

# **OIL ANALYSIS REPORT**

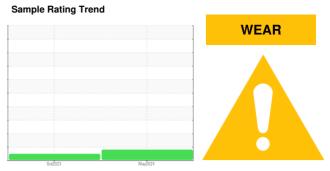


# NWW GREENWOOD **DT822**

Component

Diesel Engine

PETRO CANADA DURON SHP 10W30 (40 QTS)



### **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.

### Wear

Valve wear is indicated. All other component wear rates are normal.

#### Contamination

There is no indication of any contamination in the

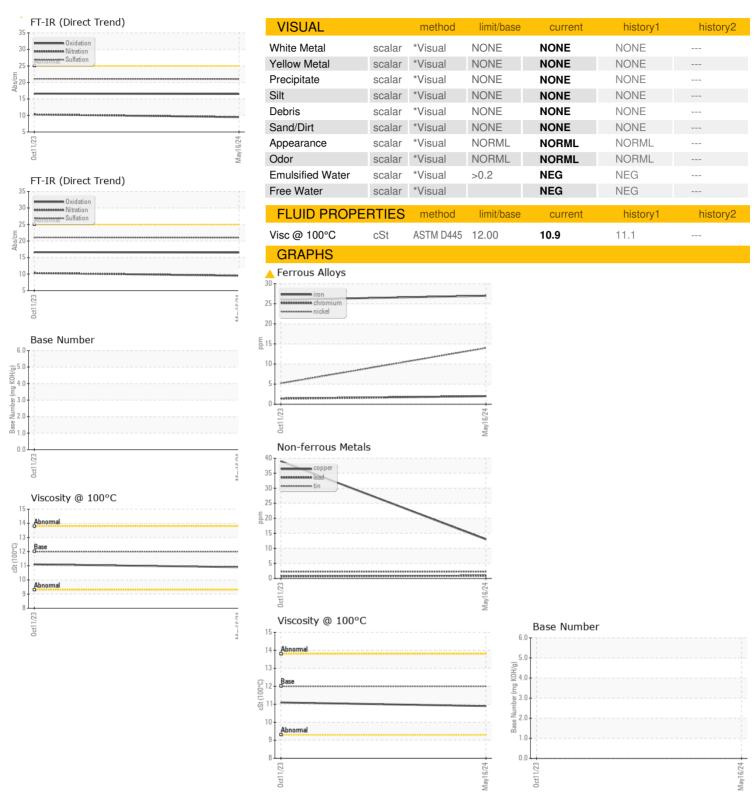
#### **Fluid Condition**

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 INFORMATION         method         limit/base         current         history1         history2           Sample Number         Client Info         PCA0127177         PCA0102375            Sample Date         Client Info         82513         50000            Oil Age         mls         Client Info         32513         0            Oil Changed         Client Info         32513         0            Oil Changed Status         ABNORMAL         NORMAL            Fuel         WC Method         >3.0         <1.0         0.3            Fuel         WC Method         >0.2         NEG         NEG            WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM 05185m         >120         27         26            Chromium         ppm         ASTM 05185m         >20         2         1            Iron         ppm         ASTM 05185m         >2         2         1            Iron         ppm         ASTM 05185m         >20         2	N 3HF 10W30 (4	0 Q 1 3)		0052023	May2U24		
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age   mls   Client Info   82513   50000	Sample Number		Client Info		PCA0127177	PCA0102375	
Oil Age	Sample Date		Client Info		16 May 2024	11 Oct 2023	
Contained   Client Info   Changed   Contained   Contained	Machine Age	mls	Client Info		82513	50000	
CONTAMINATION   method   limit/base   current   history1   history2	Oil Age	mls	Client Info		32513	0	
CONTAMINATION	Oil Changed		Client Info		Changed	Changed	
Water	Sample Status				ABNORMAL	NORMAL	
Water Glycol         WC Method         >0.2         NEG         NEG	CONTAMINAT	ION	method	limit/base	current	history1	history2
Calycol         WC Method         NEG         NEG            WEAR METALS         method         limit/base         current         history1         history2           Fron         ppm         ASTM D5185m         >120         27         26            Chromium         ppm         ASTM D5185m         >20         2         1            Nickel         ppm         ASTM D5185m         >5         ▲ 14         5            Silver         ppm         ASTM D5185m         >2         <1         <1            Aluminum         ppm         ASTM D5185m         >2         2         1            Lead         ppm         ASTM D5185m         >2         2         1            Copper         ppm         ASTM D5185m         >330         13         39            Caddium         ppm         ASTM D5185m         >15         2         2         2            ADDITIVES         method         limit/base         current         history1         history2           Barrium         ppm         ASTM D5185m         2         2         3	Fuel		WC Method	>3.0	<1.0	0.3	
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >120         27         26            Chromium         ppm         ASTM D5185m         >20         2         1            Nickel         ppm         ASTM D5185m         >2         2         1            Aluminum         ppm         ASTM D5185m         >2         2         1            Aluminum         ppm         ASTM D5185m         >2         2         1            Aluminum         ppm         ASTM D5185m         >330         13         39            Astm D5185m         >15         2         2         2         -	Water		WC Method	>0.2	NEG	NEG	
Post	Glycol		WC Method		NEG	NEG	
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
ASTM D5185m   STM D5185m   ST	ron	ppm	ASTM D5185m	>120	27	26	
Titanium	Chromium	ppm	ASTM D5185m	>20	2	1	
Silver	Nickel		ASTM D5185m	>5	<b>1</b> 4	5	
Aluminum	Titanium	ppm	ASTM D5185m	>2	<1	<1	
Lead	Silver	ppm	ASTM D5185m	>2	2	1	
Copper	Aluminum	ppm	ASTM D5185m	>20	5	7	
Programmer   Pro	_ead	ppm	ASTM D5185m	>40	<1	<1	
Vanadium	Copper	ppm	ASTM D5185m	>330	13	39	
Vanadium         ppm         ASTM D5185m         <1         <1            Cadmium         ppm         ASTM D5185m         <1         0            ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         2         2         3            Barium         ppm         ASTM D5185m         0         0         0            Molybdenum         ppm         ASTM D5185m         50         69         70            Manganese         ppm         ASTM D5185m         0         2         2         2           Manganesium         ppm         ASTM D5185m         950         889         863            Calcium         ppm         ASTM D5185m         995         889         817            Phosphorus         ppm         ASTM D5185m         995         889         817            Zinc         ppm         ASTM D5185m         2600         2953         2241            CONTAMINANTS         method         limit/base         current         history1		ppm	ASTM D5185m	>15	2	2	
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         2         2         3            Barium         ppm         ASTM D5185m         0         0         0            Molybdenum         ppm         ASTM D5185m         50         69         70            Manganese         ppm         ASTM D5185m         0         2         2            Magnesium         ppm         ASTM D5185m         950         889         863            Calcium         ppm         ASTM D5185m         1050         1206         1110            Phosphorus         ppm         ASTM D5185m         995         889         817            Zinc         ppm         ASTM D5185m         1180         1252         1144            Sulfur         ppm         ASTM D5185m         2600         2953         2241            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         20	Vanadium		ASTM D5185m		<1	<1	
Barium	Cadmium	ppm	ASTM D5185m		<1	0	
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         50         69         70            Manganese         ppm         ASTM D5185m         0         2         2            Magnesium         ppm         ASTM D5185m         950         889         863            Calcium         ppm         ASTM D5185m         1050         1206         1110            Phosphorus         ppm         ASTM D5185m         995         889         817            Zinc         ppm         ASTM D5185m         1180         1252         1144            Sulfur         ppm         ASTM D5185m         2600         2953         2241            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         10         14            Sodium         ppm         ASTM D5185m         2         2            Potassium         ppm         ASTM D5185m         >20         10         20            INFRA-RED         method         limit/base         current<	Boron	ppm	ASTM D5185m	2	2	3	
Manganese         ppm         ASTM D5185m         0         2         2            Magnesium         ppm         ASTM D5185m         950         889         863            Calcium         ppm         ASTM D5185m         1050         1206         1110            Phosphorus         ppm         ASTM D5185m         995         889         817            Zinc         ppm         ASTM D5185m         1180         1252         1144            Sulfur         ppm         ASTM D5185m         2600         2953         2241            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         10         14            Sodium         ppm         ASTM D5185m         2         2            Potassium         ppm         ASTM D5185m         20         10         20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4 <td< td=""><td>Barium</td><td>ppm</td><td>ASTM D5185m</td><td>0</td><td>0</td><td>0</td><td></td></td<>	Barium	ppm	ASTM D5185m	0	0	0	
Magnesium         ppm         ASTM D5185m         950         889         863            Calcium         ppm         ASTM D5185m         1050         1206         1110            Phosphorus         ppm         ASTM D5185m         995         889         817            Zinc         ppm         ASTM D5185m         1180         1252         1144            Sulfur         ppm         ASTM D5185m         2600         2953         2241            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         10         14            Sodium         ppm         ASTM D5185m         2         2            Potassium         ppm         ASTM D5185m         >20         10         20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.5         0.6            Sulfation         Abs/.1mm         *ASTM D7415 <td< td=""><td>Molybdenum</td><td>ppm</td><td>ASTM D5185m</td><td>50</td><td>69</td><td>70</td><td></td></td<>	Molybdenum	ppm	ASTM D5185m	50	69	70	
Calcium         ppm         ASTM D5185m         1050         1206         1110            Phosphorus         ppm         ASTM D5185m         995         889         817            Zinc         ppm         ASTM D5185m         1180         1252         1144            Sulfur         ppm         ASTM D5185m         2600         2953         2241            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         10         14            Sodium         ppm         ASTM D5185m         2         2            Potassium         ppm         ASTM D5185m         >20         10         20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.5         0.6            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base	Manganese	ppm	ASTM D5185m	0	2	2	
Phosphorus	Magnesium	ppm	ASTM D5185m	950	889	863	
Zinc   ppm   ASTM D5185m   1180   1252   1144       Sulfur   ppm   ASTM D5185m   2600   2953   2241       CONTAMINANTS   method   limit/base   current   history1   history2     Silicon   ppm   ASTM D5185m   >25   10   14       Sodium   ppm   ASTM D5185m   2   2   2       Potassium   ppm   ASTM D5185m   >20   10   20       INFRA-RED   method   limit/base   current   history1   history2     Soot %   *ASTM D7844   >4   0.5   0.6       Nitration   Abs/cm   *ASTM D7624   >20   9.5   10.3       Sulfation   Abs/.1mm *ASTM D7415   >30   21.0   21.1       FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm *ASTM D7414   >25   16.5   16.6	Calcium	ppm	ASTM D5185m	1050	1206	1110	
Sulfur         ppm         ASTM D5185m         2600         2953         2241            CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         10         14            Sodium         ppm         ASTM D5185m         2         2            Potassium         ppm         ASTM D5185m         >20         10         20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.5         0.6            Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	Phosphorus	ppm	ASTM D5185m	995	889	817	
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         10         14            Sodium         ppm         ASTM D5185m         2         2            Potassium         ppm         ASTM D5185m         >20         10         20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.5         0.6            Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	Zinc	ppm	ASTM D5185m	1180	1252	1144	
Silicon         ppm         ASTM D5185m         >25         10         14            Sodium         ppm         ASTM D5185m         2         2            Potassium         ppm         ASTM D5185m         >20         10         20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.5         0.6            Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	Sulfur	ppm	ASTM D5185m	2600	2953	2241	
Sodium         ppm         ASTM D5185m         2         2            Potassium         ppm         ASTM D5185m         >20         10         20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.5         0.6            Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         10         20            INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.5         0.6            Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	Silicon	ppm	ASTM D5185m	>25	10	14	
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.5         0.6            Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	Sodium	ppm	ASTM D5185m		2	2	
Soot %         *ASTM D7844         >4         0.5         0.6            Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	Potassium	ppm	ASTM D5185m	>20	10	20	
Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         *ASTM D7624         >20         9.5         10.3            Sulfation         Abs/.1mm         *ASTM D7615         >30         21.0         21.1            FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	Soot %	%	*ASTM D7844	>4	0.5	0.6	
Sulfation         Abs/.1mm         *ASTM D7415         >30         21.0         21.1            FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.5         16.6	Nitration	Abs/cm		>20			
Oxidation Abs/.1mm *ASTM D7414 >25 <b>16.5</b> 16.6							
	FLUID DEGRA	OATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	16.5	16.6	
	Base Number (BN)	mg KOH/g	ASTM D2896		5.9		



## **OIL ANALYSIS REPORT**







Certificate 12367

Laboratory Sample No. Test Package : FLEET

: PCA0127177 Lab Number : 06190059 Unique Number : 11046811

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 23 May 2024 Tested

: 25 May 2024 Diagnosed : 29 May 2024 - Don Baldridge

411 QUARRY ROAD GREENWOOD, SC

US 29149 Contact: Mitchell Brown greenwoodshop@nwwhite.com T: (864)389-9553

NW WHITE & CO - GREENWOOD DIVISION

To discuss this sample report, contact Customer Service at 1-800-237-1369.

 $^st$  - 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)