

# **OIL ANALYSIS REPORT**

TEAM 15 150353

Component **Hydraulic System** 

PETRO CANADA HYDREX XV ALL SEASON HYDRAULIC OIL (100 GAL)

# Sample Rating Trend



# DIAGNOSIS

## Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

### Contamination

The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable.

## **Fluid Condition**

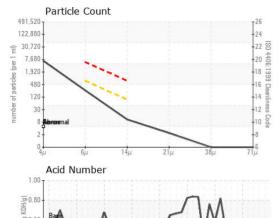
The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

| PURAULIC OIL (10  | o ane,   | 32012 Jan20   | 14 Sep 2015 May 2017   | Aug2018 Dec2019 Aug2021 1   | lov2022   |   |
|---|--|---|--|---|---|---|
| SAMPLE INFORM   | MATION   | method  | limit/base   | current   | history1  | history2  |
| Sample Number   |  | Client Info   |  | PC0077029   | PC0074827   | PC0074767   |
| Sample Date   |  | Client Info   |  | 02 Nov 2023   | 16 Aug 2023   | 25 May 2023   |
| Machine Age   | mths   | Client Info   |  | 0   | 0   | 0   |
| Oil Age   | mths   | Client Info   |  | 0   | 0   | 0   |
| Oil Changed   |  | Client Info   |  | N/A   | N/A   | N/A   |
| Sample Status   |  |   |  | NORMAL  | NORMAL  | NORMAL  |
| CONTAMINATI   | ION  | method  | limit/base   | current   | history1  | history2  |
| Water   |  | WC Method   | >0.05  | NEG   | NEG   | NEG   |
| WEAR METALS   | S  | method  | limit/base   | current   | history1  | history2  |
| Iron  | ppm  | ASTM D5185(m)   | >30  | <1  | <1  | <1  |
| Chromium  | ppm  | ASTM D5185(m)   | >2   | 0   | 0   | 0   |
| Nickel  | ppm  | ASTM D5185(m)   | >2   | <1  | 0   | <1  |
| Titanium  | ppm  | ASTM D5185(m)   |  | 0   | 0   | 0   |
| Silver  | ppm  | ASTM D5185(m)   |  | <1  | 0   | 0   |
| Aluminum  | ppm  | ASTM D5185(m)   | >2   | 0   | <1  | <1  |
| Lead  | ppm  | ASTM D5185(m)   | >10  | <1  | <1  | <1  |
| Copper  | ppm  | ASTM D5185(m)   | >25  | 10  | 10  | 10  |
| Tin   | ppm  | ASTM D5185(m)   | >20  | 0   | 0   | 0   |
| Antimony  | ppm  | ASTM D5185(m)   |  | 0   | 0   | 0   |
| Vanadium  | ppm  | ASTM D5185(m)   |  | 0   | 0   | 0   |
| Beryllium   | ppm  | ASTM D5185(m)   |  | 0   | 0   | 0   |
| Cadmium   | ppm  | ASTM D5185(m)   |  | 0   | 0   | 0   |
|   |  |   |  |   |   |   |
| ADDITIVES   |  | method  | limit/base   | current   | history1  | history2  |
| ADDITIVES<br>Boron  | ppm  | method<br>ASTM D5185(m)   | limit/base   | current   | history1<br><1  | history2<br><1  |
|   | ppm<br>ppm   |   | 0  |   |   | · ·   |
| Boron   | • •  | ASTM D5185(m)   | 0  | <1  | <1  | <1  |
| Boron<br>Barium   | ppm  | ASTM D5185(m)<br>ASTM D5185(m)<br>ASTM D5185(m)   | 0  | <1<br><1  | <1<br>0   | <1  |
| Boron<br>Barium<br>Molybdenum   | ppm<br>ppm   | ASTM D5185(m)<br>ASTM D5185(m)<br>ASTM D5185(m)   | 0<br>0<br>0  | <1<br><1<br>0   | <1<br>0<br>0  | <1<br>0<br>0  |
| Boron<br>Barium<br>Molybdenum<br>Manganese  | ppm<br>ppm   | ASTM D5185(m)<br>ASTM D5185(m)<br>ASTM D5185(m)<br>ASTM D5185(m)  | 0<br>0<br>0  | <1<br><1<br>0   | <1<br>0<br>0<br>0   | <1<br>0<br>0<br>0   |
| Boron Barium Molybdenum Manganese Magnesium   | ppm<br>ppm<br>ppm  | ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)   | 0<br>0<br>0<br>1   | <1<br><1<br>0<br>0<br><1  | <1<br>0<br>0<br>0<br>0<br><1  | <1<br>0<br>0<br>0<br>0<br><1  |
| Boron Barium Molybdenum Manganese Magnesium Calcium   | ppm<br>ppm<br>ppm<br>ppm   | ASTM D5185(m)   | 0<br>0<br>0<br>1<br>0<br>100   | <1<br><1<br>0<br>0<br><1<br>98  | <1<br>0<br>0<br>0<br>0<br><1<br>99  | <1<br>0<br>0<br>0<br>0<br><1<br>106   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus  | ppm<br>ppm<br>ppm<br>ppm<br>ppm                                    | ASTM D5185(m)   | 0<br>0<br>0<br>1<br>0<br>100<br>670  | <1<br><1<br>0<br>0<br><1<br>98<br>631                                 | <1<br>0<br>0<br>0<br>0<br><1<br>99<br>654   | <1<br>0<br>0<br>0<br>0<br><1<br>106<br>678  |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm                             | ASTM D5185(m)   | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850   | <1<br><1<br>0<br>0<br>0<br><1<br>98<br>631<br>789                     | <1<br>0<br>0<br>0<br>0<br><1<br>99<br>654<br>794  | <1<br>0<br>0<br>0<br>0<br><1<br>106<br>678<br>807                                       |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm        | ASTM D5185(m)   | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850   | <1<br><1<br>0<br>0<br><1<br>98<br>631<br>789<br>1410                  | <1<br>0<br>0<br>0<br>0<br><1<br>99<br>654<br>794<br>1448                                    | <1<br>0<br>0<br>0<br>0<br><1<br>106<br>678<br>807<br>1524                               |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm        | ASTM D5185(m)   | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600   | <1 <1 0 0 <1 98 631 789 1410 <1                                       | <1<br>0<br>0<br>0<br><1<br>99<br>654<br>794<br>1448<br><1                                   | <1<br>0<br>0<br>0<br><1<br>106<br>678<br>807<br>1524<br><1                              |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)   | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600   | <1 <1 0 0 <1 98 631 789 1410 <1 current                               | <1<br>0<br>0<br>0<br>0<br><1<br>99<br>654<br>794<br>1448<br><1                              | <1<br>0<br>0<br>0<br><1<br>106<br>678<br>807<br>1524<br><1                              |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)  method  ASTM D5185(m)  | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600   | <1 <1 0 0 0 <1 98 631 789 1410 <1 current                             | <1<br>0<br>0<br>0<br>0<br><1<br>99<br>654<br>794<br>1448<br><1<br>history1                  | <1<br>0<br>0<br>0<br><1<br>106<br>678<br>807<br>1524<br><1<br>history2                  |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium  | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)   | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600   | <1 <1 0 0 0 <1 98 631 789 1410 <1 current <1 0                        | <1<br>0<br>0<br>0<br><1<br>99<br>654<br>794<br>1448<br><1<br>history1<br><1                 | <1 0 0 0 0 <1 106 678 807 1524 <1 history2 <1 0   |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium  CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm                                 | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)  MASTM D5185(m) ASTM D5185(m)                       | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600   | <1 <1 0 0 0 <1 98 631 789 1410 <1 current <1 0 0 current 5785         | <1<br>0<br>0<br>0<br>0<br><1<br>99<br>654<br>794<br>1448<br><1<br>history1<br><1<br>0<br><1 | <1<br>0<br>0<br>0<br><1<br>106<br>678<br>807<br>1524<br><1<br>history2<br><1<br>0<br><1 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >6µm                   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)  MASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)   | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600   | <1 <1 0 0 0 <1 98 631 789 1410 <1 current <1 0 current                | <1<br>0<br>0<br>0<br>0<br><1<br>99<br>654<br>794<br>1448<br><1<br>history1<br><1<br>0<br><1 | <1<br>0<br>0<br>0<br><1<br>106<br>678<br>807<br>1524<br><1<br>history2<br><1<br>0<br><1 |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium  CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm                                 | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)  MASTM D5185(m) ASTM D5185(m)                       | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600<br>limit/base<br>>25                      | <1 <1 0 0 0 <1 98 631 789 1410 <1 current <1 0 0 current 5785         | <1<br>0<br>0<br>0<br><1<br>99<br>654<br>794<br>1448<br><1<br>history1<br><1<br>0<br><1      | <1 0 0 0 0 <1 106 678 807 1524 <1 history2 <1 0 <1                                      |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >6µm                   | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)  METHOD  ASTM D5185(m)  | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600<br>limit/base<br>>25<br>>20<br>limit/base | <1 <1 0 0 0 <1 98 631 789 1410 <1 current <1 0 current 5785 222       | <1 0 0 0 0 <1 99 654 794 1448 <1 history1 <1 0 <1   | <1 0 0 0 0 <1 106 678 807 1524 <1 history2 <1 0 <1 history2                             |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium  CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >14µm Particles >14µm | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)  METHOD  ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647                                       | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600<br>limit/base<br>>25<br>>20<br>limit/base | <1 <1 0 0 0 <1 98 631 789 1410 <1 current <1 0 0 current 5785 222 9   | <1 0 0 0 0 <1 99 654 794 1448 <1 history1 <1 0 <1   | <1 0 0 0 0 <1 106 678 807 1524 <1 history2 <1 0 <1 history2                             |
| Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium  CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >14µm Particles >21µm | ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm<br>ppm | ASTM D5185(m)  METHOD  ASTM D5185(m)  ASTM D5185(m)  METHOD  ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 | 0<br>0<br>0<br>1<br>0<br>100<br>670<br>850<br>1600<br>limit/base<br>>25<br>>20<br>limit/base | <1 <1 0 0 0 <1 98 631 789 1410 <1 current <1 0 0 current 5785 222 9 2 | <1 0 0 0 0 <1 99 654 794 1448 <1 history1 <1 0 <1   | <1 0 0 0 1 106 678 807 1524 <1 history2 <1 0 <1 history2                                |

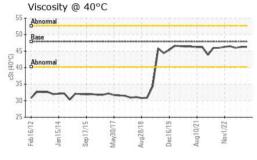


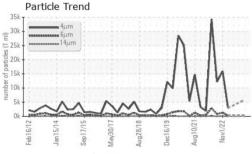
DS. 0.20

# **OIL ANALYSIS REPORT**



| Abnormal |       | <del>dalah dalah i</del> |
|----------|-------|--------------------------|
| Base     |       |                          |
| Abnormal | <br>~ | ~                        |
| Transfer |       |                          |





| FLUID DEGRAD            | NOITAC   | method        |            |         |          | history2 |
|-------------------------|----------|---------------|------------|---------|----------|----------|
| Acid Number (AN)        | mg KOH/g | ASTM D974*    | 0.60       | 0.56    |          |          |
| 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    | VLITE    | NONE     |
| Sand/Dirt               | scalar   | Visual*       | NONE       | NONE    | NONE     | NONE     |
| Appearance              | scalar   | Visual*       | NORML      | NORML   | NORML    | NORML    |
| Odor                    | scalar   | Visual*       | NORML      | NORML   | NORML    | NORML    |
| <b>Emulsified Water</b> | scalar   | Visual*       | >0.05      | NEG     | NEG      | NEG      |
| Free Water              | scalar   | Visual*       |            | NEG     | NEG      | NEG      |
| FLUID PROPE             | RTIES    | method        | limit/base | current | history1 | history2 |
| Visc @ 40°C             | cSt      | ASTM D7279(m) | 47.9       | 46.3    | 46.3     | 46.0     |
| Visc @ 100°C            | cSt      | ASTM D7279(m) | 9.67       | 9.2     | 9.2      | 9.2      |
| Viscosity Index (VI)    | Scale    | ASTM D2270*   | 192        | 185     | 185      | 187      |

| SAMPLE IMAGES | method | limit/base | current | history1          | history2 |
|---------------|--------|------------|---------|-------------------|----------|
| Color         |        |            |         |                   | 01110001 |
| Bottom        |        |            | (G)     | (G <sub>2</sub> ) |          |



CALA ISO 17025:2017 Accredited Laboratory

Laboratory Sample No. Lab Number Unique Number

: 5682622

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 : PC0077029 : 02597542

Received Diagnosed

: 21 Nov 2023 Diagnostician : Wes Davis

: 20 Nov 2023

Test Package : IND 2 (Additional Tests: KV100, VI) To discuss this sample report, contact Customer Service at 1-800-268-2131.

Test denoted (\*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

**Dryden Fibre** 

Box 3001, 1 Duke Street Dryden, ON **CA P8N 2Z7** 

Contact: Adebukola Adekanye adebukola.adekanye@domtar.com

T: (807)223-9950 F: (807)223-9176