

OIL ANALYSIS REPORT

Mt. Vernon [Mt. Vernon] Oil - Port Main Engine Component

Port Main Engine

DIESEL ENGINE OIL SAE 15W40 (150 GAL)

Recommendation

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

Wear

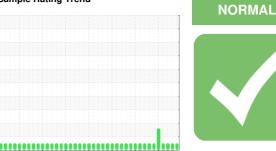
All component wear rates are normal.

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.

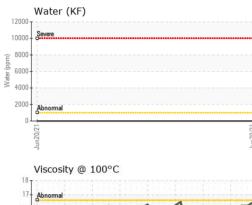


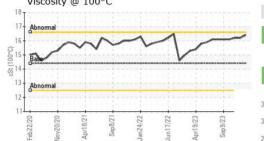
Sample Rating Trend

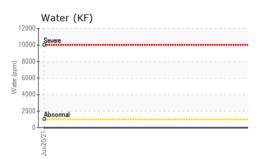
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0735851	WC0735803	WC0768997
Sample Date		Client Info		30 Dec 2023	30 Nov 2023	02 Nov 2023
Machine Age	hrs	Client Info		9808	9182	8586
Oil Age	hrs	Client Info		9808	9182	8586
Oil Changed		Client Info		Not Changd	Oil Added	Not Changd
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	٧	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	27	28	29
Chromium	ppm	ASTM D5185m	>8	1	2	2
Nickel	ppm	ASTM D5185m	>2	0	<1	<1
Titanium	ppm	ASTM D5185m	>3	0	<1	<1
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	4	4	5
Lead	ppm	ASTM D5185m	>18	32	27	26
Copper	ppm	ASTM D5185m	>80	69	66	74
Tin	ppm	ASTM D5185m	>14	17	16	16
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base		biotoput	history2
188011120		method	iiiiii/base	current	history1	TIIStory2
Boron	ppm	ASTM D5185m	250	3	1	<1
	ppm ppm	ASTM D5185m				
Boron		ASTM D5185m	250	3	1	<1
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	3 0	1 0	<1 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	3 0 2	1 0 0	<1 0 0
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	3 0 2 0	1 0 0 <1	<1 0 0 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	3 0 2 0 49	1 0 0 <1 18	<1 0 0 <1 16
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	3 0 2 0 49 3145	1 0 0 <1 18 3176	<1 0 0 <1 16 3174
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	3 0 2 0 49 3145 35	1 0 0 <1 18 3176 15	<1 0 0 <1 16 3174 49
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	3 0 2 0 49 3145 35 49	1 0 0 <1 18 3176 15 0	<1 0 0 <1 16 3174 49 5
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	3 0 2 0 49 3145 35 49 4147	1 0 0 <1 18 3176 15 0 4447	<1 0 0 <1 16 3174 49 5 4171
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	3 0 2 0 49 3145 35 49 4147 current	1 0 0 <1 18 3176 15 0 4447 history1	<1 0 0 <1 16 3174 49 5 4171 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 method	250 10 100 450 3000 1150 1350 4250 limit/base >20	3 0 2 0 49 3145 35 49 4147 <i>current</i> 11	1 0 0 <1 18 3176 15 0 4447 history1 5	<1 0 0 <1 16 3174 49 5 4171 history2 7
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 ASTM D5185m	250 10 100 450 3000 1150 1350 4250 imit/base >20 >158	3 0 2 0 49 3145 35 49 4147 <u>current</u> 11 3	1 0 0 <1 18 3176 15 0 4447 history1 5 3	<1 0 0 <1 16 3174 49 5 4171 history2 7 4
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 imit/base >20 >158 >20	3 0 2 0 49 3145 35 49 4147 current 11 3 < 1	1 0 0 <1 18 3176 15 0 4447 history1 5 3 0	<1 0 0 <1 16 3174 49 5 4171 history2 7 4 0
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 imit/base >20 >158 >20 >0.1	3 0 2 0 49 3145 35 49 4147 current 11 3 <1 NEG	1 0 0 <1 18 3176 15 0 4447 history1 5 3 0 NEG	<1 0 0 <1 16 3174 49 5 4171 history2 7 4 0 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	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 imit/base >20 >158 >20 >0.1	3 0 2 0 49 3145 35 49 4147 <i>current</i> 11 3 <1 NEG	1 0 0 <1 18 3176 15 0 4447 history1 5 3 0 NEG NEG	<1 0 0 <1 16 3174 49 5 4171 history2 7 4 0 NEG history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Water INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >20 >158 >20 >0.1	3 0 2 0 49 3145 35 49 4147 <i>current</i> 11 3 <1 NEG <i>current</i> 0.4	1 0 0 <1 18 3176 15 0 4447 history1 5 3 0 NEG NEG history1 0.4	<1 0 0 <1 16 3174 49 5 4171 history2 7 4 0 NEG history2 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium Vater 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 imit/base >20 >158 >20 >0.1 imit/base	3 0 2 0 49 3145 35 49 4147 <i>current</i> 11 3 <1 NEG <i>current</i> 0.4 14.0	1 0 0 <1 18 3176 15 0 4447 history1 5 3 0 NEG NEG NEG 0.4 13.6	<1 0 0 <1 16 3174 49 5 4171 history2 7 4 0 NEG NEG NEG 0.4 13.7
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 imit/base >20 >0.1 imit/base >20 >30	3 0 2 0 49 3145 35 49 4147 <i>current</i> 11 3 <1 NEG 0.4 14.0 22.1	1 0 0 (1 18 3176 15 0 4447 history1 5 3 0 NEG NEG NEG 0.4 13.6 21.7 history1	<1 0 0 <1 16 3174 49 5 4171 history2 7 4 0 NEG history2 0.4 13.7 22.0
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 binit/base >20 >0.1 binit/base >20 >0.1	3 0 2 0 49 3145 35 49 4147 <i>current</i> 11 3 < 1 1 NEG <i>current</i> 0.4 14.0 22.1	1 0 0 <1 18 3176 15 0 4447 history1 5 3 0 NEG NEG history1 0.4 13.6 21.7	<1 0 0 <1 16 3174 49 5 4171 history2 7 4 4 0 NEG NEG NEG 0.4 13.7 22.0 history2



