

## **OIL ANALYSIS REPORT**

#### Area KEMP QUARRIES / MUSKOGEE SAND Machine Id GEN005

Component Diesel Engine

MOBIL DELVAC 1300 SUPER15W40 (--- GAL)

#### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

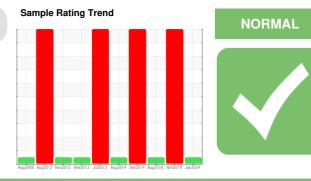
All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

### 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.



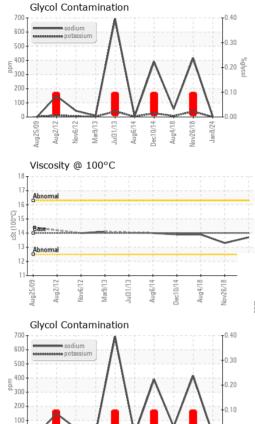
SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0085610	PCA45363033	PCA22499046
Sample Date		Client Info		08 Jan 2024	26 Nov 2018	04 Aug 2018
Machine Age	hrs	Client Info		11430	11089	10806
Oil Age	hrs	Client Info		341		
Oil Changed		Client Info		Changed	N/A	N/A
Sample Status				NORMAL	SEVERE	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>90	43	11	26
Chromium	ppm	ASTM D5185m	>20	1	0	1
Nickel	ppm	ASTM D5185m	>20	، <1	0	0
Titanium	ppm	ASTM D5185m		<1	0	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m		3	2	4
Lead	ppm	ASTM D5185m	>40	8	12	6
Copper	ppm	ASTM D5185m		37	622	512
Tin	ppm	ASTM D5185m	>15	1	0	0
Vanadium	ppm	ASTM D5185m	210	0	0	0
Cadmium	ppm	ASTM D5185m		0		
	pp			-	history1	bioto m 10
ADDITIVES		method			nistory i	history2
Boron	ppm	ASTM D5185m	0	4	40	87
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	4 0	40 1	87 17
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0	4 0 56	40 1 48	87 17 49
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 0	4 0 56 <1	40 1 48 	87 17 49 
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	4 0 56 <1 937	40 1 48  488	87 17 49  456
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 0	4 0 56 <1 937 1064	40 1 48  488 1772	87 17 49  456 1940
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	0 0 0	4 0 56 <1 937 1064 1035	40 1 48  488 1772 801	87 17 49  456 1940 1019
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 0	4 0 56 <1 937 1064 1035 1239	40 1 48  488 1772 801 981	87 17 49  456 1940 1019 1128
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	0 0 0 0 0	4 0 56 <1 937 1064 1035 1239 3045	40 1 48  488 1772 801 981 	87 17 49  456 1940 1019 1128 
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm 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 0 0 Imit/base	4 0 56 <1 937 1064 1035 1239 3045 current	40 1 48  488 1772 801 981  history1	87 17 49  456 1940 1019 1128  history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 0 0 0	4 0 56 <1 937 1064 1035 1239 3045 current 3	40 1 48  488 1772 801 981  history1 14	87 17 49  456 1940 1019 1128  history2 7
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	0 0 0 0 limit/base >25	4 0 56 <1 937 1064 1035 1239 3045 <u>current</u> 3 4	40 1 48  488 1772 801 981  history1 14 ● 416	87 17 49  456 1940 1019 1128  history2 7 56
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 0 Imit/base	4 0 56 <1 937 1064 1035 1239 3045 <u>current</u> 3 4 <1	40 1 48  488 1772 801 981  history1 14 ● 416 39	87 17 49  456 1940 1019 1128  <b>history2</b> 7 56 7
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 2 1 2 1 2	4 0 56 <1 937 1064 1035 1239 3045 <u>current</u> 3 4	40 1 48  488 1772 801 981  history1 14 ● 416 39 ● 0.1	87 17 49  456 1940 1019 1128  history2 7 56 7 56 7 0.0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m *ASTM D2982	0 0 0 0 limit/base >25	4 0 56 <1 937 1064 1035 1239 3045 <u>current</u> 3 4 <1	40 1 48  488 1772 801 981  history1 14 ● 416 39	87 17 49  456 1940 1019 1128  <b>history2</b> 7 56 7
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m *ASTM D2982 method	0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 2 1 2 1 2	4 0 56 <1 937 1064 1035 1239 3045 current 3 4 <1 NEG	40 1 48  488 1772 801 981  history1 14 ● 416 39 ● 0.1	87 17 49  456 1940 1019 1128  history2 7 56 7 56 7 0.0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m *ASTM D2982	0 0 0 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4 0 56 <1 937 1064 1035 1239 3045 <i>current</i> 3 4 <1 NEG	40 1 48  488 1772 801 981  history1 14 ● 416 39 ● 0.1 history1	87 17 49  456 1940 1019 1128  history2 7 56 7 56 7 0.0 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm %	ASTM D5185m ASTM D5185m *ASTM D2982 method	0 0 0 0 imit/base >25 >20 imit/base >6	4 0 56 <1 937 1064 1035 1239 3045 <i>current</i> 3 4 <1 NEG <i>current</i> 0.2	40 1 48  488 1772 801 981  history1 14 ● 416 39 ● 0.1 history1 0.55	87 17 49  456 1940 1019 1128  history2 7 56 7 56 7 0.0 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D2982 <b>Method</b> *ASTM D7844 *ASTM D7844	0 0 0 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4 0 56 <1 937 1064 1035 1239 3045 <u>current</u> 3 4 <1 NEG 0.2 5.8	40 1 48  488 1772 801 981  history1 14 ● 416 39 ● 0.1 history1 0.55 	87 17 49  456 1940 1019 1128  history2 7 56 7 56 7 0.0 history2 0.64 
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D2982 <b>Method</b> *ASTM D7844 *ASTM D7844	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 0 56 <1 937 1064 1035 1239 3045 <i>current</i> 3 4 <1 NEG <i>current</i> 0.2 5.8 18.6	40 1 48  488 1772 801 981  history1 14 ● 416 39 ● 0.1 history1 0.55  	87 17 49  456 1940 1019 1128  history2 7 56 7 0.0 history2 0.64 
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D2982 <b>method</b> *ASTM D7844 *ASTM D7844	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 0 56 <1 937 1064 1035 1239 3045 <i>current</i> 3 4 <1 NEG 0.2 5.8 18.6 <i>current</i>	40 1 48  488 1772 801 981  history1 14 ● 416 39 ● 0.1 history1 0.55    history1	87 17 49  456 1940 1019 1128  history2 7 56 7 56 7 0.0 history2 0.64  0.64  history2



