

LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR A954 028291-450 - Diesel Engine

Sample No: LH0244642

Oil Type: CONOCO PHILLIPS GUARDOL ECT 15W40



SAMPLE INFORMATION

Sample Number	LH0244642	LH0207977	LH0244532	LH0244528
Sample Date	15 Aug 2023	20 Jun 2023	21 Mar 2023	08 Feb 2023
Machine Hours	25759	25303	24798	24500
Oil Hours	300	300	300	300
Oil Changed	Changed	Changed	Changed	Changed
Sample Status	ABNORMAL	NORMAL	NORMAL	NORMAL

NILES IRON & METAL CO. INC.

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US 44446

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OIL CONDITION

Visc @ 100°C	cSt	13.8	13.3	14.0	13.9
Base Number (BN)	mg KOH/g	7.4	9.8	7.1	6.7
Oxidation (PA)	%	52	55	71	82



CONTAMINATION

Soot %	%	1.3	0.5	0.9	1
Nitration (PA)	%	77	69	88	96
Sulfation (PA)	%	58	51	64	69
Glycol	%	NEG	NEG	NEG	NEG
Fuel	%	<1.0	<1.0	<1.0	<1.0
Silicon	ppm	7	7	5	5
Sodium	ppm	15	19	6	3
Potassium	ppm	2	3	5	3



WEAR METALS

Iron	ppm	29	12	13	17
Copper	ppm	515	12	0	1
Lead	ppm	<1	2	2	7
Tin	ppm	1	1	0	<1
Aluminum	ppm	1	3	<1	<1
Chromium	ppm	<1	<1	0	<1
Molybdenum	ppm	11	19	31	43
Nickel	ppm	0	0	0	0
Titanium	ppm	8	15	3	5
Silver	ppm	0	0	0	0
Manganese	ppm	1	1	<1	1
Vanadium	ppm	0	0	0	0



ADDITIVES

Calcium	ppm	1782	2296	1719	1978
Magnesium	ppm	668	349	604	558
Zinc	ppm	1346	1151	1338	1400
Phosphorus	ppm	1098	1017	1080	1091
Barium	ppm	14	47	0	0
Boron	ppm	42	106	28	18

Diagnosis

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor. The copper level is abnormal. In the absence of other significant wear metals, suspect copper due to sources other than wear (i.e. cooling core). All other component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Depot: NILNIL

Unique No: 10633516

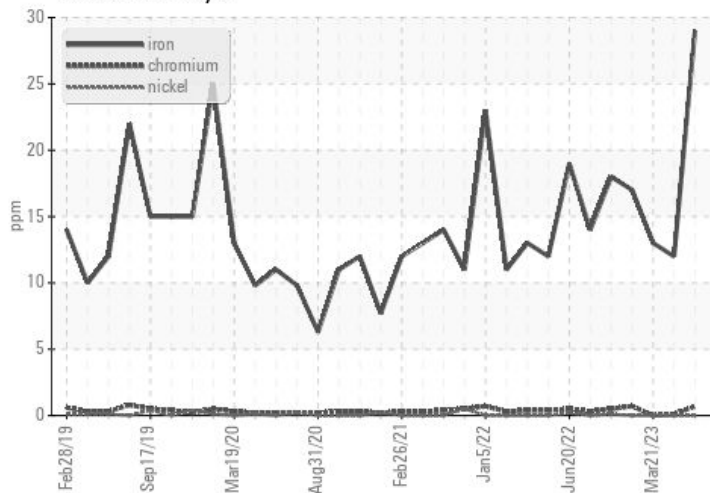
Signed: Don Baldrige

Report Date: 08 Sep 2023

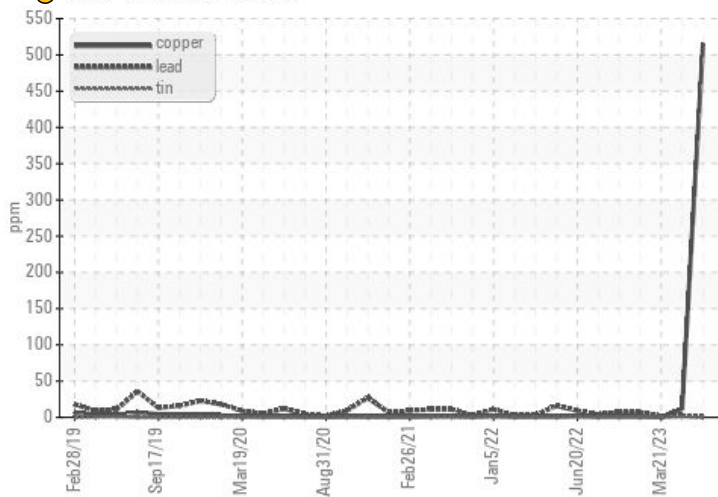


GRAPHS

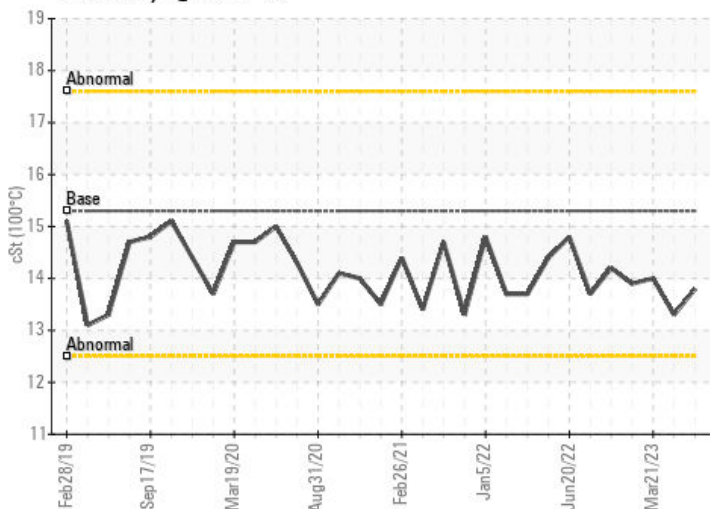
Ferrous Alloys



Non-ferrous Metals



Viscosity @ 100°C



Base Number

