

### **OIL ANALYSIS REPORT**

## KEMP QUARRIES / PRYOR STONE [66326] **WP047**

Component **Diesel Engine** 

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

### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor. ( Customer Sample Comment: PM performed. Engine oil sample taken. Engine oil, and all filters changed.)

#### 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.



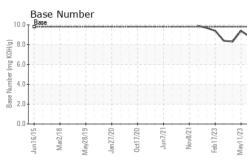
Sample Rating Trend

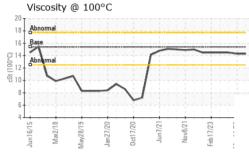


| SAMPLE INFORI                |          | method                     | limit/base | current                   | history1          | history2                  |
|------------------------------|----------|----------------------------|------------|---------------------------|-------------------|---------------------------|
|                              |          |                            | mmbase     |                           | PCA0083962        |                           |
| Sample Number<br>Sample Date |          | Client Info<br>Client Info |            | PCA0084055<br>07 Aug 2023 | 11 May 2023       | PCA0086210<br>18 Apr 2023 |
|                              | hrs      | Client Info                |            | 2873                      |                   |                           |
| Machine Age<br>Oil Age       | hrs      | Client Info                |            | 2073                      | 2576<br>263       | 2313<br>370               |
| Oil Changed                  | 1115     | Client Info                |            | Changed                   |                   | Changed                   |
| Sample Status                |          | Cilent Inio                |            | NORMAL                    | Changed<br>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       | 16                        | 12                | 14                        |
| Chromium                     | ppm      | ASTM D5185m                | >20        | <1                        | 0                 | 0                         |
| Nickel                       | ppm      | ASTM D5185m                | >4         | 0                         | 0                 | 0                         |
| Titanium                     | ppm      | ASTM D5185m                |            | 0                         | 0                 | 0                         |
| Silver                       | ppm      | ASTM D5185m                | >3         | 0                         | 0                 | 0                         |
| Aluminum                     | ppm      | ASTM D5185m                | >20        | 3                         | <1                | <1                        |
| Lead                         | ppm      | ASTM D5185m                | >40        | 3                         | 3                 | <1                        |
| Copper                       | ppm      | ASTM D5185m                | >330       | <1                        | <1                | 0                         |
| Tin                          | ppm      | ASTM D5185m                | >15        | <1                        | 0                 | 0                         |
| Vanadium                     | ppm      | ASTM D5185m                |            | 0                         | 0                 | <1                        |
| Cadmium                      | ppm      | ASTM D5185m                |            | 0                         | 0                 | 0                         |
| ADDITIVES                    |          | method                     | limit/base | current                   | history1          | history2                  |
| Boron                        | ppm      | ASTM D5185m                | 0          | 2                         | <1                | <1                        |
| Barium                       | ppm      | ASTM D5185m                | 0          | 0                         | 0                 | 0                         |
| Molybdenum                   | ppm      | ASTM D5185m                | 60         | 65                        | 61                | 61                        |
| Manganese                    | ppm      | ASTM D5185m                | 0          | <1                        | 0                 | <1                        |
| Magnesium                    | ppm      | ASTM D5185m                | 1010       | 1064                      | 984               | 977                       |
| Calcium                      | ppm      | ASTM D5185m                | 1070       | 1186                      | 1164              | 1073                      |
| Phosphorus                   | ppm      | ASTM D5185m                | 1150       | 1117                      | 1031              | 987                       |
| Zinc                         | ppm      | ASTM D5185m                | 1270       | 1375                      | 1275              | 1273                      |
| Sulfur                       | ppm      | ASTM D5185m                | 2060       | 3974                      | 3786              | 3287                      |
| CONTAMINAN                   | TS       | method                     | limit/base | current                   | history1          | history2                  |
| Silicon                      | ppm      | ASTM D5185m                | >25        | 4                         | 3                 | 2                         |
| Sodium                       | ppm      | ASTM D5185m                |            | <1                        | 2                 | <1                        |
| Potassium                    | ppm      | ASTM D5185m                | >20        | 0                         | <1                | <1                        |
| INFRA-RED                    |          | method                     | limit/base | current                   | history1          | history2                  |
| Soot %                       | %        | *ASTM D7844                | >3         | 0.3                       | 0.3               | 0.4                       |
| Nitration                    | Abs/cm   | *ASTM D7624                | >20        | 6.4                       | 6.0               | 5.6                       |
| Sulfation                    | Abs/.1mm | *ASTM D7415                | >30        | 17.4                      | 18.4              | 16.5                      |
| FLUID DEGRA                  |          | method                     | limit/base | current                   | history1          | history2                  |
| Oxidation                    | Abs/.1mm | *ASTM D7414                | >25        | 13.2                      | 14.1              | 13.1                      |
| Base Number (BN)             | mg KOH/g | ASTM D2896                 |            | 8.8                       | 9.4               | 8.3                       |
|                              |          | 22000                      |            |                           |                   |                           |



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|                     |                  |  | VISUAL   |                                | method                           | limit/base  | current                                | history1                              | history2   |
|---------------------|------------------|--|--|--------------------------------|----------------------------------|---|--|---------------------------------------|--|
|                     |                  | $\sim$   | 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   |
| 0ct17/20            |                  |  | Sand/Dirt  | scalar                         | *Visual                          | NONE  | NONE                                   | NONE                                  | NONE   |
| 0ct17/20<br>Jun7/21 | Nov8/21          | Feb17/23<br>Mav11/23                                   | Appearance   | scalar                         | *Visual                          | NORML   | NORML                                  | NORML                                 | NORML  |
| Ju                  | N                | Feb  | Odor   | scalar                         | *Visual                          | NORML   | NORML                                  | NORML                                 | NORML  |
|                     |                  |  | Emulsified Water   | scalar                         | *Visual                          | >0.2  | NEG                                    | NEG                                   | NEG  |
|                     |                  |  | Free Water   | scalar                         | *Visual                          |   | NEG                                    | NEG                                   | NEG  |
|                     |                  |  | FLUID PROF   | PERTIES                        | method                           | limit/base  | current                                | history1                              | history2   |
| - F                 |                  |  | Visc @ 100°C   | cSt                            | ASTM D445                        | 15.4  | 14.3                                   | 14.3                                  | 14.5   |
| $\sim 1$            |                  |  | GRAPHS   |                                |                                  |   |  |                                       |  |
| V                   |                  |  | Iron (ppm)   |                                |                                  |   | Lead (ppm)                             |                                       |  |
|                     |                  |  | 250 Severe   |                                |                                  | 10  | Severe                                 |                                       |  |
| 0ct17/20<br>Jun7/21 | Nov8/21          | Feb17/23   | 200 - 4  |                                |                                  |   |  |                                       |  |
| J. D.               | 2                | · 1  | e 150 -<br>100 - <b>Abnormal</b>   |                                |                                  | L.  |  |                                       |  |
|                     |                  |  |  |                                |                                  |   |  |                                       |  |
|                     |                  |  | 50   | $\sim$                         |                                  |   |  | $\sim$                                |  |
|                     |                  |  |  | Jun7/21-                       | Nov8/21-                         | 1/23  | Jun16/15 -<br>Mar2/18 -                | Jan27/20 -<br>Oct17/20 -<br>Jun7/21 - | Nov8/21 -<br>Feb17/23 -<br>Aay11/23 -                                  |
|                     |                  |  | Jun16/15<br>Mar2/18<br>May28/19  | Jur Jur                        | Nov<br>Feb 1                     | May11/23  | Jun1<br>Mar<br>May2                    | Jan2<br>Oct1<br>Jur                   | Nov8/21<br>Feb17/23<br>May11/23  |
|                     |                  |  | Aluminum (ppm  | ı)                             |                                  |   | Chromium (p                            | pm)                                   |  |
|                     |                  |  | 50 Severe  |                                |                                  |   | Severe                                 |                                       |  |
|                     |                  |  | 40 + 0   |                                |                                  |   |  |                                       |  |
|                     |                  |  | a 30 -<br>20 - Abnormal  |                                |                                  | udd 2   | Abnormal                               |                                       |  |
|                     |                  |  | 10   |                                |                                  |   | 0                                      |                                       |  |
|                     |                  |  |  | <b></b>                        |                                  |   | 0                                      |                                       |  |
|                     |                  |  | Jun 16/15<br>Mar2/18<br>May28/19   | Jun7/21                        | Nov8/21<br>Feb17/23              | May11/23  | Jun 16/15<br>Mar2/18<br>May28/19       | Jan27/20<br>Oct17/20<br>Jun7/21       | Nov8/21<br>Feb17/23<br>May11/23  |
|                     |                  |  | ∩ ≥  | Ju Det                         | No<br>Feb                        | May   | Jun<br>Ma<br>May                       | Jan                                   | No<br>Feb<br>May   |
|                     |                  |  | Copper (ppm)   |                                |                                  | 8   | Silicon (ppm)<br><sup>0</sup> ⊤ Severe |                                       |  |
|                     |                  |  | Abnonmat   |                                |                                  |   |  |                                       |  |
|                     |                  |  | 300 -  |                                |                                  |   | 0 -                                    |                                       |  |
|                     |                  |  | 툡 200 -  |                                |                                  | E 4   | Abnormal                               |                                       |  |
|                     |                  |  | 100  |                                |                                  | 2   | 10                                     |                                       |  |
|                     |                  |  | 0  |                                |                                  |   |  |                                       |  |
|                     |                  |  | Jun 16/15<br>Mar2/18<br>May28/19   | Jun7/21                        | Nov8/21<br>Feb17/23              | May11/23  | Jun16/15<br>Mar2/18<br>May28/19        | Jan27/20<br>Oct17/20<br>Jun7/21       | Nov8/21<br>Feb17/23<br>May11/23  |
|                     |                  |  |  |                                | Fel N                            | Mar   | 7 2                                    |                                       | Rel<br>Ma  |
|                     |                  |  | Viscosity @ 100  | °С                             |                                  | 10  | Base Number                            | -                                     | • • • • • • • • • • • • • • • • • • •                                  |
|                     |                  |  | Abnormal   | ++++                           | +++++++                          | (B/HO)  | .0                                     |                                       | $\sim$   |
|                     |                  |  | င္ 15 – Base<br>Abnormal   | 1                              |                                  | Ē 6   | .0                                     |                                       |  |
|                     |                  |  | (5.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0.05)<br>(0 | 1                              |                                  | aq 4  | .0                                     |                                       |  |
|                     |                  |  |  | $\sim$                         |                                  | Base Number (mg KOH/g)<br>8 8 9 8                   | .0                                     |                                       |  |
|                     |                  |  | 5 4 6 5  | 20                             | 21                               | 0   |  | 20                                    | 23   |
|                     |                  |  | Jun 16/15<br>Mar2/18<br>May28/19   | Jun7/21                        | Nov8/21<br>Feb17/23              | May11/23  | Jun16/15<br>Mar2/18<br>May28/19        | Jan27/20<br>Oct17/20<br>Jun7/21       | Nov8/21<br>Feb17/23<br>May11/23  |
|                     |                  |  |  | , . ,                          | Ĕ                                | ×   | ΞË                                     | -j o /                                | Ξ. Ξ   |
| TESTING LABORATORY  | Sa<br>Lal<br>Uni | poratory<br>mple No<br>o Numbe<br>que Numi<br>st Packa | . : PCA0084055<br>er : 05935203<br>ber : 10620474  | Received<br>Diagnos<br>Diagnos | d : 25<br>ed : 28<br>tician : Do | ary, NC 2751<br>Aug 2023<br>Aug 2023<br>n Baldridge | 3 Kemp (                               | Quarries - Pry                        | or Stone - Pryor<br>1050 E 520 Rc<br>Pryor, Ok<br>US 74361<br>Contact: |
| - Denotes           | test me          | thods the  | ort, contact Customer Se<br>at are outside of the ISC<br>pecifications are based or  | ) 17025 scc                    | pe of accred                     | ditation.   | (JCGM 106:2012                         |                                       |  |