

## **OIL ANALYSIS REPORT**

Sample Rating Trend





Component

Diesel Engine

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

### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor. Please specify the component make and model with your next sample.

#### Wear

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

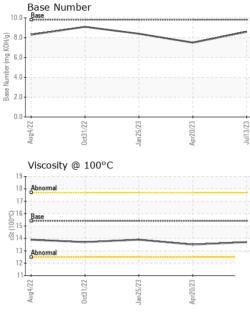
#### Fluid Condition

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

| iAL)  |  | Aug2022  | 0ct2022  | Jan2023 Apr2023   | Jul2023   |   |
|---|--|--|--|---|---|---|
| SAMPLE INFOR  | MATION   | method   | limit/base   | current   | history1  | history2  |
| Sample Number   |  | Client Info  |  | GFL0077500  | GFL0068198  | GFL0060747  |
| Sample Date   |  | Client Info  |  | 13 Jul 2023   | 20 Apr 2023   | 25 Jan 2023   |
| Machine Age   | hrs  | Client Info  |  | 3297  | 2640  | 2108  |
| Oil Age   | hrs  | Client Info  |  | 657   | 532   | 612   |
| Oil Changed   |  | Client Info  |  | Changed   | Changed   | Changed   |
| Sample Status   |  |  |  | NORMAL  | NORMAL  | NORMAL  |
| CONTAMINAT  | ION  | method   | limit/base   | current   | history1  | history2  |
| Fuel  |  | WC Method  | >5   | <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  | >100   | 14  | 16  | 19  |
| Chromium  | ppm  | ASTM D5185m  | >20  | <1  | 1   | 2   |
| Nickel  | ppm  | ASTM D5185m  | >4   | 0   | 0   | 0   |
| Titanium  | ppm  | ASTM D5185m  |  | <1  | 0   | 0   |
| Silver  | ppm  | ASTM D5185m  | >3   | 0   | 0   | 0   |
| Aluminum  | ppm  | ASTM D5185m  | >20  | 6   | 5   | 8   |
| Lead  | ppm  | ASTM D5185m  | >40  | 0   | 0   | 0   |
| Copper  | ppm  | ASTM D5185m  | >330   | <1  | <1  | <1  |
| Tin   | ppm  | ASTM D5185m  | >15  | <1  | 0   | <1  |
| Vanadium  | ppm  | ASTM D5185m  |  | <1  | 0   | 0   |
| Cadmium   | ppm  | ASTM D5185m  |  | 0   | 0   | 0   |
|   |  |  |  |   |   |   |
| ADDITIVES   |  | method   | limit/base   | current   | history1  | history2  |
|   | ppm  | method<br>ASTM D5185m  | limit/base   | current   | history1<br>4   | history2<br>4   |
| Boron   | ppm<br>ppm   | ASTM D5185m  |  |   |   |   |
| Boron<br>Barium   |  | ASTM D5185m  | 0  | 1   | 4   | 4   |
| Boron<br>Barium<br>Molybdenum   | ppm  | ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60   | 1<br>0  | 4<br>0  | 4   |
| Boron<br>Barium<br>Molybdenum<br>Manganese  | ppm<br>ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | 0<br>0<br>60   | 1<br>0<br>64  | 4<br>0<br>60  | 4<br>0<br>62  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium   | ppm<br>ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60<br>0  | 1<br>0<br>64<br><1  | 4<br>0<br>60<br><1  | 4<br>0<br>62<br><1  |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium  | 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  | 1<br>0<br>64<br><1<br>1041  | 4<br>0<br>60<br><1<br>958   | 4<br>0<br>62<br><1<br>913   |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus  | 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  | 1<br>0<br>64<br><1<br>1041<br>1180  | 4<br>0<br>60<br><1<br>958<br>1070   | 4<br>0<br>62<br><1<br>913<br>1066   |
| 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   | 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  | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035  | 4<br>0<br>60<br><1<br>958<br>1070<br>1012   | 4<br>0<br>62<br><1<br>913<br>1066<br>959  |
| 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  | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331  | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233   | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180  |
| 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  | 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  | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666  | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555   | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439  |
