



OIL ANALYSIS REPORT

WEAR	ABNORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL

Machine Id
LGS00180
 Component
Middle Biogas Engine
 Fluid
CITGO PACEMAKER GAS ENGINE LFG LA 40 (--- GAL)

RECOMMENDATION

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

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0803465	WC0803454	WC0803456
Sample Date		Client Info		20 May 2024	05 Feb 2024	30 Jan 2024
Machine Age	hrs	Client Info		61477	61379	61379
Oil Age	hrs	Client Info		98	247	247
Filter Age	hrs	Client Info		98	698	698
Oil Changed		Client Info		N/A	N/A	N/A
Filter Changed		Client Info		N/A	N/A	N/A
Sample Status				ABNORMAL	NORMAL	NORMAL

WEAR

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

Iron	ppm	ASTM D5185m	>45	14	0	4
Chromium	ppm	ASTM D5185m	>2	<1	0	<1
Nickel	ppm	ASTM D5185m	>2	▲ 4	0	0
Titanium	ppm	ASTM D5185m		<1	0	0
Silver	ppm	ASTM D5185m	>5	<1	0	0
Aluminum	ppm	ASTM D5185m	>10	2	<1	2
Lead	ppm	ASTM D5185m	>5	<1	1	0
Copper	ppm	ASTM D5185m	>14	2	<1	<1
Tin	ppm	ASTM D5185m	>13	3	1	2
Vanadium	ppm	ASTM D5185m		<1	0	0
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE

CONTAMINATION

There is no indication of any contamination in the oil.

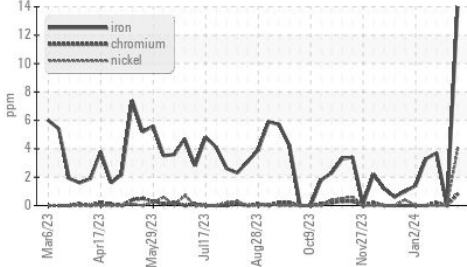
Silicon	ppm	ASTM D5185m	>200	116	78	115
Potassium	ppm	ASTM D5185m	>20	2	<1	1
Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Water		WC Method	>0.1	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844		0	0.1	0
Nitration	Abs/cm	*ASTM D7624	>20	4.6	10.2	3.5
Sulfation	Abs/.1mm	*ASTM D7415	>30	16.7	20.1	16.1
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG

FLUID CONDITION

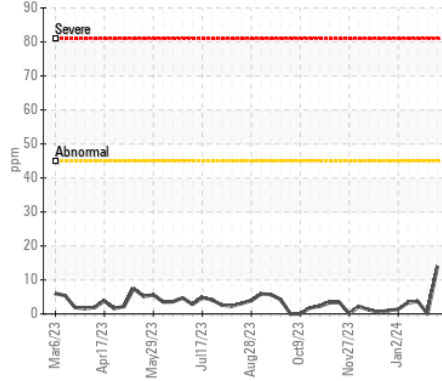
The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sodium	ppm	ASTM D5185m		0	<1	0
Boron	ppm	ASTM D5185m		2	2	1
Barium	ppm	ASTM D5185m		0	0	5
Molybdenum	ppm	ASTM D5185m		4	2	2
Manganese	ppm	ASTM D5185m		<1	<1	0
Magnesium	ppm	ASTM D5185m		35	20	35
Calcium	ppm	ASTM D5185m		1402	1308	1390
Phosphorus	ppm	ASTM D5185m		313	232	333
Zinc	ppm	ASTM D5185m		375	333	368
Sulfur	ppm	ASTM D5185m		3307	2598	3142
Oxidation	Abs/.1mm	*ASTM D7414	>25	8.9	17.2	7.2
Acid Number (AN)	mg KOH/g	ASTM D8045	1.16	0.85	0.69	0.65
Base Number (BN)	mg KOH/g	ASTM D2896	5	3.83	3.33	3.52
Visc @ 100°C	cSt	ASTM D445	13.5	12.6	12.8	12.8

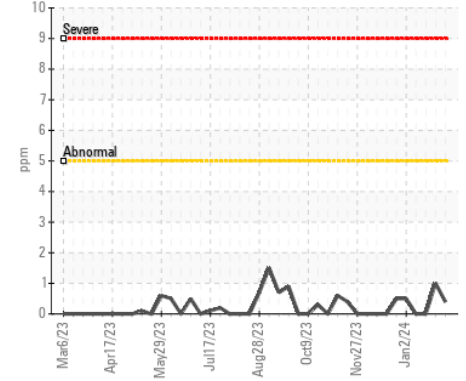
▲ Ferrous Alloys



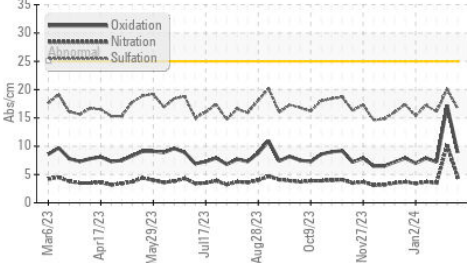
Iron (ppm)



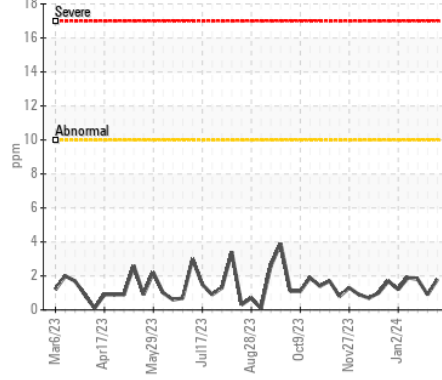
Lead (ppm)



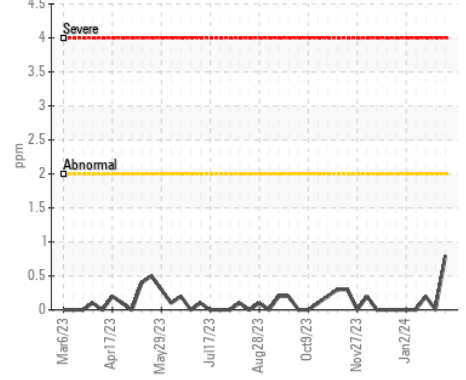
FT-IR (Direct Trend)



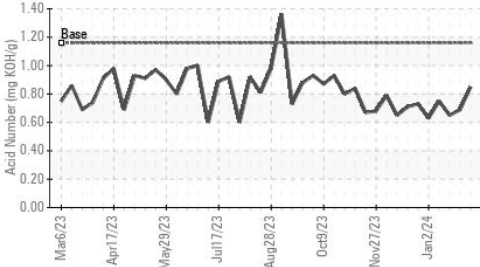
Aluminum (ppm)



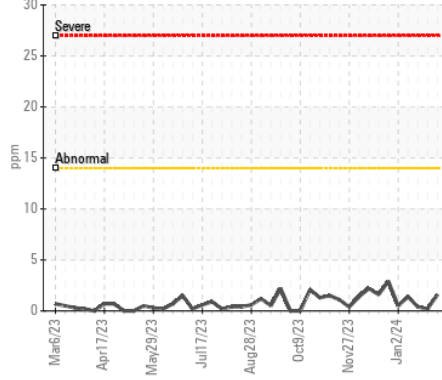
Chromium (ppm)



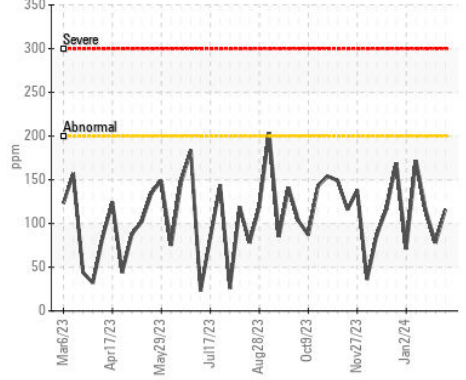
Acid Number



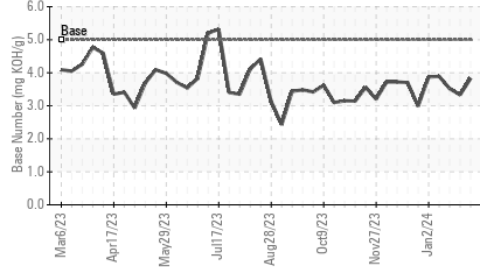
Copper (ppm)



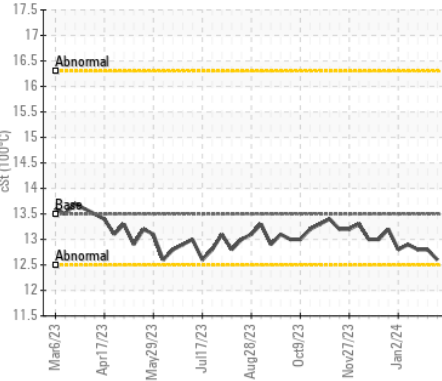
Silicon (ppm)



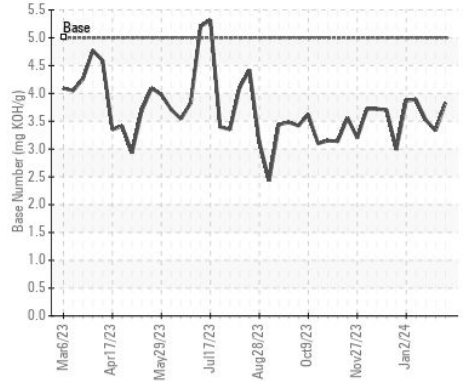
Base Number



Viscosity @ 100°C



Base Number



Certificate L2367

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

Sample No. : WC0803465

Lab Number : 06187896

Unique Number : 11044648

Test Package : MOB 2

Received : 22 May 2024

Tested : 23 May 2024

Diagnosed : 24 May 2024 - Sean Felton

BLACK OAK

5054 HWY HH

HARTVILLE, MO

US 65667

Contact: CHIP MATHEWS

chip.matthews@cubedistrictenergy.com

T:

F:

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)