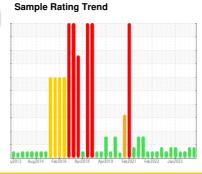


OIL ANALYSIS REPORT

KEMP QUARRIES / RIVER VALLEY BACKBONE **WL079**

Component **Diesel Engine**

MOBIL DELVAC 1300 SUPER15W40 (--- GAL)





DIAGNOSIS

Recommendation

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is an abnormal amount of solids and carbon present in the oil.

Fluid Condition

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

SAMPLE INFORMATION method Imit/base current history1 history2	· - /		y2013 Aug20	14 Feb2016 Apr2018	Apr2019 Feb2021 Feb2022 J	lan2023	
Sample Date	SAMPLE INFORM	ATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 883 341 577 Oil Age hrs Client Info Changed NCB NCB NCB NCB NCB NCB NCB NEG NED	Sample Number		Client Info		PCA0084794	PCA0085844	PCA0085860
Machine Age hrs Client Info 48609 48226 47885 Oil Age hrs Client Info 833 341 577 Oil Changed Client Info Changed Changed Changed Changed Changed NCB Sample Status Image: Client Info Image: Changed ABNORMAL ABNORMAL NCB NCB Water WC Method So.2 NEG NEG NEG NEG WEAR METALS method Imitibase current history1 history2 Iron ppm ASTM D5185m >100 44 44 34 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >22 <1 0 0 Aluminum ppm ASTM D5185m >22 <1 0 0 Lead ppm ASTM D5185m >330 5 4 4 1 Vanadium pp	Sample Date		Client Info		28 Dec 2023	13 Oct 2023	09 Aug 2023
Oil Changed Sample Status Client Info Changed ABNORMAL ABNORMAL ABNORMAL NORMAL Changed ABNORMAL ABNORMAL NORMAL Changed ABNORMAL ABNORMAL NORMAL Changed NEG NEG<	·	hrs	Client Info		48609	48226	
Sample Status Method imit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 <1 <1 <1 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >22 <1 <0 0 Nickel ppm ASTM D5185m >22 <1 <1 <1 Silver ppm ASTM D5185m >22 <1 <0 0 Aluminum ppm ASTM D5185m >22 2 <1 <1 Lead ppm ASTM D5185m >43 2 2 2 2 Copper ppm ASTM D5185m >4 2 2 2 <th>Oil Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>383</th> <th>341</th> <th>577</th>	Oil Age	hrs	Client Info		383	341	577
Sample Status Method imit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 <1 <1 <1 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >22 <1 <0 0 Nickel ppm ASTM D5185m >22 <1 <1 <1 Silver ppm ASTM D5185m >22 <1 <0 0 Aluminum ppm ASTM D5185m >22 2 <1 <1 Lead ppm ASTM D5185m >43 2 2 2 2 Copper ppm ASTM D5185m >4 2 2 2 <th>-</th> <th></th> <th>Client Info</th> <th></th> <th>Changed</th> <th>Changed</th> <th>Changed</th>	-		Client Info		Changed	Changed	Changed
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Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 44 44 34 Chromium ppm ASTM D5185m >20 <1	CONTAMINATIO	NC	method	limit/base	current	history1	history2
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Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 <1	WEAR METALS	,	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	44	44	34
Titanium ppm ASTM D5185m >2 <1 <1 <1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 2 <1	Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >25 2 <1 0 Lead ppm ASTM D5185m >40 2 2 2 2 Copper ppm ASTM D5185m >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 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Nickel	ppm	ASTM D5185m	>2	<1	0	0
Aluminum ppm ASTM D5185m >25 2 <1 0 Lead ppm ASTM D5185m >40 2 2 2 Copper ppm ASTM D5185m >330 5 4 4 Tin ppm ASTM D5185m >15 1 <1	Titanium	ppm	ASTM D5185m	>2	<1	<1	<1
Lead ppm ASTM D5185m >40 2 2 2 Copper ppm ASTM D5185m >330 5 4 4 Tin ppm ASTM D5185m >15 1 <1 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 <1 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1 0 <1 Barium ppm ASTM D5185m 0 \$8 0 0 <1 Barium ppm ASTM D5185m 0 \$62 59 63 Manganese ppm ASTM D5185m <1104 1013 1172 Magnesium ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 1221 <td>Silver</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>2</td> <th>0</th> <td>0</td> <td>0</td>	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 5 4 4 Tin ppm ASTM D5185m >15 1 <1	Aluminum	ppm	ASTM D5185m	>25	2	<1	0
Tin 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 <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	Lead	ppm	ASTM D5185m	>40	2	2	2
Vanadium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1 0 <1 Barium ppm ASTM D5185m 0 8 0 0 Molybdenum ppm ASTM D5185m 0 62 59 63 Manganese ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 930 1003 1172 Phosphorus ppm ASTM D5185m 930 1003 1170 Zinc ppm ASTM D5185m 930 1003 1100 Zilicon ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 <	Copper	ppm	ASTM D5185m	>330	5	4	4
Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1 0 <1 Barium ppm ASTM D5185m 0 8 0 0 Molybdenum ppm ASTM D5185m 0 62 59 63 Manganese ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 930 1003 1100 Phosphorus ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 1221 1239 1370 Sulfur ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon </td <td>Tin</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>15</td> <th>1</th> <td><1</td> <td><1</td>	Tin	ppm	ASTM D5185m	>15	1	<1	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1	Vanadium	ppm	ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 0 <1 0 <1 Barium ppm ASTM D5185m 0 8 0 0 Molybdenum ppm ASTM D5185m 0 62 59 63 Manganese ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 1104 1013 1172 Phosphorus ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 1221 1239 1370 Sulfur ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >20 1 3 1	Cadmium	ppm	ASTM D5185m		<1	0	0
Barium ppm ASTM D5185m 0 8 0 0 Molybdenum ppm ASTM D5185m 0 62 59 63 Manganese ppm ASTM D5185m - -1 -1 -1 Magnesium ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 1104 1013 1172 Phosphorus ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >20 1 3 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D5185m >20 1 3 1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 0 62 59 63 Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 1104 1013 1172 Phosphorus ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D5185m >20 1 3 1 Fuel % ASTM D5185m >20 1 3 1 Fuel	Boron	ppm	ASTM D5185m	0	<1	0	<1
Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 1104 1013 1172 Phosphorus ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 1221 1239 1370 Sulfur ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >20 1 3 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D5185m >20 1 3 1 Fuel % ASTM D5185m >20 1 3 1 Fuel <td>Barium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <th>8</th> <td>0</td> <td>0</td>	Barium	ppm	ASTM D5185m	0	8	0	0
Magnesium ppm ASTM D5185m 0 953 955 1038 Calcium ppm ASTM D5185m 1104 1013 1172 Phosphorus ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 1221 1239 1370 Sulfur ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >20 1 3 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0	Molybdenum	ppm	ASTM D5185m	0	62	59	63
Calcium ppm ASTM D5185m 1104 1013 1172 Phosphorus ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 1221 1239 1370 Sulfur ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >20 1 3 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0	Manganese	ppm	ASTM D5185m		<1	<1	<1
Phosphorus ppm ASTM D5185m 930 1003 1100 Zinc ppm ASTM D5185m 1221 1239 1370 Sulfur ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >0 2 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0	Magnesium	ppm	ASTM D5185m	0	953	955	1038
Zinc ppm ASTM D5185m 1221 1239 1370 Sulfur ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >20 1 3 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0	Calcium	ppm	ASTM D5185m		1104	1013	1172
Sulfur ppm ASTM D5185m 2996 2962 4047 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >20 1 3 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0	Phosphorus	ppm	ASTM D5185m		930	1003	1100
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m >0 2 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0	Zinc	ppm	ASTM D5185m		1221	1239	1370
Silicon ppm ASTM D5185m >25 4 4 3 Sodium ppm ASTM D5185m 0 2 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0 <1.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 3.4 3.5 2.2 Nitration Abs/cm *ASTM D7624 >20 8.5 8.5 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	Sulfur	ppm	ASTM D5185m		2996	2962	4047
Sodium ppm ASTM D5185m 0 2 1 Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0 <1.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 ▲ 3.4 ▲ 3.5 2.2 Nitration Abs/cm *ASTM D7624 >20 8.5 8.5 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	CONTAMINANT	S	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 1 3 1 Fuel % ASTM D3524 >5 <1.0 <1.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 ▲ 3.4 ▲ 3.5 2.2 Nitration Abs/cm *ASTM D7624 >20 8.5 8.5 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	Silicon	ppm	ASTM D5185m	>25	4	4	3
Fuel % ASTM D3524 >5 <1.0 <1.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 ▲ 3.4 ▲ 3.5 2.2 Nitration Abs/cm *ASTM D7624 >20 8.5 8.5 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	Sodium	ppm	ASTM D5185m		0	2	1
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 ▲ 3.4 ▲ 3.5 2.2 Nitration Abs/cm *ASTM D7624 >20 8.5 8.5 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	Potassium	ppm	ASTM D5185m	>20	1	3	1
Soot % % *ASTM D7844 >3 ▲ 3.4 ▲ 3.5 2.2 Nitration Abs/cm *ASTM D7624 >20 8.5 8.5 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	Fuel	%	ASTM D3524	>5	<1.0	<1.0	<1.0
Nitration Abs/cm *ASTM D7624 >20 8.5 8.5 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	INFRA-RED		method	limit/base	current	history1	history2
Nitration Abs/cm *ASTM D7624 >20 8.5 8.5 6.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	Soot %	%	*ASTM D7844	>3	▲ 3.4	△ 3.5	2.2
Sulfation Abs/.1mm *ASTM D7415 >30 23.1 23.5 20.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	Nitration	Abs/cm	*ASTM D7624	>20	8.5		6.6
Oxidation Abs/.1mm *ASTM D7414 >25 14.2 13.9 12.7	Sulfation	Abs/.1mm	*ASTM D7415	>30		23.5	20.0
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			******	05			40 =
	Oxidation	Abs/.1mm	^ASTM D/414	>25	14.2	13.9	12./



OIL ANALYSIS REPORT







Laboratory Sample No. Lab Number **Unique Number**

: PCA0084794 : 06053383 : 10819332

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : 08 Jan 2024 Recieved Diagnosed : 09 Jan 2024

Diagnostician : Sean Felton Test Package : MOB 1 (Additional Tests: FuelDilution, TBN)

Certificate L2367 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.

US 72940 Contact: backbone@rivervalleyquarries.com

Kemp Quarries - River Valley - Backbone

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

T: F:

5600 S Hwy 253

Huntington, AR