LIEBHERR
CONSTRUCTION EQUIPMENT

LIEBHERR LH50 1203-77107 - Diesel Engine

Sample No: LH0258793

Oil Type: CHEVRON DELO LE 5W40

AMERICAN STATE EQUIPMENT CO.
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WAUSAU, WI
US 54401
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SAMPLE INFORMATION

Sample Number		**LH0258793**	LH0272548	LH0243353	LH0254742
Sample Date		**01 Mar 2024**	28 Nov 2023	30 Aug 2023	16 Jun 2023
Machine Hours		**20946**	20037	19522	18994
Oil Hours		**0**	0	0	0
Oil Changed		**Changed**	Changed	Changed	Changed
Sample Status		**ABNORMAL**	ABNORMAL	NORMAL	NORMAL

OIL CONDITION

Visc @ 100°C	cSt	**13.0**	13.5	14.2	14.2
Base Number (BN)	mg KOH/g	**6.1**	8.6	7.5	8.6
Oxidation (PA)	%	**95**	70	63	63

CONTAMINATION

Water	%	**NEG**	NEG	NEG	NEG
Soot %	%	**3.1**	1.7	1.9	1.5
Nitration (PA)	%	**142**	112	100	99
Sulfation (PA)	%	**93**	66	66	60
Glycol	%	**NEG**	NEG	NEG	NEG
Fuel	%	**<1.0**	<1.0	<1.0	<1.0
Silicon	ppm	**12**	23	8	7
Sodium	ppm	**139**	1096	4	1
Potassium	ppm	**15**	97	2	2

WEAR METALS

Iron	ppm	**56**	35	31	22
Copper	ppm	**11**	32	5	5
Lead	ppm	**10**	4	<1	0
Tin	ppm	**1**	1	<1	<1
Aluminum	ppm	**13**	11	7	4
Chromium	ppm	**2**	2	1	<1
Molybdenum	ppm	**7**	8	11	21
Nickel	ppm	**0**	1	0	<1
Titanium	ppm	**86**	92	78	61
Silver	ppm	**0**	0	0	0
Manganese	ppm	**1**	1	<1	<1
Vanadium	ppm	**<1**	1	<1	<1

ADDITIVES

Calcium	ppm	**1349**	1315	1371	1239
Magnesium	ppm	**720**	615	788	804
Zinc	ppm	**1241**	1098	1242	1250
Phosphorus	ppm	**994**	909	1032	1004
Barium	ppm	**0**	11	0	0
Boron	ppm	**16**	27	24	41

Diagnosis

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.The aluminum level is abnormal. All other component wear rates are normal. Sodium and/or potassium levels remain high. There is an abnormal amount of solids and carbon present in the oil. Test for glycol is negative. 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.

Depot: LEC0008
Unique No: 10938340
Signed: Jonathan Hester
Report Date: 25 Mar 2024

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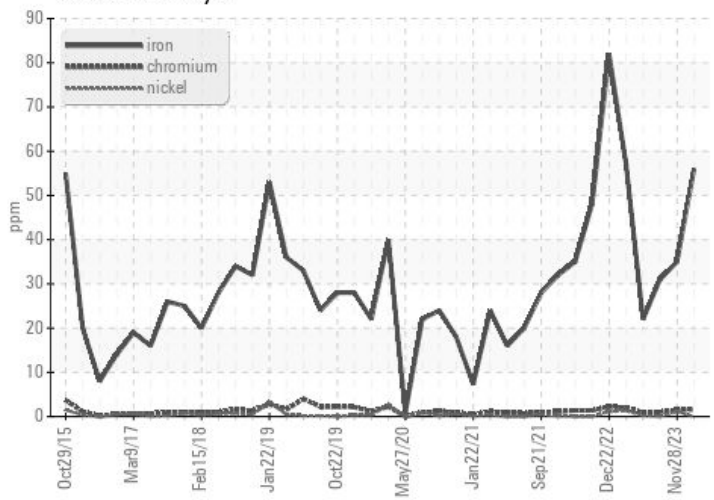
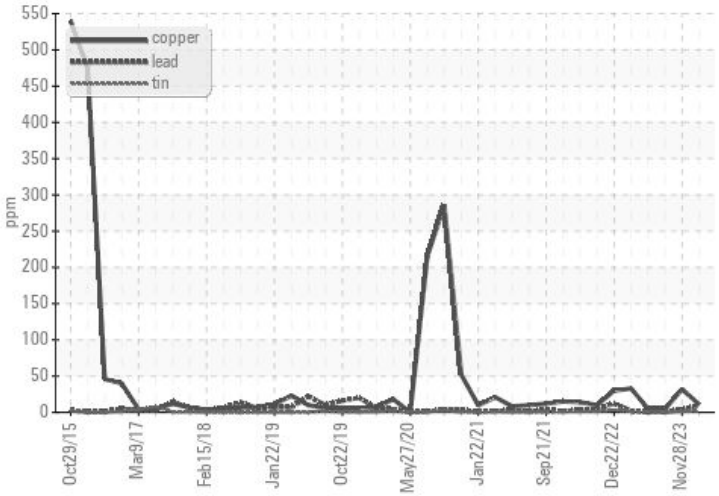
GRAPHS

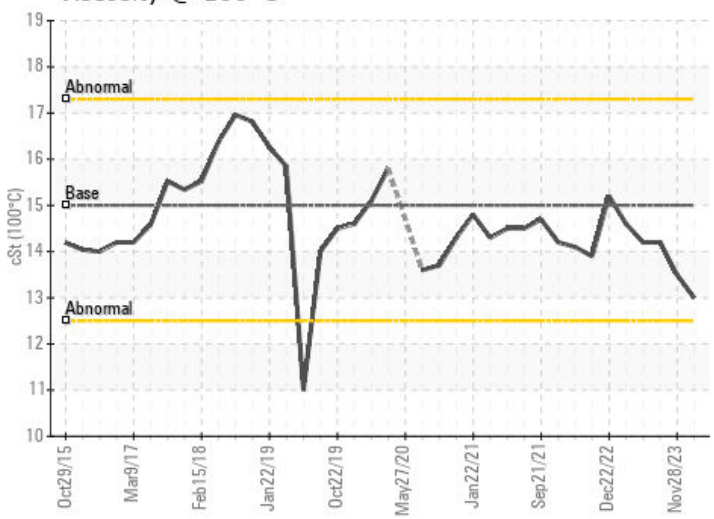
Ferrous Alloys



Non-ferrous Metals



Viscosity @ 100°C



Base Number