| 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                                   | 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   | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666<br>current   | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555<br>history1   | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439<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   | 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<br><b>method</b><br>ASTM D5185m   | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060   | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666<br>current<br>2  | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555<br>history1<br>2  | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439<br>history2<br>3   |
| 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>ppm                            | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br><b>method</b><br>ASTM D5185m   | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060<br>Limit/base   | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666<br>current<br>2<br>3   | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555<br>history1<br>2<br>4   | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439<br>history2<br>3<br>3<br>3   |
| 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>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   | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666<br>current<br>2<br>3<br>9  | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555<br>history1<br>2<br>4<br>9  | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439<br>history2<br>3<br>3<br>3<br>15                                   |
| 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>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<br>>20<br>20<br>imit/base<br>>20               | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666<br>current<br>2<br>3<br>9<br>9   | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555<br>history1<br>2<br>4<br>9<br>9                                     | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439<br>history2<br>3<br>3<br>15<br>history2                            |
| Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus<br>Zinc<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>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<br>>20<br>20<br>imit/base<br>>20               | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666<br><u>current</u><br>2<br>3<br>9<br><u>current</u><br>0.3                | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555<br>history1<br>2<br>4<br>9<br>9<br>history1<br>0.3                  | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439<br>history2<br>3<br>3<br>3<br>15<br>history2<br>0.4                |
| 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<br>INFRA-RED<br>Soot %<br>Nitration              | <pre>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm</pre> | ASTM D5185m<br>ASTM D5185m | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><i>limit/base</i><br>>25<br>>20<br><i>limit/base</i><br>>3<br>>20 | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666<br><i>current</i><br>2<br>3<br>9<br><i>current</i><br>0.3<br>7.8         | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555<br>history1<br>2<br>4<br>9<br><u>history1</u><br>0.3<br>6.9         | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439<br>history2<br>3<br>3<br>3<br>15<br>history2<br>0.4<br>7.6         |
| 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 | <pre>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm<br/>ppm</pre> | ASTM D5185m<br>ASTM D5185m | 0<br>0<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><b>imit/base</b><br>>25<br><b>imit/base</b><br>>3<br>>20<br>>3    | 1<br>0<br>64<br><1<br>1041<br>1180<br>1035<br>1331<br>3666<br><u>current</u><br>2<br>3<br>9<br><u>current</u><br>0.3<br>7.8<br>19.5 | 4<br>0<br>60<br><1<br>958<br>1070<br>1012<br>1233<br>3555<br>history1<br>2<br>4<br>9<br><u>history1</u><br>0.3<br>6.9<br>17.0 | 4<br>0<br>62<br><1<br>913<br>1066<br>959<br>1180<br>3439<br>history2<br>3<br>3<br>3<br>15<br>history2<br>0.4<br>7.6<br>18.6 |



# **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                   |
| Jan 25/23         | Apr20/23<br>Jul13/23                               | Appearance                   | scalar              | *Visual       | NORML                                   | NORML               | NORML             | NORML                  |
| Jan2              | Apr2<br>Jul1                                       | Odor                         | scalar              | *Visual       | NORML                                   | NORML               | NORML             | NORML                  |
|                   |  | Emulsified Water             | scalar              | *Visual       | >0.2                                    | NEG                 | NEG               | NEG                    |
|                   |  | Free Water                   | scalar              | *Visual       |   | NEG                 | NEG               | NEG                    |
|                   |  | FLUID PROPI                  | ERTIES              | method        | limit/base                              | current             | history1          | history2               |
|                   |  | Visc @ 100°C                 | cSt                 | ASTM D445     |   | 13.7                | 13.5              | 13.9                   |
|                   |  | GRAPHS                       |                     |               |   |                     |                   |                        |
|                   |  | Ferrous Alloys               |                     |               |   |                     |                   |                        |
| 2                 | 2  | 100 iron                     |                     |               |   |                     |                   |                        |
| Jan 25/23         | Apr20/23   | 80 - nickel                  |                     |               |   |                     |                   |                        |
| 7                 |  | 60                           |                     |               |   |                     |                   |                        |
|                   |  |                              |                     |               |   |                     |                   |                        |
|                   |  | 40                           |                     | <br> <br>     |   |                     |                   |                        |
|                   |  | 20                           |                     |               |   |                     |                   |                        |
|                   |  |                              |                     |               | _                                       |                     |                   |                        |
|                   |  |                              |                     | 53            | 53                                      |                     |                   |                        |
|                   |  | Aug4/22<br>0ct31/22          | Jan 25/23           | Apr20/23      | Jul13/23                                |                     |                   |                        |
|                   |  |                              |                     | Ä             | 7                                       |                     |                   |                        |
|                   |  | Non-ferrous Meta             | a15                 |               |   |                     |                   |                        |
|                   |  | copper                       |                     |               |   |                     |                   |                        |
|                   |  | 8-                           |                     |               |   |                     |                   |                        |
|                   |  | 6                            |                     |               |   |                     |                   |                        |
|                   |  |                              |                     |               |   |                     |                   |                        |
|                   |  | 4                            |                     | ·             |   |                     |                   |                        |
|                   |  | 2                            |                     |               |   |                     |                   |                        |
|                   |  |                              |                     |               |   |                     |                   |                        |
|                   |  |                              | 53                  | 53            | 53                                      |                     |                   |                        |
|                   |  | Aug4/22<br>0ct31/22          | Jan 25/23           | 4pr20/23      | Jul13/23                                |                     |                   |                        |
|                   |  | Viscosity @ 100°             | С                   |               |   | Base Number         |                   |                        |
|                   |  | 19<br>18 - Abnormal          |                     |               | 10.0                                    | Base                |                   |                        |
|                   |  | 18 - Abnormal                |                     |               |   |                     |                   |                        |
|                   |  | i i i                        |                     |               | 0.0 8.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 |                     |                   |                        |
|                   |  | 016 Base                     |                     |               | B 6.0                                   |                     |                   |                        |
|                   |  | <sup>t</sup> <sup>5</sup> 14 |                     |               | 4.0                                     | +                   |                   |                        |
|                   |  | 13 Abnormal                  |                     |               | ase                                     |                     |                   |                        |
|                   |  | 12-                          |                     |               | ° 2.0                                   |                     |                   |                        |
|                   |  | 11                           | 22                  | 57            |   | 5                   | <u>n</u>          | 2                      |
|                   |  | Aug4/22<br>0ct31/22          | Jan 25/23           | Apr20/23      | Jul13/23                                | Aug4/22<br>0ct31/22 | Jan 25/23         | Apr20/23               |
|                   |  | A Oc                         | Jai                 | Ap            | Jr                                      | A Oc                | Lai               | Ap                     |
| 1                 | Laboratory   | : WearCheck USA -            | 501 Madi            | son Ave., Ca  | ry, NC 27513                            | GFL Envi            | ronmental - 625 - |                        |
|                   | Sample No.   | : GFL0077500                 | Received            | <b>d</b> :18, | Jul 2023                                |                     |                   | Industrial Pkw         |
|                   | Lab Number   | : 05901808                   | Diagnos<br>Diagnost |               | Jul 2023                                |                     |                   | Harrison, N<br>US 4862 |
|                   |  |                              |                     | urian VVA     | s Davis                                 |                     |                   | 15 4862                |
|                   | Unique Numbe                                       |                              | Diagnosi            |               |   |                     | Contact: C        |                        |
| VERTIFICATE L2367 | Unique Number<br>Test Package                      | : FLEET                      | -                   |               |   |                     |                   | Glenda Stande          |
| o discuss th      | Unique Number<br>Test Package<br>is sample report, |                              | vice at 1-8         | 800-237-1369  | 9.                                      |                     |                   |                        |