           nt in the         Water         WC Method         >0.2         NEG         NEG         NEG           By Col         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         Imit/base         current         history1         history2           Iron         ppm         ASTM 05185m         >2         0         -1         0           Nickel         ppm         ASTM 05185m         >2         0         -1         0           Nickel         ppm         ASTM 05185m         >3         0         0         0         0           Nickel         ppm         ASTM 05185m         >30         0         -1         0         0           Auminum         ppm         ASTM 05185m         >30         0         -1         0         0         0           Copper         ppm         ASTM 05185m         >30         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0<		Oil Changed		Client Info		Changed	N/A	Changed
Name     Water     WC Method     >0.2     NEG     NEG     NEG       Bycol     WC Method     NEG     NEG     NEG     NEG       WEAR METALS     method     imit/base     current     history1     history2       Iron     ppm     ASTM 05185m     >80     15     17     14       Chromium     ppm     ASTM 05185m     >2     0     <1		Sample Status				ABNORMAL	SEVERE	SEVERE
Glycol         WC Method         NEG         NEG         NEG           e is         WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5165m         >80         15         17         14           Chromium         ppm         ASTM D5165m         >2         0         <1		CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS         method         limit/base         current         history1         history2           is is         Iron         ppm         ASTM D5185m         >80         15         17         14           Chromium         ppm         ASTM D5185m         >2         0         <1	nt in the	Water		WC Method	>0.2	NEG	NEG	NEG
e         is         Iron         ppm         ASTM 05185m         >80         15         17         14           Chromium         ppm         ASTM 05185m         >5         4         1         <1		Glycol		WC Method		NEG	NEG	NEG
iron         ppm         ASTM D5185m         >800         15         17         14           Chromium         ppm         ASTM D5185m         <5		WEAR METAL	S	method	limit/base	current	history1	history2
Chromium         ppm         ASTM D5185m         >5         4         1         <1           Nickel         ppm         ASTM D5185m         >2         0         <1		Iron	maa	ASTM D5185m	>80	15	17	14
Nickel         ppm         ASTM D5185m         >2         0         <1         0           Titanium         ppm         ASTM D5185m         >3         0         0         0           Silver         ppm         ASTM D5185m         >30         2         2         2           Lead         ppm         ASTM D5185m         >30         0         <1								
Titanium         ppm         ASTM D5185m         S3         0         <1         0           Aluminum         ppm         ASTM D5185m         >30         2         2         2           Lead         ppm         ASTM D5185m         >30         2         2         2           Lead         ppm         ASTM D5185m         >30         0         <1							<1	
Silver       ppm       ASTM D5185m       >3       0       0       0         Aluminum       ppm       ASTM D5185m       >30       2       2       2         Lead       ppm       ASTM D5185m       >30       0       <1       0         Copper       ppm       ASTM D5185m       >150       <1       <1       0         Tin       ppm       ASTM D5185m       >5       <1       <1       0         Vanadium       ppm       ASTM D5185m       >5       <1       <1       0         Vanadium       ppm       ASTM D5185m       0       6       2       0         ADDITIVES       method       limit/base       current       history1       history2         Boron       ppm       ASTM D5185m       0       6       2       0         Magnesium       ppm       ASTM D5185m       00       6       2       0         Magnesium       ppm       ASTM D5185m       1010       888       76       818         Calcium       ppm       ASTM D5185m       1010       888       276       818         Calcium       ppm       ASTM D5185m       1070       1090						-		
Atuminum         ppm         ASTM D5185m         >30         2         2         2           Lead         ppm         ASTM D5185m         >30         0         <1					>3			
Lead         ppm         ASTM D5185m         >30         0         <1         0           Copper         ppm         ASTM D5185m         >150         <1						-		
Copper         ppm         ASTM D5185m         >150         <1         2         0           Tin         ppm         ASTM D5185m         >5         <1								
Tin         ppm         ASTM D5185m         >5         <1         <1         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         6         2         0           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         <1						-		
Vanadium         ppm         ASTM D5185m         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         6         2         0           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         <1								
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         6         2         0           Barium         ppm         ASTM D5185m         0         0         0         0         0         0           Manganese         ppm         ASTM D5185m         0         <1         <1         0           Magnesium         ppm         ASTM D5185m         1010         888         796         818           Calcium         ppm         ASTM D5185m         1070         1090         910         857           Phosphorus         ppm         ASTM D5185m         1150         1053         890         884           Zinc         ppm         ASTM D5185m         220         1112         1058           Sulfur         ppm         ASTM D5185m         2060         3436         2778         2434           CONTAMINANTS         method         limit/base         current         history1         history2           Solicon         ppm         ASTM D5185m         20					20			
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         6         2         0           Barium         ppm         ASTM D5185m         0         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         52         51         50         0           Magnesium         ppm         ASTM D5185m         00         <1								
Boron       ppm       ASTM D5185m       0       6       2       0         Barium       ppm       ASTM D5185m       0       0       0       0         Molybdenum       ppm       ASTM D5185m       60       52       51       50         Manganese       ppm       ASTM D5185m       0       <1			ppm					
Barium         ppm         ASTM D5185m         0         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         52         51         50           Manganese         ppm         ASTM D5185m         0         <1		ADDITIVES		method	limit/base			
Molybdenum       ppm       ASTM D5185m       60       52       51       50         Manganese       ppm       ASTM D5185m       0       <1		Boron	ppm					
Maganesse       ppm       ASTM D5185m       0       <1		Barium	ppm	ASTM D5185m	0	-	0	
Magnesium       ppm       ASTM D5185m       1010       888       796       818         Calcium       ppm       ASTM D5185m       1070       1090       910       857         Phosphorus       ppm       ASTM D5185m       1150       1053       890       884         Zinc       ppm       ASTM D5185m       1270       1225       1112       1058         Sulfur       ppm       ASTM D5185m       2060       3436       2778       2434         CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m       >20       6       9       7         Sodium       ppm       ASTM D5185m       >20       6       111       8         Potassium       ppm       ASTM D5185m       >20       <1		Molybdenum	ppm	ASTM D5185m	60	52	51	50
Calcium       ppm       ASTM D5185m       1070       1090       910       857         Phosphorus       ppm       ASTM D5185m       1150       1053       890       884         Zinc       ppm       ASTM D5185m       1270       1225       1112       1058         Sulfur       ppm       ASTM D5185m       2060       3436       2778       2434         CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m       >20       6       9       7         Sodium       ppm       ASTM D5185m       >20       6       111       8         Potassium       ppm       ASTM D5185m       >20       <11		Manganese	ppm	ASTM D5185m	0	<1	<1	0
Phosphorus       ppm       ASTM D5185m       1150       1053       890       884         Zinc       ppm       ASTM D5185m       1270       1225       1112       1058         Sulfur       ppm       ASTM D5185m       2060       3436       2778       2434         CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m       >20       6       9       7         Sodium       ppm       ASTM D5185m       >20       6       111       8         Potassium       ppm       ASTM D5185m       >20       <11       2       0         Fuel       %       ASTM D5185m       >20       <11       2       0         Sodium       ppm       ASTM D5185m       >20       <11       2       0         Fuel       %       ASTM D5185m       >20       <11       2       0         Sotor%       %       ASTM D5185m       >20       <16.6       9.2       7.8         INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       *ASTM D7624       >20 <td rowspan="6"></td> <td>Magnesium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>1010</td> <td>888</td> <td>796</td> <td>818</td>		Magnesium	ppm	ASTM D5185m	1010	888	796	818
Zinc       ppm       ASTM D5185m       1270       1225       1112       1058         Sulfur       ppm       ASTM D5185m       2060       3436       2778       2434         CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m       >20       6       9       7         Sodium       ppm       ASTM D5185m       >20       6       111       8         Potassium       ppm       ASTM D5185m       >20       <11       2       0         Fuel       %       ASTM D5185m       >20       <11       2       0         Sodium       ppm       ASTM D5185m       >20       <11       2       0         Fuel       %       ASTM D5185m       >20       <11       2       0         Fuel       %       ASTM D5185m       >20       <11       2       0         Soot %       %       *ASTM D5185m       >20       <16.6       9.2       <17.8         INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       *ASTM D7624       >20 <th< td=""><td>Calcium</td><td>ppm</td><td>ASTM D5185m</td><td>1070</td><td>1090</td><td>910</td><td>857</td></th<>		Calcium	ppm	ASTM D5185m	1070	1090	910	857
SulfurppmASTM D5185m2060343627782434CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>20697SodiumppmASTM D5185m>206118PotassiumppmASTM D5185m>20<1		Phosphorus	ppm	ASTM D5185m	1150	1053	890	884
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>20697SodiumppmASTM D5185m6118PotassiumppmASTM D5185m>20<1		Zinc	ppm	ASTM D5185m	1270	1225	1112	1058
Silicon       ppm       ASTM D5185m       >20       6       9       7         Sodium       ppm       ASTM D5185m       6       11       8         Potassium       ppm       ASTM D5185m       >20       <1       2       0         Fuel       %       ASTM D3524       >5       ▲ 6.6       ▲ 9.2       ▲ 7.8         INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       *ASTM D7844       >3       0.3       0.4       0.6         Nitration       Abs/cm       *ASTM D7624       >20       7.1       8.8       8.8         Sulfation       Abs/.1mm       *ASTM D7414       >30       19.0       19.1       19.2         FLUID DEGRADATION       method       limit/base       current       history1       history2         Oxidation       Abs/.1mm       *ASTM D7414       >25       15.1       16.3       16.3		Sulfur	ppm	ASTM D5185m	2060	3436	2778	2434
Sodium         ppm         ASTM D5185m         6         11         8           Potassium         ppm         ASTM D5185m         >20         <1		CONTAMINAN	TS	mathad			history1	historv2
Potassium         ppm         ASTM D5185m         >20         <1         2         0           Fuel         %         ASTM D3524         >5         ▲ 6.6         ▲ 9.2         ▲ 7.8           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.4         0.6           Nitration         Abs/cm         *ASTM D7624         >20         7.1         8.8         8.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         19.1         19.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.1         16.3         16.3				method	limit/base	current	Thistory I	
Fuel       %       ASTM D3524       >5       ▲ 6.6       ▲ 9.2       ▲ 7.8         INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       *ASTM D7844       >3       0.3       0.4       0.6         Nitration       Abs/cm       *ASTM D7624       >20       7.1       8.8       8.8         Sulfation       Abs/.1mm       *ASTM D7415       >30       19.0       19.1       19.2         FLUID DEGRADATION       method       limit/base       current       history1       history2         Oxidation       Abs/.1mm       *ASTM D7414       >25       15.1       16.3       16.3		Silicon						
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.4         0.6           Nitration         Abs/cm         *ASTM D7624         >20         7.1         8.8         8.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         19.1         19.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.1         16.3         16.3			ppm	ASTM D5185m		6	9	7
Soot %         %         *ASTM D7844         >3         0.3         0.4         0.6           Nitration         Abs/cm         *ASTM D7624         >20         7.1         8.8         8.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         19.1         19.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.1         16.3         16.3		Sodium	ppm ppm	ASTM D5185m ASTM D5185m	>20	6 6	9 11	7 8
Nitration         Abs/cm         *ASTM D7624         >20         7.1         8.8         8.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         19.1         19.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.1         16.3         16.3		Sodium Potassium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	>20 >20	6 6 <1	9 11 2	7 8 0
Nitration         Abs/cm         *ASTM D7624         >20         7.1         8.8         8.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.0         19.1         19.2           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.1         16.3         16.3		Sodium Potassium Fuel	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D3524	>20 >20 >5	6 6 <1 ▲ 6.6	9 11 2 ▲ 9.2	7 8 0 ▲ 7.8
SulfationAbs/.1mm*ASTM D7415>3019.019.119.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2515.116.316.3		Sodium Potassium Fuel INFRA-RED	ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D3524 method	>20 >20 >5 limit/base	6 6 <1 ▲ 6.6 current	9 11 2 ▲ 9.2 history1	7 8 0 ▲ 7.8 history2
FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2515.116.316.3		Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D3524 <b>method</b> *ASTM D7844	>20 >20 >5 limit/base >3	6 6 <1 ▲ 6.6 <u>current</u> 0.3	9 11 2 ▲ 9.2 history1 0.4	7 8 0 ▲ 7.8 history2 0.6
Oxidation         Abs/.1mm         *ASTM D7414         >25         15.1         16.3         16.3		Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D3524 ASTM D3524 <b>method</b> *ASTM D7844 *ASTM D7624	>20 >20 >5 limit/base >3 >20	6 6 <1 ▲ 6.6 <u>current</u> 0.3 7.1	9 11 2 ▲ 9.2 history1 0.4 8.8	7 8 0 ▲ 7.8 history2 0.6 8.8
		Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm ppm % % Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D3524 ASTM D3524 *ASTM D7844 *ASTM D7624 *ASTM D7415	>20 >20 >5 limit/base >3 >20 >30	6 6 <1 ▲ 6.6 <u>current</u> 0.3 7.1 19.0	9 11 2 ▲ 9.2 history1 0.4 8.8 19.1	7 8 0 ▲ 7.8 history2 0.6 8.8 19.2
		Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE	ppm ppm ppm % Abs/cm Abs/cm Abs/1mm	ASTM D5185m ASTM D5185m ASTM D3524 ASTM D3524 *ASTM D7844 *ASTM D7624 *ASTM D7415	>20 >20 >5 Iimit/base >3 >20 >30 Iimit/base	6 6 <1 ▲ 6.6 <u>current</u> 0.3 7.1 19.0 <u>current</u>	9 11 2 ▲ 9.2 history1 0.4 8.8 19.1 history1	7 8 0 ▲ 7.8 history2 0.6 8.8 19.2 history2

### DIAGNOSIS Recommendation

We advise that you check the fuel inject Oil and filter change at the time of samp been noted. Resample at the next servi to monitor.

Machine Id 4630M

### Wear

All component wear rates are normal.

### Contamination

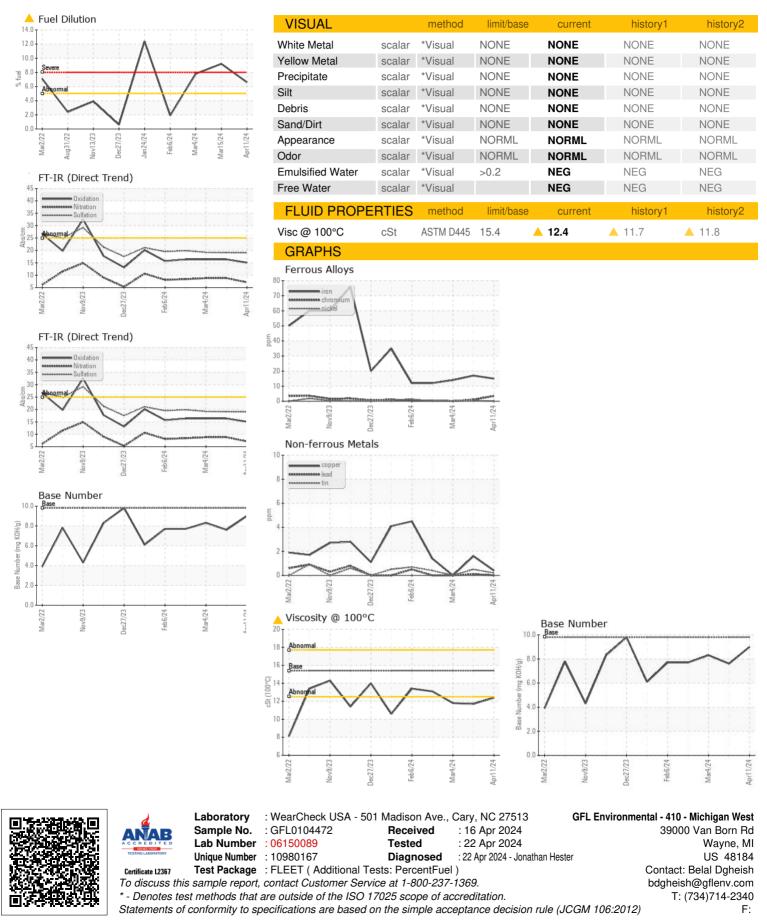
There is a moderate amount of fuel pres oil.

#### Fluid Condition

Fuel is present in the oil and is lowering viscosity. The BN result indicates that the suitable alkalinity remaining in the oil.



# **OIL ANALYSIS REPORT**



Submitted By: seel also GFL468 - Laura Wilson