

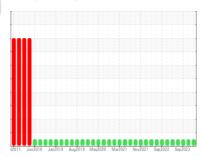
OIL ANALYSIS REPORT



KEMP QUARRIES / MUSKOGEE SAND [68593] WL109

Component **Front Right Final Drive**

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



Sample Rating Trend



DIAGNOSIS

Recommendation

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

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

Fluid Condition

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

Cample Number Client Info PCA0086511 PCA0070580 PCA004865 PCA004865 PCA0070580 PCA004865 PCA0070580 PCA004865 PCA0070580 PCA004865 PCA0070580 PCA004865 PCA0070580 PCA004865 PCA0070580 PCA004866 PCA0048666 PCA004866	RO TO-4 SAE 50 (-	GAL)	il2017 Jun201	8 Jan2019 Aug2019 Mar	2020 Mar2021 Nov2021 Sep2023	2 Sep2023	
Client Info	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 50702 50215 49706 Dil Age hirs Client Info 50702 50215 49706 Dil Changed Client Info N/A N/A N/A N/A Contradius Normal Normal Normal Normal Normal CONTAMINATION method Imitibase ourrent history1 history1 Wear WC Method >0.2 NEG NEG NEG WEAR METALS method Imitibase ourrent history1 history1 fron ppm ASTM D5185m >80.0 22 17 30 Chromium ppm ASTM D5185m >10 0 0 <1	Sample Number		Client Info		PCA0086511	PCA0070580	PCA004860
Dil Age	Sample Date		Client Info		05 Feb 2024	22 Nov 2023	11 Sep 2023
Cilichanged Cilient Info N/A N/A N/A NORMAL	Machine Age	hrs	Client Info		50702	50215	49706
NORMAL N	Oil Age	hrs	Client Info		50702	50215	49706
CONTAMINATION method limit/base current history1 history1 Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ASTM D5185m >800 22 17 30 Chromium ppm ASTM D5185m >10 0 0 1 Nickel ppm ASTM D5185m >15 <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 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Oil Changed		Client Info		N/A	N/A	Changed
Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >800 22 17 30 Chromium ppm ASTM D5185m >10 0 0 <1 Nickel ppm ASTM D5185m >5 0 0 0 Nickel ppm ASTM D5185m >5 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >7 0 <1 1 3 Lead ppm ASTM D5185m >8 <1 0 0 0 Copper ppm ASTM D5185m >8 <1 0 0 0 Vanadumium ppm ASTM D5185m 0	Sample Status				NORMAL	NORMAL	NORMAL
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
Chromium	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>800	22	17	30
Description	Chromium	ppm	ASTM D5185m	>10	0	0	<1
Silver	Nickel	ppm	ASTM D5185m	>5	0	0	0
Aluminum	Titanium	ppm	ASTM D5185m	>15	<1	<1	<1
Aluminum	Silver	ppm	ASTM D5185m	>2	0	0	0
Lead	Aluminum		ASTM D5185m	>75	1	1	3
Description	Lead				<1	0	0
Name	Copper		ASTM D5185m	>75		<1	1
Vanadium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 2 <1 0 2 Barium ppm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 0 0 <1 2 Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 9 15 13 14 Calcium ppm ASTM D5185m 3114 3033 3183 2660 Phosphorus ppm ASTM D5185m 1099 1121 1070 928 Zinc ppm ASTM D5185m 1245 1337 1258 1120 Sulfur ppm ASTM D5185m 7086 5213 54	Tin				<1		0
ADDITIVES	Vanadium		ASTM D5185m			0	0
Boron	Cadmium						0
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 0 0 <1 2 Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 9 15 13 14 Calcium ppm ASTM D5185m 3114 3033 3183 2660 Phosphorus ppm ASTM D5185m 1099 1121 1070 928 Zinc ppm ASTM D5185m 1245 1337 1258 1120 Sulfur ppm ASTM D5185m 7086 5213 5416 4012 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >400 14 11 10 Sodium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 White Metal scalar *Visual <th< td=""><td>Boron</td><td>ppm</td><td>ASTM D5185m</td><td>2</td><th><1</th><td>0</td><td>2</td></th<>	Boron	ppm	ASTM D5185m	2	<1	0	2
Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 9 15 13 14 Calcium ppm ASTM D5185m 3114 3033 3183 2660 Phosphorus ppm ASTM D5185m 1099 1121 1070 928 Zinc ppm ASTM D5185m 1245 1337 1258 1120 Sulfur ppm ASTM D5185m 7086 5213 5416 4012 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >400 14 11 10 Sodium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 White Metal scalar *Visual NONE NONE NONE Yellow Metal scalar *Visual <	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 9 15 13 14 Calcium ppm ASTM D5185m 3114 3033 3183 2660 Phosphorus ppm ASTM D5185m 1099 1121 1070 928 Zinc ppm ASTM D5185m 1245 1337 1258 1120 Sulfur ppm ASTM D5185m 7086 5213 5416 4012 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >400 14 11 10 Sodium ppm ASTM D5185m >400 14 11 10 Sodium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 White Metal scalar *Visual NONE NONE NONE Yellow Metal scalar *Visual <	Molybdenum	ppm	ASTM D5185m	0	0	<1	2
Calcium ppm ASTM D5185m 3114 3033 3183 2660 Phosphorus ppm ASTM D5185m 1099 1121 1070 928 Zinc ppm ASTM D5185m 1245 1337 1258 1120 Sulfur ppm ASTM D5185m 7086 5213 5416 4012 CONTAMINANTS method limit/base current history1 history Solium ppm ASTM D5185m >400 14 11 10 Solium ppm ASTM D5185m >40 0 2 2 Potassium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 VISUAL method limit/base current history1 history2 VISUAL NONE NONE NONE NONE NONE Yellow Metal	Manganese	ppm	ASTM D5185m	0	<1	0	<1
Phosphorus ppm ASTM D5185m 1099 1121 1070 928 Zinc ppm ASTM D5185m 1245 1337 1258 1120 Sulfur ppm ASTM D5185m 7086 5213 5416 4012 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >400 14 11 10 Sodium ppm ASTM D5185m >40 14 11 10 Sodium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 White Metal scalar *Visual NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE NONE Precipitate scalar *Visual NONE NONE NONE NONE Debris scalar *Visual	Magnesium	ppm	ASTM D5185m	9	15	13	14
Zinc ppm ASTM D5185m 1245 1337 1258 1120 Sulfur ppm ASTM D5185m 7086 5213 5416 4012 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >400 14 11 10 Sodium ppm ASTM D5185m >20 0 2 2 Potassium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 White Metal scalar *Visual NONE NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE NONE NONE Precipitate scalar *Visual NONE NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NONE NONE <	Calcium	ppm	ASTM D5185m	3114	3033	3183	2660
Sulfur ppm ASTM D5185m 7086 5213 5416 4012 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >400 14 11 10 Sodium ppm ASTM D5185m >20 0 2 2 Potassium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 White Metal scalar *Visual NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE NONE Precipitate scalar *Visual NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NONE Appearance scalar *Visual NORML NORML NORML NORML	Phosphorus	ppm	ASTM D5185m	1099	1121	1070	928
CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >400 14 11 10 0 0 Sodium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history White Metal scalar *Visual NONE NONE NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE NONE NONE Precipitate scalar *Visual NONE NONE NONE NONE NONE Silt scalar *Visual NONE NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NONE Appearance scalar *Visual NONE NONE NONE NONE NONE NONE NONE NON	Zinc	ppm	ASTM D5185m	1245	1337	1258	1120
Silicon ppm ASTM D5185m >400 14 11 10 Sodium ppm ASTM D5185m <1 0 0 Potassium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 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 Appearance scalar *Visual NORML NORML NORML NORML	Sulfur	ppm	ASTM D5185m	7086	5213	5416	4012
Sodium ppm ASTM D5185m <1 0 0 Potassium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history1 White Metal scalar *Visual 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 Appearance scalar *Visual NORML NORML NORML NORML NORML	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 2 2 VISUAL method limit/base current history1 history 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 NONE NONE NONE NONE NONE NONE NONE NONE	Silicon	ppm	ASTM D5185m	>400	14	11	10
VISUAL method limit/base current history1 history 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 NONE NONE NONE NONE NONE	Sodium	ppm	ASTM D5185m		<1	0	0
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	Potassium	ppm	ASTM D5185m	>20	0	2	2
Yellow Metalscalar*VisualNONENONENONENONEPrecipitatescalar*VisualNONENONENONENONESiltscalar*VisualNONENONENONENONEDebrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORML	VISUAL		method	limit/base	current	history1	history2
Precipitate scalar *Visual NONE 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	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Silt scalar *Visual NONE 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 NORML	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Debrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORML	Precipitate	scalar		NONE	NONE	NONE	NONE
Sand/Dirt scalar *Visual NONE NONE NONE NONE NONE Appearance scalar *Visual NORML NORML NORML NORML	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance scalar *Visual NORML NORML NORML NORML NORML	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Odor scalar *Visual NORML NORML NORML NORML NORML	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML

NEG

NEG

>0.2

NEG

NEG

Emulsified Water

Free Water

scalar *Visual

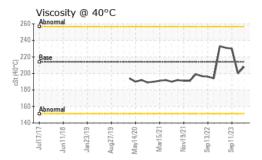
scalar *Visual

NEG

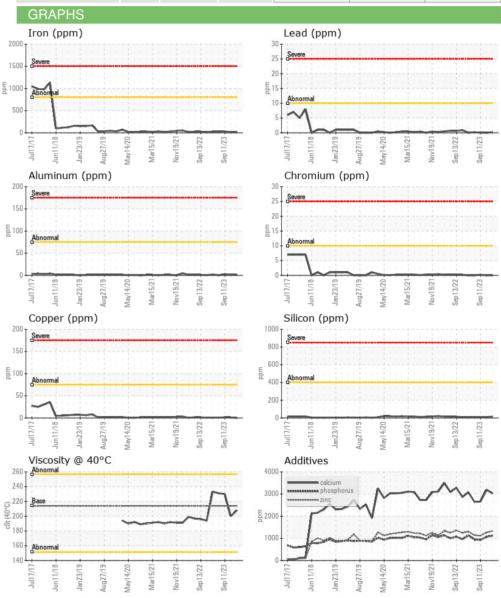
NEG



OIL ANALYSIS REPORT









Certificate L2367

Laboratory Sample No.

Lab Number : 06088387 Unique Number : 10875832

: PCA0086511 Test Package : MOB 1

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 13 Feb 2024 **Tested**

: 14 Feb 2024 : 15 Feb 2024 - Sean Felton Diagnosed

Kemp Quarries - Muskogee Sand

3395 W 50th St N Porter, OK

US 74454 Contact:

T:

F:

muskogee@muskogeesand.com

To discuss this sample report, contact Customer Service at 1-800-237-1369.

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)