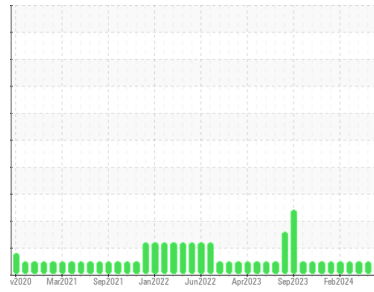




# OIL ANALYSIS REPORT

Sample Rating Trend



**NORMAL**



Area

**Mt. Vernon**

Machine Id

**[Mt. Vernon] Oil - Starboard Main Engine**

Component

**Starboard Main Engine**

Fluid

**DIESEL ENGINE OIL SAE 15W40 (250 GAL)**

## DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor. ( Customer Sample Comment: Ronnie Wilbanks )

### Wear

All component wear rates are normal for time on oil.

### 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		<b>WC0859778</b>	WC0769043	WC0769037
Sample Date	Client Info		<b>14 Jun 2024</b>	18 May 2024	17 Apr 2024
Machine Age	hrs	Client Info	<b>13520</b>	12863	12159
Oil Age	hrs	Client Info	<b>13520</b>	12863	12159
Oil Changed	Client Info		<b>Not Chngd</b>	Not Chngd	Not Chngd
Sample Status			<b>NORMAL</b>	NORMAL	NORMAL

## CONTAMINATION

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

## WEAR METALS

	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m >75	<b>42</b>	39	39
Chromium	ppm	ASTM D5185m >8	<b>2</b>	2	2
Nickel	ppm	ASTM D5185m >2	<b>2</b>	<1	2
Titanium	ppm	ASTM D5185m >3	<b>&lt;1</b>	0	<1
Silver	ppm	ASTM D5185m >2	<b>0</b>	<1	0
Aluminum	ppm	ASTM D5185m >15	<b>6</b>	5	5
Lead	ppm	ASTM D5185m >18	<b>76</b>	64	62
Copper	ppm	ASTM D5185m >80	<b>77</b>	74	80
Tin	ppm	ASTM D5185m >14	<b>17</b>	17	18
Vanadium	ppm	ASTM D5185m	<b>0</b>	0	0
Cadmium	ppm	ASTM D5185m	<b>0</b>	0	<1

## ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m 250	<b>6</b>	<1	1
Barium	ppm	ASTM D5185m 10	<b>0</b>	0	0
Molybdenum	ppm	ASTM D5185m 100	<b>3</b>	1	4
Manganese	ppm	ASTM D5185m	<b>1</b>	<1	<1
Magnesium	ppm	ASTM D5185m 450	<b>30</b>	14	15
Calcium	ppm	ASTM D5185m 3000	<b>3601</b>	3491	3362
Phosphorus	ppm	ASTM D5185m 1150	<b>22</b>	19	45
Zinc	ppm	ASTM D5185m 1350	<b>21</b>	13	31
Sulfur	ppm	ASTM D5185m 4250	<b>5358</b>	5208	4686

## CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m >20	<b>10</b>	8	9
Sodium	ppm	ASTM D5185m >158	<b>12</b>	11	11
Potassium	ppm	ASTM D5185m >20	<b>2</b>	0	2
Water	%	ASTM D6304 >0.1	<b>NEG</b>	NEG	NEG

## INFRA-RED

	method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844	<b>0.6</b>	0.6	0.5
Nitration	Abs/cm	*ASTM D7624 >20	<b>15.0</b>	14.9	14.7
Sulfation	Abs/.1mm	*ASTM D7415 >30	<b>23.6</b>	23.7	23.3

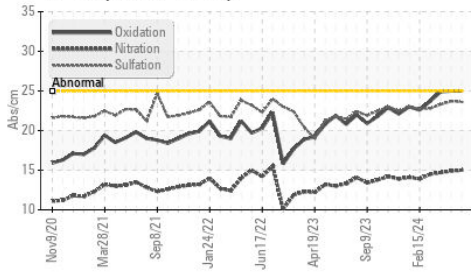
## FLUID DEGRADATION

	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414 >25	<b>25.0</b>	25.0	24.9
Base Number (BN)	mg KOH/g	ASTM D2896 8.5	<b>8.49</b>	8.49	8.47

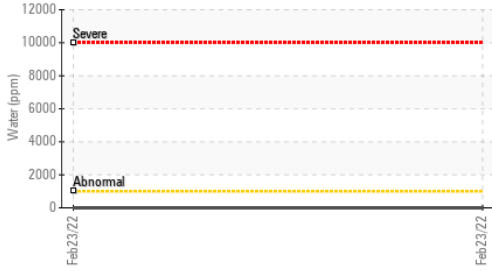


# OIL ANALYSIS REPORT

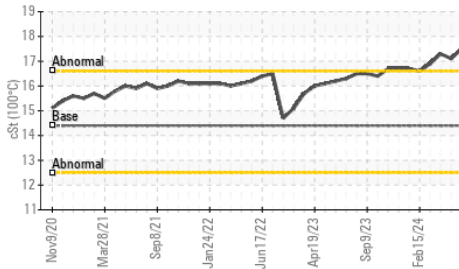
FT-IR (Direct Trend)



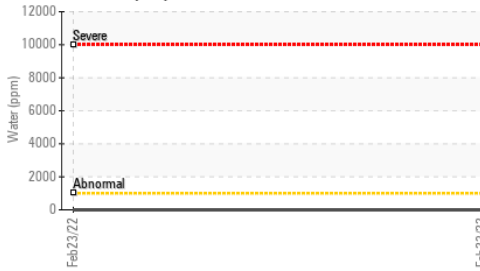
Water (KF)



Viscosity @ 100°C



Water (KF)

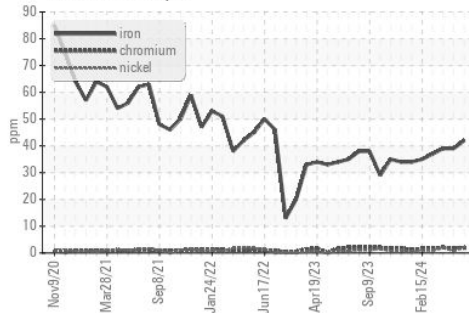


VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	LIGHT
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	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

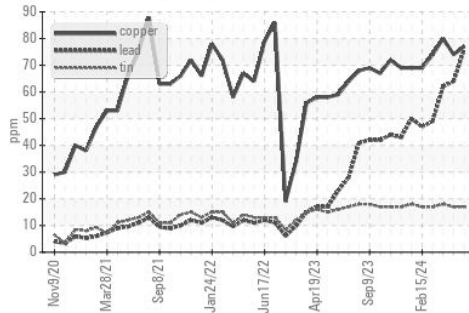
FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	17.5	17.1

## GRAPHS

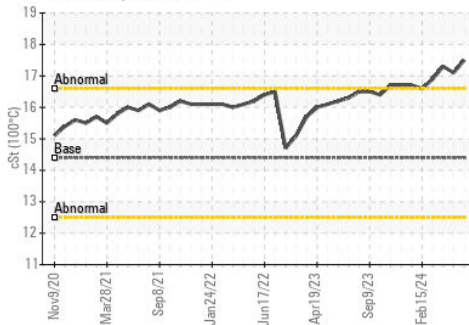
Ferrous Alloys



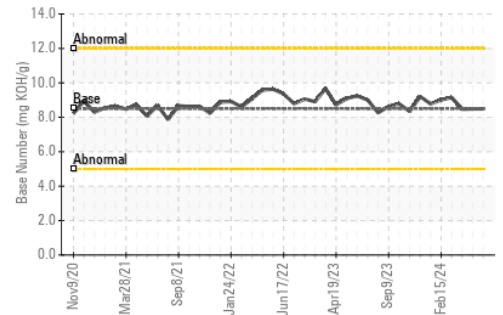
Non-ferrous Metals



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513

Sample No. : WC0859778

Lab Number : 06219911

Unique Number : 11098108

Test Package : IND 2 ( Additional Tests: KF )

Received : 25 Jun 2024

Tested : 26 Jun 2024

Diagnosed : 26 Jun 2024 - Sean Felton

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)