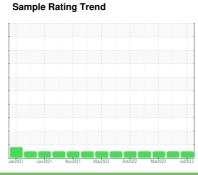


# **OIL ANALYSIS REPORT**

# KEMP QUARRIES / MUSKOGEE SAND **ENG045**

Component **Diesel Engine** 

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





## 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**

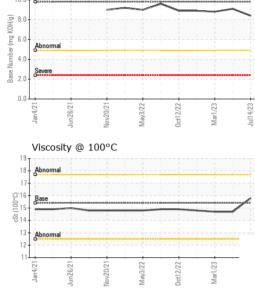
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0087097	PCA0087184	PCA0087165
Sample Date		Client Info		14 Jul 2023	01 May 2023	01 Mar 2023
Machine Age	hrs	Client Info		12635	12280	11955
Oil Age	hrs	Client Info		355	325	330
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>2.1	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>51	8	12	40
Chromium	ppm	ASTM D5185m	>11	<1	0	1
Nickel	ppm	ASTM D5185m	>5	<1	<1	<1
Titanium	ppm	ASTM D5185m		0	0	0
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>31	2	<1	2
Lead	ppm	ASTM D5185m	>26	13	4	4
Copper	ppm	ASTM D5185m	>26	<1	<1	<1
Tin	ppm	ASTM D5185m	>4	1	<1	<1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	nnm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTIVI DSTOSIII		U	0	U
ADDITIVES	ррпі	method	limit/base	current	history1	history2
	ррт		limit/base			_
ADDITIVES		method		current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	0	current 0	history1	history2
ADDITIVES Boron Barium	ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	0	current 0 0	history1 <1 0	history2
ADDITIVES Boron Barium Molybdenum	ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	current 0 0 63	history1 <1 0 59	history2 1 0 63
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm	method  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m	0 0 60 0	current 0 0 63	history1 <1 0 59 <1	history2  1 0 63
ADDITIVES  Boron  Barium  Molybdenum  Manganese  Magnesium	ppm ppm ppm ppm	method  ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	current 0 0 63 0 956	history1 <1 0 59 <1 876	history2  1 0 63 1 962
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185m	0 0 60 0 1010 1070	current 0 0 63 0 956 1116	history1 <1 0 59 <1 876 1023	history2  1 0 63 1 962 1120
ADDITIVES  Boron  Barium  Molybdenum  Manganese  Magnesium  Calcium  Phosphorus	ppm ppm ppm ppm ppm ppm	method ASTM D5185m	0 0 60 0 1010 1070 1150	current 0 0 63 0 956 1116 976	history1 <1 0 59 <1 876 1023 953	history2  1 0 63 1 962 1120 1000
ADDITIVES  Boron  Barium  Molybdenum  Manganese  Magnesium  Calcium  Phosphorus  Zinc	ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	0 0 60 0 1010 1070 1150 1270	current 0 0 63 0 956 1116 976 1271	history1 <1 0 59 <1 876 1023 953 1140	history2  1 0 63 1 962 1120 1000 1346
ADDITIVES  Boron  Barium  Molybdenum  Manganese  Magnesium  Calcium  Phosphorus  Zinc  Sulfur	ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060	current 0 0 63 0 956 1116 976 1271 2996	history1 <1 0 59 <1 876 1023 953 1140 3241	history2  1 0 63 1 962 1120 1000 1346 3521
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base	current 0 0 63 0 956 1116 976 1271 2996 current	history1  <1 0 59 <1 876 1023 953 1140 3241 history1	history2  1 0 63 1 962 1120 1000 1346 3521 history2
ADDITIVES  Boron  Barium  Molybdenum  Manganese  Magnesium  Calcium  Phosphorus  Zinc  Sulfur  CONTAMINAN  Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base	current 0 0 0 63 0 956 1116 976 1271 2996 current	history1  <1 0 59 <1 876 1023 953 1140 3241 history1 1	history2  1 0 63 1 962 1120 1000 1346 3521 history2
ADDITIVES  Boron  Barium  Molybdenum  Manganese  Magnesium  Calcium  Phosphorus  Zinc  Sulfur  CONTAMINAN  Silicon  Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >22 >31	current 0 0 63 0 956 1116 976 1271 2996 current 2	history1 <1 0 59 <1 876 1023 953 1140 3241 history1 1	history2  1 0 63 1 962 1120 1000 1346 3521 history2 4
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >22 >31 >20	current 0 0 0 63 0 956 1116 976 1271 2996 current 2 3 <1	history1  <1 0 59 <1 876 1023 953 1140 3241 history1 1 2 0	history2  1 0 63 1 962 1120 1000 1346 3521 history2 4 2 2
ADDITIVES 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	method  ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >22 >31 >20 limit/base	current 0 0 0 63 0 956 1116 976 1271 2996 current 2 3 <1	history1  <1 0 59 <1 876 1023 953 1140 3241 history1 1 2 0 history1	history2  1 0 63 1 962 1120 1000 1346 3521 history2 4 2 2
ADDITIVES 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	method ASTM D5185m  method ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >22 >31 >20 limit/base	current  0  0  63  0  956  1116  976  1271  2996  current  2  3  <1  current  0.1	history1  <1 0 59 <1 876 1023 953 1140 3241 history1 1 2 0 history1 0.1	history2  1 0 63 1 962 1120 1000 1346 3521 history2 4 2 2 history2
ADDITIVES 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	method  ASTM D5185m method  ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 limit/base >22 >31 >20	current  0  0  63  0  956  1116  976  1271  2996  current  2  3  <1  current  0.1  11.7	history1 <1 0 59 <1 876 1023 953 1140 3241 history1 1 2 0 history1 0.1 9.0	history2  1 0 63 1 962 1120 1000 1346 3521 history2 4 2 2 history2 0.2 7.3
ADDITIVES 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	method  ASTM D5185m  method  *ASTM D5185m ASTM D7844  *ASTM D7624  *ASTM D7415	0 0 0 0 1010 1070 1150 1270 2060 limit/base >22 >31 >20 limit/base >3 >20 >3	current  0  0  63  0  956  1116  976  1271  2996  current  2  3  <1  current  0.1  11.7  21.3	history1 <1 0 59 <1 876 1023 953 1140 3241 history1 1 2 0 history1 0.1 9.0 19.4	history2  1 0 63 1 962 1120 1000 1346 3521 history2 4 2 2 history2 0.2 7.3 18.4



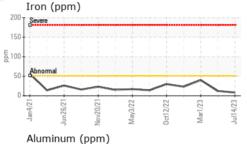
Base Number

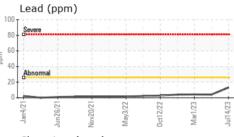
# **OIL ANALYSIS REPORT**

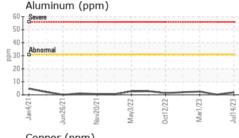


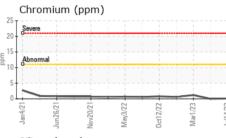
VISUAL		method				history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.21	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
ELLIID DRODE	DTIES	method	limit/base	current	hietory1	history2

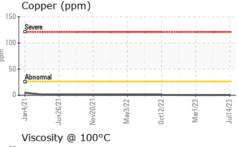
I LOID I HOI	LITTIEO					
Visc @ 100°C	cSt	ASTM D445	15.4	15.8	14.7	14.7
GRAPHS						

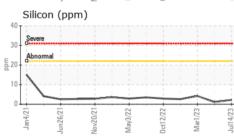


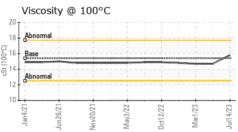


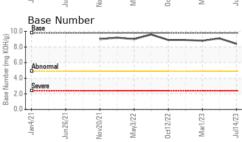














Laboratory Sample No. Lab Number **Unique Number** Test Package : MOB 1 (Additional Tests: TBN)

: 05969523 : 10676074

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PCA0087097

Received : 04 Oct 2023 Diagnosed : 05 Oct 2023 Diagnostician : Wes Davis

US 74454 Contact: MUSCOGEE NOTIFICATIONS muskogee@muskogeesand.com

Kemp Quarries - Muskogee Sand

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)

Report Id: KEMPOR [WUSCAR] 05969523 (Generated: 10/12/2023 20:15:31) Rev: 1

3395 W 50th St N

Porter, OK

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