

## **OIL ANALYSIS REPORT**

#### Area (EJZ942) Machine Id 910025 Component

Diesel Engine

## PETRO CANADA DURON SHP 15W40 (11 GAL)

### DIAGNOSIS

#### A Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

#### Wear

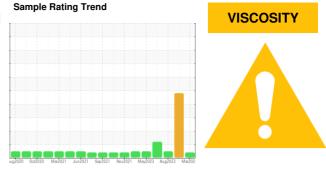
All component wear rates are normal.

#### Contamination

Fuel content negligible. There is no indication of any contamination in the oil.

#### Fluid Condition

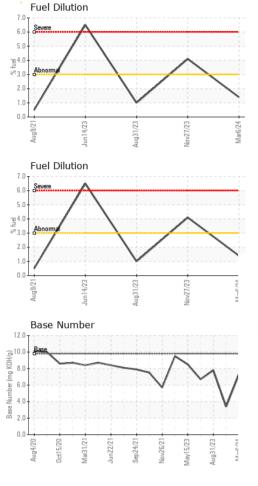
The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil.



Sample Date     Client Info     06 Mar 2024     27 Nov 2023     31 Aug 2023       Machine Age     hrs     Client Info     8945     8682     8558       Oil Age     hrs     Client Info     263     124     572       Oil Changed     Client Info     Not Changed     Changed     Changed     Changed     Changed     Changed     Changed     NEG     Net       Sample Status     WC Method     >0.2     NEG     NEG     NEG     NEG       Water     WC Method     >0.2     NEG     NEG     NEG     NEG       Chromium     ppm     ASTM 05185m     >20     C     1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     -1     0     0     -1     0     0     -1     0     0     -1     0     0     -1     0     0     -1     0     0     -1     0	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 8945 8682 855   Di Aga hrs Client Info 263 124 572   Di Changed Client Info Not Changed Changed Changed   Sample Status I Imit/base current ABNORMAL NORMAL   CONTAMINATION WC Method >0.2 NEG NEG NEG   Silycol WC Method >0.2 NEG NEG NEG   WEAR METALS wethod >0.2 NEG NEG NEG   Vickel ppm ASTM05155 >20 <1	Sample Number		Client Info		GFL0103426	GFL0074632	GFL0092498
Machine Age hrs Client Info 8945 8682 855   Di Aga hrs Client Info 263 124 572   Di Changed Client Info Not Changed Changed Changed   Sample Status Info Not Changed ABNORMAL NORMAL   CONTAMINATION wethod 20.2 NEG NEG NEG   Mater WC Method 20.2 NEG NEG NEG   Slycol WC Method 20.2 NEG NEG NEG   VEAR METALS wethod 1mit/base current history1 history2   Yoron ppm ASTM D5155 >20 -1 0 0   Vickel ppm ASTM D5155 >20 -1 0 0   Vickel ppm ASTM D5155 >2 -1 0 0   Silver ppm ASTM D5155 >20 -1 0 0   Quandum ppm ASTM D5155 >20 -1 0 0   Changed ppm ASTM D5155 >20 -1 0 0   Quandum ppm ASTM D5155 >300 -1 0 0	Sample Date		Client Info		06 Mar 2024	27 Nov 2023	31 Aug 2023
Dil Changed Client Info Not Changed MARGINAL Changed ABNORMAL Changed NORMAL   CONTAMINATION method limit/base current history1 history2   Water WC Method >0.2 NEG NEG NEG   Water WC Method >0.2 NEG NEG NEG   WEAR METALS method limit/base current history1 history2   Iron ppm ASTM D5185m >20 <1		hrs	Client Info		8945	8682	8558
Oil Changed Client Info Not Changed MARGINAL Changed ABNORMAL Changed NORMAL Changed NORMAL   CONTAMINATION method limit/base current history1 history2   Water WC Method >0.2 NEG NEG NEG   Water WC Method >0.2 NEG NEG NEG   WEAR METALS method limit/base current history1 history2   Iron ppm ASTM D5185 >20 <1	Oil Age	hrs	Client Info		263	124	572
Sample Status     MARGINAL     ABNORMAL     NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.2     NEG     NEG     NEG       Glycol     WC Method     >0.2     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >20     <1	-		Client Info		Not Changd	Changed	Changed
Water     WC Method     >0.2     NEG     NEG     NEG     NEG       Glycol     WC Method     Imit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >90     7     3     7       Chromium     ppm     ASTM D5185m     >20     <1	-				MARGINAL		
Glycol     WC Method     NEG     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >20     <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >90     7     3     7       Chromium     ppm     ASTM D5185m     >20     <1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron     ppm     ASTM D5185m     >90     7     3     7       Chromium     ppm     ASTM D5185m     >20     <1	Glycol		WC Method		NEG	NEG	NEG
Chromium     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >2     0     <1	WEAR METAL	S	method	limit/base	current	history1	history2
Chromium     ppm     ASTM D5185m     >20     <1     <1     <1     <1       Nickel     ppm     ASTM D5185m     >2     0     <1	Iron	ppm	ASTM D5185m	>90	7	3	7
Nickel     ppm     ASTM D5185m     >2     0     <1     0       Titanium     ppm     ASTM D5185m     >2     <1	Chromium		ASTM D5185m	>20	<1	<1	<1
Titanium     ppm     ASTM D5185m     >2     <1     0     0       Silver     ppm     ASTM D5185m     >2     <1	Nickel		ASTM D5185m	>2	0	<1	0
Silver     ppm     ASTM D5185m     >2     <1     0     0       Aluminum     ppm     ASTM D5185m     >20     2     1     1       Lead     ppm     ASTM D5185m     >40     <1     0     0       Copper     ppm     ASTM D5185m     >15     <1     0     0       Vanadium     ppm     ASTM D5185m     >15     <1     0     0       Cadmium     ppm     ASTM D5185m     >15     <1     0     0       Cadmium     ppm     ASTM D5185m     0     6     <1     1       Boron     ppm     ASTM D5185m     0     6     <1     1       Barium     ppm     ASTM D5185m     0     <1     0     0     0       Madgaese     ppm     ASTM D5185m     0     <1     0     0       Galeium     ppm     ASTM D5185m     1010     775     310     916       Calcium     ppm     ASTM D5185m     1070     999	Titanium		ASTM D5185m	>2	<1	0	0
Aluminum     ppm     ASTM D5185m     >20     2     1     1       Lead     ppm     ASTM D5185m     >40     <1							
Lead     ppm     ASTM D5185m     >40     <1     0     0       Copper     ppm     ASTM D5185m     >330     <1							
Copper     ppm     ASTM D5185m     >330     <1     0     <1       Tin     ppm     ASTM D5185m     >15     <1						0	0
Tin     ppm     ASTM D5185m     >15     <1     0     0       Vanadium     ppm     ASTM D5185m     <1							
Vanadium     ppm     ASTM D5185m     <1     0     <1       Cadmium     ppm     ASTM D5185m     <1							
Cadmium     ppm     ASTM D5185m     <1     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     6     <1     1       Barium     ppm     ASTM D5185m     0     0     0     0     0     0       Marganese     ppm     ASTM D5185m     0     6     <1     1     0     0       Marganese     ppm     ASTM D5185m     0     <1     0     0     0       Marganesum     ppm     ASTM D5185m     1010     775     310     916       Calcium     ppm     ASTM D5185m     1070     999     356     1087       Phosphorus     ppm     ASTM D5185m     1270     1053     563     1187       Sulfur     ppm     ASTM D5185m     1270     1053     563     1187       Sulfur     ppm     ASTM D5185m     225     3     1     3       Sodium				210			
ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     6     <1							
Boron     ppm     ASTM D5185m     0     6     <1     1       Barium     ppm     ASTM D5185m     0     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     57     19     60       Manganese     ppm     ASTM D5185m     0     <1		PP		limit/base			
Barium     ppm     ASTM D5185m     0     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     57     19     60       Manganese     ppm     ASTM D5185m     0     <1							
Molybdenum     ppm     ASTM D5185m     60     57     19     60       Manganese     ppm     ASTM D5185m     0     <1							
Manganese     ppm     ASTM D5185m     0     <1     0     0       Magnesium     ppm     ASTM D5185m     1010     775     310     916       Calcium     ppm     ASTM D5185m     1070     999     356     1087       Phosphorus     ppm     ASTM D5185m     1070     999     356     1087       Phosphorus     ppm     ASTM D5185m     1150     951     492     932       Zinc     ppm     ASTM D5185m     1270     1053     563     1187       Sulfur     ppm     ASTM D5185m     2060     2949     1360     3330       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     1     3       Sodium     ppm     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D5185m     >20 <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td>÷</td>					-		÷
Magnesium     ppm     ASTM D5185m     1010     775     310     916       Calcium     ppm     ASTM D5185m     1070     999     356     1087       Phosphorus     ppm     ASTM D5185m     1150     951     492     932       Zinc     ppm     ASTM D5185m     1270     1053     563     1187       Sulfur     ppm     ASTM D5185m     2060     2949     1360     3330       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     1     3       Sodium     ppm     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D5185m     >20     3     2     1       Soot %     %     *ASTM D7844     >6     0.4 <td>•</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td>	•					-	
Calcium     ppm     ASTM D5185m     1070     999     356     1087       Phosphorus     ppm     ASTM D5185m     1150     951     492     932       Zinc     ppm     ASTM D5185m     1270     1053     563     1187       Sulfur     ppm     ASTM D5185m     2060     2949     1360     3330       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     22     2     4       Potassium     ppm     ASTM D5185m     20     3     2     1       Fuel     %     ASTM D5185m     >20     3     2     1       Nitration     Abs/cm     *ASTM D7844     >6     0.4     0.3	0	ppm					-
Phosphorus     ppm     ASTM D5185m     1150     951     492     932       Zinc     ppm     ASTM D5185m     1270     1053     563     1187       Sulfur     ppm     ASTM D5185m     2060     2949     1360     3330       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     1     3       Sodium     ppm     ASTM D5185m     >25     3     1     3       Sodium     ppm     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D5185m     >20     3     2     1       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/.tmm     *ASTM D7415     >30     16.7	-	ppm					
Zinc     ppm     ASTM D5185m     1270     1053     563     1187       Sulfur     ppm     ASTM D5185m     2060     2949     1360     3330       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     1     3       Sodium     ppm     ASTM D5185m     >25     3     1     3       Sodium     ppm     ASTM D5185m     >20     3     2     4       Potassium     ppm     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D3524     >3.0     1.4     4.1     1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/.mm< *ASTM D7415		ppm	ASTM D5185m	1070			
Sulfur     ppm     ASTM D5185m     2060     2949     1360     3330       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     1     3       Sodium     ppm     ASTM D5185m     >25     3     1     3       Potassium     ppm     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D5185m     >20     3     2     1       Nitration     ppm     ASTM D3524     >3.0     1.4     4.1     1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/cm     *ASTM D7414     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7414     >25     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base	Phosphorus	ppm		1150		-	
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m<>25313SodiumppmASTM D5185m224PotassiumppmASTM D5185m>20321Fuel%ASTM D5185m>20321Fuel%ASTM D5185m>20321SodiumppmASTM D5185m>20321Fuel%ASTM D524>3.01.4▲4.11.0INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>60.40.30.6NitrationAbs/cm*ASTM D7624>205.73.87.2SulfationAbs/.tmm*ASTM D7415>3016.713.618.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.tmm*ASTM D7414>2511.86.213.1	Zinc	ppm	ASTM D5185m	1270	1053	<u> </u>	1187
Silicon     ppm     ASTM D5185m     >25     3     1     3       Sodium     ppm     ASTM D5185m     20     3     2     4       Potassium     ppm     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D3524     >3.0     1.4     4.1     1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/cm     *ASTM D7624     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1	Sulfur	ppm	ASTM D5185m	2060	2949	<u> </u>	3330
Sodium     ppm     ASTM D5185m     2     2     4       Potassium     ppm     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D3524     >3.0     1.4     4.1     1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/cm     *ASTM D7624     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium     ppm     ASTM D5185m     >20     3     2     1       Fuel     %     ASTM D3524     >3.0     1.4     4.1     1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/cm     *ASTM D7624     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1	Silicon	ppm	ASTM D5185m	>25	3	1	3
Fuel     %     ASTM D3524     >3.0     1.4     4.1     1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/cm     *ASTM D7624     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1	Sodium	ppm	ASTM D5185m		2	2	4
INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/cm     *ASTM D7624     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1	Potassium	ppm	ASTM D5185m	>20	3	2	1
Soot %     %     *ASTM D7844     >6     0.4     0.3     0.6       Nitration     Abs/cm     *ASTM D7624     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1		0/	<b>ASTM D3524</b>	>3.0	1.4	<b>4</b> .1	1.0
Nitration     Abs/cm     *ASTM D7624     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1	Fuel	%	AO INI DOJET				
Nitration     Abs/cm     *ASTM D7624     >20     5.7     3.8     7.2       Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1		%			current	history1	history2
Sulfation     Abs/.1mm     *ASTM D7415     >30     16.7     13.6     18.2       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     11.8     6.2     13.1	INFRA-RED		method	limit/base			
Oxidation Abs/.1mm *ASTM D7414 >25 11.8 6.2 13.1	INFRA-RED Soot %	%	method *ASTM D7844	limit/base >6	0.4	0.3	0.6
	INFRA-RED Soot % Nitration	% Abs/cm	method *ASTM D7844 *ASTM D7624	limit/base >6 >20	0.4 5.7	0.3 3.8	0.6 7.2
	INFRA-RED Soot % Nitration Sulfation	% Abs/cm Abs/.1mm	method *ASTM D7844 *ASTM D7624 *ASTM D7415	limit/base >6 >20 >30	0.4 5.7 16.7	0.3 3.8 13.6	0.6 7.2 18.2
	INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE	% Abs/cm Abs/.1mm DATION	method *ASTM D7844 *ASTM D7624 *ASTM D7415 method	limit/base >6 >20 >30 limit/base	0.4 5.7 16.7 current	0.3 3.8 13.6 history1	0.6 7.2 18.2 history2



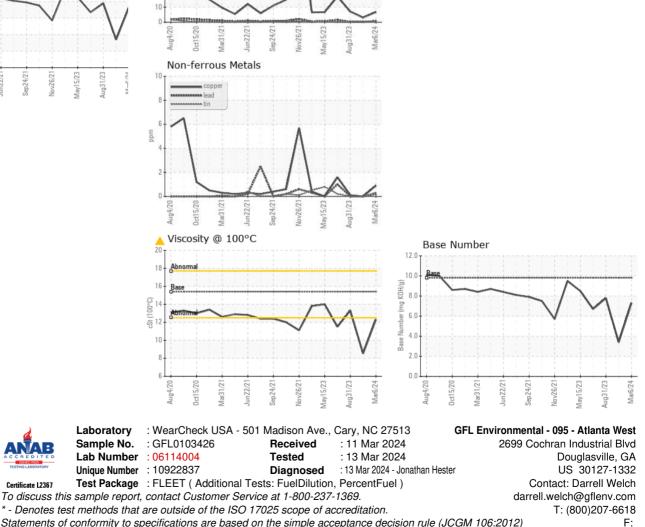
# **OIL ANALYSIS REPORT**

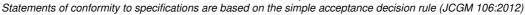


30

20

VISUAL		method	limit/base	current	history1	history2
VISUAL		methou	IIIIII/Dase	current	TIISTOLA I	Thistory2
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	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.4	<b>12.3</b>	8.53	13.3
GRAPHS						
Ferrous Alloys						
<sup>30</sup>		[				
ron chromium		A				
50 nickel						
50	1					
		de la constanción da				





Page 2 of 2