

LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR R954 027106-1328 - Diesel Engine

Sample No: LHMC106041
 Oil Type: DIESEL ENGINE OIL SAE 15W40



AMERICAN STATE EQUIPMENT CO.
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 Contact: CHRIS BARTNIK
 cbartnik@amstate.com
 T: (715)675-6900
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Sample Information

Sample Number	LHMC106041	LHMC040831	---	---
Sample Date	08 Sep 2017	06 Apr 2011	---	---
Machine Hours	5753	150	---	---
Oil Hours	0	150	---	---
Oil Changed	Not Chngd	Not Chngd	---	---
Sample Status	NORMAL	NORMAL	---	---



Oil Condition

Visc @ 100°C	cSt	14.6	13.35	---	---
Oxidation (PA)	%	64	48	---	---



Contamination

Water	%	NEG	NEG	---	---
Soot %	%	0.1	0	---	---
Nitration (PA)	%	67	67	---	---
Sulfation (PA)	%	55	42	---	---
Glycol	%	NEG	NEG	---	---
Fuel	%	<1.0	<1.0	---	---
Silicon	ppm	6	5	---	---
Sodium	ppm	4	3	---	---
Potassium	ppm	0	2	---	---



Wear Metals

Iron	ppm	5	8	---	---
Copper	ppm	1	11	---	---
Lead	ppm	<1	2	---	---
Tin	ppm	0	0	---	---
Aluminum	ppm	<1	1	---	---
Chromium	ppm	<1	<1	---	---
Molybdenum	ppm	20	0	---	---
Nickel	ppm	0	0	---	---
Titanium	ppm	<1	<1	---	---
Silver	ppm	0	0	---	---
Manganese	ppm	<1	<1	---	---
Vanadium	ppm	0	<1	---	---



Additives

Calcium	ppm	1056	2065	---	---
Magnesium	ppm	794	744	---	---
Zinc	ppm	1045	1250	---	---
Phosphorus	ppm	929	1107	---	---
Barium	ppm	0	11	---	---
Boron	ppm	60	127	---	---

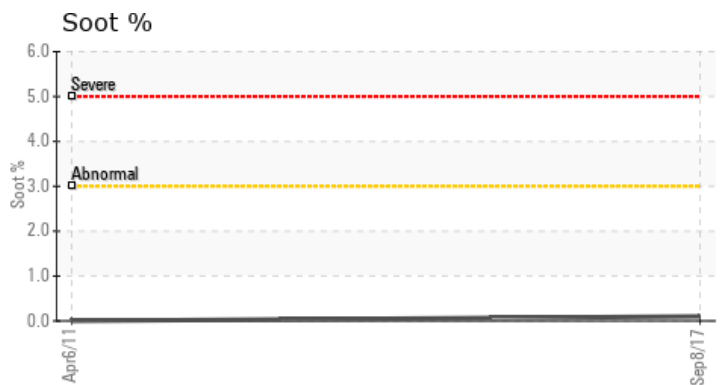
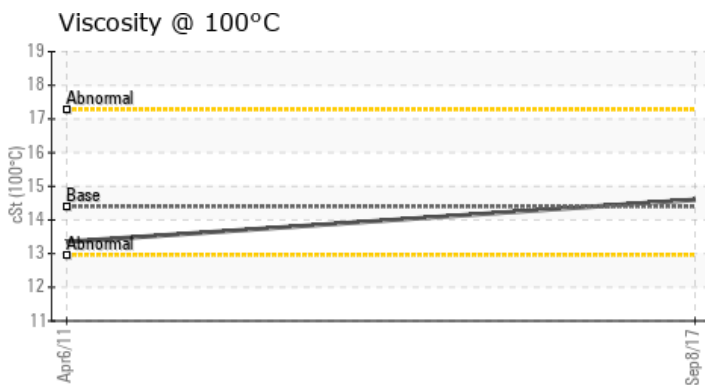
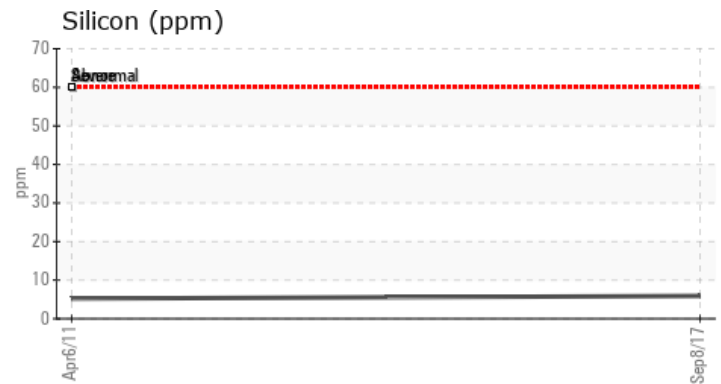
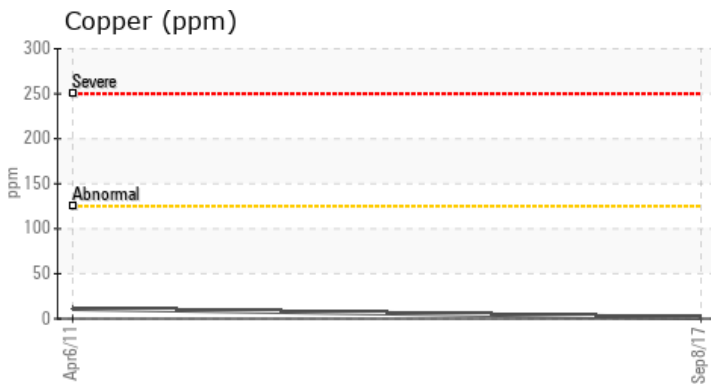
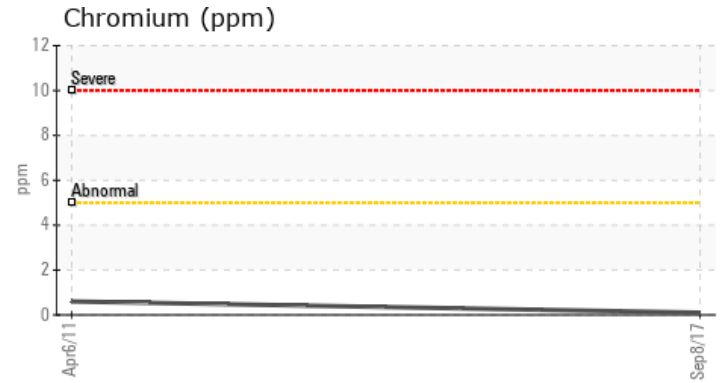
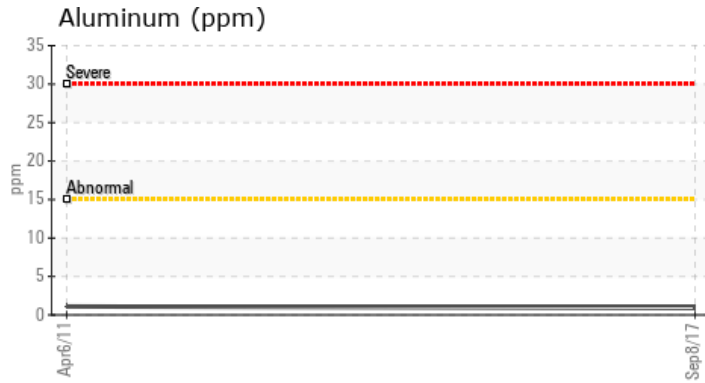
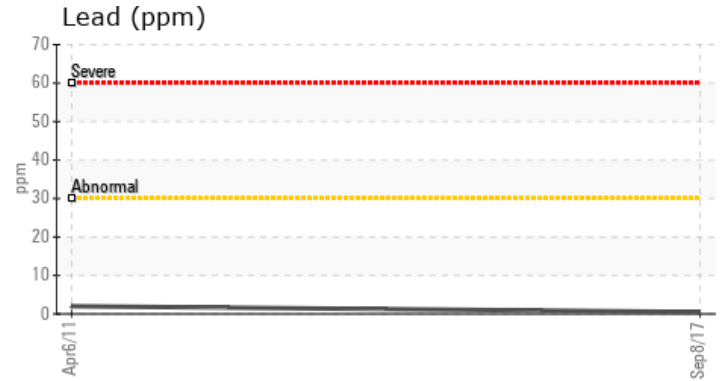
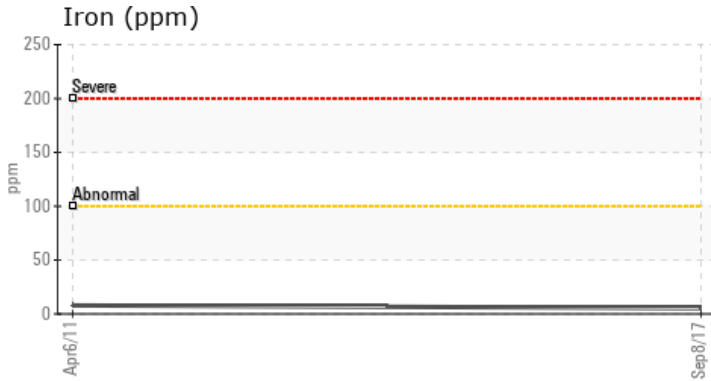
Diagnosis

Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The condition of the oil is acceptable for the time in service.

Depot: LEC0008
 Unique No: 7926681
 Signed: Wes Davis
 Report Date: 14 Sep 2017



Graphs



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CONSTRUCTION EQUIPMENT



LIEBHERR R954 027106-1328 - Hydraulic System

Sample No: LHMC87807

Oil Type: HY 10



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Sample Information

Sample Number	LHMC87807	LHMC37436	---	---
Sample Date	08 Sep 2017	06 Apr 2011	---	---
Machine Hours	5753	150	---	---
Oil Hours	0	150	---	---
Oil Changed	Not Chngd	Not Chngd	---	---
Sample Status	NORMAL	NORMAL	---	---



Oil Condition

Visc @ 40°C	cSt	38.55	45.18	---	---
Acid Number (AN)	mg KOH/g	0.656	1.02	---	---



Contamination

Water	%	NEG	NEG	---	---
Particles 5-15µm	count	4192	---	---	---
Particles 15-25µm	count	139	---	---	---
Particles 25-50µm	count	-114	---	---	---
Particles 50-100µm	count	0	---	---	---
Particles >100µm	count	193	---	---	---
NAS Code		10	---	---	---
Particles >4µm		194	757	---	---
Particles >6µm		57	412	---	---
Particles >14µm		8	70	---	---
ISO 4406:1999 (c)		15/13/10	17/16/13	---	---
Silicon	ppm	4	4	---	---
Sodium	ppm	<1	2	---	---
Potassium	ppm	<1	0	---	---



Wear Metals

Iron	ppm	1	2	---	---
Copper	ppm	<1	1	---	---
Lead	ppm	0	4	---	---
Tin	ppm	0	0	---	---
Aluminum	ppm	0	<1	---	---
Chromium	ppm	0	<1	---	---
Molybdenum	ppm	0	<1	---	---
Nickel	ppm	0	0	---	---
Titanium	ppm	0	<1	---	---
Silver	ppm	<1	0	---	---
Manganese	ppm	2	<1	---	---
Vanadium	ppm	0	0	---	---



Additives

Calcium	ppm	8	1610	---	---
Magnesium	ppm	0	8	---	---
Zinc	ppm	15	597	---	---
Phosphorus	ppm	180	514	---	---
Barium	ppm	4	<1	---	---
Boron	ppm	6	26	---	---

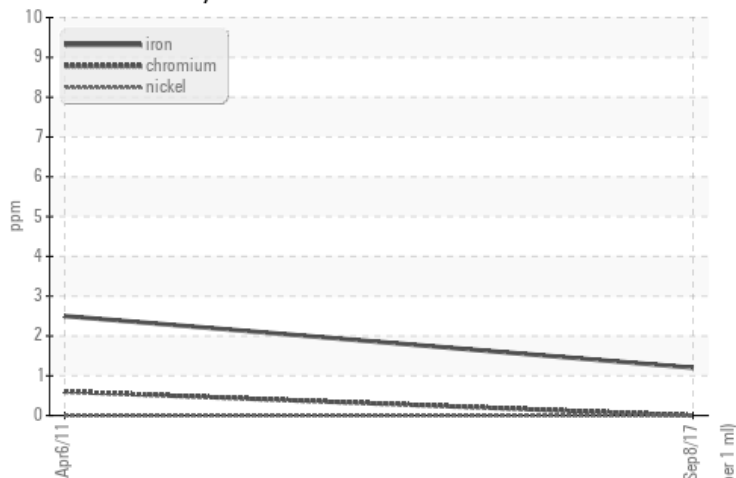
Depot: LEC0008
 Unique No: 7926524
 Signed: Jonathan Hester
 Report Date: 15 Sep 2017

Contact/Location: CHRIS BARTNIK - LEC0008

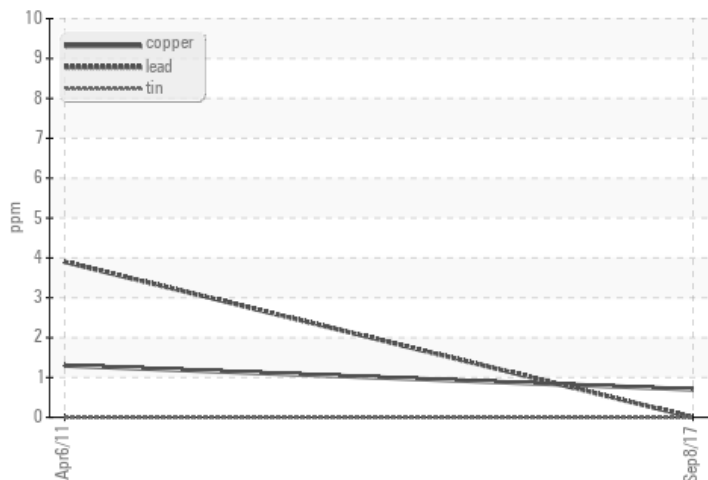


Graphs

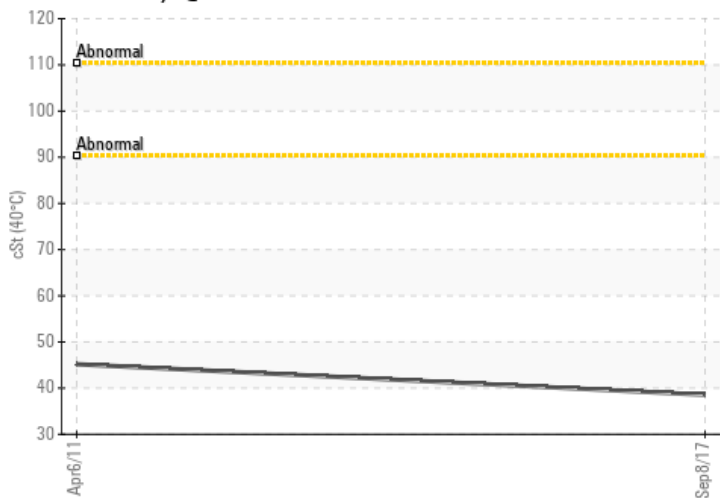
Ferrous Alloys



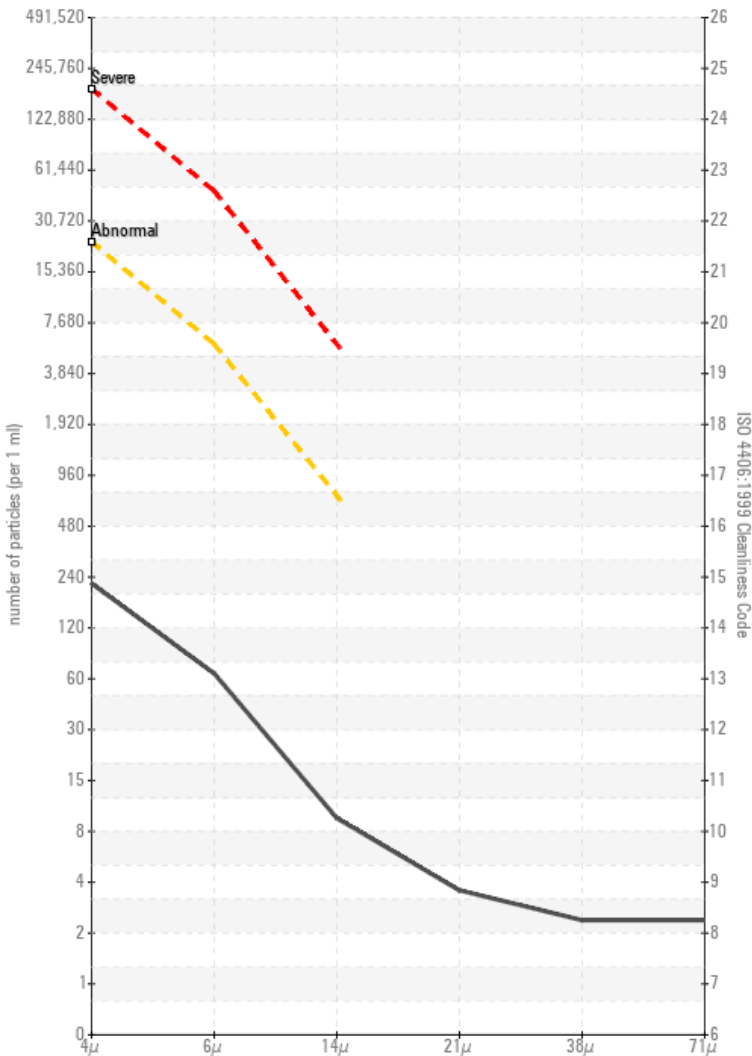
Non-ferrous Metals



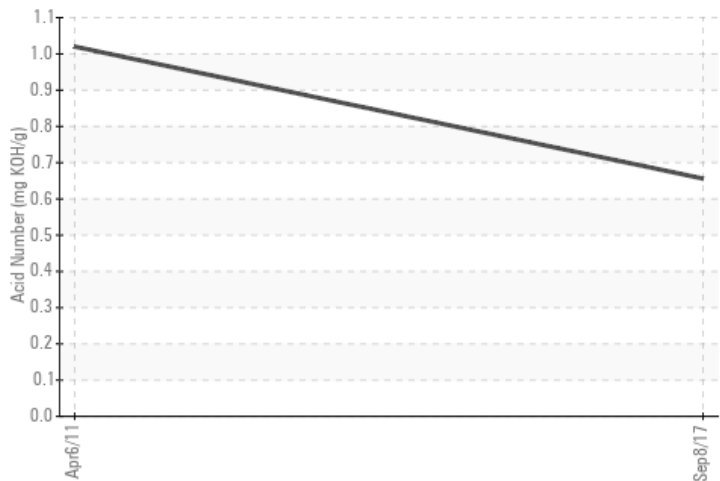
Viscosity @ 40°C



Particle Count



Acid Number



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LIEBHERR R954 027106-1328 - Swing Drive

Sample No: LHMC87801

Oil Type: GEAR OIL SAE 80W90



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Sample Information

Sample Number	LHMC87801	---	---	---
Sample Date	08 Sep 2017	---	---	---
Machine Hours	5753	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	ABNORMAL	---	---	---



Oil Condition

Visc @ 40°C	cSt	● 108.1	---	---	---
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Contamination

Water	%	● 0.255	---	---	---
Silicon	ppm	● 2	---	---	---
Sodium	ppm	● 1	---	---	---
Potassium	ppm	● 5	---	---	---



Wear Metals

Iron	ppm	● 146	---	---	---
Copper	ppm	● 10	---	---	---
Lead	ppm	● 0	---	---	---
Tin	ppm	● 0	---	---	---
Aluminum	ppm	● <1	---	---	---
Chromium	ppm	● 2	---	---	---
Molybdenum	ppm	● <1	---	---	---
Nickel	ppm	● <1	---	---	---
Titanium	ppm	● 0	---	---	---
Silver	ppm	● <1	---	---	---
Manganese	ppm	● <1	---	---	---
Vanadium	ppm	● 0	---	---	---



Additives

Calcium	ppm	● 22	---	---	---
Magnesium	ppm	● 4	---	---	---
Zinc	ppm	● 20	---	---	---
Phosphorus	ppm	● 1376	---	---	---
Barium	ppm	● <1	---	---	---
Boron	ppm	● 224	---	---	---

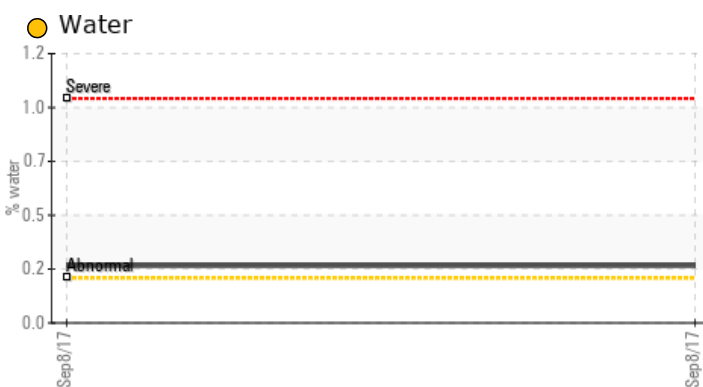
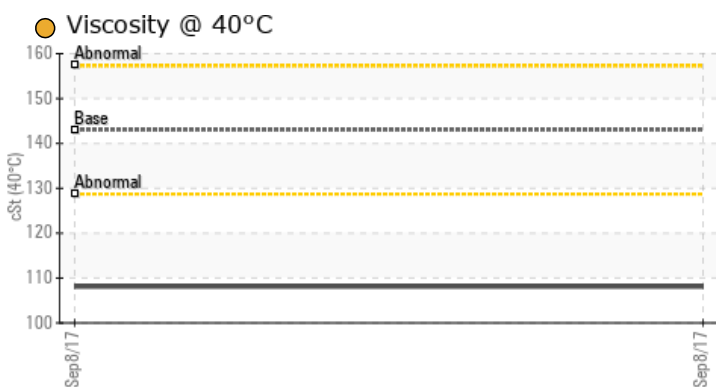
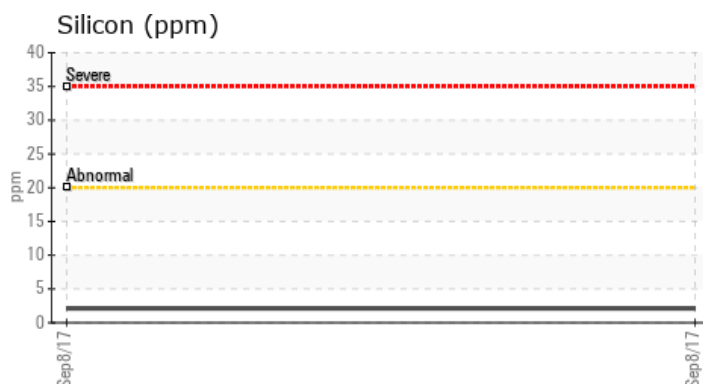
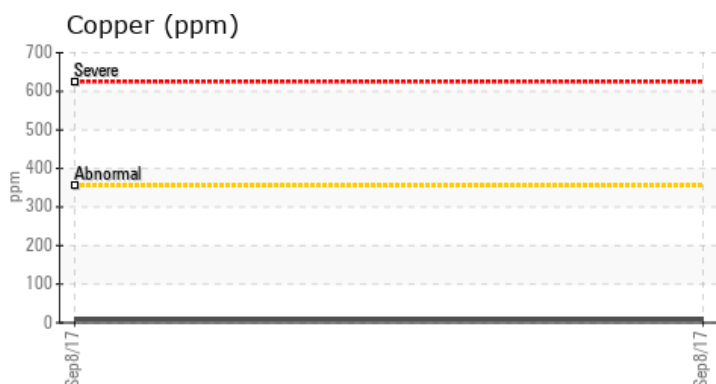
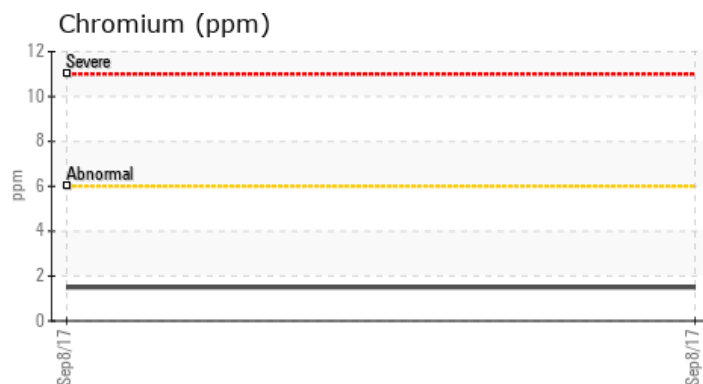
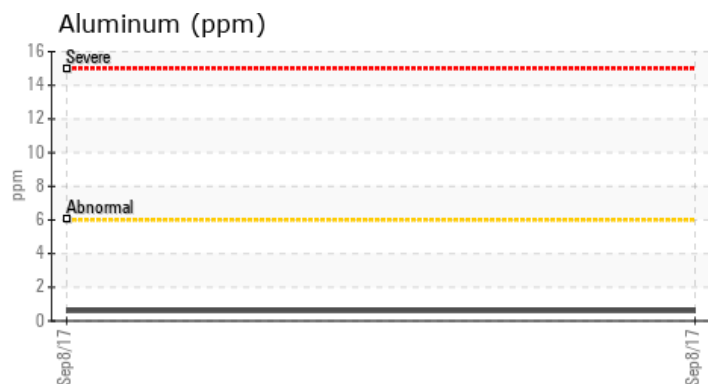
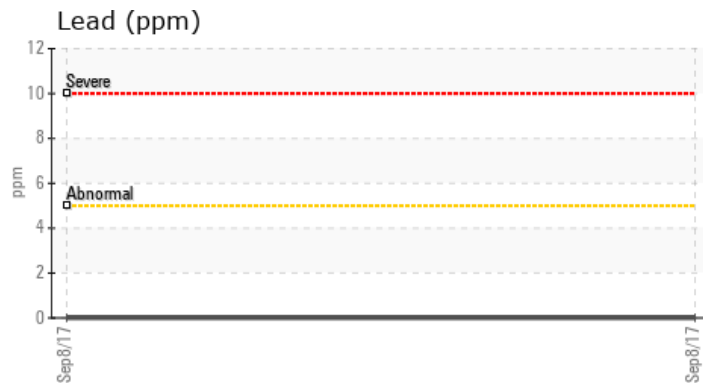
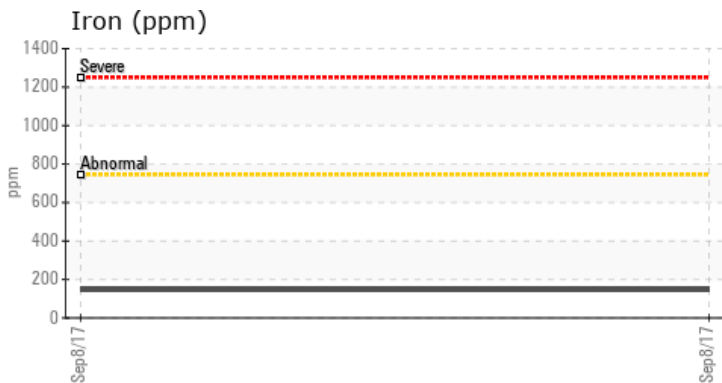
Diagnosis

No corrective action is recommended at this time. Resample at the next service interval to monitor. All component wear rates are normal. There is a light concentration of water present in the oil. The oil viscosity is lower than normal. The condition of the oil is acceptable for the time in service.

Depot: LEC0008
Unique No: 7926694
Signed: Elizabeth Valachovic
Report Date: 14 Sep 2017



Graphs



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CONSTRUCTION EQUIPMENT



LIEBHERR R954 027106-1328 - Left Final Drive

Sample No: LHMC106036

Oil Type: GEAR OIL SAE 80W90



Sample Information

Sample Number	LHMC106036	---	---	---
Sample Date	08 Sep 2017	---	---	---
Machine Hours	5753	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	ATTENTION	---	---	---

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Oil Condition

Visc @ 40°C	cSt	105.7	---	---	---
-------------	-----	-------	-----	-----	-----



Contamination

Water	%	NEG	---	---	---
Silicon	ppm	2	---	---	---
Sodium	ppm	<1	---	---	---
Potassium	ppm	9	---	---	---



Wear Metals

Iron	ppm	9	---	---	---
Copper	ppm	3	---	---	---
Lead	ppm	0	---	---	---
Tin	ppm	0	---	---	---
Aluminum	ppm	1	---	---	---
Chromium	ppm	<1	---	---	---
Molybdenum	ppm	<1	---	---	---
Nickel	ppm	<1	---	---	---
Titanium	ppm	0	---	---	---
Silver	ppm	0	---	---	---
Manganese	ppm	0	---	---	---
Vanadium	ppm	0	---	---	---



Additives

Calcium	ppm	14	---	---	---
Magnesium	ppm	8	---	---	---
Zinc	ppm	16	---	---	---
Phosphorus	ppm	1395	---	---	---
Barium	ppm	0	---	---	---
Boron	ppm	274	---	---	---

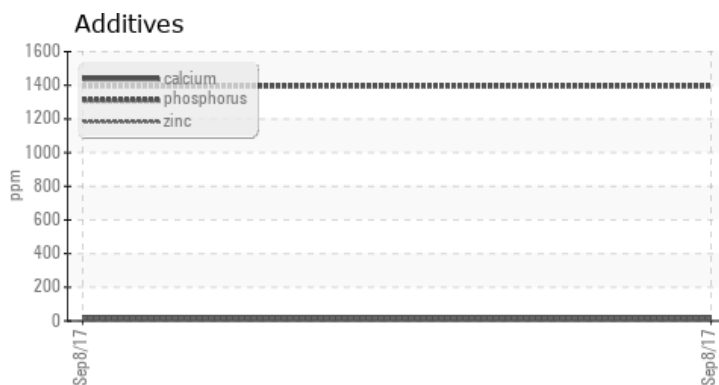
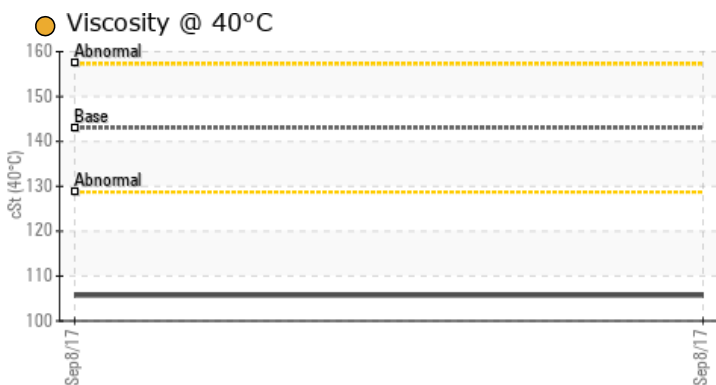
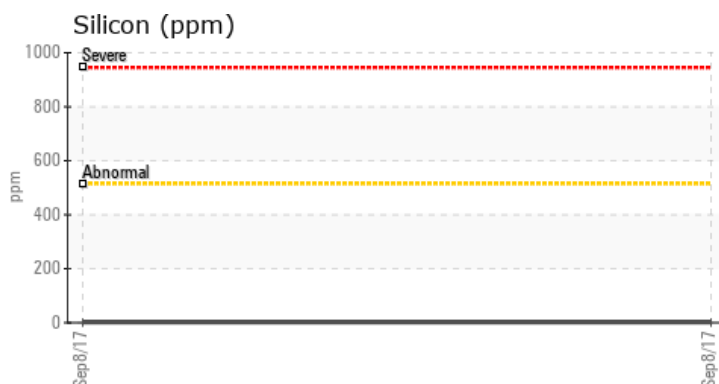
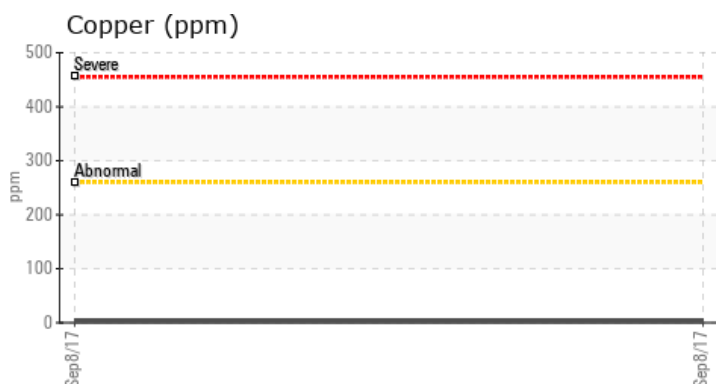
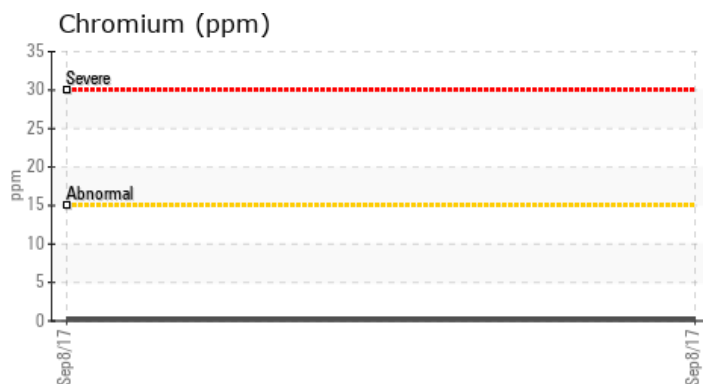
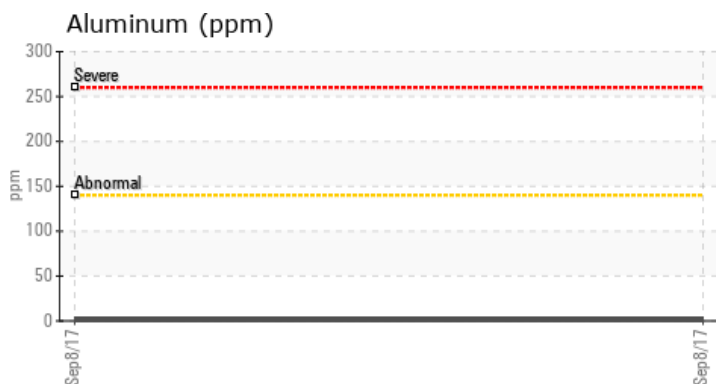
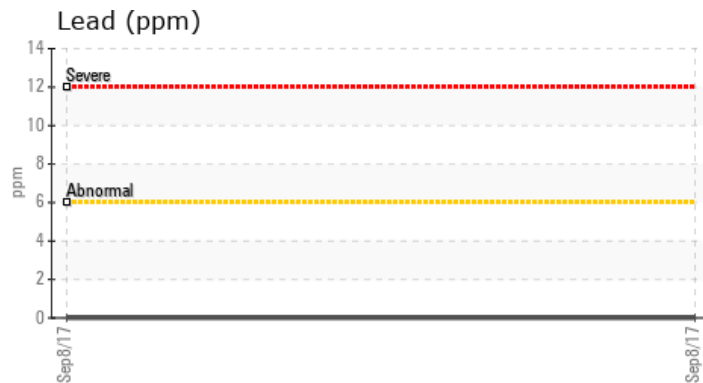
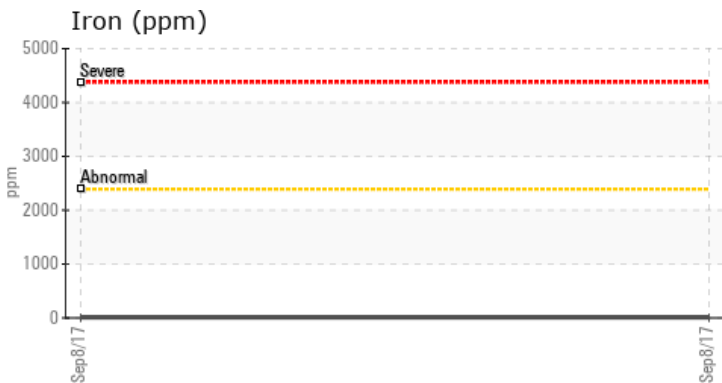
Diagnosis

No corrective action is recommended at this time. Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The oil viscosity is lower than normal. Confirm oil type. The condition of the oil is acceptable for the time in service.

Depot: LEC0008
Unique No: 7926700
Signed: Elizabeth Valachovic
Report Date: 14 Sep 2017



Graphs



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CONSTRUCTION EQUIPMENT



LIEBHERR R954 027106-1328 - Splitter Box

Sample No: LHMC87798

Oil Type: SAE 80W90



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Sample Information

Sample Number	LHMC87798	---	---	---
Sample Date	08 Sep 2017	---	---	---
Machine Hours	5753	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Changd	---	---	---
Sample Status	ATTENTION	---	---	---



Oil Condition

Visc @ 40°C	cSt	100.2	---	---	---
-------------	-----	-------	-----	-----	-----



Contamination

Water	%	NEG	---	---	---
Silicon	ppm	2	---	---	---
Sodium	ppm	1	---	---	---
Potassium	ppm	2	---	---	---



Wear Metals

Iron	ppm	24	---	---	---
Copper	ppm	1	---	---	---
Lead	ppm	0	---	---	---
Tin	ppm	0	---	---	---
Aluminum	ppm	3	---	---	---
Chromium	ppm	<1	---	---	---
Molybdenum	ppm	0	---	---	---
Nickel	ppm	<1	---	---	---
Titanium	ppm	<1	---	---	---
Silver	ppm	0	---	---	---
Manganese	ppm	<1	---	---	---
Vanadium	ppm	0	---	---	---



Additives

Calcium	ppm	4	---	---	---
Magnesium	ppm	0	---	---	---
Zinc	ppm	6	---	---	---
Phosphorus	ppm	1314	---	---	---
Barium	ppm	0	---	---	---
Boron	ppm	240	---	---	---

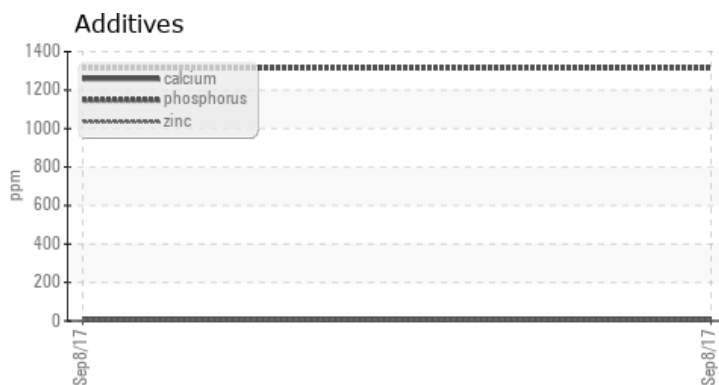
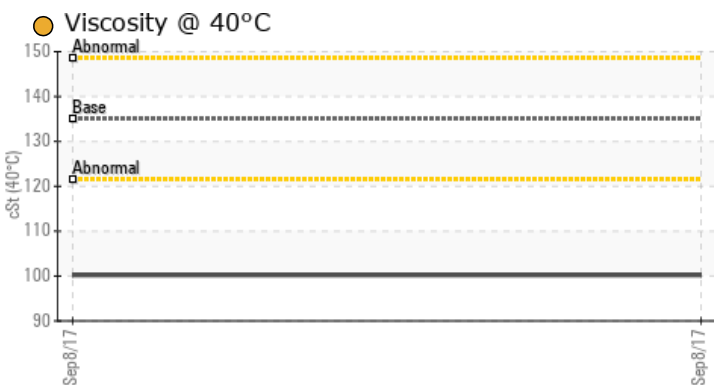
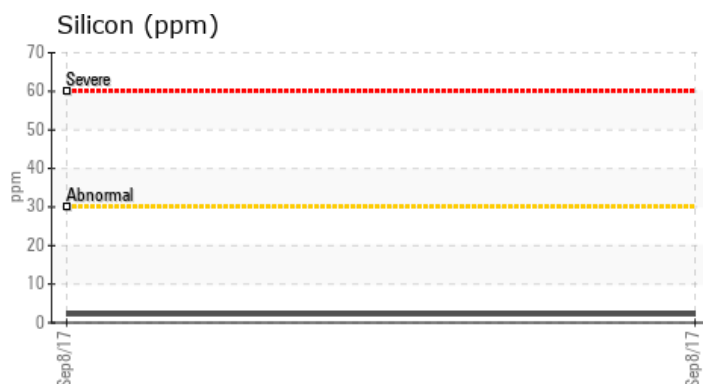
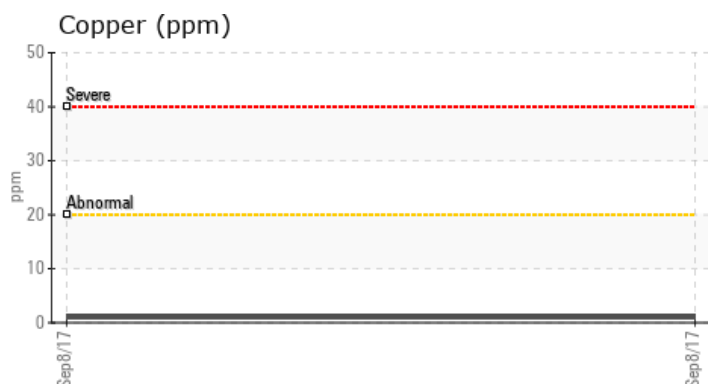
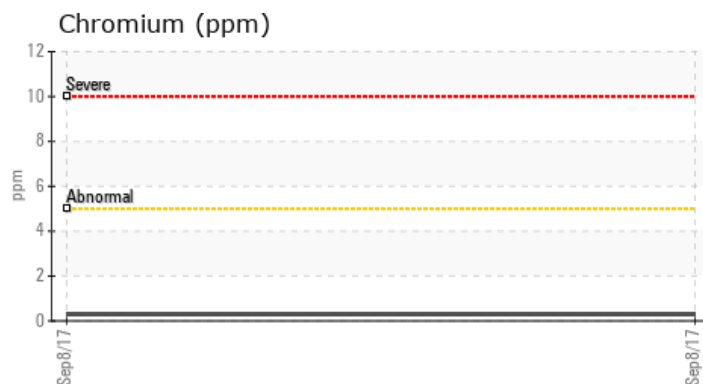
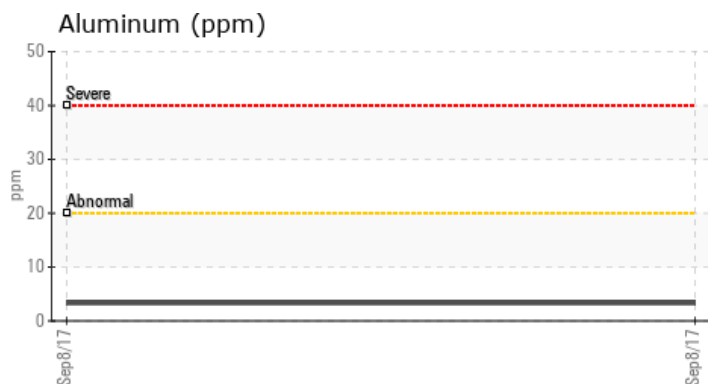
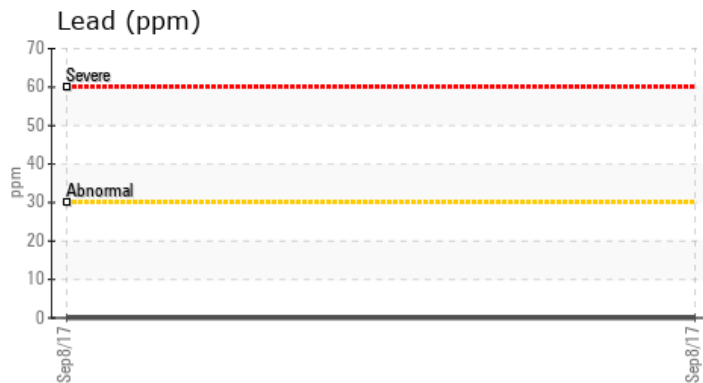
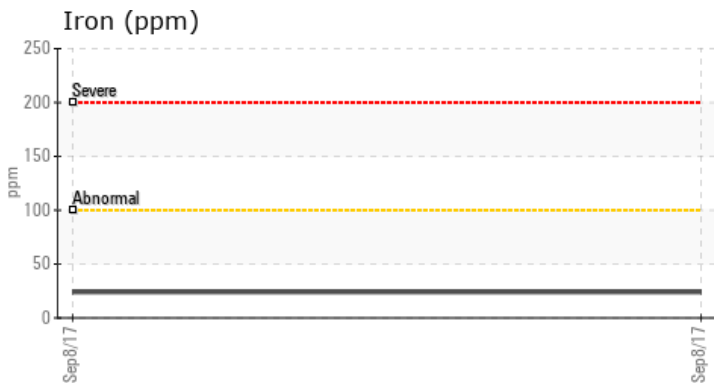
Diagnosis

No corrective action is recommended at this time. Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The oil viscosity is lower than normal. Confirm oil type.

Depot: LEC0008
 Unique No: 7925648
 Signed: Jonathan Hester
 Report Date: 14 Sep 2017



Graphs



LIEBHERR

CONSTRUCTION EQUIPMENT



LIEBHERR R954 027106-1328 - Right Final Drive

Sample No: LHMC95451

Oil Type: GEAR OIL SAE 80W90



AMERICAN STATE EQUIPMENT CO.
 2400 NORTH 14TH AVENUE
 WAUSAU, WI
 US 54401
 Contact: CHRIS BARTNIK
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Sample Information

Sample Number	LHMC95451	---	---	---
Sample Date	08 Sep 2017	---	---	---
Machine Hours	5753	---	---	---
Oil Hours	0	---	---	---
Oil Changed	Not Chngd	---	---	---
Sample Status	ATTENTION	---	---	---



Oil Condition

Visc @ 40°C	cSt	105.0	---	---	---
-------------	-----	-------	-----	-----	-----



Contamination

Water	%	NEG	---	---	---
Silicon	ppm	1	---	---	---
Sodium	ppm	<1	---	---	---
Potassium	ppm	3	---	---	---



Wear Metals

Iron	ppm	6	---	---	---
Copper	ppm	2	---	---	---
Lead	ppm	<1	---	---	---
Tin	ppm	0	---	---	---
Aluminum	ppm	1	---	---	---
Chromium	ppm	<1	---	---	---
Molybdenum	ppm	0	---	---	---
Nickel	ppm	0	---	---	---
Titanium	ppm	0	---	---	---
Silver	ppm	0	---	---	---
Manganese	ppm	<1	---	---	---
Vanadium	ppm	0	---	---	---



Additives

Calcium	ppm	3	---	---	---
Magnesium	ppm	2	---	---	---
Zinc	ppm	5	---	---	---
Phosphorus	ppm	1344	---	---	---
Barium	ppm	<1	---	---	---
Boron	ppm	276	---	---	---

Diagnosis

No corrective action is recommended at this time. Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The oil viscosity is lower than normal. The condition of the oil is acceptable for the time in service.

Depot: LEC0008
 Unique No: 7926696
 Signed: Elizabeth Valachovic
 Report Date: 14 Sep 2017



Graphs

