

### **OIL ANALYSIS REPORT**

# Tri State [Tri State] Oil - Starboard Reduction Gear

Starboard Reduction Gear

Fluid DIESEL ENGINE OIL SAE 40 (8 GAL)

#### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

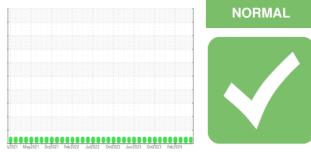
All component wear rates are normal.

#### Contamination

The water content is negligible. There is no indication of any contamination in the oil.

#### Fluid Condition

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

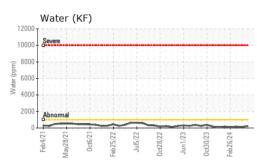


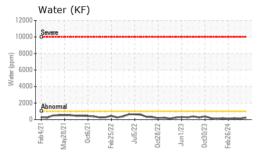
SAMPLE INFORM	<b>IATION</b>	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0874538	WC0719294	WC0874792
Sample Date		Client Info		24 May 2024	23 Apr 2024	20 Mar 2024
Machine Age	hrs	Client Info		23684	23068	22372
Oil Age	hrs	Client Info		590	1111	415
Oil Changed		Client Info		Not Changd	Changed	Not Changd
Sample Status				NORMAL	NORMAL	NORMAL
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>150	2	3	2
Chromium	ppm	ASTM D5185m	>10	<1	0	0
Nickel	ppm	ASTM D5185m	>10	0	0	0
Titanium	ppm	ASTM D5185m		<1	0	0
Silver	ppm	ASTM D5185m		0	0	0
Aluminum	ppm	ASTM D5185m	>25	2	0	1
Lead	ppm	ASTM D5185m	>100	0	<1	0
Copper	ppm	ASTM D5185m	>50	1	<1	<1
Tin	ppm	ASTM D5185m	>10	<1	0	0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		<1	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 0	history1 <1	history2 0
	ppm ppm					
Boron		ASTM D5185m	250	0	<1	0
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	0 <1	<1 0	0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	0 <1 41	<1 0 40	0 0 40
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	0 <1 41 0 642 714	<1 0 40 0	0 0 40 0
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	0 <1 41 0 642	<1 0 40 0 618	0 0 40 0 644
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	0 <1 41 0 642 714	<1 0 40 0 618 707	0 0 40 0 644 722
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150	0 <1 41 0 642 714 753	<1 0 40 0 618 707 813	0 0 40 0 644 722 825
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350	0 <1 41 0 642 714 753 919	<1 0 40 0 618 707 813 892	0 0 40 0 644 722 825 931
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250	0 <1 41 0 642 714 753 919 2295 current 2	<1 0 40 0 618 707 813 892 2694 history1 1	0 0 40 0 644 722 825 931 2461
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >50	0 <1 41 0 642 714 753 919 2295 current	<1 0 40 0 618 707 813 892 2694 history1 1 2	0 0 40 0 644 722 825 931 2461 <u>history2</u> 2 2 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >50	0 <1 41 0 642 714 753 919 2295 Current 2 0 2	<1 0 40 0 618 707 813 892 2694 history1 1	0 0 40 0 644 722 825 931 2461 <b>history2</b> 2 2 <1 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >50 >216 >20	0 <1 41 0 642 714 753 919 2295 current 2 0	<1 0 40 0 618 707 813 892 2694 history1 1 2	0 0 40 0 644 722 825 931 2461 <u>history2</u> 2 2 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >50 >216 >20	0 <1 41 0 642 714 753 919 2295 Current 2 0 2	<1 0 40 0 618 707 813 892 2694 history1 1 2 2 <1	0 0 40 0 644 722 825 931 2461 <b>history2</b> 2 2 <1 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>linit/base</b> >50 >216 >20 >0.1	0 <1 41 0 642 714 753 919 2295 current 2 0 2 0 2 0.022	<1 0 40 0 618 707 813 892 2694 history1 1 2 2694 (1 2 2 4 1 0.012	0 0 40 0 644 722 825 931 2461 <b>history2</b> 2 2 <1 2 2 <1 2 0.016

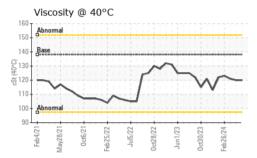
Sample Rating Trend



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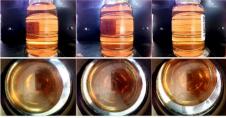






VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	138	120	120	121
SAMPLE IMAGES		method	limit/base	current	history1	history2

Color



Bottom

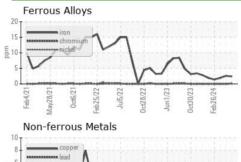
Feb4/21

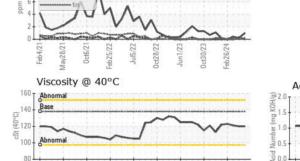
av28/21

Dct6/21

eb25/22



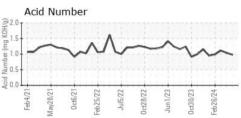




un1/23

eb26/24

ct28/22



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 MARATHON PETROLEUM CO. Sample No. : WC0874538 Received : 06 Jun 2024 101 12TH ST Lab Number : 06201559 Tested : 10 Jun 2024 CATLETTSBURG, KY Unique Number : 11063682 Diagnosed : 10 Jun 2024 - Angela Borella US 41169 Test Package : IND 2 (Additional Tests: KF, PQ) Contact: CORY GUMBERT Certificate 12367 cagumbert@marathonpetroleum.com To discuss this sample report, contact Customer Service at 1-800-237-1369. T: (606)585-3950 \* - 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) F: x:

Report Id: MARCAT [WUSCAR] 06201559 (Generated: 06/10/2024 13:27:19) Rev: 1

Submitted By: M/V MAP RUNNER

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