

# **OIL ANALYSIS REPORT**

Sample Rating Trend





CATERPILLAR 30-399 (S/N RYG20146)

Hydraulic System

PETRO CANADA ENVIRON MV 46 (220 LTR)

RON MV 46 (22	,			Nov2023		
SAMPLE INFOR	MATION	M method	limit/base	current	history1	history2
Sample Number		Client Info		PC0069830		
Sample Date		Client Info		01 Nov 2023		
Machine Age	hrs	Client Info		2911		
Dil Age	hrs	Client Info		5		
Dil Changed		Client Info		Not Changd		
Sample Status				NORMAL		
CONTAMINAT	ION	method	limit/base	current	history1	history2
Vater		WC Method	>0.05	NEG		
WEAR METAL	.S	method	limit/base	current	history1	history2
ron	ppm	ASTM D5185(m)	>20	0		
Chromium	ppm	ASTM D5185(m)	>20	0		
Nickel	ppm	ASTM D5185(m)	>20	0		
Titanium	ppm	ASTM D5185(m)		0		
Silver	ppm	ASTM D5185(m)		<1		
Aluminum	ppm	ASTM D5185(m)	>20	0		
ead	ppm	ASTM D5185(m)	>20	0		
Copper	ppm	ASTM D5185(m)	>20	<1		
īn	ppm	ASTM D5185(m)	>20	0		
Antimony	ppm	ASTM D5185(m)		0		
/anadium	ppm	ASTM D5185(m)		0		
Beryllium	ppm	ASTM D5185(m)		0		
	ppm ppm	ASTM D5185(m) ASTM D5185(m)		0 0		
			limit/base			
Cadmium ADDITIVES		ASTM D5185(m)	limit/base 0	0		
Cadmium ADDITIVES Boron	ppm	ASTM D5185(m) method	0	0 current	 history1	 history2
Cadmium ADDITIVES Boron Barium	ppm ppm	ASTM D5185(m) method ASTM D5185(m)	0	0 current <1	 history1 	 history2 
Cadmium ADDITIVES Boron Barium Molybdenum	ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	0	0 current <1 <1	 history1 	 history2 
Cadmium ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0	0 current <1 <1 0	 history1  	 history2 
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0	0 current <1 <1 0 0	 history1  	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0	0 current <1 <1 0 0 <1	 history1   	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0	0 current <1 <1 0 0 <1 6	 history1    	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 650	0 current <1 <1 0 0 <1 6 6 628	 history1     	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 650 0 1420	0 current <1 <1 0 0 <1 6 6 628 3	 history1     	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Cinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 650 0 1420	0 current <1 <1 0 0 <1 6 628 3 1354	 history1     	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Cinc Sulfur ithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 650 0 1420	0 current <1 <1 0 0 <1 6 628 3 1354 <1	 history1        -	history2
Cadmium ADDITIVES Boron Barium Aolybdenum Aanganese Aagnesium Calcium Phosphorus Cinc Sulfur .ithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 650 0 1420 Iimit/base	0 current <1 <1 0 0 <1 6 628 3 1354 <1 current	 history1        -	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Cinc Sulfur ithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 650 0 1420 Iimit/base	0 current <1 <1 0 0 <1 6 628 3 1354 <1 current 0	 history1        -	history2
Cadmium ADDITIVES Boron Barium Aolybdenum Aanganese Aagnesium Calcium Phosphorus Cinc Sulfur .ithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 650 0 1420 limit/base >15	0 current <1 <1 0 0 <1 6 628 3 1354 <1 current 0 <1	 history1        history1  history1	history2
Cadmium ADDITIVES Boron Barium Aolybdenum Aanganese Aagnesium Calcium Phosphorus Cinc Sulfur ithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 650 0 1420 <b>imit/base</b> >15 >20	0 current <1 <1 0 0 <1 6 628 3 1354 <1 current 0 <1 0 <1 0 0 <1 0 0 0 0 0 0 0 0 0 0 0 0 0	 history1       history1   	history2 i
Cadmium Cadmium ADDITIVES Boron Barium Aolybdenum Aanganese Aagnesium Calcium Phosphorus Cinc Sulfur .ithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 650 0 1420 <b>imit/base</b> >15 >20 <b>imit/base</b>	0 current <1 <1 0 0 <1 6 628 3 1354 <1 current 0 <1 0 current	 history1       history1   	history2 i
Cadmium Cadmium ADDITIVES Boron Barium Aolybdenum Aanganese Aagnesium Calcium Phosphorus Cinc Soulfur ithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 650 0 1420 1420 1420 1420 1420 1420 1420 1	0 current <1 <1 0 0 <1 6 628 3 1354 <1 current 0 <1 0 current 276	 history1       history1  history1  history1	history2
Cadmium Cadmium ADDITIVES Boron Barium Aolybdenum Aanganese Aagnesium Calcium Phosphorus Cinc Soulfur Cithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm Particles >4µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m)      method      ASTM D5185(m)      A	0 0 0 0 0 0 650 0 1420 1420 1420 1420 1420 1420 1420 1	0 current <1 <1 0 0 <1 6 628 3 1354 <1 current 0 <1 0 current 276 78	 history1       history1  history1  history1	history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 650 0 1420 1420 1420 1420 1420 1420 1420 1	0 current <1 <1 0 0 <1 6 628 3 1354 <1 current 0 <1 0 <1 0 current 276 78 8	 history1        history1  history1	history2
Cadmium Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Cinc Soulfur CONTAMINAN Silicon CONTAMINAN Silicon Cotassium Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 650 0 1420 1420 <b>imit/base</b> >15 >20 <b>imit/base</b> >5000 >1300 >160 >40	0 current <1 0 0 <1 6 628 3 1354 <1 current 0 <1 0 <1 0 current 276 78 8 2	history1 i i i i i i i i i i i history1 i <td>image: image: image:</td>	image:

## DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor.

### Wear

All component wear rates are normal.

#### Contamination

The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable.

#### Fluid Condition

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

Contact/Location: Service Manager - LESNEW



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cSt (100°C) ł 4

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P 6 Ê 51

> 21 1 Ok

回路

cSt (100°C) ł

# **OIL ANALYSIS REPORT**

1-	Viscosity @ 100°C	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
0		Acid Number (AN)	mg KOH/g	ASTM D974*	0.12	0.07		
9	Abnormal	VISUAL		method	limit/base	current	history1	history2
8	Base	White Metal	scalar	Visual*	NONE	NONE		
7	Abnormal	Yellow Metal	scalar	Visual*	NONE	NONE		
1		Precipitate	scalar	Visual*	NONE	NONE		
61	73 -	- ·	scalar	Visual*	NONE	NONE		
	Nov1/23	Debris	scalar	Visual*	NONE	NONE		
	Particle Trend	Sand/Dirt	scalar	Visual*	NONE	NONE		
k T		Appearance	scalar	Visual*	NORML	NORML		
k -	4μm 6μm	Odor	scalar	Visual*	NORML	NORML		
k -	14μm	Emulsified Water Free Water	scalar scalar	Visual* Visual*	>0.05	NEG NEG		
k - k -		FLUID PROPE		method	limit/base	current	history1	history2
k-								
k		Visc @ 40°C Visc @ 100°C	cSt cSt	ASTM D7279(m) ASTM D7279(m)	45.0 8.2	44.1 8		
	Nov1/23	Viscosity Index (VI)	Scale	ASTM D7273(III) ASTM D2270*	158	155		
	2 2	SAMPLE IMAG		method	limit/base	current	history1	history2
17	Viscosity @ 100°C		LU	methou	intil base		Thistory I	Thistoryz
0								
č	Abnormal	Color					no image	no image
9- 8-	Base							
7	Abnormal							
<i>_</i>		Bottom					no image	no image
b -	Nov1/23 -	22						
	Nov	GRAPHS						
	Viscosity @ 40°C	Ferrous Alloys			491,52	Particle Count	t	т26
2 0	Abnormal	iron			122,88			+24
8-		E 5 - nickel			30,72	Severe		-22
6 4	Base	0				0 Abnormal		
2.		Nov1/23			Nov1/23			18 18
0-	Abnormal	~ Non-ferrous Metal	-		saloiti 48			-20 4406:1999 C -18 -16 Cear
6		<sup>10</sup> T			ba		<b>N</b>	-14 In
	Nov1/23	E 5-			nbe			-14 Iness -12 Ode
	~					8		10
k	Particle Trend	33			/23	2-		+8
k -		Nov1/23			Nov1/23	0		
k-	14μm	Viscosity @ 40°C			(B)	<sup>4μ</sup> Acid Number	14µ 21µ	38μ /1μ
k-		55 50 Abnormal			(B/H0.1 	5 Base		
k-		C 50 Abnormal Base 3 40 Abnormal			<u>ຍັ</u> 0.1	0-		1
k-		3 40 Abnormal			23	15		
<sub>k</sub> I		Nov1/23			Nov1/23	Nov1/23		Nov1/23 -
	Nov1/25	Nov			Nov	Nov		Nov
	Laboratory Sample No. Lab Number Unique Number	: 02600482	75 Apple Received Diagnose Diagnost	i : 04 l ed : 05 l	ington, ON I Dec 2023 Dec 2023 s Davis		52 CHEMIN DE S	EPRISES PEC SAINT-EDGAR CHMOND, QC CA G0C 2B0