

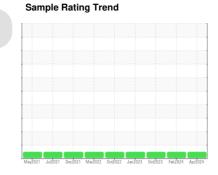
# **OIL ANALYSIS REPORT**



# KEMP QUARRIES / HULBERT **ENG039**

Diesel Engine

**DIESEL ENGINE OIL SAE 40 (--- 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

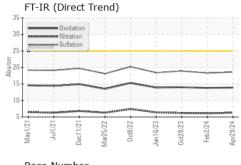
### **Fluid Condition**

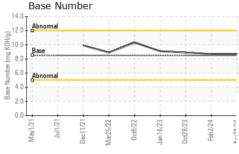
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

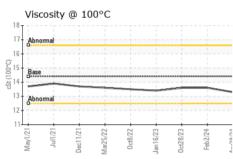
Sample Date   Client Info   29 Apr 2024   02 Feb 2024   28 Oct 202	SAMPLE INFORM	/ATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         36115         35574         35021           Oil Age         hrs         Client Info         541         0         0           Oil Changed         Changed         Changed         Changed         Changed           Sample Status         NORMAL         NEG	Sample Number		Client Info		PCA0085950	PCA0086870	PCA0086817
Oil Age         hrs         Client Info         541         0         0           Oil Changed         Client Info         Changed         NORMAL         NORMAL <th< td=""><td>Sample Date</td><td></td><td>Client Info</td><td></td><th>29 Apr 2024</th><td>02 Feb 2024</td><td>28 Oct 2023</td></th<>	Sample Date		Client Info		29 Apr 2024	02 Feb 2024	28 Oct 2023
Oil Changed Sample Status         Client Info         Changed NORMAL         Change And Shade NoRMAL         Change And Shade NoRMAL         Change And Shade NoRMAL         Change And Shade NoRMAL	Machine Age	hrs	Client Info		36115	35574	35021
NORMAL   NORMAL   NORMAL   NORMAL	Oil Age	hrs	Client Info		541	0	0
CONTAMINATION         method         limit/base         current         history1         history1           Fuel         WC Method         >5         <1.0	Oil Changed		Client Info		Changed	Changed	Changed
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
Water         WC Method         >0.2         NEG         Neg <t< td=""><td>CONTAMINATI</td><td>ON</td><td>method</td><td>limit/base</td><th>current</th><td>history1</td><td>history2</td></t<>	CONTAMINATI	ON	method	limit/base	current	history1	history2
Glycol         WC Method         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history1           Iron         ppm         ASTM D5185m         >100         8         3         6           Chromium         ppm         ASTM D5185m         >20         <1	Fuel		WC Method	>5	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Irron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         <1         0         0           Nickel         ppm         ASTM D5185m         >2         <1	WEAR METALS	3	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	8	3	6
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	0	0
Silver	Nickel	ppm	ASTM D5185m	>2	<1	<1	0
Aluminum	Titanium	ppm	ASTM D5185m	>2	<1	0	<1
Lead	Silver	ppm	ASTM D5185m	>2	0	0	0
Lead         ppm         ASTM D5185m         >40         2         <1         1           Copper         ppm         ASTM D5185m         >330         8         4         8           Tin         ppm         ASTM D5185m         >15         1         <1         <1         <1           Vanadium         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	Aluminum	ppm	ASTM D5185m	>25	2	2	<1
Copper         ppm         ASTM D5185m         >330         8         4         8           Tin         ppm         ASTM D5185m         >15         1         <1	Lead				2	<1	1
Tin	Copper		ASTM D5185m	>330	8		8
Vanadium         ppm         ASTM D5185m         <1         0         0           Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history           Boron         ppm         ASTM D5185m         250         0         2         0           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         60         58         58           Manganese         ppm         ASTM D5185m         100         60         58         58           Manganesium         ppm         ASTM D5185m         450         921         953         943           Calcium         ppm         ASTM D5185m         3000         1066         1023         1022           Phosphorus         ppm         ASTM D5185m         350         1247         1291         1268           Sulfur         ppm         ASTM D5185m         4250         3615         3228         3021           CONTAMINANTS         method         limit/base         current         history1					_		
Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history           Boron         ppm         ASTM D5185m         250         0         2         0           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         60         58         58           Manganese         ppm         ASTM D5185m         100         60         58         58           Manganesium         ppm         ASTM D5185m         450         921         953         943           Calcium         ppm         ASTM D5185m         450         921         953         943           Calcium         ppm         ASTM D5185m         3000         1066         1023         1022           Phosphorus         ppm         ASTM D5185m         1350         1247         1291         1268           Sulfur         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >25         4		• •			-		
Boron							
Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         60         58         58           Manganese         ppm         ASTM D5185m         100         60         58         58           Manganese         ppm         ASTM D5185m         100         450         921         953         943           Calcium         ppm         ASTM D5185m         3000         1066         1023         1022           Phosphorus         ppm         ASTM D5185m         1150         1060         1088         1004           Zinc         ppm         ASTM D5185m         1350         1247         1291         1268           Sulfur         ppm         ASTM D5185m         4250         3615         3228         3021           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >20         3         1         1           INFRA-RED         method <td>ADDITIVES</td> <td></td> <td>method</td> <td>limit/base</td> <th>current</th> <td>history1</td> <td>history2</td>	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         100         60         58         58           Manganese         ppm         ASTM D5185m         450         921         953         943           Calcium         ppm         ASTM D5185m         3000         1066         1023         1022           Phosphorus         ppm         ASTM D5185m         1150         1060         1088         1004           Zinc         ppm         ASTM D5185m         1350         1247         1291         1268           Sulfur         ppm         ASTM D5185m         4250         3615         3228         3021           CONTAMINANTS         method         limit/base         current         history1         history           Silicon         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >216         0         2         <1	Boron	ppm	ASTM D5185m	250	0	2	0
Manganese         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         <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 <td>Barium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>10</td> <th>0</th> <td>0</td> <td>0</td>	Barium	ppm	ASTM D5185m	10	0	0	0
Manganese         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         <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 <td>Molybdenum</td> <td>ppm</td> <td>ASTM D5185m</td> <td>100</td> <th>60</th> <td>58</td> <td>58</td>	Molybdenum	ppm	ASTM D5185m	100	60	58	58
Calcium         ppm         ASTM D5185m         3000         1066         1023         1022           Phosphorus         ppm         ASTM D5185m         1150         1060         1088         1004           Zinc         ppm         ASTM D5185m         1350         1247         1291         1268           Sulfur         ppm         ASTM D5185m         4250         3615         3228         3021           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >216         0         2         <1		ppm	ASTM D5185m		<1	<1	<1
Calcium         ppm         ASTM D5185m         3000         1066         1023         1022           Phosphorus         ppm         ASTM D5185m         1150         1060         1088         1004           Zinc         ppm         ASTM D5185m         1350         1247         1291         1268           Sulfur         ppm         ASTM D5185m         4250         3615         3228         3021           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >216         0         2         <1	Magnesium		ASTM D5185m	450	921	953	943
Phosphorus         ppm         ASTM D5185m         1150         1060         1088         1004           Zinc         ppm         ASTM D5185m         1350         1247         1291         1268           Sulfur         ppm         ASTM D5185m         4250         3615         3228         3021           CONTAMINANTS         method         limit/base         current         history1         history           Silicon         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >216         0         2         <1			ASTM D5185m	3000	1066	1023	1022
Zinc         ppm         ASTM D5185m         1350         1247         1291         1268           Sulfur         ppm         ASTM D5185m         4250         3615         3228         3021           CONTAMINANTS         method         limit/base         current         history1         history           Silicon         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >216         0         2         <1	Phosphorus				1060	1088	1004
Sulfur         ppm         ASTM D5185m         4250         3615         3228         3021           CONTAMINANTS         method         limit/base         current         history1         history           Silicon         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >216         0         2         <1			ASTM D5185m				1268
Silicon         ppm         ASTM D5185m         >25         4         4         2           Sodium         ppm         ASTM D5185m         >216         0         2         <1           Potassium         ppm         ASTM D5185m         >20         3         1         1           INFRA-RED         method         limit/base         current         history1         history           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         6.3         6.1         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.6         18.3         18.9           FLUID DEGRADATION method         limit/base         current         history1         history           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         13.8         14.0	-						
Sodium         ppm         ASTM D5185m         >216         0         2         <1           Potassium         ppm         ASTM D5185m         >20         3         1         1           INFRA-RED         method         limit/base         current         history1         history1           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         6.3         6.1         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.6         18.3         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         13.8         14.0	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         3         1         1           INFRA-RED         method         limit/base         current         history1         history1           Soot %         %         *ASTM D7844         >3         0.3         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         6.3         6.1         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.6         18.3         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         13.8         14.0	Silicon	ppm	ASTM D5185m	>25	4	4	2
INFRA-RED	Sodium	ppm	ASTM D5185m	>216	0	2	<1
Soot %         %         *ASTM D7844 >3         0.3         0.3         0.3           Nitration         Abs/cm         *ASTM D7624 >20         6.3         6.1         6.2           Sulfation         Abs/.1mm         *ASTM D7415 >30         18.6         18.3         18.9           FLUID DEGRADATION method limit/base current history1         history1         history           Oxidation         Abs/.1mm         *ASTM D7414 >25         13.9         13.8         14.0	Potassium	ppm	ASTM D5185m	>20	3	1	1
Nitration         Abs/cm         *ASTM D7624         >20         6.3         6.1         6.2           Sulfation         Abs/.1mm         *ASTM D7615         >30         18.6         18.3         18.9           FLUID DEGRADATION method limit/base current         history1         history           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         13.8         14.0	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.6         18.3         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         13.8         14.0	Soot %	%	*ASTM D7844	>3	0.3	0.3	0.3
FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 13.9 13.8 14.0	Nitration	Abs/cm	*ASTM D7624	>20	6.3	6.1	6.2
Oxidation Abs/.1mm *ASTM D7414 >25 <b>13.9</b> 13.8 14.0							
	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	13.9	13.8	14.0
	Base Number (BN)	mg KOH/g	ASTM D2896	8.5	8.7	8.7	8.9



# **OIL ANALYSIS REPORT**



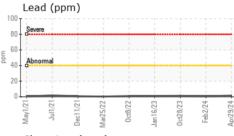


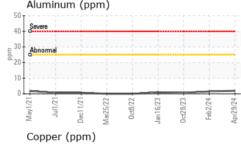


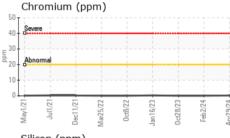
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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

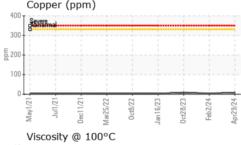
LLUID FROFI		memou			HISTOLAL	HISTORYZ
Visc @ 100°C	cSt	ASTM D445	14.4	13.3	13.6	13.6

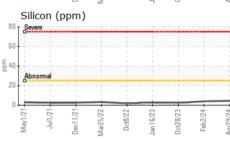
		- :				
		-				
						_
1/21	5/22	8/22 .	6/23	8/23	2/24	Any20.74
lac1	/ar2	Oct	all	0ct2	물	Carl
	Dec11/21	Dec11/21	a25/22 	Decl 1/21 Mar25/22 Oct8/22	Jec11/21 har25/22 Oct8/22 an 16/23	ec11/21 ar25,72 0ct8/22 ct28/23

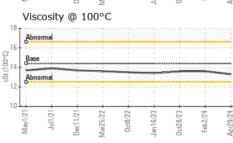


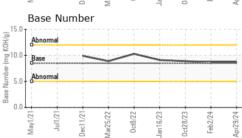
















Laboratory

Sample No.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PCA0085950

Received Lab Number : 06178149 **Tested** Diagnosed

: 13 May 2024 : 14 May 2024 : 14 May 2024 - Wes Davis

Kemp Quarries - Kemp Stone - Hulbert 17801 Hwy 80 Hulbert, OK US 74441

Certificate 12367

Unique Number : 11029475 Test Package : MOB 1 ( Additional Tests: TBN )

Contact: HULBERT NOTIFICATIONS hulbert@kempstone.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)

T:

F: