

## Area Louisville [Louisville] Oil - Port Main Engine

Port Main Engine

Fluid DIESEL ENGINE OIL SAE 15W40 (150 GAL)

### Recommendation

Resample at the next service interval to monitor.

#### Wear

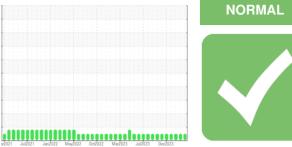
All component wear rates are normal.

#### 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.

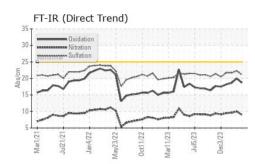


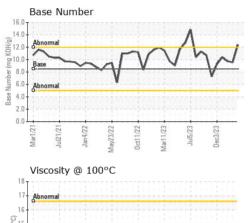
Sample Rating Trend

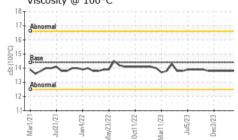
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0874801	WC0804842	WC0859790
Sample Date		Client Info		28 Apr 2024	30 Jan 2024	29 Dec 2023
Machine Age	hrs	Client Info		950	39417	0
Oil Age	hrs	Client Info		950	6631	0
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	٨	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	6	7	4
Chromium	ppm	ASTM D5185m	>8	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	<1	0	<1
Titanium	ppm	ASTM D5185m	>3	<1	<1	<1
Silver	ppm	ASTM D5185m	>2	<1	0	0
Aluminum	ppm	ASTM D5185m	>15	2	<1	2
Lead	ppm	ASTM D5185m	>18	1	3	4
Copper	ppm	ASTM D5185m	>80	6	24	26
Tin	ppm	ASTM D5185m	>14	1	<1	1
Vanadium	ppm	ASTM D5185m		<1	0	<1
Cadmium	ppm	ASTM D5185m		<1	0	<1
ADDITIVES		ام م مالا م میں				
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	250	current 20	history1 10	nistory2 12
	ppm ppm	ASTM D5185m				
Boron		ASTM D5185m	250	20	10	12
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	20 <1	10 0	12 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	20 <1 61	10 0 61	12 0 62
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	20 <1 61 <1	10 0 61 <1	12 0 62 2
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	20 <1 61 <1 1396	10 0 61 <1 1477	12 0 62 2 1374
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	20 <1 61 <1 1396 1186	10 0 61 <1 1477 1165	12 0 62 2 1374 1060
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	250 10 100 450 3000 1150 1350	20 <1 61 <1 1396 1186 1067	10 0 61 <1 1477 1165 981	12 0 62 2 1374 1060 933
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	20 <1 61 <1 1396 1186 1067 1238	10 0 61 <1 1477 1165 981 1283	12 0 62 2 1374 1060 933 1197
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	20 <1 61 <1 1396 1186 1067 1238 3455	10 0 61 <1 1477 1165 981 1283 2833	12 0 62 2 1374 1060 933 1197 2602
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	250 10 100 450 3000 1150 1350 4250	20 <1 61 <1 1396 1186 1067 1238 3455 current	10 0 61 <1 1477 1165 981 1283 2833 history1	12 0 62 2 1374 1060 933 1197 2602 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	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 <i>limit/base</i> >20	20 <1 61 <1 1396 1186 1067 1238 3455 current 5	10 0 61 <1 1477 1165 981 1283 2833 history1 4	12 0 62 2 1374 1060 933 1197 2602 history2 4
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 ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >20 >158	20 <1 61 <1 1396 1186 1067 1238 3455 Current 5 3	10 0 61 <1 1477 1165 981 1283 2833 2833 history1 4 2	12 0 62 2 1374 1060 933 1197 2602 history2 4 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	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> >20 >158 >20	20 <1 61 <1 1396 1186 1067 1238 3455 <b>Current</b> 5 3 2	10 0 61 <1 1477 1165 981 1283 2833 history1 4 2 2 0	12 0 62 2 1374 1060 933 1197 2602 history2 4 4 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water	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> >20 >158 >20 >0.1	20 <1 61 <1 1396 1186 1067 1238 3455 current 5 3 2 NEG	10 0 61 <1 1477 1165 981 1283 2833 history1 4 2 2 0 NEG	12 0 62 2 1374 1060 933 1197 2602 history2 4 4 4 4 4 NEG
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED	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> >20 >158 >20 >0.1	20 <1 61 <1 1396 1186 1067 1238 3455 <b>current</b> 5 3 2 NEG	10 0 61 <1 1477 1165 981 1283 2833 history1 4 2 0 NEG history1	12 0 62 2 1374 1060 933 1197 2602 history2 4 4 4 4 8 4 8 4 8 4 8 4 8 8 8 8 8 8 8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot %	ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >20 >158 >20 >0.1 <b>limit/base</b>	20 <1 61 <1 1396 1186 1067 1238 3455 <i>current</i> 5 3 2 NEG <i>current</i> 0.1	10 0 61 <1 1477 1165 981 1283 2833 history1 4 2 0 NEG history1 0.1	12 0 62 2 1374 1060 933 1197 2602 history2 4 4 4 4 4 NEG history2 0.1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration	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> >20 >158 >20 >0.1 <b>limit/base</b>	20 <1 61 <1 1396 1186 1067 1238 3455 <b>current</b> 5 3 2 <b>NEG</b> 0.1 9.0	10 0 61 <1 1477 1165 981 1283 2833 history1 4 2 2 0 NEG NEG NEG 0.1 10.0	12 0 62 2 1374 1060 933 1197 2602 history2 4 4 4 4 NEG NEG history2 0.1 9.6
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Vater INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>imit/base</b> >20 >158 >20 >0.1 <b>imit/base</b>	20 <1 61 <1 1396 1186 1067 1238 3455 Current 5 3 2 NEG 0.1 9.0 21.1	10 0 61 <1 1477 1165 981 1283 2833 history1 4 2 0 NEG history1 0.1 0.1 10.0 22.3	12 0 62 2 1374 1060 933 1197 2602 history2 4 4 4 4 NEG history2 0.1 9.6 21.7
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	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> >20 >158 >20 >0.1 <b>limit/base</b> >20 >30.	20 <1 61 <1 1396 1186 1067 1238 3455 <b>current</b> 5 3 2 <b>NEG</b> 0.1 9.0 21.1	10 0 61 <1 1477 1165 981 1283 2833 history1 4 2 2 0 NEG NEG history1 0.1 10.0 22.3 history1	12 0 62 2 1374 1060 933 1197 2602 history2 4 4 4 4 4 NEG history2 0.1 9.6 21.7 history2



# **OIL ANALYSIS REPORT**



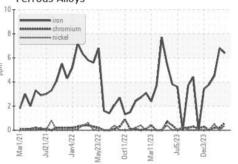


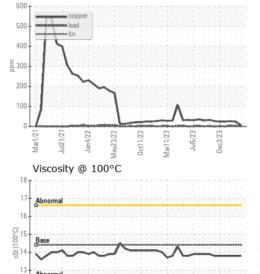


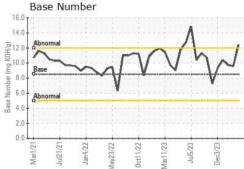
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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 @ 100°C	cSt	ASTM D445	14.4	13.8	13.8	13.8
GRAPHS						

Ferrous Alloys

Non-ferrous Metals







Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 MARATHON PETROLEUM CO. Sample No. : WC0874801 Received : 16 May 2024 101 12TH ST Lab Number : 06181570 Tested : 20 May 2024 CATLETTSBURG, KY Unique Number : 11032896 Diagnosed : 20 May 2024 - Sean Felton US 41169 Test Package : IND 2 (Additional Tests: KF) 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:

Vav73/77

Mar11/23

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Jul5/23

Dec3/23

Report Id: MARCAT [WUSCAR] 06181570 (Generated: 05/20/2024 10:49:18) Rev: 1

Abnorma

Jul21/21 Jan4/22

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Mar1/21-

Submitted By: M/V LOUISVILLE

Page 2 of 2