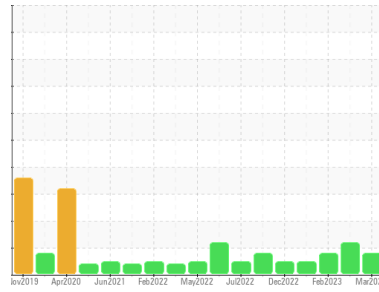




OIL ANALYSIS REPORT

Sample Rating Trend



ISO



Area

Marathon

Machine Id

[Marathon] Hydraulic - Steering

Component

Hydraulic System

Fluid

R&O OIL ISO 46 (35 GAL)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor. (Customer Sample Comment: Chris Comuzie)

Wear

All component wear rates are normal.

Contamination

There is a moderate amount of silt (particulates < 6 microns in size) present in the oil.

Fluid Condition

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

SAMPLE INFORMATION

| | method | limit/base | current | history1 | history2 |
|---------------|-------------|-------------|--------------------|-------------|-------------|
| Sample Number | Client Info | | WC0846117 | WC0769293 | WC0735247 |
| Sample Date | Client Info | | 31 Mar 2024 | 01 Jul 2023 | 14 Feb 2023 |
| Machine Age | hrs | Client Info | 17961 | 13100 | 10800 |
| Oil Age | hrs | Client Info | 17961 | 13100 | 10800 |
| Oil Changed | Client Info | | Filtered | Filtered | N/A |
| Sample Status | | | ATTENTION | ABNORMAL | ATTENTION |

WEAR METALS

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

ADDITIVES

| | method | limit/base | current | history1 | history2 |
|------------|--------|------------------|--------------|----------|----------|
| Boron | ppm | ASTM D5185m 5 | 0 | 0 | 0 |
| Barium | ppm | ASTM D5185m 5 | 0 | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m 5 | <1 | <1 | 0 |
| Manganese | ppm | ASTM D5185m | 0 | 0 | 0 |
| Magnesium | ppm | ASTM D5185m 5 | 2 | <1 | 0 |
| Calcium | ppm | ASTM D5185m 5 | 4 | 14 | 5 |
| Phosphorus | ppm | ASTM D5185m 100 | 19 | 64 | 9 |
| Zinc | ppm | ASTM D5185m 25 | 29 | 91 | 15 |
| Sulfur | ppm | ASTM D5185m 1500 | 210 | 784 | 183 |

CONTAMINANTS

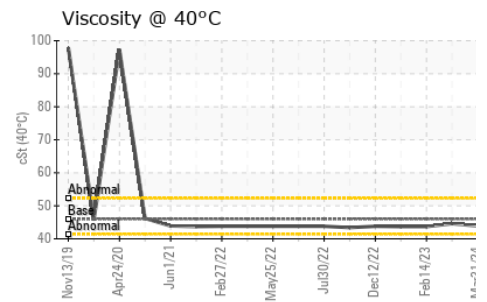
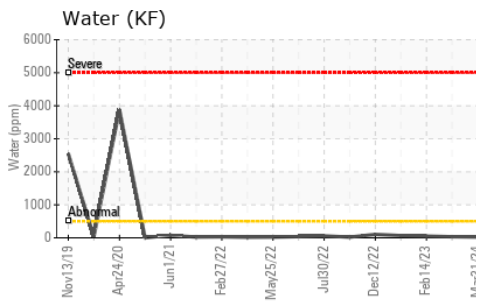
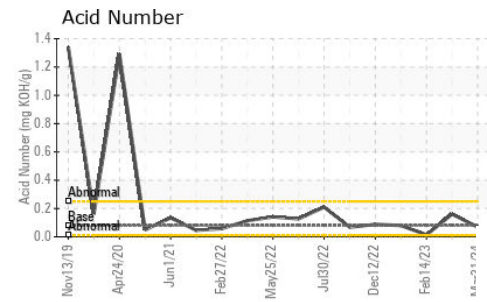
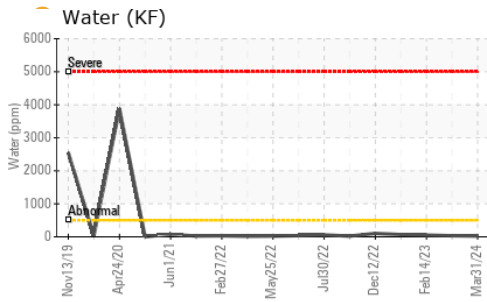
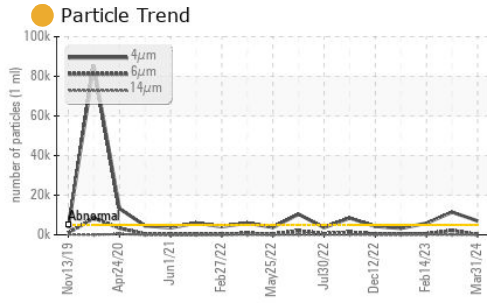
| | method | limit/base | current | history1 | history2 |
|-----------|--------|------------------|--------------|----------|----------|
| Silicon | ppm | ASTM D5185m >15 | <1 | <1 | 0 |
| Sodium | ppm | ASTM D5185m | 0 | 0 | 0 |
| Potassium | ppm | ASTM D5185m >20 | <1 | <1 | 0 |
| Water | % | ASTM D6304 >0.05 | 0.002 | 0.003 | 0.005 |
| ppm Water | ppm | ASTM D6304 >500 | 22 | 32.4 | 52.8 |

FLUID CLEANLINESS

| | method | limit/base | current | history1 | history2 |
|-----------------|--------------|------------|----------------|----------|----------|
| Particles >4µm | ASTM D7647 | >5000 | 7024 | 11436 | 5874 |
| Particles >6µm | ASTM D7647 | >1300 | 99 | 2225 | 485 |
| Particles >14µm | ASTM D7647 | >160 | 4 | 64 | 31 |
| Particles >21µm | ASTM D7647 | >40 | 2 | 11 | 9 |
| Particles >38µm | ASTM D7647 | >10 | 0 | 1 | 1 |
| Particles >71µm | ASTM D7647 | >3 | 0 | 0 | 0 |
| Oil Cleanliness | ISO 4406 (c) | >19/17/14 | 20/14/9 | 21/18/13 | 20/16/12 |

FLUID DEGRADATION

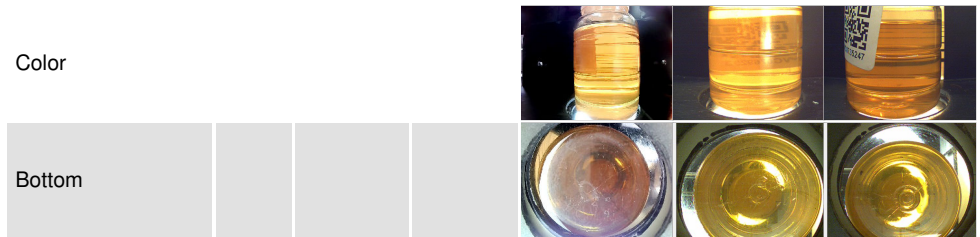
| | method | limit/base | current | history1 | history2 |
|------------------|----------|-----------------|--------------|----------|----------|
| Acid Number (AN) | mg KOH/g | ASTM D8045 0.08 | 0.069 | 0.16 | 0.014 |



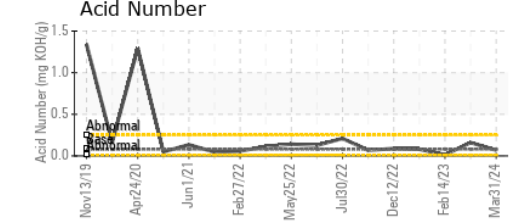
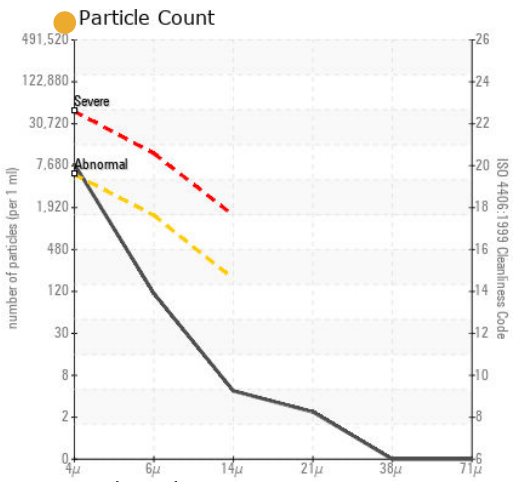
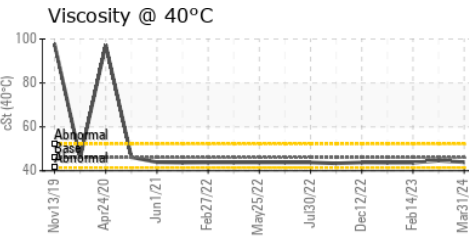
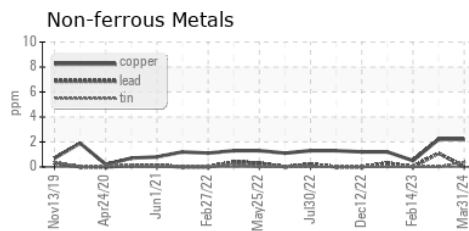
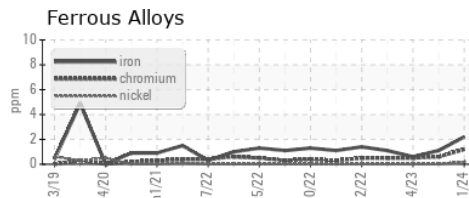
| VISUAL | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| White Metal | scalar | *Visual | NONE | NONE | NONE |
| Yellow Metal | scalar | *Visual | NONE | NONE | NONE |
| Precipitate | scalar | *Visual | NONE | NONE | NONE |
| Silt | scalar | *Visual | NONE | NONE | NONE |
| Debris | scalar | *Visual | NONE | NONE | VLITE |
| 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 | 43.9 | 44.6 |

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



GRAPHS



Certificate L2367

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

Sample No. : WC0846117

Lab Number : 06157689

Unique Number : 10993112

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 : 23 Apr 2024

Tested : 24 Apr 2024

Diagnosed : 25 Apr 2024 - Jonathan Hester

MARATHON PETROLEUM CO.

101 12TH ST

CATLETTSBURG, KY

US 41169

Contact: CORY GUMBERT

cagumbert@marathonpetroleum.com

T: (606)585-3950

F: x: