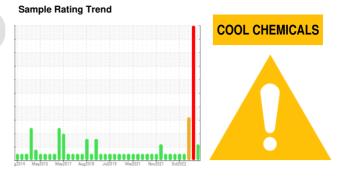


# **OIL ANALYSIS REPORT**

(YA115786) 3491C

Natural Gas Engine

PETRO CANADA DURON GEO LD 15W40 (30 GAL)



## **DIAGNOSIS**

#### Recommendation

Check for low coolant level. We recommend an early resample to monitor this condition.

## Wear

All component wear rates are normal.

## Contamination

Sodium and/or potassium levels are high.

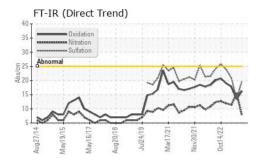
## **Fluid Condition**

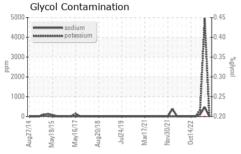
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

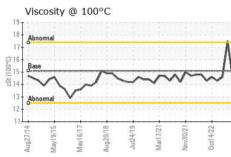
Sample Number         Client Info         GFL0123395         GFL0082421         GFL0082426         05 Jan 2024         06 Jan 2024         07 Jan 2024         06 Jan 2024         07 Jan 2024         08 Jan 2024	-							
Sample Date	SAMPLE INFORM	<b>MATION</b>	method	limit/base	current	history1	history2	
Machine Age         hrs         Client Info         97464         0         97464           Oil Age         hrs         Client Info         97464         0         97464           Oil Changed         Client Info         N/A         N/A         N/A         N/A           Sample Status         Client Info         N/A         N/A         N/A         N/A         ABNORMAL           CONTAMINATION         method         limit/base         current         history1         history2           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         23         AS2         A60           Chromium         ppm         ASTM D5185m         >4         2         4         3           Nickel         ppm         ASTM D5185m         >4         2         4         3           Nickel         ppm         ASTM D5185m         >3         0         <1         2           Silver         ppm         ASTM D5185m         >30         4         11         2           Copper         ppm         ASTM D5185m         >30         4         <	Sample Number		Client Info		GFL0123395	GFL0082421	GFL0082436	
Oil Age         hrs         Client Info         97464         0         97464           Oil Changed         Client Info         N/A         N/A         Changed           Sample Status         Client Info         N/A         N/A         N/A         Changed           Sample Status         Med         Limit/base         Current         history1         history2           Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         23         &82         60           Chromium         ppm         ASTM D5185m         >4         2         4         3           Iron         ppm         ASTM D5185m         >2         0         <1	Sample Date		Client Info		18 Jun 2024	16 Apr 2024	05 Jan 2024	
Oil Changed Sample Status	Machine Age	hrs	Client Info		97464	0	97464	
ABNORMAL   SEVERE   ABNORMAL   CONTAMINATION   method   limit/base   current   history1   history2	Oil Age	hrs	Client Info		97464	0	97464	
CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         23         & 82         & 60           Chromium         ppm         ASTM D5185m         >4         2         4         3           Nickel         ppm         ASTM D5185m         >4         2         4         3           Nickel         ppm         ASTM D5185m         >3         0         <1	Oil Changed		Client Info		N/A	N/A	Changed	
Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         23         ▲ 82         ♠ 60           Chromium         ppm         ASTM D5185m         >4         2         4         3           Nickel         ppm         ASTM D5185m         >2         0         <1	Sample Status				ABNORMAL	SEVERE	ABNORMAL	
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         23         ▲ 82         ▲ 60           Chromium         ppm         ASTM D5185m         >4         2         4         3           Nickel         ppm         ASTM D5185m         >2         0         <1         2           Titanium         ppm         ASTM D5185m         >3         0         <1         0           Aluminum         ppm         ASTM D5185m         >3         0         <1         0           Aluminum         ppm         ASTM D5185m         >30         4         11         2           Copper         ppm         ASTM D5185m         >30         4         11         2           Copper         ppm         ASTM D5185m         >4         0         3         <1           Vanadium         ppm         ASTM D5185m         >4         0         3         <1         <1           Vanadium         ppm         ASTM D5185m         0         33         30         8           Barium         ppm         ASTM D5185m         50         33<	CONTAMINATI	ON	method	limit/base	current	history1	history2	
Iron	Water		WC Method	>0.1	NEG	NEG	NEG	
Chromium         ppm         ASTM D5185m         >4         2         4         3           Nickel         ppm         ASTM D5185m         >2         0         <1         2           Titanium         ppm         ASTM D5185m         >2         0         <1         <1           Silver         ppm         ASTM D5185m         >3         0         <1         0           Aluminum         ppm         ASTM D5185m         >3         0         <1         0           Aluminum         ppm         ASTM D5185m         >30         4         11         2           Copper         ppm         ASTM D5185m         >30         4         11         2           Copper         ppm         ASTM D5185m         >4         0         3         <1           Vanadium         ppm         ASTM D5185m         >4         0         3         <1         0           Cadmium         ppm         ASTM D5185m         >4         0         3         <1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	WEAR METALS	3	method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>50	23	<b>▲</b> 82	<b>6</b> 0	
Titanium	Chromium	ppm	ASTM D5185m	>4	2	4	3	
Silver	Nickel	ppm	ASTM D5185m	>2	0	<1	2	
Aluminum         ppm         ASTM D5185m         >9         2         ▲ 13         4           Lead         ppm         ASTM D5185m         >30         4         11         2           Copper         ppm         ASTM D5185m         >35         1         ▲ 55         3           Tin         ppm         ASTM D5185m         >4         0         3         <1	Titanium	ppm	ASTM D5185m		<1	<1	<1	
Lead         ppm         ASTM D5185m         >30         4         11         2           Copper         ppm         ASTM D5185m         >35         1         ▲ 55         3           Tin         ppm         ASTM D5185m         >4         0         3         <1	Silver	ppm	ASTM D5185m	>3				
Copper         ppm         ASTM D5185m         >35         1         ▲ 55         3           Tin         ppm         ASTM D5185m         >4         0         3         <1           Vanadium         ppm         ASTM D5185m         >4         0         3         <1           Cadmium         ppm         ASTM D5185m         0         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         33         30         8           Barium         ppm         ASTM D5185m         50         52         91         57           Manganese         ppm         ASTM D5185m         50         52         91         57           Magnesium         ppm         ASTM D5185m         560         615         464         536           Calcium         ppm         ASTM D5185m         780         871         702         686           Zinc         ppm         ASTM D5185m         870         1056         889         971           Sulfur         ppm         ASTM D5185m         2040         3151	Aluminum	ppm						
Tin	Lead	• • • • • • • • • • • • • • • • • • • •			-			
Vanadium         ppm         ASTM D5185m         <1	Copper	ppm	ASTM D5185m					
Cadmium         ppm         ASTM D5185m         0         <1	Tin	ppm		>4	-			
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         50         33         30         8           Barium         ppm         ASTM D5185m         5         <1								
Boron         ppm         ASTM D5185m         50         33         30         8           Barium         ppm         ASTM D5185m         5         <1	Cadmium	ppm	ASTM D5185m		0	<1	<1	
Barium         ppm         ASTM D5185m         5         <1	ADDITIVES		method	limit/base		history1	history2	
Molybdenum         ppm         ASTM D5185m         50         52         91         57           Manganese         ppm         ASTM D5185m         0         1         2         2           Magnesium         ppm         ASTM D5185m         560         615         464         536           Calcium         ppm         ASTM D5185m         1510         1743         1386         1592           Phosphorus         ppm         ASTM D5185m         780         871         702         686           Zinc         ppm         ASTM D5185m         870         1056         889         971           Sulfur         ppm         ASTM D5185m         2040         3151         2329         2356           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         >20         109         4833         321           Glycol         %         *ASTM D5185m         >20         109         4933         321           Glycol         %         *ASTM D78	Boron	ppm	ASTM D5185m		33			
Manganese         ppm         ASTM D5185m         0         1         2         2           Magnesium         ppm         ASTM D5185m         560         615         464         536           Calcium         ppm         ASTM D5185m         1510         1743         1386         1592           Phosphorus         ppm         ASTM D5185m         780         871         702         686           Zinc         ppm         ASTM D5185m         870         1056         889         971           Sulfur         ppm         ASTM D5185m         2040         3151         2329         2356           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         >+20         109         4933         321           Glycol         *ASTM D5185m         >20         109         4933         321           Glycol         *ASTM D7844         0         0.20            INFRA-RED         method         limit/base         current         history1	Barium	ppm						
Magnesium         ppm         ASTM D5185m         560         615         464         536           Calcium         ppm         ASTM D5185m         1510         1743         1386         1592           Phosphorus         ppm         ASTM D5185m         780         871         702         686           Zinc         ppm         ASTM D5185m         870         1056         889         971           Sulfur         ppm         ASTM D5185m         2040         3151         2329         2356           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         >20         109         4933         321           Glycol         *ASTM D5185m         >20         109         4933         321           Glycol         *ASTM D5185m         >20         109         4933         321           Glycol         *ASTM D544         0         0.1         0	-							
Calcium         ppm         ASTM D5185m         1510         1743         1386         1592           Phosphorus         ppm         ASTM D5185m         780         871         702         686           Zinc         ppm         ASTM D5185m         870         1056         889         971           Sulfur         ppm         ASTM D5185m         2040         3151         2329         2356           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         >20         109         4933         321           Glycol         %         *ASTM D5185m         >20         109         4933         321           Glycol         %         *ASTM D5185m         >20         109         4933         321           Glycol         %         *ASTM D5185m         >20         10         0.20 <td cols<="" th=""><th>•</th><th></th><th></th><th></th><th></th><th></th><th></th></td>	<th>•</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	•						
Phosphorus         ppm         ASTM D5185m         780         871         702         686           Zinc         ppm         ASTM D5185m         870         1056         889         971           Sulfur         ppm         ASTM D5185m         2040         3151         2329         2356           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         >20         483         99           Potassium         ppm         ASTM D5185m         >20         4933         321           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8		• •						
Zinc         ppm         ASTM D5185m         870         1056         889         971           Sulfur         ppm         ASTM D5185m         2040         3151         2329         2356           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         9         483         99           Potassium         ppm         ASTM D5185m         >20         109         4933         321           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.1         0           Nitration         Abs/cm         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION         method         limit/base         current					_			
Sulfur         ppm         ASTM D5185m         2040         3151         2329         2356           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         9         483         99           Potassium         ppm         ASTM D5185m         >20         109         4933         321           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.1         0           Nitration         Abs/cm         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.3								
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         9         29         12           Sodium         ppm         ASTM D5185m         9         483         99           Potassium         ppm         ASTM D5185m         >20         109         4933         321           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.1         0           Nitration         Abs/cm         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.3         13.5         17.8	-							
Silicon       ppm       ASTM D5185m       >+100       9       29       12         Sodium       ppm       ASTM D5185m       9       483       99         Potassium       ppm       ASTM D5185m       >20       109       4933       321         Glycol       %       *ASTM D2982        0.20          INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       *ASTM D7844       0       0.1       0         Nitration       Abs/cm       *ASTM D7624       >20       7.6       15.5       11.4         Sulfation       Abs/.1mm       *ASTM D7415       >30       19.8       13.6       20.8         FLUID DEGRADATION       method       limit/base       current       history1       history2         Oxidation       Abs/.1mm       *ASTM D7414       >25       16.3       13.5       17.8					3151			
Sodium         ppm         ASTM D5185m         9         483         99           Potassium         ppm         ASTM D5185m         >20         109         4933         321           Glycol         %         *ASTM D2982          0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.1         0           Nitration         Abs/cm         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.3         13.5         17.8								
Potassium         ppm         ASTM D5185m         >20         ▲ 109         ▲ 4933         ▲ 321           Glycol         %         *ASTM D2982          ▲ 0.20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.1         0           Nitration         Abs/cm         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.3         13.5         17.8				>+100				
Soot %								
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0         0.1         0           Nitration         Abs/cm         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.3         13.5         17.8				>20				
Soot %         %         *ASTM D7844         0         0.1         0           Nitration         Abs/cm         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.3         13.5         17.8	,	%	*AS1M D2982			▲ 0.20		
Nitration         Abs/cm         *ASTM D7624         >20         7.6         15.5         11.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.3         13.5         17.8	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation         Abs/.1mm         *ASTM D7415         >30         19.8         13.6         20.8           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.3         13.5         17.8	Soot %		*ASTM D7844		0	0.1	0	
FLUID DEGRADATION method limit/base current history1 history2  Oxidation Abs/.1mm *ASTM D7414 >25 16.3 13.5 17.8	Nitration	Abs/cm	*ASTM D7624	>20	7.6	15.5	11.4	
Oxidation Abs/.1mm *ASTM D7414 >25 <b>16.3</b> 13.5 17.8	Sulfation	Abs/.1mm	*ASTM D7415	>30	19.8	13.6	20.8	
	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2	
Base Number (BN) mg KOH/g ASTM D2896 10.2 7.8 45.2 6.0	Oxidation	Abs/.1mm	*ASTM D7414	>25	16.3	13.5	17.8	
	O/110011							

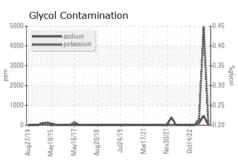


## **OIL ANALYSIS REPORT**









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	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	SOLID	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.1	NEG	▲ 0.2%	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

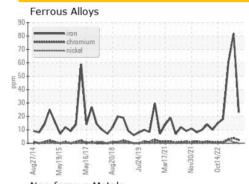
limit/base

14.4

<u>17.5</u>

Visc @	100°C
GRA	PHS

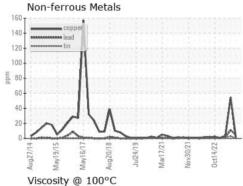
**FLUID PROPERTIES** 

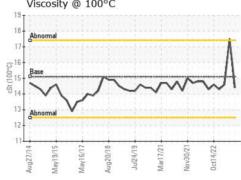


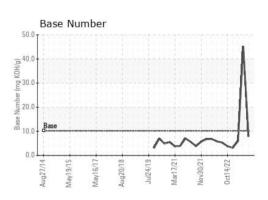
cSt

method

ASTM D445 15.1











Certificate 12367

Laboratory Sample No.

Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0123395 Lab Number : 06215578 Unique Number : 11088442

Received : 20 Jun 2024 **Tested** Diagnosed

: 21 Jun 2024 : 21 Jun 2024 - Sean Felton

GFL Environmental - 007 - Brunswick

2809 Galloway Road Bolivia, NC US 28422

Contact: DONALD CRAVEN dcraven@gflenv.com

To discuss this sample report, contact Customer Service at 1-800-237-1369. \* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

F: (910)253-4179

T:

history2

14.6