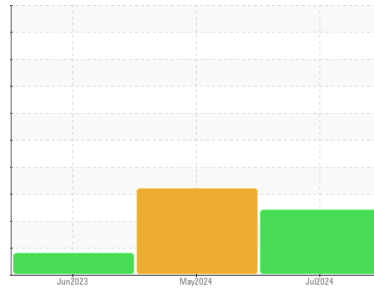




OIL ANALYSIS REPORT

Sample Rating Trend



DIRT



Area
West Virginia
 Machine Id
[West Virginia] Hydraulic - Steering
 Component
Hydraulic System
 Fluid
MARATHON R&O 32 (35 GAL)

DIAGNOSIS

▲ Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

▲ Wear

The copper level is abnormal. All other component wear rates are normal.

▲ Contamination

Elemental level of silicon (Si) above normal indicating ingress of seal material. The amount and size of particulates present in the system are acceptable.

Fluid Condition

The AN level is acceptable for this fluid. The condition of the oil is acceptable for the time in service.

SAMPLE INFORMATION

| | method | limit/base | current | history1 | history2 |
|---------------|-------------|-------------|--------------------|-------------|-------------|
| Sample Number | Client Info | | WC0859988 | WC0874855 | WC0769407 |
| Sample Date | Client Info | | 06 Jul 2024 | 13 May 2024 | 30 Jun 2023 |
| Machine Age | hrs | Client Info | 0 | 0 | 0 |
| Oil Age | hrs | Client Info | 0 | 0 | 0 |
| Oil Changed | Client Info | | Not Chngd | N/A | N/A |
| Sample Status | | | ABNORMAL | ABNORMAL | ABNORMAL |

WEAR METALS

| | method | limit/base | current | history1 | history2 |
|----------|--------|-----------------|-------------|----------|----------|
| Iron | ppm | ASTM D5185m >20 | <1 | <1 | <1 |
| Chromium | ppm | ASTM D5185m >20 | <1 | 0 | 0 |
| Nickel | ppm | ASTM D5185m >20 | <1 | 0 | 0 |
| Titanium | ppm | ASTM D5185m | <1 | 0 | 0 |
| Silver | ppm | ASTM D5185m | 0 | <1 | 0 |
| Aluminum | ppm | ASTM D5185m >20 | 2 | 0 | 0 |
| Lead | ppm | ASTM D5185m >20 | <1 | 0 | 0 |
| Copper | ppm | ASTM D5185m >20 | ▲ 62 | ▲ 59 | ▲ 56 |
| Tin | ppm | ASTM D5185m >20 | 0 | 0 | 0 |
| Vanadium | ppm | ASTM D5185m | 0 | 0 | 0 |
| Cadmium | ppm | ASTM D5185m | <1 | 0 | 0 |

ADDITIVES

| | method | limit/base | current | history1 | history2 |
|------------|--------|-------------|------------|----------|----------|
| Boron | ppm | ASTM D5185m | 0 | 0 | 0 |
| Barium | ppm | ASTM D5185m | 0 | <1 | 0 |
| Molybdenum | ppm | ASTM D5185m | <1 | 0 | <1 |
| Manganese | ppm | ASTM D5185m | 0 | 0 | 0 |
| Magnesium | ppm | ASTM D5185m | <1 | 0 | 0 |
| Calcium | ppm | ASTM D5185m | 34 | 45 | 54 |
| Phosphorus | ppm | ASTM D5185m | 262 | 255 | 306 |
| Zinc | ppm | ASTM D5185m | 341 | 312 | 373 |
| Sulfur | ppm | ASTM D5185m | 670 | 779 | 952 |

CONTAMINANTS

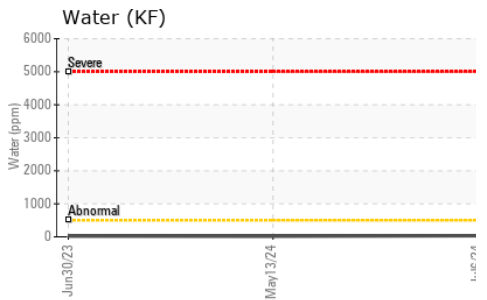
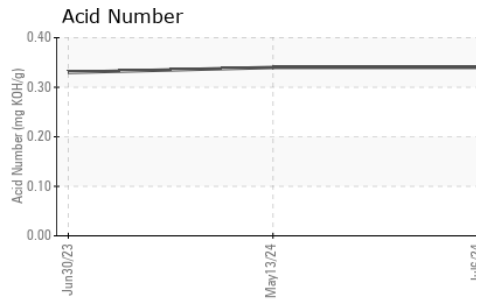
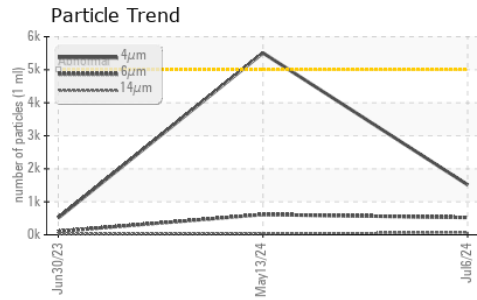
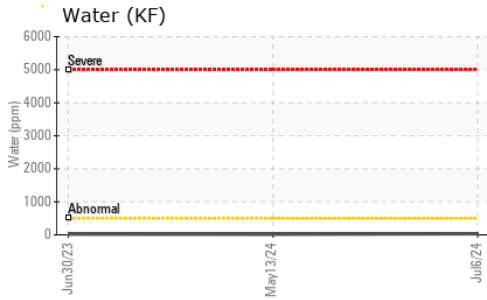
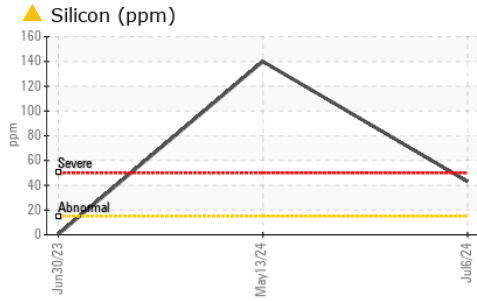
| | method | limit/base | current | history1 | history2 |
|-----------|--------|------------------|--------------|----------|----------|
| Silicon | ppm | ASTM D5185m >15 | ▲ 43 | ▲ 140 | <1 |
| Sodium | ppm | ASTM D5185m | 0 | 2 | <1 |
| Potassium | ppm | ASTM D5185m >20 | <1 | 0 | <1 |
| Water | % | ASTM D6304 >0.05 | 0.003 | 0.002 | 0.002 |
| ppm Water | ppm | ASTM D6304 >500 | 32 | 16 | 21.0 |

FLUID CLEANLINESS

| | method | limit/base | current | history1 | history2 |
|-----------------|--------------|------------|-----------------|------------|----------|
| Particles >4µm | ASTM D7647 | >5000 | 1515 | ● 5508 | 512 |
| Particles >6µm | ASTM D7647 | >1300 | 524 | 614 | 103 |
| Particles >14µm | ASTM D7647 | >160 | 65 | 38 | 20 |
| Particles >21µm | ASTM D7647 | >40 | 21 | 10 | 7 |
| Particles >38µm | ASTM D7647 | >10 | 1 | 1 | 0 |
| Particles >71µm | ASTM D7647 | >3 | 0 | 0 | 0 |
| Oil Cleanliness | ISO 4406 (c) | >19/17/14 | 18/16/13 | ● 20/16/12 | 16/14/11 |

FLUID DEGRADATION

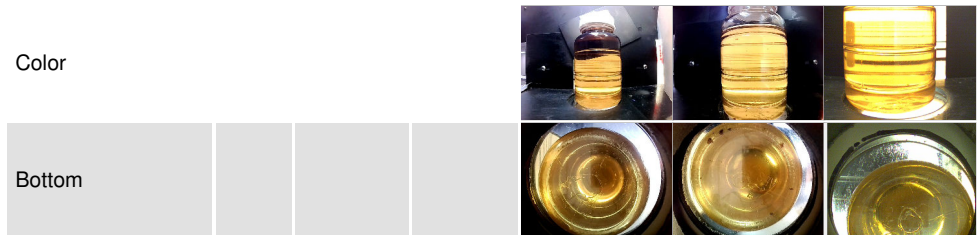
| | method | limit/base | current | history1 | history2 |
|------------------|----------|------------|-------------|----------|----------|
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 0.34 | 0.34 | 0.33 |



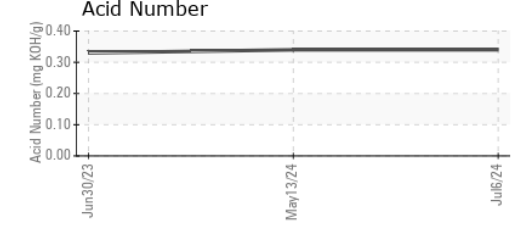
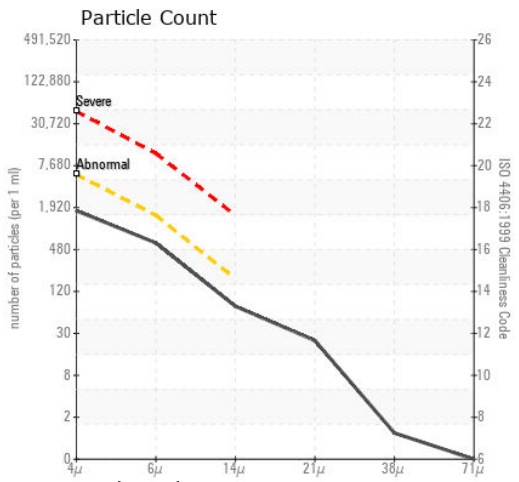
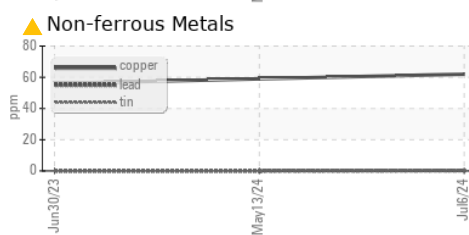
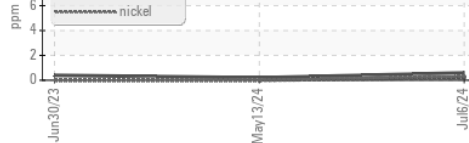
| VISUAL | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | NONE | NONE |
| Silt | scalar | *Visual | NONE | NONE | NONE |
| Debris | scalar | *Visual | NONE | LIGHT | NONE |
| Sand/Dirt | scalar | *Visual | NONE | NONE | NONE |
| Appearance | scalar | *Visual | NORML | NORML | NORML |
| Odor | scalar | *Visual | NORML | NORML | NORML |
| Emulsified Water | scalar | *Visual | >0.05 | NEG | NEG |
| Free Water | scalar | *Visual | | NEG | NEG |

| FLUID PROPERTIES | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| Visc @ 40°C | cSt | ASTM D445 | 46.0 | 46.9 | 46.5 |

| SAMPLE IMAGES | method | limit/base | current | history1 | history2 |
|---------------|--------|------------|---------|----------|----------|
|---------------|--------|------------|---------|----------|----------|



GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513

Sample No. : WC0859988

Lab Number : 06235932

Unique Number : 11124766

Test Package : IND 2 (Additional Tests: KF)

To discuss this sample report, contact Customer Service at 1-800-237-1369.

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Received : 15 Jul 2024

Tested : 16 Jul 2024

Diagnosed : 16 Jul 2024 - Don Baldrige

MARATHON PETROLEUM CO.

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CATLETTSBURG, KY

US 41169

Contact: CORY GUMBERT

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T: (606)585-3950

F: x: