

## **OIL ANALYSIS REPORT**

### Sample Rating Trend

### **NORMAL**



# KEMP QUARRIES / MUSKOGEE SAND [68593] **WL109**

Component **Diesel Engine** 

PETRO CANADA DURON SHP 15W40 (--- GAL)

# DIAGNOSIS

#### Recommendation

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

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the

#### **Fluid Condition**

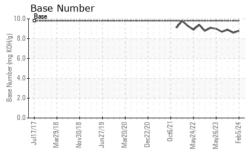
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

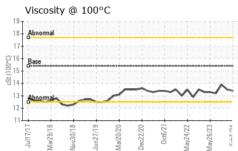


Sample Number		Client Info		PCA0086518	PCA0070594	PCA0086472
Sample Date		Client Info		05 Feb 2024	22 Nov 2023	11 Sep 2023
Machine Age	hrs	Client Info		50702	50215	49706
Oil Age	hrs	Client Info		50702	50215	49706
Oil Changed	0	Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
			11 11 11			
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
WEAR METALS	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	14	15	11
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>4	0	0	0
Titanium	ppm	ASTM D5185m		0	<1	0
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	<1	1	<1
Lead	ppm	ASTM D5185m	>40	0	0	<1
Copper	ppm	ASTM D5185m	>330	3	5	3
Tin	ppm	ASTM D5185m	>15	<1	0	<1
Vanadium	ppm	ASTM D5185m		<1	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 7	history1 <1	history2 0
	ppm				•	·
Boron		ASTM D5185m	0	7	<1	0
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	7 0	<1	0 2
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	7 0 57	<1 0 58	0 2 61
Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	7 0 57 <1	<1 0 58 0	0 2 61 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	7 0 57 <1 909	<1 0 58 0 893	0 2 61 <1 948
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	7 0 57 <1 909 1076	<1 0 58 0 893 1014	0 2 61 <1 948 1047
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150	7 0 57 <1 909 1076 939	<1 0 58 0 893 1014 1032	0 2 61 <1 948 1047 1044
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270	7 0 57 <1 909 1076 939 1193	<1 0 58 0 893 1014 1032 1165	0 2 61 <1 948 1047 1044 1242
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	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	0 0 60 0 1010 1070 1150 1270 2060	7 0 57 <1 909 1076 939 1193 2992	<1 0 58 0 893 1014 1032 1165 3223	0 2 61 <1 948 1047 1044 1242 3293
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060	7 0 57 <1 909 1076 939 1193 2992 current	<1 0 58 0 893 1014 1032 1165 3223 history1	0 2 61 <1 948 1047 1044 1242 3293 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060	7 0 57 <1 909 1076 939 1193 2992 current	<1 0 58 0 893 1014 1032 1165 3223 history1	0 2 61 <1 948 1047 1044 1242 3293 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base	7 0 57 <1 909 1076 939 1193 2992 current 2	<1 0 58 0 893 1014 1032 1165 3223 history1 2 0	0 2 61 <1 948 1047 1044 1242 3293 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >25	7 0 57 <1 909 1076 939 1193 2992 current 2 <1 0	<1 0 58 0 893 1014 1032 1165 3223 history1 2 0 2	0 2 61 <1 948 1047 1044 1242 3293 history2 3 2 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20	7 0 57 <1 909 1076 939 1193 2992 current 2 <1	<1 0 58 0 893 1014 1032 1165 3223 history1 2 0 2	0 2 61 <1 948 1047 1044 1242 3293 history2 3 2 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m  method  *ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base	7 0 57 <1 909 1076 939 1193 2992 current 2 <1 0 current 0.6	<1 0 58 0 893 1014 1032 1165 3223 history1 2 0 2 history1 0.6	0 2 61 <1 948 1047 1044 1242 3293 history2 3 2 <1 history2 0.5
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m  Method  ASTM D5185m  Method  *ASTM D7844  *ASTM D7624  *ASTM D76145	0 0 0 0 1010 1150 1270 2060 limit/base >25 >20 limit/base	7 0 57 <1 909 1076 939 1193 2992 current 2 <1 0 current 0.6 6.4	<1 0 58 0 893 1014 1032 1165 3223 history1 2 0 2 history1 0.6 6.2	0 2 61 <1 948 1047 1044 1242 3293 history2 3 2 <1 history2 0.5 5.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAD	ppm	ASTM D5185m  method  ASTM D5185m ASTM D5185m  ASTM D5185m ASTM D5185m  ASTM D5185m  ASTM D5185m  method  *ASTM D7844  *ASTM D7624  *ASTM D7415  method	0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >3 >20 >3 limit/base	7 0 57 <1 909 1076 939 1193 2992 current 2 <1 0 current 0.6 6.4 18.7 current	<1 0 58 0 893 1014 1032 1165 3223 history1 2 0 2 history1 0.6 6.2 18.7 history1	0 2 61 <1 948 1047 1044 1242 3293 history2 3 2 <1 history2 0.5 5.4 18.0 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m  Method  ASTM D5185m  Method  *ASTM D7844  *ASTM D7624  *ASTM D76145	0 0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >3 >20 >30	7 0 57 <1 909 1076 939 1193 2992 current 2 <1 0 current 0.6 6.4 18.7	<1 0 58 0 893 1014 1032 1165 3223 history1 2 0 2 history1 0.6 6.2 18.7	0 2 61 <1 948 1047 1044 1242 3293 history2 3 2 <1 history2 0.5 5.4 18.0



# **OIL ANALYSIS REPORT**





VISUAL		method	limit/base	current	history1	history2
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
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

FLUID PROPI	ERIIES	metnoa	ilmit/base	current	nistory i	nistory2
Visc @ 100°C	cSt	ASTM D445	15.4	13.4	13.5	13.9

	GRAP	HS																	
	Iron (p	pm)								Le	ad (p	pm)							
250 T 200 <b>-</b>	Severe									100 T Se	vere								Ī
150-										00									
100	Abnormal								-	40 AL	normal								
50	W	~			~	^	~~		H÷	20-		HH		-					
0.1	1717	9/18	61/	02/0	02/2	0ct6/21	1/22	6/23	Feb5/24	0	8/18	₩ 81/0	61/	02/0	720	Oct6/21	1/22	1/23	*
	Jul17/17 Mar29/18	Nov30/18	Jun27/19	Mar20/20	Dec22/20	Oct	May24/22	May26/23	FebS	71/71luC	Mar29/18	Nov30/18	Jun27/19	Mar20/20	Dec22/20	Oct	May24/22	May26/23	
	Alumin	um (	ppm)	)						Cł	romi	um (	ppm	)					
50 40	Severe									50 T Se	vere								Ī
30										20									
20	Abnormal								-	20	normal								-
10				1111						10				-					
01	81/2	81/0	61/	02/0	02/2	6/21	1722	1,73	47/9	0	8/18	81/0	61/	02/0	02/3	Oct6/21-	1/22	1,73	+
	Jul17/17 Mar29/18	Nov30/18	Jun27/19	Mar20/20	Dec22/20	Oct6/21	May24/22	May26/23	Feb5/24	71/71lnC	Mar29/18	Nov30/18	Jun27/19	Mar20/20	Dec22/20	Oct	May24/22	May26/23	
0.0	Copper	(ppr	n)							Si	icon	(ppm	)						
00 T	Severe Abnormal										vere								-
00+							Ш			60+									
00-										E 40	normal								Ì
00-							Ш			20		~~			$\neg$	+ +		1   1	*
0.1	81/1	18	- 61/	1/20	720	Oct6/21-	1/22		Feb5/24	0	8 5	18	61/	02/	02/	0ct6/21	1727	173	7
	Jul17/17 Mar29/18	Nov30/18	Jun27/19	Mar20/20	Dec22/20	Oct	May24/22	May26/23	Feb	Jul17/17	Mar29/18	Nov30/18	Jun27/19	Mar20/20	Dec22/20	Oct	May24/22	May26/23	
	Viscosit	у @	100°	С							se N	umbe	er						
20 T	Abnormal										1 1 1					1	~	$\overline{}$	
16	Base									0.0 mg (6.0									
14-	Total Line						~~		~	ब्रि च 4.0-									
12-	Abnormal	_			1417		-			Base Number (mg KOH/g)									
										0.0									





Laboratory Sample No.

Lab Number : 06088100 Unique Number : 10875545 Test Package : MOB 1 ( Additional Tests: TBN )

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PCA0086518 Received : 13 Feb 2024

**Tested** Diagnosed

: 14 Feb 2024 : 15 Feb 2024 - Don Baldridge

3395 W 50th St N Porter, OK US 74454 Contact:

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

muskogee@muskogeesand.com T:

Kemp Quarries - Muskogee Sand

\* - 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)

F: