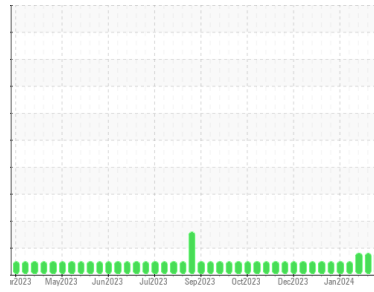




OIL ANALYSIS REPORT

Sample Rating Trend



WEAR



Machine Id

LGS00180

Component

Middle Biogas Engine

Fluid

CITGO PACEMAKER GAS ENGINE LFG LA 40 (--- GAL)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. We recommend an early resample to monitor this condition.

Wear

The nickel level is abnormal. All other 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 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 | | WC0803467 | WC0803466 | WC0803465 |
| Sample Date | Client Info | | 28 May 2024 | 24 May 2024 | 20 May 2024 |
| Machine Age | hrs | Client Info | 61660 | 61569 | 61477 |
| Oil Age | hrs | Client Info | 282 | 190 | 98 |
| Oil Changed | Client Info | | N/A | N/A | N/A |
| Sample Status | | | ABNORMAL | ABNORMAL | ABNORMAL |

CONTAMINATION

| | method | limit/base | current | history1 | history2 |
|--------|-----------|------------|----------------|----------|----------|
| Fuel | WC Method | >4.0 | <1.0 | <1.0 | <1.0 |
| Water | WC Method | >0.1 | NEG | NEG | NEG |
| Glycol | WC Method | | NEG | NEG | NEG |

WEAR METALS

| | method | limit/base | current | history1 | history2 | |
|----------|--------|-------------|---------|--------------|----------|-----|
| Iron | ppm | ASTM D5185m | >45 | 15 | 14 | 14 |
| Chromium | ppm | ASTM D5185m | >2 | <1 | 1 | <1 |
| Nickel | ppm | ASTM D5185m | >2 | ▲ 3 | ▲ 4 | ▲ 4 |
| Titanium | ppm | ASTM D5185m | | 0 | <1 | <1 |
| Silver | ppm | ASTM D5185m | >5 | 0 | 1 | <1 |
| Aluminum | ppm | ASTM D5185m | >10 | 2 | 2 | 2 |
| Lead | ppm | ASTM D5185m | >5 | <1 | <1 | <1 |
| Copper | ppm | ASTM D5185m | >14 | 2 | 2 | 2 |
| Tin | ppm | ASTM D5185m | >13 | 4 | 4 | 3 |
| Vanadium | ppm | ASTM D5185m | | <1 | <1 | <1 |
| Cadmium | ppm | ASTM D5185m | | 0 | <1 | 0 |

ADDITIVES

| | method | limit/base | current | history1 | history2 | |
|------------|--------|-------------|---------|--------------|----------|------|
| Boron | ppm | ASTM D5185m | | 0 | 0 | 2 |
| Barium | ppm | ASTM D5185m | | 0 | 0 | 0 |
| Molybdenum | ppm | ASTM D5185m | | 2 | 4 | 4 |
| Manganese | ppm | ASTM D5185m | | <1 | <1 | <1 |
| Magnesium | ppm | ASTM D5185m | | 21 | 31 | 35 |
| Calcium | ppm | ASTM D5185m | | 1552 | 1328 | 1402 |
| Phosphorus | ppm | ASTM D5185m | | 307 | 284 | 313 |
| Zinc | ppm | ASTM D5185m | | 390 | 337 | 375 |
| Sulfur | ppm | ASTM D5185m | | 3756 | 3340 | 3307 |

CONTAMINANTS

| | method | limit/base | current | history1 | history2 | |
|-----------|--------|-------------|---------|--------------|----------|-----|
| Silicon | ppm | ASTM D5185m | >200 | 179 | 155 | 116 |
| Sodium | ppm | ASTM D5185m | | <1 | <1 | 0 |
| Potassium | ppm | ASTM D5185m | >20 | 0 | 2 | 2 |

INFRA-RED

| | method | limit/base | current | history1 | history2 | |
|-----------|----------|-------------|---------|-------------|----------|------|
| Soot % | % | *ASTM D7844 | | 0 | 0.1 | 0 |
| Nitration | Abs/cm | *ASTM D7624 | >20 | 3.3 | 3.2 | 4.6 |
| Sulfation | Abs/.1mm | *ASTM D7415 | >30 | 16.8 | 15.7 | 16.7 |

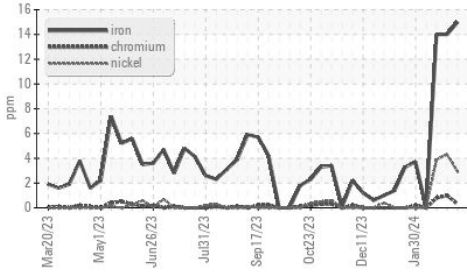
FLUID DEGRADATION

| | method | limit/base | current | history1 | history2 | |
|------------------|----------|-------------|---------|-------------|----------|------|
| Oxidation | Abs/.1mm | *ASTM D7414 | >25 | 7.1 | 6.8 | 8.9 |
| Acid Number (AN) | mg KOH/g | ASTM D8045 | 1.16 | 1.53 | 0.92 | 0.85 |
| Base Number (BN) | mg KOH/g | ASTM D2896 | 5 | 3.46 | 3.61 | 3.83 |

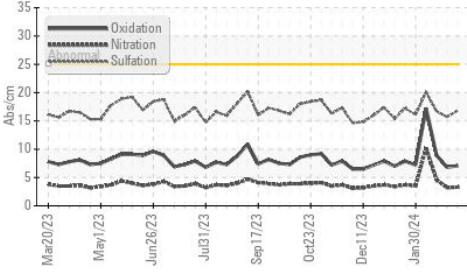


OIL ANALYSIS REPORT

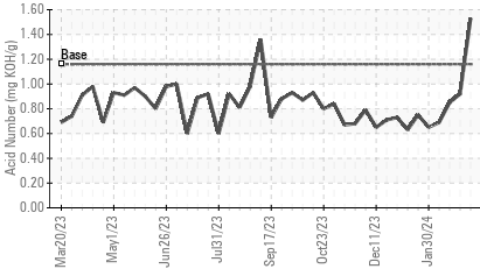
▲ Ferrous Alloys



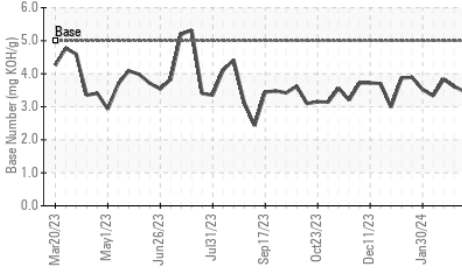
FT-IR (Direct Trend)



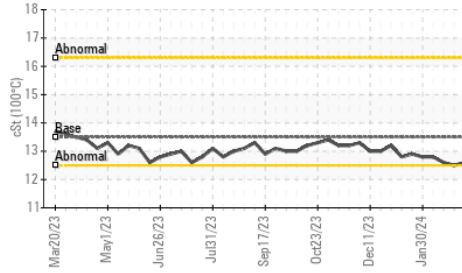
Acid Number



Base Number



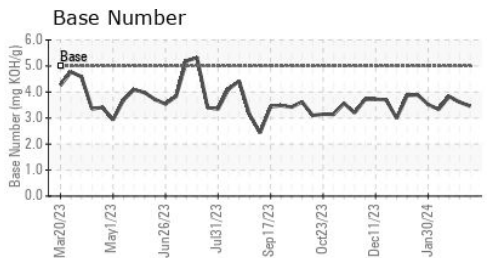
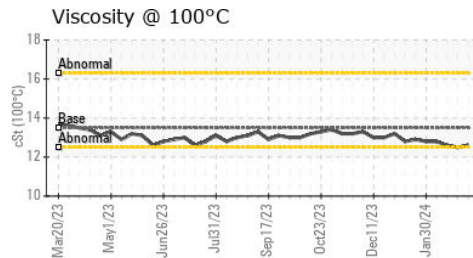
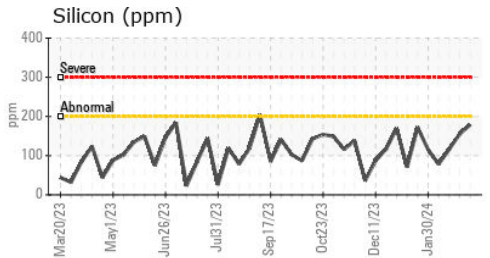
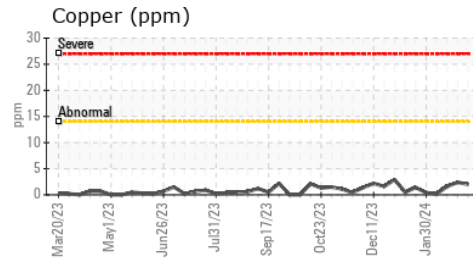
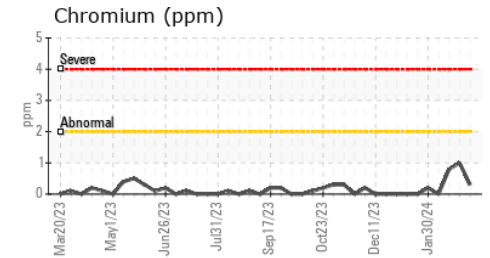
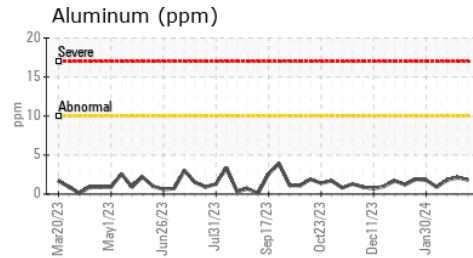
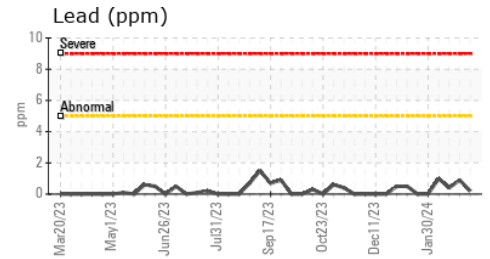
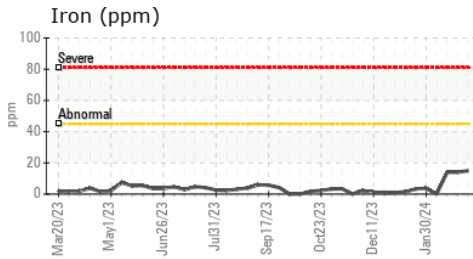
Viscosity @ 100°C



| 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 | NONE |
| Sand/Dirt | scalar | *Visual | NONE | NONE | NONE |
| Appearance | scalar | *Visual | NORML | NORML | NORML |
| Odor | scalar | *Visual | NORML | NORML | NORML |
| Emulsified Water | scalar | *Visual | >0.1 | NEG | NEG |
| Free Water | scalar | *Visual | | NEG | NEG |

| FLUID PROPERTIES | method | limit/base | current | history1 | history2 |
|------------------|--------|------------|---------|----------|----------|
| Visc @ 100°C | cSt | ASTM D445 | 13.5 | 12.6 | 12.5 |

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0803467
Lab Number : 06196019
Unique Number : 11058142
Test Package : MOB 2

Received : 30 May 2024
Tested : 02 Jun 2024
Diagnosed : 02 Jun 2024 - Don Baldrige

BLACK OAK
 5054 HWY HH
 HARTVILLE, MO
 US 65667

Contact: CHIP MATHEWS
 chip.matthews@cubedistrictenergy.com

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)

T:
 F: