

## **OIL ANALYSIS REPORT**

#### Area KEMP QUARRIES / MUSKOGEE SAND [67431] Machine Id WL001 Component

Rear Right Final Drive

PETRO CANADA PRODURO TO-4 SAE 50 (--- GAL)

### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor. ( Customer Sample Comment:  $\mbox{PM-2}$  sampled fluid )

#### Wear

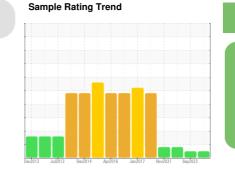
All component wear rates are normal.

#### Contamination

The water content is negligible. There is no indication of any contamination in the oil.

#### **Fluid Condition**

The condition of the oil is acceptable for the time in service.



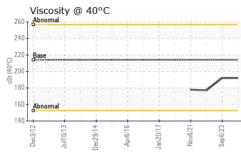
 $\checkmark$ 

NORMAL

	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0086550	PCA0048596	PCA0070493
Sample Date		Client Info		29 Feb 2024	06 Sep 2023	08 Jul 2022
Machine Age	hrs	Client Info		3895	3441	2975
Oil Age	hrs	Client Info		3895	3441	613
Oil Changed		Client Info		N/A	N/A	Changed
Sample Status				NORMAL	NORMAL	ABNORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Water		WC Method	>0.2	NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>800	61	59	<b>1</b> 740
Chromium	ppm	ASTM D5185m	>10	0	<1	2
Nickel	ppm	ASTM D5185m	>5	0	0	0
Titanium	ppm	ASTM D5185m	>15	0	<1	<1
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>75	2	2	8
Lead	ppm	ASTM D5185m	>10	0	0	<1
Copper	ppm	ASTM D5185m	>75	<1	0	12
Tin	ppm	ASTM D5185m	>8	<1	<1	0
Antimony	ppm	ASTM D5185m	>50			
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	<1
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	2	0	0	2
Barium	ppm	ASTM D5185m	0	0	5	99
				v	Ŭ	00
Molybdenum	ppm	ASTM D5185m	0	۰ <1	0	<1
Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m		-		
-				<1	0	<1
Manganese	ppm	ASTM D5185m	0	<1 <1	0 <1	<1 7
Manganese Magnesium	ppm ppm	ASTM D5185m ASTM D5185m	0 9	<1 <1 0	0 <1 21	<1 7 15
Manganese Magnesium Calcium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 9 3114	<1 <1 0 2780	0 <1 21 3459	<1 7 15 2865
Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 9 3114 1099	<1 <1 0 2780 796	0 <1 21 3459 963	<1 7 15 2865 983
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 9 3114 1099 1245	<1 <1 0 2780 796 845	0 <1 21 3459 963 1178	<1 7 15 2865 983 1114
Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 9 3114 1099 1245 7086 limit/base	<1 <1 0 2780 796 845 6765	0 <1 21 3459 963 1178 9035	<1 7 15 2865 983 1114 10129
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>	0 9 3114 1099 1245 7086 limit/base	<1 <1 0 2780 796 845 6765 current	0 <1 21 3459 963 1178 9035 history1	<1 7 15 2865 983 1114 10129 history2
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	0 9 3114 1099 1245 7086 limit/base >400	<1 <1 0 2780 796 845 6765 current 18	0 <1 21 3459 963 1178 9035 history1 20	<1 7 15 2865 983 1114 10129 history2 37
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 9 3114 1099 1245 7086 limit/base >400	<1 <1 0 2780 796 845 6765 current 18 2	0 <1 21 3459 963 1178 9035 history1 20 1	<1 7 15 2865 983 1114 10129 history2 37 6
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 9 3114 1099 1245 7086 <b>limit/base</b> >400	<1 <1 0 2780 796 845 6765 current 18 2 0	0 <1 21 3459 963 1178 9035 history1 20 1 0	<1 7 15 2865 983 1114 10129 history2 37 6 7
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL	ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 9 3114 1099 1245 7086 <i>limit/base</i> >400 >20 <i>limit/base</i>	<1 <1 <1 0 2780 796 845 6765 current 18 2 0 current	0 <1 21 3459 963 1178 9035 history1 20 1 0 history1	<1 7 15 2865 983 1114 10129 history2 37 6 7 history2
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate	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 *Visual *Visual	0 9 3114 1099 1245 7086 limit/base >400 	<1 <li>&lt;1 </li> <li>&lt;1 </li> <li>0 </li> <li>2780 </li> <li>796 </li> <li>845 </li> <li>6765 </li> <li>current </li> <li>18 </li> <li>2 </li> <li>0 </li> <li>current </li> <li>NONE </li> <li>NONE </li> <li>NONE </li> <li>NONE&lt;</li> <li>NONE</li> <li>NONE</li> <li>NONE</li> <li>NONE</li> <li>NONE</li> <li>NONE</li>	0 <1 21 3459 963 1178 9035 history1 20 1 20 1 0 <i>history1</i> NONE	<1 7 15 2865 983 1114 10129 history2 37 6 7 history2 NONE