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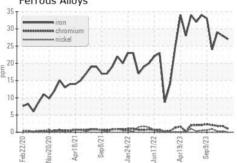


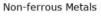


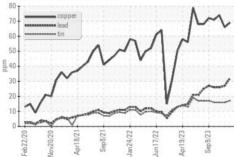


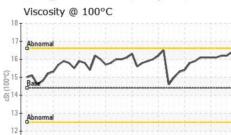
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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		method	limit/base	current	history1	history2
T LOID THICK LIT		method	mmbase	current	matory	THStoryz
Visc @ 100°C	cSt	ASTM D445	14.4	16.4	16.2	16.2
GRAPHS						











Sep9/23 .

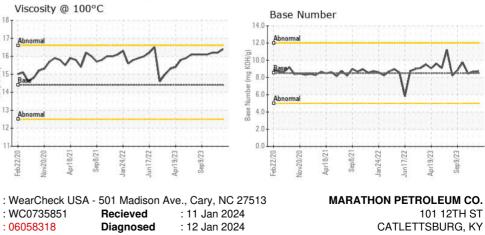
Jun17/22

Jan24/22

Recieved

Diagnosed

Apr19/23



US 41169 Contact: CORY GUMBERT cagumbert@marathonpetroleum.com T: (606)585-3950 F: x:



Unique Number Diagnostician : Sean Felton Test Package : IND 2 (Additional Tests: KF) Certificate L2367 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)

Sen 8/21

Apr18/21

Vov20/20

: WC0735851

: 06058318

: 10829700

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Laboratory

Sample No.

Lab Number

Feb22/20

Submitted By: M/V MT VERNON

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