

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend



# Machine Id 912054

#### Component Diesel Engine

Fluid 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

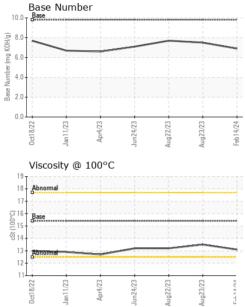
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

| SAMPLE INFORI   | MATION  | method  | limit/base   | current  | history1   | history2  |
|---|---|---|--|--|--|---|
| Sample Number   |   | Client Info   |  | GFL0106134   | GFL0078649   | GFL0082071  |
| Sample Date   |   | Client Info   |  | 14 Feb 2024  | 23 Aug 2023  | 22 Aug 2023   |
| Machine Age   | hrs   | Client Info   |  | 6311   | 50006  | 5006  |
| Oil Age   | hrs   | Client Info   |  | 600  | 596  | 600   |
| 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  |
| Water   |   | WC Method   | >0.2   | NEG  | NEG  | NEG   |
| Glycol  |   | WC Method   |  | NEG  | NEG  | NEG   |
| WEAR METAL  | S   | method  | limit/base   | current  | history1   | history2  |
| Iron  | ppm   | ASTM D5185m   | >110   | 7  | 9  | 15  |
| Chromium  | ppm   | ASTM D5185m   | >4   | 0  | <1   | <1  |
| Nickel  | ppm   | ASTM D5185m   | >2   | 0  | 0  | 0   |
| Titanium  | ppm   | ASTM D5185m   |  | 0  | 0  | 0   |
| Silver  | ppm   | ASTM D5185m   | >2   | 0  | 0  | 0   |
| Aluminum  | ppm   | ASTM D5185m   | >25  | 2  | 4  | 9   |
| Lead  | ppm   | ASTM D5185m   | >45  | 0  | 0  | 0   |
| Copper  | ppm   | ASTM D5185m   | >85  | <1   | <1   | <1  |
| Tin   | ppm   | ASTM D5185m   | >4   | 0  | <1   | <1  |
| Vanadium  | ppm   | ASTM D5185m   |  | <1   | 0  | 0   |
| Cadmium   | ppm   | ASTM D5185m   |  | 0  | 0  | 0   |
|   |   |   |  |  |  |   |
| ADDITIVES   |   | method  | limit/base   | current  | history1   | history2  |
| ADDITIVES<br>Boron  | ppm   | method<br>ASTM D5185m   | limit/base   | current<br>6   | history1<br>11   | history2<br>5   |
|   | ppm<br>ppm  | ASTM D5185m   |  |  |  |   |
| Boron   |   | ASTM D5185m   | 0  | 6  | 11   | 5   |
| Boron<br>Barium   | ppm   | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0  | 6<br>0   | 11<br>0  | 5<br>0  |
| Boron<br>Barium<br>Molybdenum   | ppm<br>ppm  | ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | 0<br>0<br>60   | 6<br>0<br>60   | 11<br>0<br>67  | 5<br>0<br>66  |
| 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  | 6<br>0<br>60<br>0  | 11<br>0<br>67<br><1  | 5<br>0<br>66<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  | 6<br>0<br>60<br>0<br>1014  | 11<br>0<br>67<br><1<br>999   | 5<br>0<br>66<br><1<br>991   |
| 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  | 6<br>0<br>60<br>0<br>1014<br>1138  | 11<br>0<br>67<br><1<br>999<br>1161   | 5<br>0<br>66<br><1<br>991<br>1180   |
| 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  | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012  | 11<br>0<br>67<br><1<br>999<br>1161<br>1052   | 5<br>0<br>66<br><1<br>991<br>1180<br>1109   |
| 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  | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289  | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340   | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342   |
| 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>00<br>00<br>1010<br>1070<br>1150<br>1270<br>2060  | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718  | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612   | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823   |
| 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>00<br>00<br>1010<br>1070<br>1150<br>1270<br>2060  | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br>current   | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1   | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<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   | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060<br>Limit/base<br>>30  | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br>2718<br>current<br>4  | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1<br>4  | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<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><b>method</b><br>ASTM D5185m   | 0<br>0<br>60<br>1010<br>1070<br>1150<br>1270<br>2060<br>Limit/base<br>>30  | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br><i>current</i><br>4<br><1<br><1   | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1<br>4<br>1   | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<br>history2<br>4<br>2   |
| 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   | 0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br><b>limit/base</b><br>>30                                    | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br><i>current</i><br>4<br><1<br><1   | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1<br>4<br>1<br>4  | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<br>history2<br>4<br>2<br>10   |
| 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  | 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>>30<br>-20                                    | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br><b>current</b><br>4<br><1<br><1<br><1   | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1<br>4<br>1<br>4<br>1<br>4<br>1<br>4  | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<br>history2<br>4<br>2<br>10<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>>30<br>20<br>limit/base                             | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br><i>current</i><br>4<br><1<br><1<br><1<br><i>current</i><br>0.4                | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1<br>4<br>1<br>4<br>1<br>4<br>1<br>4<br>1<br>4<br>1<br>4                      | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<br>history2<br>4<br>2<br>10<br>history2<br>0.3                                    |
| 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<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><i>limit/base</i><br>>30<br>200<br><i>limit/base</i><br>>3<br>>20 | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br><i>current</i><br>4<br><1<br><1<br><1<br><i>current</i><br>0.4<br>8.1         | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1<br>4<br>1<br>4<br>1<br>4<br>1<br>4<br>1<br>4<br>1<br>4<br>1<br>4            | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<br>history2<br>4<br>2<br>10<br>history2<br>0.3<br>8.9                             |
| 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><b>imit/base</b><br>>30<br><b>imit/base</b><br>>3<br>>20<br>>3    | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br><b>current</b><br>4<br><1<br><1<br><1<br><b>current</b><br>0.4<br>8.1<br>20.2 | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1<br>4<br>1<br>4<br>1<br>4<br>1<br>4<br><b>history1</b><br>0.4<br>7.9<br>19.5 | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<br>history2<br>4<br>2<br>10<br>history2<br>0.3<br>8.9<br>18.9                     |
| 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<br>FLUID DEGRAC | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>TS<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>2060<br>2060<br>2060<br>2060<br>2060<br>2060<br>2060<br>20                        | 6<br>0<br>60<br>0<br>1014<br>1138<br>1012<br>1289<br>2718<br>Current<br>4<br><1<br><1<br><1<br>current<br>0.4<br>8.1<br>20.2<br>Current    | 11<br>0<br>67<br><1<br>999<br>1161<br>1052<br>1340<br>3612<br>history1<br>4<br>1<br>4<br>1<br>4<br>1<br>4<br>0.4<br>7.9<br>19.5<br>history1        | 5<br>0<br>66<br><1<br>991<br>1180<br>1109<br>1342<br>3823<br>history2<br>4<br>2<br>10<br>history2<br>0.3<br>8.9<br>18.9<br>18.9<br>history2 |



# **OIL ANALYSIS REPORT**

VISUAL



| Certificate L2367 To discuss this sample report |            | tory : WearCheck US<br>e No. : GFL0106134<br>Imber : 06093509<br>Iumber : 10886362<br>ckage : FLEET<br>report, contact Custome |            |               |                  | Madiso<br>Rece<br>Testo   | on Ave., (<br>i <b>ved</b> | ve., Cary, NC 27513 GFL<br>: 19 Feb 2024<br>: 20 Feb 2024<br>: 20 Feb 2024<br>: 20 Feb 2024 - Wes Davis |                    |          |                                       |                | Environmental - 152 - Jacksonville<br>7580 PHILIPS HWY<br>Jacksonville, FL<br>US 32256<br>Contact: Chris Smith<br>chris.smith@gflenv.com<br>T: (904)252-0013 |          |         |               |          |              |          |
|---|------------|--|------------|---------------|------------------|---------------------------|----------------------------|---|--------------------|----------|---------------------------------------|----------------|--|----------|---------|---------------|----------|--------------|----------|
|   |            |  |            | 1:<br>1:<br>1 | 3 Abnom          | Jan 11/23                 | Apr4/23                    | Jun24/23  | Aug22/23           | Aug23/23 | Feb14/24 + Base Nur                   | 0.0            | 0ct18/22   | Jan11/23 | Apr4/23 | Jun24/23      | Aug22/23 | Aug23/23     | Feb14/24 |
|   |            |  |            | cst (100°C)   |                  | nal                       |                            |   |                    |          | Base Number (ma KOH/a)                | 8.0 -<br>6.0 - | /  | _        |         |               |          |              | /        |
|   |            |  |            | 1:            | Visco            | osity @                   | 400°C                      | Jun24/23  | Aug22/23           |          | Feb14/24                              | E<br>10.0 T 1  | Base   | Numb     | er      |               |          |              |          |
|   |            |  |            | udd           | 6                |                           |                            | _   |                    |          |                                       |                |  |          |         |               |          |              |          |
|   |            |  |            | 1             | Non-             | ferrous<br>copper<br>lead |                            |   | Au                 | Au       | <br>                                  |                |  |          |         |               |          |              |          |
|   |            |  |            |               | 0ct18/22         | Jan 11/23                 | Apr4/23                    | Jun24/23  | Aug22/23           | Aug23/23 | Feb14/24                              |                |  |          |         |               |          |              |          |
|   | Jun24/23 - | Aug22/23 -   | Aug23/23 - | 1             | 2 -              | iron<br>chromiu<br>nickel | m                          | $\checkmark$  | $\backslash$       |          | · · · · · · · · · · · · · · · · · · · |                |  |          |         |               |          |              |          |
|   |            |  |            | 1             |                  | APHS<br>ous Allo          | ys                         |   |                    |          |                                       |                |  |          |         |               |          |              |          |
|   |            |  |            |               |                  | 0 100°C                   |                            | cSt   | ASTM D             | 445 15   | 5.4                                   |                | 13.1   |          |         | 13.5          |          | 13.2         |          |
|   |            |  |            |               |                  | ID PR                     | OPE                        |   |                    |          | imit/bas                              | se             |  | rrent    |         | history       | /1       | histor       | ry2      |
| °C  |            |  |            |               | Emulsi<br>Free V | fied Wa<br>/ater          | ter                        | scalar<br>scalar  | *Visual<br>*Visual |          | ).2                                   |                | NEG  |          |         | NEG<br>NEG    |          | NEG<br>NEG   |          |
| ŀ   | Jun24/23   | Aug22/23   | Aug23/23   |               | Odor             |                           |                            | scalar  | *Visual            | N        | ORML                                  |                | NOF  | RML      |         | NORML         |          | NORM         |          |
| 2   | /23 -      | /23  | /23        |               | Sand/[<br>Appea  |                           |                            | scalar<br>scalar  | *Visual<br>*Visual |          | ONE<br>ORML                           |                | NON<br>NOF   |          |         | NONE<br>NORML |          | NONE<br>NORM |          |
|   |            |  |            |               | Debris           |                           |                            | scalar  | *Visual            |          | ONE                                   |                | NON  |          |         | NONE          |          | NONE         |          |
|   |            |  |            |               | Precipi<br>Silt  | tate                      |                            | scalar<br>scalar  | *Visual<br>*Visual |          | ONE<br>ONE                            |                | NON  |          |         | NONE<br>NONE  |          | NONE<br>NONE |          |
|   |            |  |            |               | Yellow           | Metal                     |                            | scalar  | *Visual            | N        | ONE                                   |                | NOM  | IE       |         | NONE<br>NONE  |          | NONE<br>NONE |          |
|   |            |  |            |               | White            | wetai                     |                            | scalar  | *Visual            | 11       | ONE                                   |                | NON  |          |         |               |          | INCINE       |          |

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Submitted By: WITH iNDIANA GFL - Chris Smith