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt	ppm ppm ppm ppm ppm ppm TS ppm ppm ppm scalar scalar	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m XSTM D5185m *Visual	0 9 3114 1099 1245 7086 <i>limit/base</i> >400 >20 <i>limit/base</i> NONE NONE	<1 <1 <1 0 2780 796 845 6765 Current 18 2 0 Current NONE NONE NONE NONE NONE NONE NONE	0 <1 21 3459 963 1178 9035 history1 20 1 20 1 0 Vont NONE NONE NONE NONE NONE	<1 7 15 2865 983 1114 10129 history2 37 6 7 kistory2 NONE NONE NONE
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate	ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm scalar scalar scalar	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *Visual *Visual	0 9 3114 1099 1245 7086 imit/base >400 >20 imit/base NONE NONE NONE NONE	<1 <li>&lt;1 </li> <li>&lt;1 </li> <li>0 </li> <li>2780 </li> <li>796 </li> <li>845 </li> <li>6765 </li> <li>current </li> <li>18 </li> <li>2 </li> <li>0 </li> <li>current </li> <li>NONE </li> <li>NONE </li> <li>NONE </li> <li>NONE&lt;</li> <li>NONE</li> <li>NONE</li> <li>NONE</li> <li>NONE</li> <li>NONE</li> <li>NONE</li>	0 <1 21 3459 963 1178 9035 history1 20 1 20 1 0 <u>history1</u> NONE NONE NONE NONE NONE NONE	<1 7 15 2865 983 1114 10129 history2 37 6 7 Kistory2 NONE NONE NONE NONE
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt	ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm scalar scalar scalar scalar	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *Visual *Visual *Visual *Visual *Visual *Visual *Visual	0 9 3114 1099 1245 7086 imit/base >400 >20 imit/base NONE NONE NONE NONE	<1 <1 <1 0 2780 796 845 6765 Current 18 2 0 Current NONE NONE NONE NONE NONE NONE NONE	0 <1 21 3459 963 1178 9035 history1 20 1 20 1 0 Vont NONE NONE NONE NONE NONE	<1 7 15 2865 983 1114 10129 history2 37 6 7 NONE NONE NONE NONE NONE NONE
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt Debris	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 *Visual *Visual *Visual *Visual *Visual	0 9 3114 1099 1245 7086 imit/base >400 >20 imit/base NONE NONE NONE NONE NONE NONE	<1  <1 <1 <1 <1 <0 <2780 796 845 <6765   <	0 <1 21 3459 963 1178 9035 history1 20 1 20 1 0 <u>history1</u> NONE NONE NONE NONE NONE NONE	<1 7 15 2865 983 1114 10129 history2 37 6 7 history2 NONE NONE NONE NONE NONE NONE NONE
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance Odor	ppm ppm ppm ppm ppm ppm ppm ppm ppm scalar scalar scalar scalar scalar scalar scalar	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *Visual *Visual *Visual *Visual *Visual *Visual *Visual	0 9 3114 1099 1245 7086 imit/base >400 >20 imit/base NONE NONE NONE NONE NONE NONE NONE NON	<1 <li>&lt;1 </li> <li>&lt;2780 </li> <li>796 </li> <li>845 </li> <li>6765 </li> <li><i>current</i> </li> <li>18 </li> <li>2 </li> <li>0 </li> <li><i>current</i> </li> <li>NONE </li> <li>NONE </li> <li>NONE </li> <li>LIGHT </li> <li>NONE&lt;</li> <li>LIGHT </li> <li>NONE&lt;</li>	0 <1 21 3459 963 1178 9035 history1 20 1 20 1 20 1 0 <i>history1</i> NONE NONE NONE NONE NONE NONE NONE NON	<1 7 15 2865 983 1114 10129 history2 37 6 7 history2 NONE NONE NONE NONE NONE NONE NONE NON
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance	ppm ppm ppm ppm ppm ppm ppm ppm ppm scalar scalar scalar scalar scalar scalar scalar	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *Visual *Visual *Visual *Visual *Visual *Visual *Visual *Visual	0 9 3114 1099 1245 7086 imit/base >400 >20 imit/base NONE NONE NONE NONE NONE NONE NONE NON	<1  <1 <1 <1 <1 <0 <2780 796 845 <6765   <	0 <1 21 3459 963 1178 9035 history1 20 1 20 1 20 1 0 <i>bistory1</i> NONE NONE NONE NONE NONE NONE NONE NON	<1 7 15 2865 983 1114 10129 history2 37 6 7 history2 NONE NONE NONE NONE NONE NONE NONE NON



# **OIL ANALYSIS REPORT**



	FLUID PROPERT	IES meth	od limit/ba	se current	histo	ry1	his	tory2
	Visc @ 40°C cS	t ASTM I	D445 213.9	192	192		177	
	SAMPLE IMAGES	meth	od limit/ba	se current	histo	ry1	his	tory2
110 	Color			no image	no ima	ge	no in	nage
Apr6/16 Jan20/17 Nov6/21	Bottom			no image	no ima	ge	no in	nage
	GRAPHS				1			
	Iron (ppm)			Lead (ppm)				
	1500 - Severe			25 - Severe				
	Esono			20 - 톱 15 -				
				10 Abnormal				
	500			5				
	Dec3/12 + Jult0/13 + Dec29/14 + Apr6/16 +	Jan 20/17 -	Sep 6/23	Dec3/12	Dec29/14 -	Jan 20/17	Nov6/21-	Sep6/23
	ے ج	Jar	ő	ے تے Chromium (		Jar	Z	Se
	200 Severe			30	ррпту			
	150			25 - 20 - 20 - 20 - 20 - 20 - 20 - 20 -				
	톨 100 - Abnormal			톱 15				
	50			10 - Abnormal			1	
	14	21	53	33 12 0	16	11	21	23
	Dec3/12 Jul10/13 Dec29/14 Apr6/16	Jan 20/17 Nov6/21	Sep6/23	Dec3/12 - Jul10/13	Dec29/14 Apr6/16	Jan 20/17	Nov6/21	Sep6/23
	Copper (ppm)			Silicon (ppm	)			
	Severe 150			800 - Severe				
	E 100-			600 - Abnormal				
	Abnormal 50-			400 - 0				
				200				
	Dec3/12 Jul10/13 Dec29/14	Jan 20/17 -	Sep 6/23	Dec3/12	Dec29/14 - Apr6/16 -	Jan 20/17 -	Nov6/21-	Sep6/23 -
	□	Ja N	õ	□ ⊰ Additives	A	Ja	Z	õ
	260 Abnormal			4000 3500 <b>–</b> calcium				
	240 220 - Base			3000 - zinc	orus		-	$\wedge$
	G 220			2500	~	$\sim$		
	160 - Abnormal			1500		EDer-		
	140	/17	23	500 - 21 - 21	n4		/21	23
	Dec3/12 Jult0/13 Dec29/14 Apr6/16	Jan20/17 Nov6/21	Sep 6/23	Dec3/12 Jul10/13	Dec29/14 Apr6/16	Jan20/17	Nov6/21	Sep6/23
ficate L2367 Test Packag	. : PCA0086550 F er : 06115487 T er : 10924320 D	Received Tested Diagnosed	: 11 Mar 202 : 12 Mar 202 : 13 Mar 2024 -	4 4 Don Baldridge	Kemp Quarries - Muskogee Sand 3395 W 50th St N Porter, Ok US 74454 Contact: muskogee@muskogeesand.con			
	at are outside of the ISO 1702						900000	T: