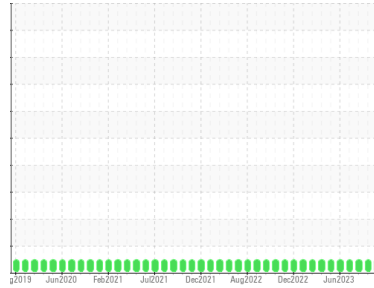




OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Area
Kentucky
 Machine Id
[Kentucky] Oil - Starboard Main Engine
 Component
Starboard Main Engine
 Fluid
DIESEL ENGINE OIL SAE 15W40 (150 GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

Fluid Condition

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

SAMPLE INFORMATION

	method	limit/base	current	history1	history2
Sample Number	Client Info		WC0805480	WC0769068	WC0769174
Sample Date	Client Info		30 Oct 2023	03 Oct 2023	24 Aug 2023
Machine Age	hrs	Client Info	10966	10432	9750
Oil Age	hrs	Client Info	1358	824	142
Oil Changed	Client Info		Not Chngd	Not Chngd	Not Chngd
Sample Status			NORMAL	NORMAL	NORMAL

CONTAMINATION

	method	limit/base	current	history1	history2
Fuel	WC Method	>4.0	<1.0	<1.0	<1.0
Glycol	WC Method		NEG	NEG	NEG

WEAR METALS

	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m >75	5	4	4
Chromium	ppm	ASTM D5185m >8	<1	<1	<1
Nickel	ppm	ASTM D5185m >2	<1	0	0
Titanium	ppm	ASTM D5185m >3	<1	0	<1
Silver	ppm	ASTM D5185m >2	0	0	0
Aluminum	ppm	ASTM D5185m >15	1	2	2
Lead	ppm	ASTM D5185m >18	2	1	1
Copper	ppm	ASTM D5185m >80	2	2	2
Tin	ppm	ASTM D5185m >14	0	<1	1
Vanadium	ppm	ASTM D5185m	0	0	<1
Cadmium	ppm	ASTM D5185m	<1	0	<1

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m 250	24	32	41
Barium	ppm	ASTM D5185m 10	2	0	0
Molybdenum	ppm	ASTM D5185m 100	48	53	51
Manganese	ppm	ASTM D5185m	0	0	<1
Magnesium	ppm	ASTM D5185m 450	756	765	961
Calcium	ppm	ASTM D5185m 3000	1290	1427	1713
Phosphorus	ppm	ASTM D5185m 1150	920	1080	1088
Zinc	ppm	ASTM D5185m 1350	1161	1259	1405
Sulfur	ppm	ASTM D5185m 4250	3039	3828	4137

CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m >20	3	4	4
Sodium	ppm	ASTM D5185m >158	3	2	4
Potassium	ppm	ASTM D5185m >20	2	2	<1

INFRA-RED

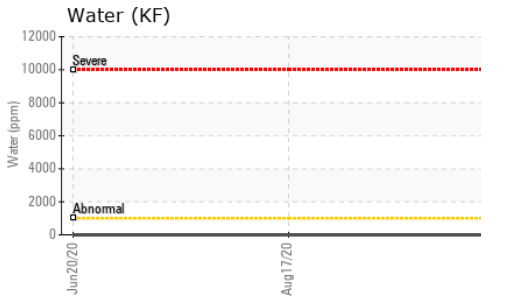
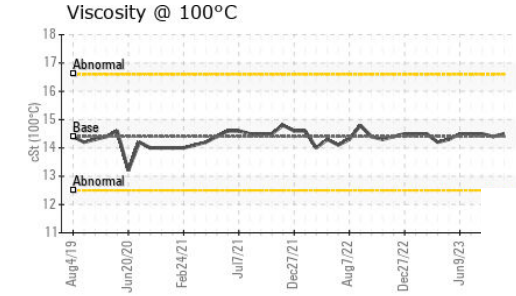
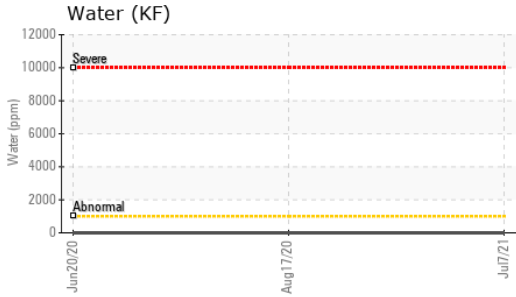
	method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844	0.1	0.1	0.1
Nitration	Abs/cm	*ASTM D7624 >20	8.7	8.7	7.3
Sulfation	Abs/.1mm	*ASTM D7415 >30	21.3	21.5	20.1

FLUID DEGRADATION

	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414 >25	18.4	18.6	16.9
Base Number (BN)	mg KOH/g	ASTM D2896 8.5	10.02	10.55	10.55



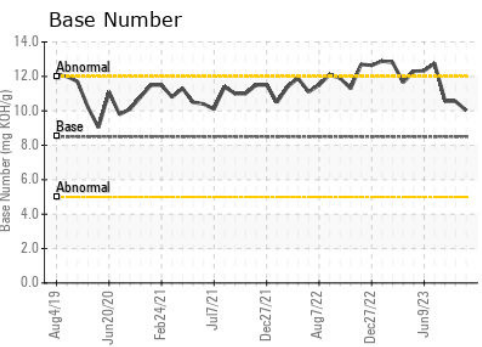
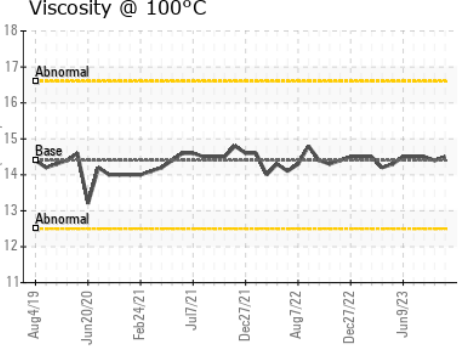
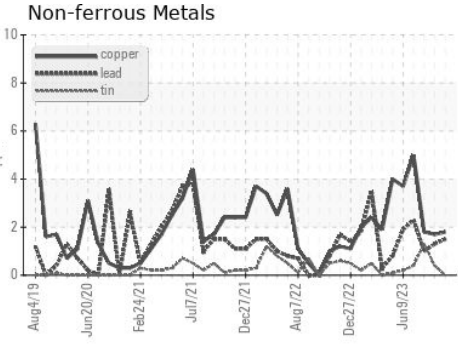
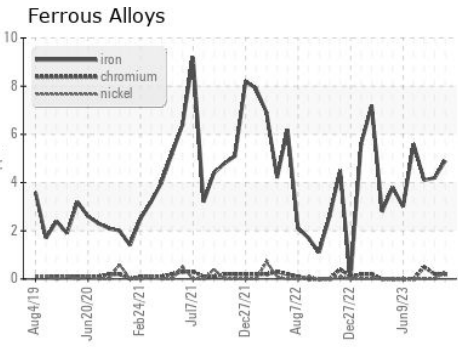
OIL ANALYSIS REPORT



VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2	
Visc @ 100°C	cSt	ASTM D445	14.4	14.5	14.4	14.5

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0805480 **Received** : 06 Nov 2023
Lab Number : 05999217 **Diagnosed** : 07 Nov 2023
Unique Number : 10727577 **Diagnostician** : Sean Felton
Test Package : IND 2 (Additional Tests: KF)

MARATHON PETROLEUM CO.
 101 12TH ST
 CATLETTSBURG, KY
 US 41169
 Contact: CORY GUMBERT
 cagumbert@marathonpetroleum.com
 T: (606)585-3950
 F: x:

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)