

OIL ANALYSIS REPORT

Galveston Bay [Galveston Bay] 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: Top Up Amount: 1 GAL)

Wear

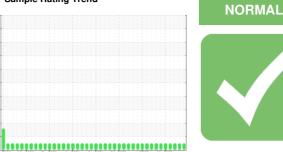
All component wear rates are normal.

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.



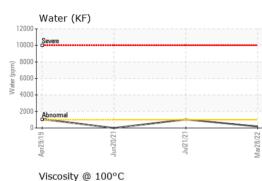


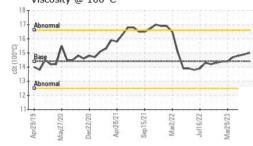
Sample Rating Trend

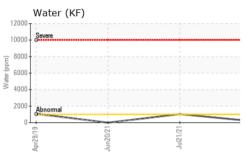
Sample Number Client Info WC0735275 WC0805204 WC0769421 Sample Date Client Info 08 Nov 2023 10 Oct 2023 20 Jun 2023 Machine Age hrs Client Info 0539 10185 8426 Oil Age hrs Client Info 011 Added N/A Filtered Sample Status Client Info OIL Added N/A Filtered CONTAMINATION method Initobas NORMAL NORMAL NORMAL Glyool WC Method >4.0 <1.0 <1.0 <1.0 <1.0 Glyool WC Method >4.0 <1.0 NCRG NEG NEG Glyool WC Method >4.0 <1.0 <1.0 <1.0 <1.0 Glyool Ppm ASTM D5185m >2 0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 10539 10185 8426 Oil Age hrs Client Info 8217 10185 6104 Oil Changed Client Info Oil Added N/A Filtered Sample Status Imit/Desc Current NoRMAL NORMAL NORMAL CONTAMINATION method Imit/Desc current Nistory1 Aistory2 Fuel WC Method >4.0 <1.0	Sample Number		Client Info		WC0735275	WC0805204	WC0769421
Oil Age hrs Client Info 8217 10185 6104 Oil Changed Client Info Oil Added N/A Filtered Sample Status Imit Mark NORMAL NORMAL NORMAL NORMAL CONTAMINATION method Imit/base current history2 History2 Fuel WC Method >4.0 <1.0 <1.0 <1.0 Glycol WC Method >4.0 <1.0 <1.0 <1.0 Chromium ppm ASTM D5185n >75 24 27 22 Chromium ppm ASTM D5185n >75 24 21 1 Nickel ppm ASTM D5185n >22 0 <1 1 Nickel ppm ASTM D5185n >18 2 3 4 Copper ppm ASTM D5185n >14 <1 1 1 Vanadium ppm ASTM D5185n >18 2 3 4 Copper<	Sample Date		Client Info		08 Nov 2023	10 Oct 2023	20 Jun 2023
Oil Anaged Sample StatusClient InfoOil Added NORMALN/AFiltered NORMALCONTAMINATIONmethodimil/basecurrenthistory1history2FuelWC Method>4.0<1.0	Machine Age	hrs	Client Info		10539	10185	8426
Sample Status NORMAL NORMAL NORMAL NORMAL CONTAMINATION method imit/base current history1 history2 Fuel WC Method >4.0 <1.0 <1.0 <1.0 Glycol WC Method >4.0 NEG NEG NEG WEAR METALS method imit/base current history1 history2 Iron ppm ASTM D5185m >75 24 27 22 Chromium ppm ASTM D5185m >2 0 <1 1 Nickel ppm ASTM D5185m >2 0 <1 <1 Silver ppm ASTM D5185m >1 2 0 <1 Auminum ppm ASTM D5185m >18 2 0 <1 Adopter ppm ASTM D5185m >14 <1 1 1 Vanadlum ppm ASTM D5185m 10 0 0 <1 Adopp	Oil Age	hrs	Client Info		8217	10185	6104
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >4.0 <1.0 <1.0 <1.0 Glycol WC Method >4.0 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 24 27 22 Chromium ppm ASTM D5185m >2 0 <1 <1 Nickel ppm ASTM D5185m >2 0 <1 <1 Aluminum ppm ASTM D5185m >1 2 0 <1 Lead ppm ASTM D5185m >14 <1 <1 1 Vanadium ppm ASTM D5185m 14 <1 <1 1 Vanadium ppm ASTM D5185m 10 0 0 <1 ADDITIVES method limit/base current history1 hiesory2	Oil Changed		Client Info		Oil Added	N/A	Filtered
Fuel WC Method >4.0 <1.0	Sample Status				NORMAL	NORMAL	NORMAL
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 24 27 22 Chromium ppm ASTM D5185m >8 <1 <1 1 Nickel ppm ASTM D5185m >2 0 <1 <1 Silver ppm ASTM D5185m >3 <1 <1 <1 Aluminum ppm ASTM D5185m >15 1 2 0 <1 Lead ppm ASTM D5185m >14 <1 <1 1 <1 1 <1 <1 1 <1 <1 1 <1 1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 S1 S1 S	CONTAMINATIO	Ν	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >75 24 27 22 Chromium ppm ASTM D5185m >8 <1 <1 1 Nickel ppm ASTM D5185m >2 0 <1 <1 Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >1 2 0 <1 Lead ppm ASTM D5185m >16 1 2 0 Copper ppm ASTM D5185m >14 <1 <1 1 Vanadium ppm ASTM D5185m 0 0 0 <1 Vanadium ppm ASTM D5185m 10 0 0 4 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 100 32 38	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Iron ppm ASTM D5185m >75 24 27 22 Chromium ppm ASTM D5185m >8 <1 <1 1 Nickel ppm ASTM D5185m >2 0 <1 <1 Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >2 0 0 <1 Lead ppm ASTM D5185m >11 2 0 0 Lead ppm ASTM D5185m >14 <1 1 1 Vanadium ppm ASTM D5185m 0 0 0 <1 Vanadium ppm ASTM D5185m 10 0 0 <1 ADDTIVES method Imit/base current history1 history2 Boron ppm ASTM D5185m 100 3 3 <td< th=""><th>Glycol</th><th></th><th>WC Method</th><th></th><th>NEG</th><th>NEG</th><th>NEG</th></td<>	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >8 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >2 0 <1 <1 Titanium ppm ASTM D5185m >3 <1	Iron	ppm	ASTM D5185m	>75	24	27	22
Titanium ppm ASTM D5185m >3 <1 <1 <1 Silver ppm ASTM D5185m >2 0 0 <1	Chromium	ppm	ASTM D5185m	>8	<1	<1	1
Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >15 1 2 0 Lead ppm ASTM D5185m >18 2 3 4 Copper ppm ASTM D5185m >80 4 5 5 Tin ppm ASTM D5185m >14 <1	Nickel	ppm	ASTM D5185m	>2	0	<1	<1
Aluminum ppm ASTM D5185m >15 1 2 0 Lead ppm ASTM D5185m >18 2 3 4 Copper ppm ASTM D5185m >80 4 5 5 Tin ppm ASTM D5185m >14 <1	Titanium	ppm	ASTM D5185m	>3	<1	<1	<1
Lead ppm ASTM D5185m >18 2 3 4 Copper ppm ASTM D5185m >80 4 5 5 Tin ppm ASTM D5185m >14 <1	Silver	ppm	ASTM D5185m	>2	0	0	<1
Copper ppm ASTM D5185m >80 4 5 5 Tin ppm ASTM D5185m >14 <1	Aluminum	ppm	ASTM D5185m	>15	1	2	0
Tin ppm ASTM D5185m >14 <1	Lead	ppm	ASTM D5185m	>18	2	3	4
Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 34 38 43 Barium ppm ASTM D5185m 10 0 0 4 Molybdenum ppm ASTM D5185m 100 32 38 35 Magnese ppm ASTM D5185m 100 32 38 35 Calcium ppm ASTM D5185m 100 32 38 35 Calcium ppm ASTM D5185m 450 1018 1065 1169 Calcium ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 20 3 <	Copper	ppm	ASTM D5185m	>80	4	5	5
Cadmium ppm ASTM D5185m 0 0 <1	Tin	ppm	ASTM D5185m	>14	<1	<1	1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 34 38 43 Barium ppm ASTM D5185m 10 0 0 4 Molybdenum ppm ASTM D5185m 100 32 38 35 Manganese ppm ASTM D5185m 100 32 38 35 Magnesium ppm ASTM D5185m 450 1018 1065 1169 Calcium ppm ASTM D5185m 3000 1358 1460 1562 Phosphorus ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 220 3 3636 3893 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m	Vanadium	ppm	ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 250 34 38 43 Barium ppm ASTM D5185m 10 0 0 4 Molybdenum ppm ASTM D5185m 10 32 38 35 Manganese ppm ASTM D5185m 100 32 38 35 Magnesium ppm ASTM D5185m 100 32 38 35 Calcium ppm ASTM D5185m 100 32 38 35 Calcium ppm ASTM D5185m 450 1018 1065 1169 Calcium ppm ASTM D5185m 3000 1358 1460 1562 Phosphorus ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m >20 3 3 3 Sodium ppm ASTM D5185m	Cadmium	ppm	ASTM D5185m		0	0	<1
Barium ppm ASTM D5185m 10 0 0 4 Molybdenum ppm ASTM D5185m 100 32 38 35 Manganese ppm ASTM D5185m 100 32 38 35 Magnesium ppm ASTM D5185m 450 1018 1065 1169 Calcium ppm ASTM D5185m 3000 1358 1460 1562 Phosphorus ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 4250 2943 3636 3893 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 3 3 3 Sodium ppm ASTM D5185m >20 <1 3 4 INFRA-RED method limit/base <th>ADDITIVES</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 100 32 38 35 Manganese ppm ASTM D5185m < 1 1 Magnesium ppm ASTM D5185m 450 1018 1065 1169 Calcium ppm ASTM D5185m 3000 1358 1460 1562 Phosphorus ppm ASTM D5185m 1150 864 1034 974 Zinc ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 4250 2943 3636 3893 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 3 3 3 Potassium ppm ASTM D7844 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7844 0.3	Boron	ppm	ASTM D5185m	250	34	38	43
Manganese ppm ASTM D5185m <1	Barium	ppm	ASTM D5185m	10	0	0	4
Magnesium ppm ASTM D5185m 450 1018 1065 1169 Calcium ppm ASTM D5185m 3000 1358 1460 1562 Phosphorus ppm ASTM D5185m 1150 864 1034 974 Zinc ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 4250 2943 3636 3893 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 3 3 3 Sodium ppm ASTM D5185m >20 3 3 4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.tmm *ASTM D7624 <	Molybdenum						
Calcium ppm ASTM D5185m 3000 1358 1460 1562 Phosphorus ppm ASTM D5185m 1150 864 1034 974 Zinc ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 4250 2943 3636 3893 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 3 3 3 Sodium ppm ASTM D5185m >158 2 <1 3 Potassium pm ASTM D5185m >20 <1 3 4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.tmm<*ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.imm<*ASTM D7624 >20		ppm	ASTM D5185m	100	32	38	35
Phosphorus ppm ASTM D5185m 1150 864 1034 974 Zinc ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 4250 2943 3636 3893 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 3 3 3 Sodium ppm ASTM D5185m >20 3 3 3 Potassium ppm ASTM D5185m >20 <1 3 4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.tmm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.tmm *ASTM D7415 <td< th=""><th>Manganese</th><th></th><th></th><th>100</th><th></th><th></th><th></th></td<>	Manganese			100			
Zinc ppm ASTM D5185m 1350 1101 1179 1207 Sulfur ppm ASTM D5185m 4250 2943 3636 3893 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 3 3 3 Sodium ppm ASTM D5185m >20 3 3 3 Potassium ppm ASTM D5185m >20 <1 3 4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.imm *ASTM D7415 >30 25.3 24.8 24.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.imm *ASTM D7414 <td< th=""><th>-</th><th>ppm</th><th>ASTM D5185m</th><th></th><th><1</th><th><1</th><th>1</th></td<>	-	ppm	ASTM D5185m		<1	<1	1
Sulfur ppm ASTM D5185m 4250 2943 3636 3893 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 3 3 3 Sodium ppm ASTM D5185m >20 3 3 3 Potassium ppm ASTM D5185m >20 <1 3 4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.1mm *ASTM D7624 >20 11.5 14.8 24.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 22.8 22.6	Magnesium	ppm ppm	ASTM D5185m ASTM D5185m	450	<1 1018	<1 1065	1 1169
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>20333SodiumppmASTM D5185m>1582<13PotassiumppmASTM D5185m>20<134INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D78440.30.30.3NitrationAbs/cm*ASTM D7624>2011.511.410.6SulfationAbs/limm*ASTM D7415>3025.324.824.5FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.imm*ASTM D7414>2523.222.822.6	Magnesium Calcium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	450 3000	<1 1018 1358	<1 1065 1460	1 1169 1562
Silicon ppm ASTM D5185m >20 3 3 3 Sodium ppm ASTM D5185m >158 2 <1 3 Potassium ppm ASTM D5185m >20 <1 3 4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.tmm *ASTM D7415 >30 25.3 24.8 24.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.tmm *ASTM D7414 >25 23.2 22.8 22.6	Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	450 3000 1150	<1 1018 1358 864	<1 1065 1460 1034	1 1169 1562 974
Sodium ppm ASTM D5185m >158 2 <1	Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	450 3000 1150 1350	<1 1018 1358 864 1101	<1 1065 1460 1034 1179	1 1169 1562 974 1207
Potassium ppm ASTM D5185m >20 <1	Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	450 3000 1150 1350 4250	<1 1018 1358 864 1101 2943	<1 1065 1460 1034 1179 3636	1 1169 1562 974 1207 3893
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 25.3 24.8 24.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 22.8 22.6	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	450 3000 1150 1350 4250 limit/base	<1 1018 1358 864 1101 2943 current	<1 1065 1460 1034 1179 3636 history1	1 1169 1562 974 1207 3893 history2
Soot % % *ASTM D7844 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.1mm *ASTM D7615 >30 25.3 24.8 24.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 22.8 22.6	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	450 3000 1150 1350 4250 limit/base >20	<1 1018 1358 864 1101 2943 current 3	<1 1065 1460 1034 1179 3636 history1 3	1 1169 1562 974 1207 3893 history2 3
Nitration Abs/cm *ASTM D7624 >20 11.5 11.4 10.6 Sulfation Abs/.1mm *ASTM D7624 >30 25.3 24.8 24.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 22.8 22.6	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m	450 3000 1150 1350 4250 limit/base >20 >158	<1 1018 1358 864 1101 2943 current 3 2	<1 1065 1460 1034 1179 3636 history1 3 <1	1 1169 1562 974 1207 3893 history2 3 3 3
Sulfation Abs/.1mm *ASTM D7415 >30 25.3 24.8 24.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 22.8 22.6	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	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	450 3000 1150 1350 4250 limit/base >20 >158 >20	<1 1018 1358 864 1101 2943 current 3 2 <1	<1 1065 1460 1034 1179 3636 <u>history1</u> 3 <1 3	1 1169 1562 974 1207 3893 history2 3 3 3 4
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.2 22.8 22.6	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	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	450 3000 1150 1350 4250 limit/base >20 >158 >20	<1 1018 1358 864 1101 2943 current 3 2 <1 current	<1 1065 1460 1034 1179 3636 history1 3 <1 3 history1	1 1169 1562 974 1207 3893 history2 3 3 4 4 history2
Oxidation Abs/.1mm *ASTM D7414 >25 23.2 22.8 22.6	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D51854	450 3000 1150 1350 4250 <i>limit/base</i> >20 >158 >20 <i>limit/base</i>	<1 1018 1358 864 1101 2943 current 3 2 <1 2 <1 current 0.3	<1 1065 1460 1034 1179 3636 history1 3 <1 3 -1 3 bistory1 0.3	1 1169 1562 974 1207 3893 history2 3 3 3 4 history2 0.3
	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	450 3000 1150 1350 4250 imit/base >20 >158 >20 imit/base	<1 1018 1358 864 1101 2943 current 3 2 <1 2 <1 current 0.3 11.5	<1 1065 1460 1034 1179 3636 history1 3 <1 3 <1 3 history1 0.3 11.4	1 1169 1562 974 1207 3893 history2 3 3 4 4 history2 0.3 10.6
Base Number (BN) mg KOH/g ASTM D2896 8.5 7.51 7.93 8.78	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624	450 3000 1150 1350 4250 limit/base >20 >158 >20 limit/base	<1 1018 1358 864 1101 2943 current 3 2 <1 current 0.3 11.5 25.3	<1 1065 1460 1034 1179 3636 history1 3 <113 0.3 11.4 24.8	1 1169 1562 974 1207 3893 history2 3 3 3 4 history2 0.3 10.6 24.5
	Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm 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 D7844 *ASTM D7624 *ASTM D7415	450 3000 1150 1350 4250 imit/base >20 >158 >20 imit/base >20 imit/base	<1 1018 1358 864 1101 2943 current 3 2 <1 current 0.3 11.5 25.3 current	<1 1065 1460 1034 1179 3636 history1 3 <11 3 <1 3 0.3 11.4 24.8 history1	1 1169 1562 974 1207 3893 history2 3 3 3 4 history2 0.3 10.6 24.5 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	15.0	14.9	14.8
GRAPHS						

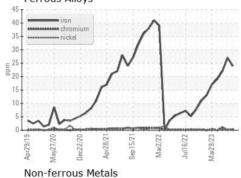
Ferrous Alloys

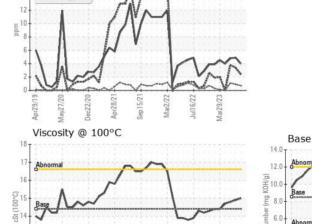
18

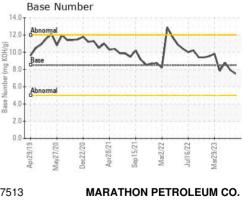
16

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Mar2/22 lul16/22 Mar29/23 Apr29/19 Mav27/20 Dec22/20 Apr 28/21 Sep 15/21 Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 Sample No. : WC0735275 Received : 15 Nov 2023 101 12TH ST Lab Number : 06008555 Diagnosed : 17 Nov 2023 CATLETTSBURG, KY Unique Number : 10742317 Diagnostician : Sean Felton US 41169 Test Package : IND 2 (Additional Tests: KF) Contact: SHAWN MCCLASKEY Certificate L2367 To discuss this sample report, contact Customer Service at 1-800-237-1369. stmcclaskey@marathonpetroleum.com * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: (606)739-2416 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: x:

Submitted By: M/V GALVESTON BAY

Page 2 of 2