

# **OIL ANALYSIS REPORT**

### Sample Rating Trend





#### DIAGNOSIS

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

		lov2022 Jan	2023 Mar2023 May20	23 Jul2023 Aug2023 Sep20	23 Nov202:				
SAMPLE INFORM	ATION	method	limit/base	current	history1	history2			
Sample Number		Client Info		HPL0003072	HPL0002586	HPL0003070			
Sample Date		Client Info		15 Nov 2023	16 Oct 2023	14 Sep 2023			
Machine Age	hrs	Client Info		0	0	0			
Oil Age	hrs	Client Info		0	0	0			
Oil Changed		Client Info		N/A	N/A	N/A			
Sample Status				NORMAL	NORMAL	ATTENTION			
CONTAMINATION		method	limit/base	current	history1	history2			
Water		WC Method	>0.1	NEG	NEG	NEG			
WEAR METALS		method	limit/base	current	history1	history2			
Iron	ppm	ASTM D5185m	>50	0	0	<1			
Chromium	ppm	ASTM D5185m	>10	0	0	0			
Nickel	ppm	ASTM D5185m		<1	0	0			
Titanium	ppm	ASTM D5185m		0	0	0			
Silver	ppm	ASTM D5185m		0	0	<1			
Aluminum	ppm	ASTM D5185m	>25	0	0	4			
Lead	ppm	ASTM D5185m	>25	0	0	0			
Copper	ppm	ASTM D5185m	>50	1	1	6			
Tin	ppm	ASTM D5185m	>15	<1	0	0			
Vanadium	ppm	ASTM D5185m		0	0	0			
Cadmium	ppm	ASTM D5185m		0	0	0			
ADDITIVES		method	limit/base	current	history1	history2			
Boron	ppm	ASTM D5185m		0	0	0			
Barium	ppm	ASTM D5185m		0	0	0			
Molybdenum	ppm	ASTM D5185m		0	0	0			
Manganese	ppm	ASTM D5185m		0	0	0			
Magnesium	ppm	ASTM D5185m		<1	0	1			
Calcium	ppm	ASTM D5185m		<1	0	1			
Phosphorus	ppm	ASTM D5185m		151	143	60			
Zinc	ppm	ASTM D5185m		0	0	0			
Sulfur	ppm	ASTM D5185m		15868	14547	13545			
CONTAMINANTS		method	limit/base	current	history1	history2			
Silicon	ppm	ASTM D5185m	>25	2	1	<1			
Sodium	ppm	ASTM D5185m		1	0	<1			
Potassium	ppm	ASTM D5185m	>20	<1	0	0			
FLUID DEGRADA	TION	method	limit/base	current	history1	history2			
Acid Number (AN)	mg KOH/g	ASTM D8045		0.48	0.48	0.31			

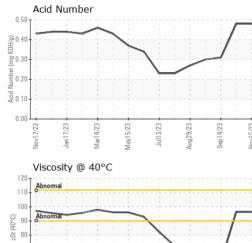


70 60 50

Nov17/22

Jan 17/23

# **OIL ANALYSIS REPORT**



Mar14/23

White Metal									
Winto Motal	scalar	*Visual	NONE		NONE	NONE	Ν	IONE	
Yellow Metal	scalar	*Visual	NONE		NONE	NONE	Ν	IONE	
Precipitate	scalar	*Visual	NONE		NONE	NONE	Ν	IONE	
Silt	scalar	*Visual	NONE		NONE	NONE	Ν	IONE	
Debris	scalar	*Visual	NONE		NONE	LIGHT			
Sand/Dirt	scalar	*Visual	NONE		NONE	NONE	N	IONE	
Appearance		*Visual	NORML		NORML	NORML	Ν	IORML	
		*Visual	NORML		NORML	NORML	Ν	IORML	
Free Water	scalar	*Visual			NEG	NEG			
FLUID PROPERT	IES	method	limit/bas	se	current	history1		history	/2
Visc @ 40°C	cSt	ASTM D445			96.3	96.3	<b>6</b>	1.1	
SAMPLE IMAGES	5	method	limit/bas	se	current	history1		history	/2
Color					no image	no image	r	io imagi	e
Bottom					no image	no image	r	image	e
GRAPHS Iron (ppm)				100 T	Lead (ppm)				
				<u>50</u>					
					Abnorma				
	3/23 -	9/23 -	5/23	0-	1/22 - 1/23 - 4/23 -	5/23 -	9/23 .	¥/23 -	5/23
Mar1	Jult	Aug2	Nov1		Nov1 Jan1	Jul1:	Aug2	Sep 14	Nov15/23
Aluminum (ppm)	-				Chromium (pp				
10				<sup>30</sup> T	Severe				
0				E. 20	Abnormal				
o Honomia					- d				
	23	23	23	01	22	23	23	23	23
ov17// an17// ar14//	ul13/	ng 29//	ov15//		ov17// an17// ar14//	ay15//	1829/	ep 14//	Nov15/23
		S. A	Z			Σ Γ	Aı	ŝ	ž
Copper (ppm)				100 T					
Severe					Severe				
Abnormal				<u>e</u> 50	Abnormal				1
0			~	0			~	m	
v17/2 n17/2 r14/2	113/2	g29/2	v15/2		v17/2 n17/2 r14/2	y15/2	g29/2	p14/2	Nov15/23
	Ju	Au				Ma	Au	Sel	Nov
Viscosity @ 40°C			(DH/d)	0.60-	Acid Number				
Abnormal			ma Ki	0.40				/	_
IO - Abnoma		~	uber (	0.20				_	
ol				0.00				_	_
17/23 17/23 14/23	13/23	29/2:	/15/23 Aci		17/23 17/23 14/23	15/2:	29/23	14/23	Nov15/23
Nov Mari Mavi	Jul	Aug	Novi		Nov Jan Mar	Mav	Augi	Sep	Nov
HPL0003072 F   06016628 D   10755772 D   MOB 2 2	513	513 <b>MARATHON PETROLEUM CO</b> IL. REFININF DIVISION, 400 S MARATHON AVI ROBINSON, II US 62454 Contact: M.S. MANHAR <sup></sup> mmanhart@marathonpetroleum.con							
	Silt Debris Sand/Dirt Appearance Odor Emulsified Water Free Water FLUID PROPERT Visc @ 40°C SAMPLE IMAGES Color Bottom GRAPHS Iron (ppm) GRAPHS Iron (ppm) Copper (ppm) Copper (ppm) Severe Annomal EZ/LING Color Copper (ppm) Copper (ppm) Copper (ppm) Copper (ppm) Copper (ppm) Copper (ppm) Copper (ppm) Color Color Color Color Color Color Color Color Copper (ppm) Copper (ppm) Copper (ppm) Copper (ppm) Copper (ppm) Copper (ppm) Color Color Color Color Color Color Color Copper (ppm) Copper (ppm) Copper (ppm) Color Color Color Color Color Copper (ppm) Copper (ppm) Copper (ppm) Color Color Color Color Color Color Color Copper (ppm) Copper (ppm) Color Color Color Color Color Color Copper (ppm) Copper (ppm) Color Color Color Color Color Color Color Copper (ppm) Color C	Silt scalar Debris scalar Sand/Dirt scalar Appearance scalar Odor scalar Emulsified Water scalar Free Water scalar Free Water scalar FLUID PROPERTIES Visc @ 40°C cSt SAMPLE IMAGES Color Bottom GRAPHS Iron (ppm) GRAPHS Iron (ppm) Copper (	Silt scalar *Visual Debris scalar *Visual Appearance scalar *Visual Emulsified Water scalar *Visual Free Water scalar *Visual FLUID PROPERTIES method Visc @ 40°C cSt ASTM D445 SAMPLE IMAGES method Color Bottom GRAPHS Iron (ppm) Copper (ppm)	Silt scalar *Visual NONE Debris scalar *Visual NONE Sand/Dirt scalar *Visual NONE Appearance scalar *Visual NORML Odor scalar *Visual NORML Emulsified Water scalar *Visual >0.1 Free Water scalar *Visual >0.1 Free Water scalar *Visual FLUID PROPERTIES method limit/bas Visc @ 40°C cSt ASTM D445 SAMPLE IMAGES method limit/bas Color Bottom GRAPHS Iron (ppm) Graph (ppm) Copper (	Silt scalar "Visual NONE Debris scalar "Visual NONE Sand/Dirt scalar "Visual NONE Appearance scalar "Visual NORML Odor scalar "Visual NORML Color scalar "Visual NORML FLUID PROPERTIES method limit/base Visc @ 40°C cSt ASTM D445 SAMPLE IMAGES method limit/base Color Bottom GRAPHS Iron (ppm)	Silt scalar Visual NONE NONE Debris scalar Visual NONE NONE Appearance scalar Visual NORML NORML Odor scalar Visual NORML NORML Emulsified Water scalar Visual NORML NORML Emulsified Water scalar Visual NORML NORML Emulsified Water scalar Visual NORML NORML Start Scalar Visual NORML NORML NEG FLUID PROPERTIES method imit/base current Visc @ 40°C cSt ASTM D445 96.3 SAMPLE IMAGES method imit/base current Color no image Bottom no image Copper (ppm) Copper (ppm	Siti scalar Visual NONE NONE NONE LIGHT Debris scalar Visual NONE NONE LIGHT Sand/Dirt scalar Visual NONE NONE NONE LIGHT Sand/Dirt scalar Visual NORML NORM NONE Appearance scalar Visual NORML NORML NORM NORM NORM Codor scalar Visual NORML NORM NORM NORM NORM NORM Free Water scalar Visual NORML NORM NORM NORM NORM NORM Free Water scalar Visual Scalar Visual Scalar Visual Scalar Visual Scalar Visual NORM NORM NORM NORM NORM NORM NORM NORM	Silt scalar Visual NONE NONE NONE NONE LIGHT L Debris scalar Visual NONE NORE LIGHT L Sand/Dirt scalar Visual NORML NO	Silt scalar Visual NONE NONE NONE NONE NONE NONE NONE NON

Contact/Location: M.S. MANHART - MARROB