



OIL ANALYSIS REPORT

WEAR	MARGINAL
CONTAMINATION	ABNORMAL
FLUID CONDITION	NORMAL

Area
Store 9 - Marietta

Machine Id
1110

Component
Diesel Engine

Fluid
SHELL ROTELLA T 15W40 (--- GAL)

RECOMMENDATION

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		LEC0045346	LEC0045794	LEC0045849
Sample Date		Client Info		20 Feb 2024	01 Jan 2024	05 Nov 2023
Machine Age	mls	Client Info		575956	560574	543142
Oil Age	mls	Client Info		10000	10000	10000
Filter Age	mls	Client Info		10000	10000	10000
Oil Changed		Client Info		Changed	Changed	Changed
Filter Changed		Client Info		Changed	Changed	Changed
Sample Status				ABNORMAL	NORMAL	NORMAL

WEAR

The iron level is marginal. The lead level is marginal.

Iron	ppm	ASTM D5185m	>100	▲ 92	42	29
Chromium	ppm	ASTM D5185m	>20	3	<1	<1
Nickel	ppm	ASTM D5185m	>4	<1	0	0
Titanium	ppm	ASTM D5185m		<1	0	0
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	8	4	4
Lead	ppm	ASTM D5185m	>40	▲ 32	10	4
Copper	ppm	ASTM D5185m	>330	11	6	6
Tin	ppm	ASTM D5185m	>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		<1	0	0
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE

CONTAMINATION

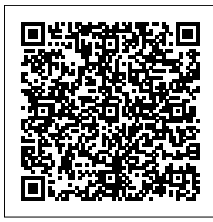
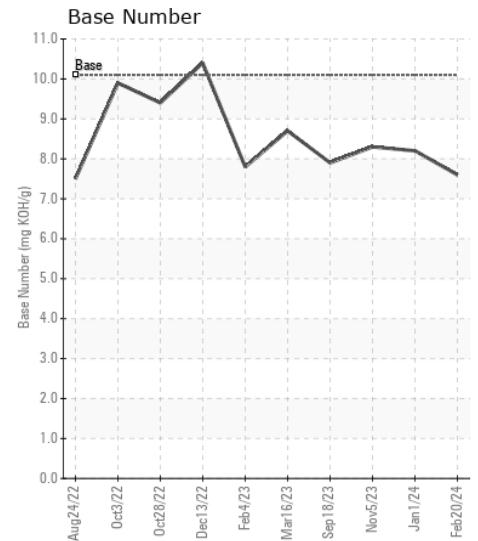
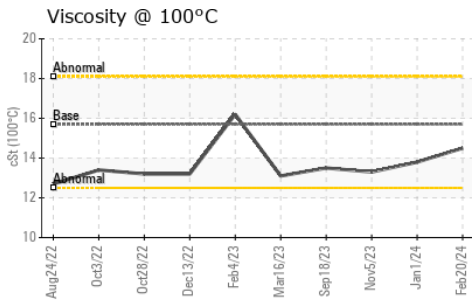
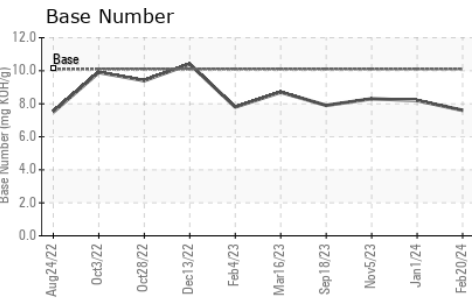
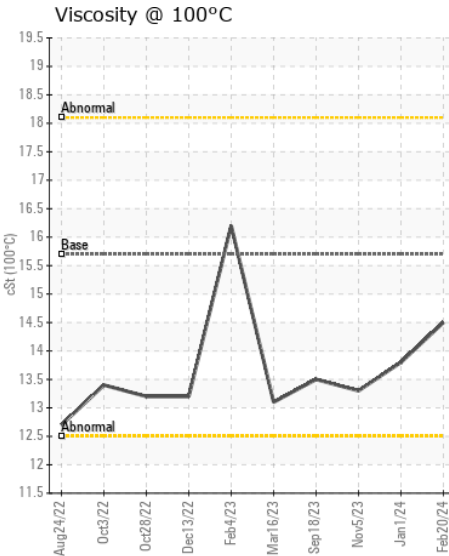
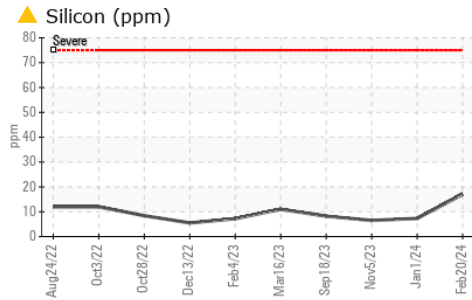
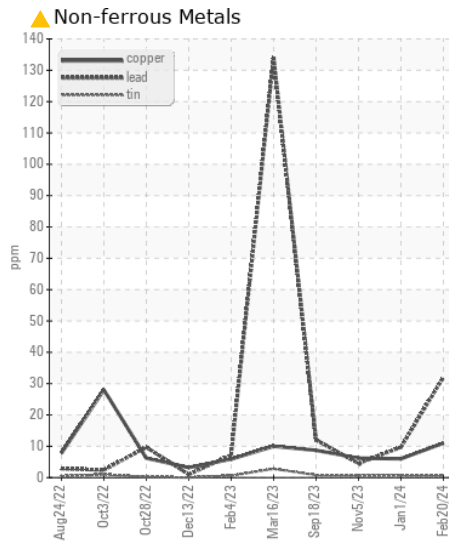
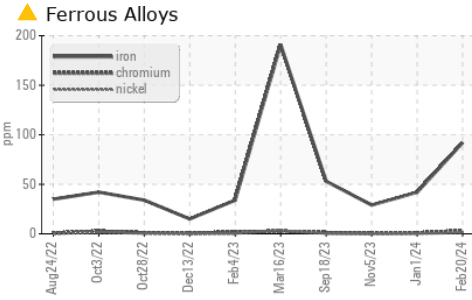
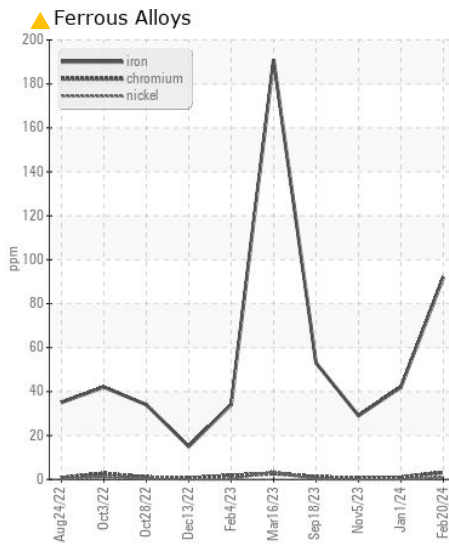
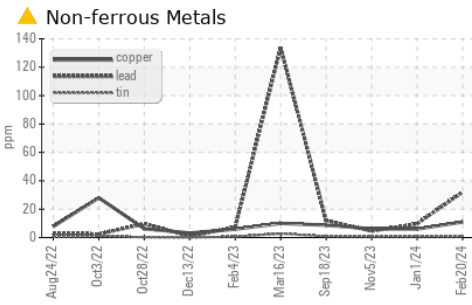
Sodium and/or potassium levels are high. Elemental level of silicon (Si) above normal indicating ingress of dirt/seal material. Test for glycol is negative.

Silicon	ppm	ASTM D5185m	>120	▲ 17	7	6
Potassium	ppm	ASTM D5185m	>20	▲ 40	1	<1
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol	%	*ASTM D2982		NEG	NEG	NEG
Soot %	%	*ASTM D7844	>3	0.3	0.4	0.4
Nitration	Abs/cm	*ASTM D7624	>20	12.3	12.0	11.2
Sulfation	Abs/.1mm	*ASTM D7415	>30	29.4	28.2	27.0
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	>0.2	NEG	NEG	NEG

FLUID CONDITION

The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

Sodium	ppm	ASTM D5185m		6	1	<1
Boron	ppm	ASTM D5185m	316	386	229	216
Barium	ppm	ASTM D5185m	0.0	0	0	0
Molybdenum	ppm	ASTM D5185m	1.2	310	129	125
Manganese	ppm	ASTM D5185m		1	<1	<1
Magnesium	ppm	ASTM D5185m	24	1139	699	685
Calcium	ppm	ASTM D5185m	2292	2580	1565	1544
Phosphorus	ppm	ASTM D5185m	1064	1151	739	709
Zinc	ppm	ASTM D5185m	1160	1469	902	893
Sulfur	ppm	ASTM D5185m	4996	4465	2433	2382
Oxidation	Abs/.1mm	*ASTM D7414	>25	30.7	27.9	25.1
Base Number (BN)	mg KOH/g	ASTM D2896	10.1	7.6	8.2	8.3
Visc @ 100°C	cSt	ASTM D445	15.7	14.5	13.8	13.3



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : LEC0045346 **Received** : 28 Feb 2024
Lab Number : 06102805 **Tested** : 01 Mar 2024
Unique Number : 10901035 **Diagnosed** : 01 Mar 2024 - Jonathan Hester
Test Package : CONST (Additional Tests: Glycol, TBN)
 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)

HALL DRILLING LLC
 PO BOX 249
 ELLENBORO, WV
 US 26346
 Contact: CHRIS PETROVICH
 chrispetrovich@halldrilling.com
 T: (304)869-3404
 F: (304)869-3408