

## **OIL ANALYSIS REPORT**

Sample Rating Trend





Machine Id 929097

Fluid

Component Diesel Engine

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

| DIAGNOSIS |  |
|-----------|--|
|           |  |

Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

### Fluid Condition

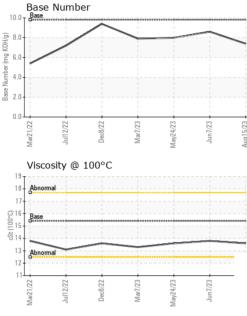
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| SAMPLE INFORI   | MATION   | method  | limit/base   | mit/base current   |   | history2  |  |
|---|--|---|--|--|---|---|--|
| Sample Number   |  | Client Info   | GFL0072538   |  | GFL0068291  | GFL0068327  |  |
| Sample Date   |  | Client Info   |  | 15 Aug 2023  | 07 Jun 2023   | 24 May 2023   |  |
| Machine Age   | hrs  | Client Info   |  | 8767   | 77735   | 77735   |  |
| Oil Age   | hrs  | Client Info   | 8767   |  | 77735   | 77735   |  |
| Oil Changed   |  | Client Info   | Changed  |  | N/A Changed   |   |  |
| Sample Status   |  |   | NORMAL   |  | NORMAL  | NORMAL  |  |
| CONTAMINAT  | ION  | method  | limit/base   | current  | history1  | history2  |  |
| Fuel  |  | WC Method   | >3.0   | <1.0   | <1.0  | <1.0  |  |
| Glycol  |  | WC Method   |  | NEG  | NEG   | NEG   |  |
| WEAR METAL  | S  | method  | limit/base   | current  | history1  | history2  |  |
| Iron  | ppm  | ASTM D5185m   | >120   | 13   | 8   | 12  |  |
| Chromium  | ppm  | ASTM D5185m   |  | <1   | <1  | <1  |  |
| Nickel  | ppm  | ASTM D5185m   | >5   | 0  | 0   | <1  |  |
| Titanium  | ppm  | ASTM D5185m   |  | 0  | 0   | <1  |  |
| Silver  | ppm  | ASTM D5185m   | >2   | 0  | 0   | <1  |  |
| Aluminum  | ppm  | ASTM D5185m   |  | 3  | 2   | 5   |  |
| Lead  |  | ASTM D5185m   | >40  | 0  | <1  | 2   |  |
| Copper  | ppm  | ASTM D5185m   |  | ں<br><1  | <1  | 2   |  |
| Tin   | ppm  | ASTM D5185m   |  | <1   | <1  | 1   |  |
| Vanadium  | ppm  | ASTM D5185m   | >10  | 0  | 0   | <1  |  |
| Cadmium   | ppm  | ASTM D5185m   |  | 0  | 0   | <1  |  |
|   | ppm  | ASTIVI DOTODIII   |  | 0  | -   |   |  |
|   |  |   |  |  |   | history2  |  |
| ADDITIVES   |  | method  | IIIIII/Dase  | current  | history1  |   |  |
| Boron   | ppm  | ASTM D5185m   | 0  | 3  | 5   | 4   |  |
|   | ppm<br>ppm   |   |  | 3<br>0   | 5<br>0  |   |  |
| Boron   |  | ASTM D5185m   | 0  | 3  | 5   | 4   |  |
| Boron<br>Barium   | ppm  | ASTM D5185m<br>ASTM D5185m  | 0  | 3<br>0   | 5<br>0<br>58<br>0   | 4   |  |
| Boron<br>Barium<br>Molybdenum   | ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60   | 3<br>0<br>67   | 5<br>0<br>58  | 4<br>0<br>61  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese  | ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>0  | 3<br>0<br>67<br><1   | 5<br>0<br>58<br>0   | 4<br>0<br>61<br><1  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium   | ppm<br>ppm<br>ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>0<br>1010  | 3<br>0<br>67<br><1<br>1016   | 5<br>0<br>58<br>0<br>889  | 4<br>0<br>61<br><1<br>998   |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070  | 3<br>0<br>67<br><1<br>1016<br>1205   | 5<br>0<br>58<br>0<br>889<br>1069  | 4<br>0<br>61<br><1<br>998<br>1104   |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                                   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150  | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051   | 5<br>0<br>58<br>0<br>889<br>1069<br>983   | 4<br>0<br>61<br><1<br>998<br>1104<br>978  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                            | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270  | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352   | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169   | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                            | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060   | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351   | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014   | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                     | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060   | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br>current  | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br>history1   | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br>history2  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS               | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060   | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br>current<br>4   | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br>history1<br>6  | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br>history2<br>4   |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS               | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><b>limit/base</b><br>>25  | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br>current<br>4<br>5  | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br>history1<br>6<br><1  | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br><b>history2</b><br>4<br>4   |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS               | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><b>imit/base</b><br>>25<br>>20  | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br>current<br>4<br>5<br>1   | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br><b>history1</b><br>6<br><1<br><1   | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br>history2<br>4<br>4<br>4<br>1  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED                                     | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS<br>ppm<br>ppm | ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>2060<br>225<br>>25  | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br>current<br>4<br>5<br>1<br>1<br>current                                     | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br>history1<br>6<br><1<br><1<br><1<br><1<br>0.3   | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br>history2<br>4<br>4<br>1<br>1<br>history2  |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %                           | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS<br>ppm<br>ppm | ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25<br>>20<br>limit/base  | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br>current<br>4<br>5<br>1<br>1<br>current<br>0.7                              | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br><b>history1</b><br>6<br><1<br><1<br><1<br><b>history1</b>  | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br>history2<br>4<br>4<br>4<br>1<br>history2<br>0.7                                 |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration              | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm       | ASTM D5185m<br>ASTM D5185m                              | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>imit/base<br>>25<br>>20<br>imit/base<br>>20   | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br>current<br>4<br>5<br>1<br>2<br>5<br>1<br>2<br>0.7<br>8.3                   | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br>history1<br>6<br><1<br><1<br><1<br>history1<br>0.3<br>5.6  | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br>history2<br>4<br>4<br>4<br>1<br>history2<br>0.7<br>7.7                          |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration<br>Sulfation | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm       | ASTM D5185m<br>ASTM D5185m               | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>2060<br>225<br>20<br>225<br>20<br><b>imit/base</b><br>>20<br>20<br>20                               | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br><u>current</u><br>4<br>5<br>1<br>1<br><u>current</u><br>0.7<br>8.3<br>20.3 | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br><b>history1</b><br>6<br><1<br><1<br><1<br><b>history1</b><br>0.3<br>5.6<br>18.8                    | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br>history2<br>4<br>4<br>4<br>1<br>1<br>history2<br>0.7<br>7.7<br>20.5<br>history2 |  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<br>Sulfur<br>CONTAMINAN<br>Silicon<br>Sodium<br>Potassium<br>INFRA-RED<br>Soot %<br>Nitration<br>Sulfation | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm       | ASTM D5185m<br>ASTM D7844<br>*ASTM D7844 | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>2060<br>225<br>20<br>225<br>20<br>220<br>220<br>220<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20 | 3<br>0<br>67<br><1<br>1016<br>1205<br>1051<br>1352<br>3351<br>current<br>4<br>5<br>1<br>current<br>0.7<br>8.3<br>20.3<br>current         | 5<br>0<br>58<br>0<br>889<br>1069<br>983<br>1169<br>3014<br><b>history1</b><br>6<br><1<br><1<br><1<br><b>history1</b><br>0.3<br>5.6<br>18.8<br><b>history1</b> | 4<br>0<br>61<br><1<br>998<br>1104<br>978<br>1227<br>2974<br>history2<br>4<br>4<br>1<br>history2<br>0.7<br>7.7<br>20.5                       |  |



# **OIL ANALYSIS REPORT**

VISUAL



| <b>Oo</b> Ueck/12<br>Mar/1/23<br>May24/23                     | Jun7/23 +  | White Metal<br>Yellow Metal<br>Precipitate<br>Silt<br>Debris<br>Sand/Dirt<br>Appearance<br>Odor<br>Emulsified Water<br>Free Water  | scalar<br>scalar<br>scalar<br>scalar<br>scalar<br>scalar<br>scalar<br>scalar | *Visual<br>*Visual<br>*Visual<br>*Visual<br>*Visual<br>*Visual<br>*Visual<br>*Visual<br>*Visual  | NONE<br>NONE<br>NONE<br>NONE<br>NONE<br>NORML<br>NORML<br>>0.2                    | NONE<br>NONE<br>NONE<br>NONE<br>NORE<br>NORML<br>NORML<br>NEG | NONE<br>NONE<br>NONE<br>NONE<br>NONE<br>NORML<br>NORML<br>NEG | NONE<br>NONE<br>NONE<br>NONE<br>NONE<br>NORML<br>NORML<br>NEG  |
|---|--|--|--|--|---|---|---|--|
|   |  | FLUID PROPE  |  | method   | limit/base  | current   | history1  | history2   |
|   |  | Visc @ 100°C   | cSt  | ASTM D445  | 15.4  | 13.6  | 13.8  | 13.6   |
|   |  | GRAPHS   |  |  |   |   |   |  |
| Mar/24/23<br>Mar/23   | + 52/LmuL<br>2 mqq<br>1 mqq  | Mar21/22<br>Jul12/22 -   | Mar/1/23   | May24/23 May24/23 Jun7/23 Jun7 | Aug15/23  |   |   |  |
|   | 1  | Viscosity @ 100°C  |  |  | 10.0 T  | Base Number   |   |  |
|   | 1<br>(3-001)<br>150<br>1<br>1  | 8 Abnormal<br>7 Abno | Mar7/23  | May24/23   | (0,H0), Base Minupac (0,H0)<br>Base Minupac (0,H0)<br>Base 2.0<br>0.0<br>EZ/S12bn | Marc1/122<br>Jult12/22<br>Dec8/22                             | Mar7/23 May24/23  | Jun7/23  |
| Certificate L2367<br>To discuss this sa<br>* - Denotes test m | ample No.<br>ab Number<br>nique Number<br>est Package<br>mple report, co<br>nethods that are | 05936004   | Received<br>Diagnose<br>Diagnosti<br>ice at 1-80<br>7025 scop                | : 28 A<br>d : 28 A<br>cian : Wes<br>00-237-1369<br>De of accredi   | ug 2023<br>ug 2023<br>Davis   |   | Contact: Je<br>jhines@  | etro Saginaw<br>N Michigan<br>Saginaw, MI<br>US 48604<br>eremy Hines<br>⊉gflenv.com<br>00)684-1277<br>F: |