0

Aug25/09 Aug2/12 Nov6/12 Mar9/13 Jul31/13 Aug6/14 .

# **OIL ANALYSIS REPORT**



nation	VISUAL		method	limit/base	current	history1	history2		
Λ	White Metal	scalar	*Visual	NONE	NONE				
-0.30	Yellow Metal	scalar	*Visual	NONE	NONE				
0.20 gr	Precipitate	scalar	*Visual	NONE	NONE				
	Silt	scalar	*Visual	NONE	NONE				
	Debris	scalar	*Visual	NONE	NONE				
0.00	Sand/Dirt	scalar	*Visual	NONE	NONE				
Jul31/13 Aug6/14 Dec10/14 Aug4/18 Nov26/18 Jan8/24	Appearance	scalar	*Visual	NORML	NORML				
Ju Nov Ja	Odor	scalar	*Visual	NORML	NORML				
°C	Emulsified Water	scalar	*Visual	>0.2	NEG				
	Free Water	scalar	*Visual		NEG				
	FLUID PROPE	RTIES	method	limit/base	current	history1	history2		
	Visc @ 100°C	cSt	ASTM D445	14	13.7	13.3	13.9		
	GRAPHS								
	Iron (ppm)			100	Lead (ppm)				
~ + + 0 00	250 Severe	1 1		100	Severe				
Jul31/13 - Aug6/14 + Dec10/14 + Aug4/18 - Nov26/18 -	200 4			60					
	150 - Abnormal			e 40	Abnormal				
ation				20					
A T <sup>0.40</sup>							$ \longrightarrow $		
-0.30	Aug25/09 - Aug2/12 - Nov6/12 - Mar9/13 -	Jul31/13 - Aug6/14 -	Dec10/14 - Aug4/18 - Nov26/18 -	Jan 8/24	Aug25/09 - Aug2/12 - Nov6/12 -	- 61/0131/13 - Aug6/14 -	Dec10/14 - Aug4/18 - Nov26/18 - Jan8/24 -		
	Augí Nov Ma	Jul: Auç	Dec: Auç Nov2	Jar	Aug	Jul	Dec' Auç Nov2 Jan		
0.20	Aluminum (ppm)		Chromium (pp	m)					
0.10	40 Severe	I I I I		50	Severe				
0.00	Abnomal			<sup>30</sup> ع	Abnormal				
Jul31/13 Aug6/14 Dec10/14 Aug4/18 Nov26/18 Jan8/24	10-			10	4				
				0			$\sim$		
	Aug25/09 - Aug2/12 - Nov6/12 - Mar9/13 -	Jul31/13 - Aug6/14 -	Dec10/14 - Aug4/18 - Nov26/18 -	Jan8/24 .	Aug25/09 . Aug2/12 . Nov6/12 .	Aug6/14 1	Dec10/14 - Aug4/18 - Nov26/18 + Jan8/24 -		
	Augá Nor Ma	Jul	Aug	Jar	Aug Aug Nov	Juli	Decí Aug Nová Jar		
	Copper (ppm)				Silicon (ppm)				
	1200 1000				Severe		1 1 1		
	800	Δ		60	• • • • • • • • • • • • • • • • • • • •				
Ed	600		N	툍 40		$\wedge$			
	400 - <b>Abytosmal</b>	<u> </u>	4	20	Abnormal				
	200	. V					$\sim \sim$		
	ug25/09 Aug2/12 - Nov6/12 - Mar9/13 -	Jul31/13 - Aug6/14 -	Dec10/14 - Aug4/18 - Vov26/18 -	Jan 8/24	wg25/09 - Aug2/12 - Nov6/12 -	- 21/21/13 - Jul31/13 - Aug6/14 -	Jan 8/24 -		
	Aug25/09 Aug2/12 Nov6/12 Mar9/13	Jul3 Aug	Dec10/14 Aug4/18 Nov26/18	Jan	Aug25/09 Aug2/12 Nov6/12	Jul3 Aug	Dec10/14 Aug4/18 Nov26/18 Jan8/24		
	Viscosity @ 100°C			Base Number					
	18 Abnormal								
	16			(B/HQ) Base Minmber 4.0 2.0					
	(3) 14 Abnormal	Alight of the supervised of the second se		L 0.0					
	경 12 -								
	10		_	0.0					
	Aug25/09 Aug2/12 Nov6/12 Mar9/13	Jul31/13 Aug6/14	Dec10/14 Aug4/18 Nov26/18	Jan 8/24	Aug25/09 Aug2/12 Nov6/12	c 1/c 1/13 Aug 6/14	Dec10/14 Aug4/18 Nov26/18 Jan8/24		
	Aug2 Aug Nov Ma	Jul	Dec1 Aug Nov2	Jar	Aug2 Aug	Jul3 Aug	Dec1 Aug Nov2 Jar		
) Laborations		04		NO 07540	<b>K</b>	0	<b>M</b> araha ara <b>O</b> ra d		
Laboratory Sample No.	: WearCheck USA - 501 : PCA0085610 Rec			ry, NC 27513 Jan 2024	Kem	Kemp Quarries - Muskogee Sand 3395 W 50th St N			
Lab Number		Diagnos		Jan 2024 Jan 2024		Porter, OK			
Unique Number	: 10850318	Diagnost				US 74454			
Certificate L2367 Test Package : MOB 1 (Additional Tests: TBN)					Contact: MUSCOGEE NOTIFICATIONS				
To discuss this sample report, ( * - Denotes test methods that a					mu	iskogee@mu	skogeesand.com T:		
Statements of conformity to spec					ICGM 106:2012)		F:		