

## **OIL ANALYSIS REPORT**

Sample Rating Trend

NORMAL



425058-402291

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 INFORM   | MATION   | method   | limit/base  | current  | history1  | history2   |
|---|--|--|---|--|---|--|
| Sample Number   |  | Client Info  |   | GFL0087901   | GFL0048666  | GFL0048747   |
| Sample Date   |  | Client Info  |   | 24 Jul 2023  | 07 Jul 2022   | 29 Mar 2022  |
| Machine Age   | hrs  | Client Info  |   | 20839  | 377607  | 18138  |
| Oil Age   | hrs  | Client Info  |   | 600  | 0   | 0  |
| Oil Changed   |  | Client Info  |   | Changed  | Changed   | Changed  |
| Sample Status   |  |  |   | NORMAL   | NORMAL  | NORMAL   |
| CONTAMINATI   | ON   | method   | limit/base  | current  | history1  | history2   |
| Fuel  |  | WC Method  | >3.0  | <1.0   | <1.0  | <1.0   |
| Glycol  |  | WC Method  |   | NEG  | NEG   | NEG  |
|   | 2  | mothod   | limit/baco  | ourropt  | history1  | history?   |
|   | 5  | method   | IIIIII/Dase   | Current  | nistory i   | TIISTOL A  |
| Iron  | ppm  | ASTM D5185m  | >120  | 21   | 7   | 11   |
| Chromium  | ppm  | ASTM D5185m  | >20   | <1   | <1  | <1   |
| Nickel  | ppm  | ASTM D5185m  | >5  | 2  | <1  | 1  |
| Titanium  | ppm  | ASTM D5185m  | >2  | 0  | 0   | 0  |
| Silver  | ppm  | ASTM D5185m  | >2  | 0  | <1  | 0  |
| Aluminum  | ppm  | ASTM D5185m  | >20   | 5  | 2   | 3  |
| Lead  | ppm  | ASTM D5185m  | >40   | 1  | <1  | <1   |
| Copper  | ppm  | ASTM D5185m  | >330  | 41   | 2   | 2  |
| Tin   | ppm  | ASTM D5185m  | >15   | 1  | 1   | <1   |
| Antimony  | ppm  | ASTM D5185m  |   |  |   |  |
| Vanadium  | ppm  | ASTM D5185m  |   | 0  | 0   | 0  |
| Cadmium   | nnm  | ASTM D5185m  |   | 0  | 0   | 0  |
| Oddinium  | ppm  |  |   | 0  | 0   | Ŭ  |
| ADDITIVES   | ppm  | method   | limit/base  | current  | history1  | history2   |
| ADDITIVES<br>Boron  | ppm  | method<br>ASTM D5185m  | limit/base<br>0   | current  | history1  | history2<br>2  |
| ADDITIVES<br>Boron<br>Barium  | ppm<br>ppm   | method<br>ASTM D5185m<br>ASTM D5185m   | limit/base<br>0<br>0  | current<br><1<br>0   | history1<br>2<br>0  | history2<br>2<br>0   |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum  | ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base<br>0<br>0<br>60  | current<br><1<br>0<br>64   | history1           2           0           61   | history2<br>2<br>0<br>59   |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese   | ppm<br>ppm<br>ppm<br>ppm   | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | limit/base<br>0<br>0<br>60<br>0   | <ul> <li>current</li> <li>&lt;1</li> <li>0</li> <li>64</li> <li>&lt;1</li> </ul>   | history1           2           0           61           <1  | history2           2           0           59           <1   |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm  | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m  | limit/base<br>0<br>0<br>60<br>0<br>1010   | <ul> <li>current</li> <li>&lt;1</li> <li>0</li> <li>64</li> <li>&lt;1</li> <li>1070</li> </ul>   | history1           2           0           61           <1           992  | history2           2           0           59           <1           1040  |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm   | Method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | limit/base<br>0<br>0<br>60<br>0<br>1010<br>1070   | <ul> <li>current</li> <li>&lt;1</li> <li>0</li> <li>64</li> <li>&lt;1</li> <li>1070</li> <li>1119</li> </ul>   | history1           2           0           61           <1           992           1175   | history2           2           0           59           <1           1040           1139   |
| ADDITIVES<br>Boron<br>Barium<br>Molybdenum<br>Manganese<br>Magnesium<br>Calcium<br>Phosphorus   | 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  | limit/base<br>0<br>0<br>60<br>0<br>1010<br>1070<br>1150   | <ul> <li>current</li> <li>&lt;1</li> <li>0</li> <li>64</li> <li>&lt;1</li> <li>1070</li> <li>1119</li> <li>1031</li> </ul>   | history1           2           0           61           <1           992           1175           1032  | history2           2           0           59           <1           1040           1139           1094  |
| ADDITIVES<br>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<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   | limit/base<br>0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270   | <ul> <li>current</li> <li>&lt;1</li> <li>0</li> <li>64</li> <li>&lt;1</li> <li>1070</li> <li>1119</li> <li>1031</li> <li>1380</li> </ul>   | history1           2           0           61           <1           992           1175           1032           1284   | bistory2           2           0           59           <1           1040           1139           1094           1371   |
| ADDITIVES<br>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<br>ppm<br>ppm                            | method<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m<br>ASTM D5185m   | limit/base<br>0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060   | <ul> <li>current</li> <li>&lt;1</li> <li>0</li> <li>64</li> <li>&lt;1</li> <li>1070</li> <li>1119</li> <li>1031</li> <li>1380</li> <li>3020</li> </ul>   | history1           2           0           61           <1           992           1175           1032           1284           3451  | bistory2           2           0           59           <1           1040           1139           1094           1371           2604  |
| ADDITIVES<br>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<br>ppm                            | method<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  | limit/base<br>0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base   | current<br><1<br>0<br>64<br><1<br>1070<br>1119<br>1031<br>1380<br>3020<br>current  | history1           2           0           61           <1           992           1175           1032           1284           3451           history1   | history2         2         0         59         <1         1040         1139         1094         1371         2604         history2   |
| ADDITIVES<br>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>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<br>ASTM D5185m   | imit/base 0 0 0 60 0 1010 1070 1150 1270 2060 imit/base >25   | current           <1           0           64           <1           1070           1119           1031           1380           3020           current           8  | history1         2         0         61         <1         992         1175         1032         1284         3451         history1         4   | history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4   |
| ADDITIVES<br>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<br><b>TS</b>               | method           ASTM D5185m   | limit/base 0 0 0 60 0 1010 1070 1150 1270 2060 limit/base >25   | current         <1         0         64         <1         1070         1119         1031         1380         3020         current         8         16   | history1         2         0         61         <1         992         1175         1032         1284         3451         history1         4         6   | history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4         7   |
| ADDITIVES<br>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>ppm<br>ppm                     | method           ASTM D5185m   | limit/base<br>0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25<br>>20   | current           <1           0           64           <1           1070           1119           1031           1380           3020           current           8           16           12  | history1           2           0           61           <1           992           1175           1032           1284           3451           history1           4           6           0   | history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4         7         1   |
| ADDITIVES<br>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<br><b>TS</b><br>ppm<br>ppm | method           ASTM D5185m   | imit/base 0 0 0 0 0 0 1010 1070 1150 1270 2060 225 >225 imit/base   | current         <1         0         64         <1         1070         1119         1031         1380         3020         current         8         16         12         current  | history1         2         0         61         <1         992         1175         1032         1284         3451         history1         4         6         0         history1  | history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4         7         1         history2  |
| ADDITIVES<br>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<br>ppm                     | method           ASTM D5185m           ASTM D5185m | imit/base 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | current         <1         0         64         <1         1070         1119         1031         1380         3020         current         8         16         12         current         1.2  | history1         2         0         61         <1         992         1175         1032         1284         3451         history1         4         6         0         history1         0.5  | -         history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4         7         1         history2         0.5  |
| ADDITIVES<br>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                     | method         ASTM D5185m   | limit/base<br>0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25<br>>20<br>limit/base<br>>4<br>>20  | current         <1         0         64         <1         1070         1119         1031         1380         3020         current         8         16         12         current         1.2         10.7   | history1         2         0         61         <1         992         1175         1032         1284         3451         history1         4         6         0         history1         0.5         9.1  | -         history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4         7         1         history2         0.5         9.2  |
| ADDITIVES<br>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                     | method         ASTM D5185m               | imit/base          0         0         60         0         1010         1070         1150         1270         2060         imit/base         >25         20         imit/base         >20         20         >4         >20         >30 | current         <1         0         64         <1         1070         1119         1031         1380         3020         current         8         16         12         current         1.2         10.7         23.2                              | history1         2         0         61         <1         992         1175         1032         1284         3451         history1         4         6         0         history1         0         0.5         9.1         20.9                               | -         history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4         7         1         history2         0.5         9.2         21.2                               |
| ADDITIVES<br>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                     | method         ASTM D5185m         ASTM D7844         *ASTM D7624         *ASTM D7415         method | limit/base<br>0<br>0<br>60<br>0<br>1010<br>1070<br>1150<br>1270<br>2060<br>limit/base<br>>25<br>>20<br>limit/base<br>>4<br>>20<br>>30   | current         <1         0         64         <1         1070         1119         1031         1380         3020         current         8         16         12         current         1.2         10.7         23.2         current              | history1         2         0         61         <1         992         1175         1032         1284         3451         history1         4         6         0         history1         0         0.5         9.1         20.9         history1              | -         history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4         7         1         history2         0.5         9.2         21.2         history2              |
| ADDITIVES<br>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 DEGRAE<br>Oxidation | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                     | method         ASTM D5185m         ASTM D7844         *ASTM D7624         *ASTM D7414  | imit/base 0 0 0 60 0 1010 1070 1150 1270 2060 imit/base >25 20 imit/base >4 >20 >30 imit/base >25   | current         <1         0         64         <1         1070         1119         1031         1380         3020         current         8         16         12         current         1.2         10.7         23.2         current         19.9 | o         history1         2         0         61         <1         992         1175         1032         1284         3451         history1         4         6         0         history1         0.5         9.1         20.9         history1         16.9 | J         history2         2         0         59         <1         1040         1139         1094         1371         2604         history2         4         7         1         history2         0.5         9.2         21.2         history2         17.1 |



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Mav22/19

# **OIL ANALYSIS REPORT**



Mar18/20

| 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     |
| 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       | 13.2    | 13.2     | 13.4     |
| GRAPHS           |        |           |            |         |          |          |
| Ferrous Alloys   |        |           |            |         |          |          |





Contact/Location: GFL856, 859, 864 - KEITH ROWALD - GFL856

F: