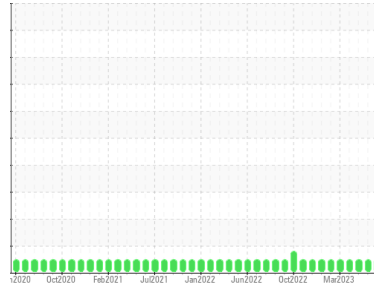




OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Area
Ohio Valley
 Machine Id
[Ohio Valley] 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		WC0735670	WC0683580	WC0735698
Sample Date	Client Info		09 Jul 2023	11 Jun 2023	12 May 2023
Machine Age	hrs	Client Info	58594	58064	57799
Oil Age	hrs	Client Info	3714	3187	2922
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	14	15	15
Chromium	ppm	ASTM D5185m >8	<1	<1	<1
Nickel	ppm	ASTM D5185m >2	0	<1	<1
Titanium	ppm	ASTM D5185m >3	<1	<1	<1
Silver	ppm	ASTM D5185m >2	0	0	<1
Aluminum	ppm	ASTM D5185m >15	1	1	2
Lead	ppm	ASTM D5185m >18	0	0	1
Copper	ppm	ASTM D5185m >80	<1	<1	<1
Tin	ppm	ASTM D5185m >14	0	<1	<1
Vanadium	ppm	ASTM D5185m	<1	<1	<1
Cadmium	ppm	ASTM D5185m	0	<1	<1

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m 250	43	52	46
Barium	ppm	ASTM D5185m 10	0	0	0
Molybdenum	ppm	ASTM D5185m 100	27	29	27
Manganese	ppm	ASTM D5185m	<1	<1	<1
Magnesium	ppm	ASTM D5185m 450	1034	1093	996
Calcium	ppm	ASTM D5185m 3000	1758	1886	1652
Phosphorus	ppm	ASTM D5185m 1150	823	886	776
Zinc	ppm	ASTM D5185m 1350	1037	1113	968
Sulfur	ppm	ASTM D5185m 4250	4075	4399	3555

CONTAMINANTS

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

INFRA-RED

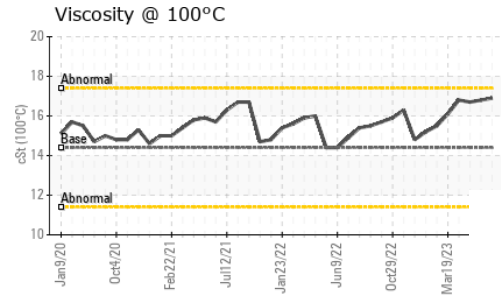
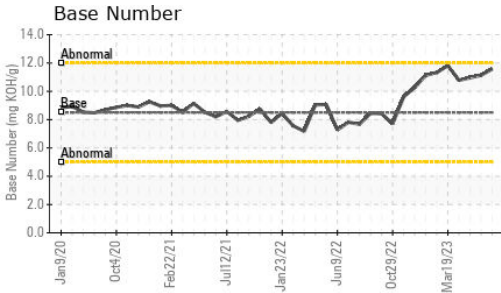
	method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844	2.4	2.1	2.1
Nitration	Abs/cm	*ASTM D7624 >20	11.4	10.4	10.8
Sulfation	Abs/.1mm	*ASTM D7415 >30	25.5	24.6	24.5

FLUID DEGRADATION

	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414 >25	17.3	17.7	16.7
Base Number (BN)	mg KOH/g	ASTM D2896 8.5	11.57	11.13	10.96



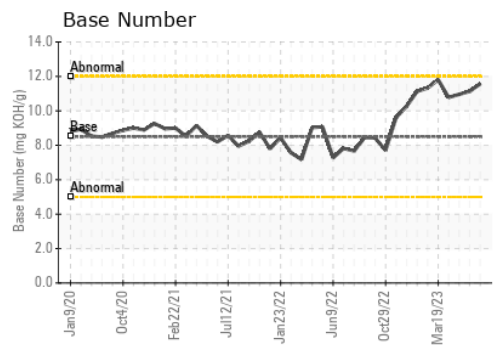
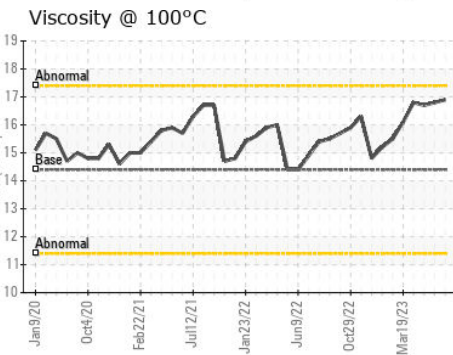
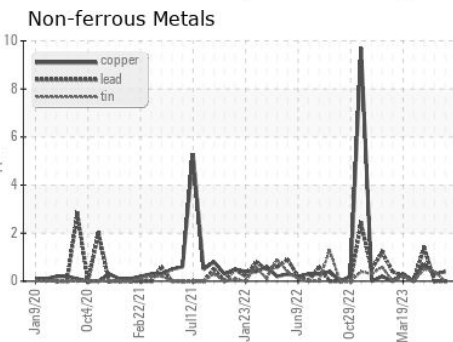
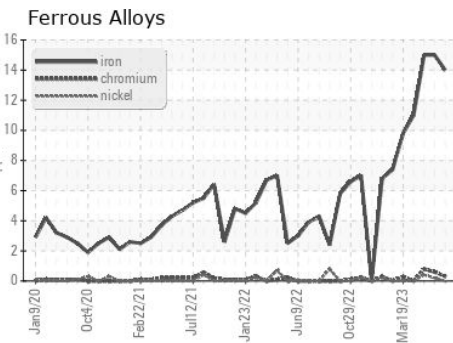
OIL ANALYSIS REPORT



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	16.9	16.8	16.7

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0735670 **Received** : 17 Jul 2023
Lab Number : **05900161** **Diagnosed** : 20 Jul 2023
Unique Number : 10561517 **Diagnostician** : Jonathan Hester
Test Package : IND 2 (Additional Tests: KF)

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 101 12TH ST
 CATLETTSBURG, KY
 US 41169
 Contact: CORY GUMBERT
 cagumbert@marathonpetroleum.com
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 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)