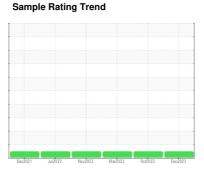


# **OIL ANALYSIS REPORT**

Vessel KAT 012 (Main Engine)

Main Engine

PETRO CANADA CM MHP 153 (1000 LTR)





### DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

### Contamination

There is no indication of any contamination in the

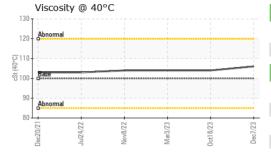
### **Fluid Condition**

The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

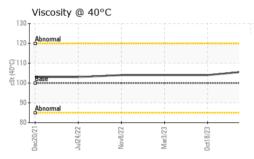
Sample Number   Client Info   PC0080264   PC0018595   PC0032197   Sample Date   Client Info   07 Dec 2023   18 Oct 2023   03 Mar 2023   03 M	SAMPLE INFOR	AOLTAN	method	limit/base	current	history1	history2
Sample Date							
Machine Age   hrs   Client Info   191564   188528   188528   188528   Oli Age   hrs   Client Info   191564   188528   Oli Client Info   N/A	·						
Oil Age	•	hre					
Oil Changed   Cilent Info   N/A   N/A   N/A   N/A   NORMAL   NOR							
NORMAL   NORMAL   NORMAL   NORMAL   CONTAMINATION   method   limit/base   current   history1   history2   history2   Fuel   WC Method   >4.0   <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   <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   <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   <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   <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   <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   <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   <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   <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   <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   <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   <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   <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   <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   <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   <1.0   <1.0	•	1110					
CONTAMINATION			Oliciti IIIIO				
Fuel	·						
Water Glycol         WC Method         >0.1         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185(m)         >25         4         5         6           Chromium         ppm         ASTM D5185(m)         >5         0         0         0           Nickel         ppm         ASTM D5185(m)         >5         <1         0         <1           Silver         ppm         ASTM D5185(m)         >3         0         0         <1           Silver         ppm         ASTM D5185(m)         >3         0         0         <1           Aluminum         ppm         ASTM D5185(m)         >5         0         <1         <1           Lead         ppm         ASTM D5185(m)         >5         0         <1         <1           Copper         ppm         ASTM D5185(m)         >5         <1         <1         <1           Tin         ppm         ASTM D5185(m)         >5         <1         <1         <1           Aparadium         ppm         ASTM D5185(m)         0         0 <th></th> <th>ION</th> <th></th> <th></th> <th>current</th> <th>•</th> <th>· ·</th>		ION			current	•	· ·
WEAR METALS							
WEAR METALS				>0.1			
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185(m)         >5         0         0         0           Nickel         ppm         ASTM D5185(m)         >5         <1         0         <1           Titanium         ppm         ASTM D5185(m)         >3         0         0         <1           Silver         ppm         ASTM D5185(m)         >2         <1         <1         0           Aluminum         ppm         ASTM D5185(m)         >10         2         1         2           Lead         ppm         ASTM D5185(m)         >5         0         <1         <1           Copper         ppm         ASTM D5185(m)         >5         <1         <1         <1           Tin         ppm         ASTM D5185(m)         >5         <1         <1         <1         <1           Tin         ppm         ASTM D5185(m)         >5         <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 <t< th=""><th>WEAR METAL</th><th>S</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></t<>	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185(m)	>25	4	5	6
Description	Chromium	ppm	ASTM D5185(m)	>5	0	0	0
Silver	Nickel	ppm	ASTM D5185(m)	>5	<1	0	<1
Aluminum	Titanium	ppm	ASTM D5185(m)	>3	0	0	<1
Lead	Silver	ppm	ASTM D5185(m)	>2	<1	<1	0
Copper         ppm         ASTM D5185(m)         >5         <1         <1         <1         <1         <1         Tin         ppm         ASTM D5185(m)         >5         0         0         0         0         0         ASTM D5185(m)         0         1         1         2         2         2         3         3         2         2         2         3         3         3         2         2         3         3         3         2         2         2         3         3	Aluminum	ppm	ASTM D5185(m)	>10	2	1	2
Tin ppm ASTM D5185(m) >5 0 0 0 0  Antimony ppm ASTM D5185(m) 0 0 0 1  Vanadium ppm ASTM D5185(m) 0 0 0 0  Beryllium ppm ASTM D5185(m) 0 0 0 0  Cadmium ppm ASTM D5185(m) 0 0 0 0  ADDITIVES method limit/base current history1 history2  Boron ppm ASTM D5185(m) 3 3 3 2  Barium ppm ASTM D5185(m) 2 1 <1 0  Molybdenum ppm ASTM D5185(m) 2 2 2 3  Manganese ppm ASTM D5185(m) 0 0 0 <1  Magnesium ppm ASTM D5185(m) 44 55 55  Calcium ppm ASTM D5185(m) 44 55 55  Calcium ppm ASTM D5185(m) 5283 5343 5438  Phosphorus ppm ASTM D5185(m) 857 869 959  Zinc ppm ASTM D5185(m) 857 869 959  Zinc ppm ASTM D5185(m) 1090 972 991 980  Sulfur ppm ASTM D5185(m) 9331 9374 9314  Lithium ppm ASTM D5185(m) <1 <1 <1 <1  CONTAMINANTS method limit/base current history1 history2  Silicon ppm ASTM D5185(m) >20 6 9 6  Sodium ppm ASTM D5185(m) >20 6 9 6  Sodium ppm ASTM D5185(m) >20 <1 <1 <1  INFRA-RED method limit/base current history1 history2  Soot % % ASTM D7844* >2 0 0 0 0  Nitration Abs/cm ASTM D7624* >20 8.3 7.9 7.3	Lead	ppm	ASTM D5185(m)	>5	0	<1	<1
Antimony         ppm         ASTM D5185(m)         0         0         <1           Vanadium         ppm         ASTM D5185(m)         0         0         0           Beryllium         ppm         ASTM D5185(m)         0         0         0           Cadmium         ppm         ASTM D5185(m)         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         3         3         2           Barium         ppm         ASTM D5185(m)         <1	Copper	ppm	ASTM D5185(m)	>5	<1	<1	<1
Vanadium         ppm         ASTM D5185(m)         0         0         0           Beryllium         ppm         ASTM D5185(m)         0         0         0           Cadmium         ppm         ASTM D5185(m)         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         3         3         2           Barium         ppm         ASTM D5185(m)         <1         <1         0           Molybdenum         ppm         ASTM D5185(m)         2         2         3         3         2           Manganese         ppm         ASTM D5185(m)         0         0         <1         0         <1         0         <1         0         <1         44         55	Tin	ppm	ASTM D5185(m)	>5	0	0	0
Beryllium	Antimony	ppm	ASTM D5185(m)		0	0	<1
Cadmium         ppm         ASTM D5185(m)         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         3         3         2           Barium         ppm         ASTM D5185(m)         <1	Vanadium	ppm	ASTM D5185(m)		0	0	0
ADDITIVES	Beryllium	ppm	ASTM D5185(m)		0	0	0
Boron	Cadmium	ppm	ASTM D5185(m)		0	0	0
Barium         ppm         ASTM D5185(m)         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185(m)         2         2         3           Manganese         ppm         ASTM D5185(m)         0         0         <1	Boron	ppm	ASTM D5185(m)		3	3	2
Manganese         ppm         ASTM D5185(m)         0         0         <1	Barium	ppm	ASTM D5185(m)		<1	<1	0
Magnesium         ppm         ASTM D5185(m)         44         55         55           Calcium         ppm         ASTM D5185(m)         5283         5343         5438           Phosphorus         ppm         ASTM D5185(m)         857         869         959           Zinc         ppm         ASTM D5185(m)         1090         972         991         980           Sulfur         ppm         ASTM D5185(m)         9331         9374         9314           Lithium         ppm         ASTM D5185(m)         <1	Molybdenum	ppm	ASTM D5185(m)		2	2	3
Calcium         ppm         ASTM D5185(m)         5283         5343         5438           Phosphorus         ppm         ASTM D5185(m)         857         869         959           Zinc         ppm         ASTM D5185(m)         1090         972         991         980           Sulfur         ppm         ASTM D5185(m)         9331         9374         9314           Lithium         ppm         ASTM D5185(m)         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >20         6         9         6           Sodium         ppm         ASTM D5185(m)         >75         1         1         <1         <1           Potassium         ppm         ASTM D5185(m)         >20         <1         <1         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >2         0         0         0           Nitration         Abs/cm         ASTM D7624*         >20         8.3         7.9	Manganese	ppm	ASTM D5185(m)		0	0	<1
Phosphorus         ppm         ASTM D5185(m)         857         869         959           Zinc         ppm         ASTM D5185(m)         1090         972         991         980           Sulfur         ppm         ASTM D5185(m)         9331         9374         9314           Lithium         ppm         ASTM D5185(m)         <1	Magnesium	ppm	ASTM D5185(m)		44	55	55
Zinc         ppm         ASTM D5185(m)         1 090         972         991         980           Sulfur         ppm         ASTM D5185(m)         9331         9374         9314           Lithium         ppm         ASTM D5185(m)         <1	Calcium	ppm	ASTM D5185(m)		5283	5343	5438
Sulfur         ppm         ASTM D5185(m)         9331         9374         9314           Lithium         ppm         ASTM D5185(m)         <1	Phosphorus	ppm	. ,		857	869	959
Lithium         ppm         ASTM D5185(m)         <1	Zinc	ppm	ASTM D5185(m)	1090	972	991	980
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >20         6         9         6           Sodium         ppm         ASTM D5185(m)         >75         1         1         <1           Potassium         ppm         ASTM D5185(m)         >20         <1         <1         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >2         0         0         0           Nitration         Abs/cm         ASTM D7624*         >20         8.3         7.9         7.3	Sulfur	ppm	ASTM D5185(m)		9331	9374	9314
Silicon         ppm         ASTM D5185(m)         >20         6         9         6           Sodium         ppm         ASTM D5185(m)         >75         1         1         <1	Lithium	ppm	ASTM D5185(m)		<1	<1	<1
Sodium         ppm         ASTM D5185(m)         >75         1         1         <1	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185(m)         >20         <1         <1         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >2         0         0         0           Nitration         Abs/cm         ASTM D7624*         >20         8.3         7.9         7.3	Silicon	ppm	ASTM D5185(m)	>20	6	9	6
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >2         0         0         0           Nitration         Abs/cm         ASTM D7624*         >20         8.3         7.9         7.3	Sodium	ppm	ASTM D5185(m)	>75	1	1	<1
Soot %         %         ASTM D7844*         >2         0         0         0           Nitration         Abs/cm         ASTM D7624*         >20         8.3         7.9         7.3	Potassium	ppm	ASTM D5185(m)	>20	<1	<1	<1
Nitration         Abs/cm         ASTM D7624*         >20         8.3         7.9         7.3	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         ASTM D7624*         >20         8.3         7.9         7.3	Soot %	%	ASTM D7844*	>2	0	0	0
	Nitration	Abs/cm	ASTM D7624*	>20	8.3	7.9	7.3
	Sulfation		ASTM D7415*	>30			



## **OIL ANALYSIS REPORT**



Viscosi	ty @ 10	0°C			
13 - Abnormal					
.12					
Base					
Abnormal					
9-					
8 12		- 52	23	53	
Dec20/21	Jul24/2	Nov8/2	Mar3/2	Oct18/	ì



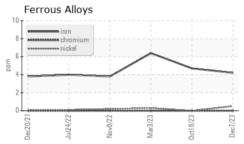
FLUID DEGRA	NOITAC	method				history2
Oxidation	Abs/.1mm	ASTM D7414*	>25	6.8	6.3	7.2
Base Number (BN)	mg KOH/g	ASTM D2896*	15.77	15.69		
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	NONE		
Yellow Metal	scalar	Visual*	NONE	NONE		
Precipitate	scalar	Visual*	NONE	NONE		
Silt	scalar	Visual*	NONE	NONE		
Debris	scalar	Visual*	NONE	NONE		
Sand/Dirt	scalar	Visual*	NONE	NONE		
Appearance	scalar	Visual*	NORML	NORML		
Odor	scalar	Visual*	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	Visual*	>0.1	NEG	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPE	RTIFS	method	limit/base	current	historv1	historv2

### **GRAPHS**

Viscosity Index (VI)

Visc @ 40°C

Visc @ 100°C



cSt

cSt

Scale

ASTM D7279(m)

ASTM D2270\*

ASTM D7279(m) 11.16

99.91

106

11.7

97

104

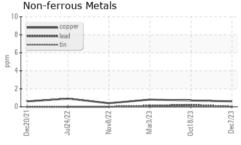
11.7

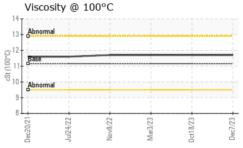
100

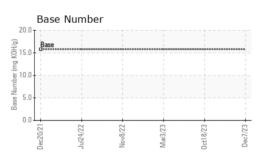
104

11.7

100









CALA ISO 17025:2017 Accredited Laboratory

Laboratory Sample No. Lab Number **Unique Number** 

: 5694837

: PC0080264 : 02601752

Validity of results and interpretation are based on the sample and information as supplied.

Received

Diagnosed Diagnostician : Wes Davis

: 08 Dec 2023 : 13 Dec 2023

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Ocean Choice International - Katsheshuk II 1315 Topsail Rd, P.O. Box 8190 St. John's, NL **CA A1B 3N4** Contact: Chief Engineer

Test Package : MAR 2 ( Additional Tests: KV40, VI, Visual ) To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (\*) outside scope of accreditation, (m) method modified, (e) tested at external lab.

T: F:

katengine@oceanchoice.com

Submitted By: Stephen Elliott