



OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL

Area  
**RIG 4**  
Machine Id  
**R4-CHANGE SHACK NKL**  
Component  
**Diesel Engine**  
Fluid  
**CHEVRON 15W40 (--- GAL)**

**RECOMMENDATION**

Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		<b>KL0013888</b>	KL0014057	KL0013127
Sample Date		Client Info		<b>28 Feb 2024</b>	12 Dec 2023	03 Nov 2023
Machine Age	days	Client Info		<b>45350</b>	45272	45233
Oil Age	days	Client Info		<b>0</b>	0	0
Filter Age	days	Client Info		<b>0</b>	0	0
Oil Changed		Client Info		<b>N/A</b>	N/A	N/A
Filter Changed		Client Info		<b>N/A</b>	N/A	N/A
Sample Status				<b>NORMAL</b>	NORMAL	NORMAL

**WEAR**

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>100	<b>2</b>	3	7
Chromium	ppm	ASTM D5185m	>20	<b>0</b>	<1	0
Nickel	ppm	ASTM D5185m	>4	<b>0</b>	<1	<1
Titanium	ppm	ASTM D5185m		<b>0</b>	<1	0
Silver	ppm	ASTM D5185m	>3	<b>0</b>	0	0
Aluminum	ppm	ASTM D5185m	>20	<b>3</b>	3	4
Lead	ppm	ASTM D5185m	>40	<b>0</b>	<1	0
Copper	ppm	ASTM D5185m	>330	<b>0</b>	<1	4
Tin	ppm	ASTM D5185m	>15	<b>0</b>	<1	<1
Vanadium	ppm	ASTM D5185m		<b>0</b>	0	<1
White Metal	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE

**CONTAMINATION**

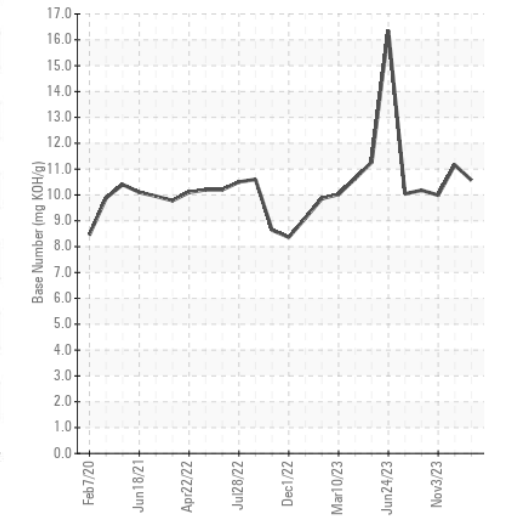
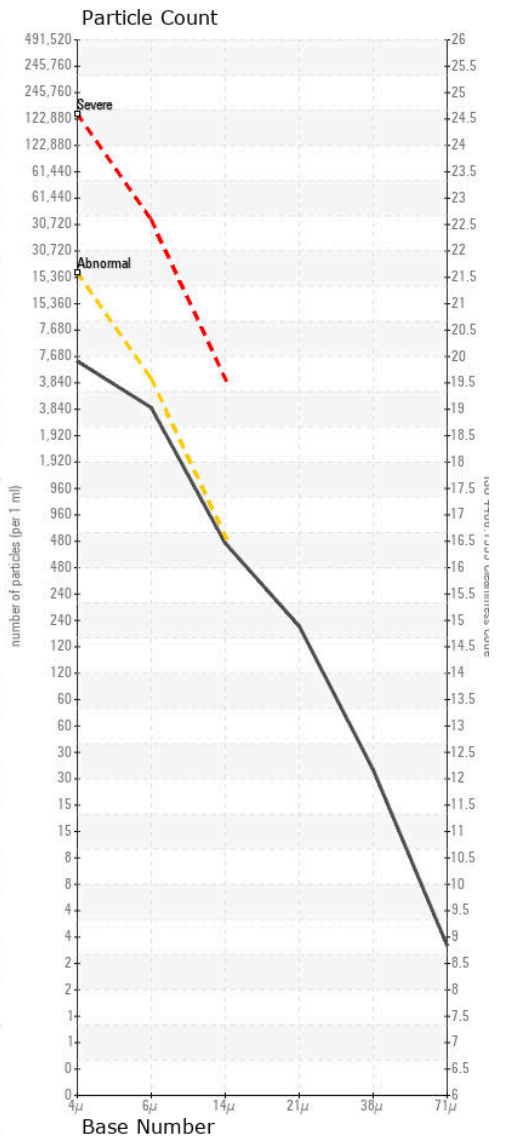
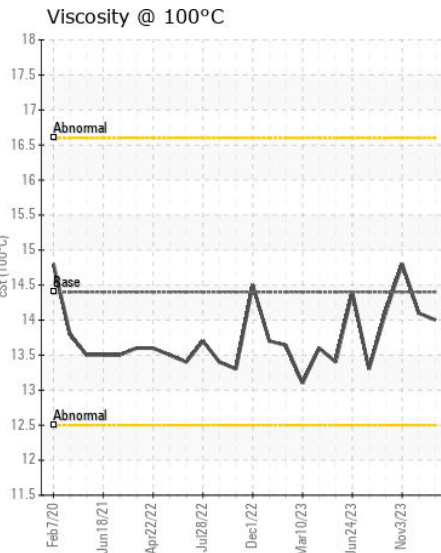
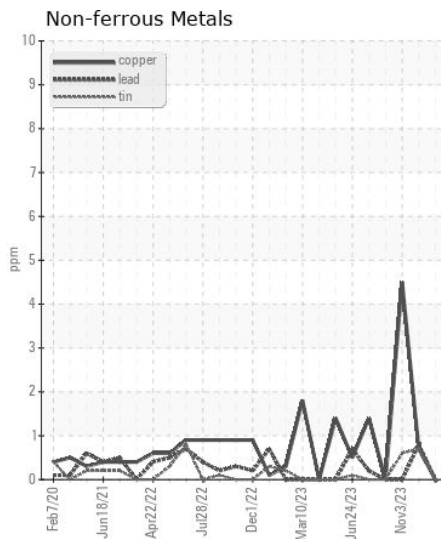
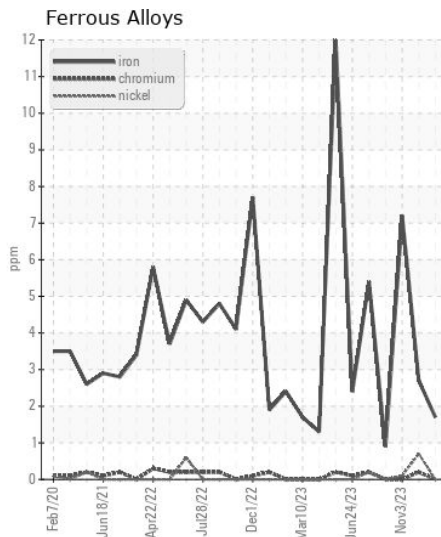
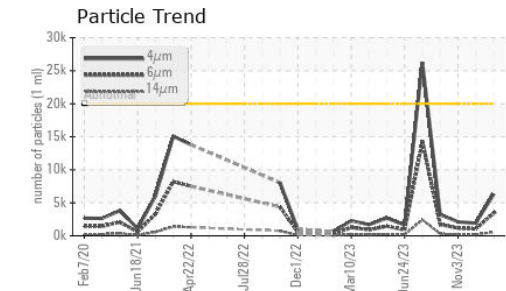
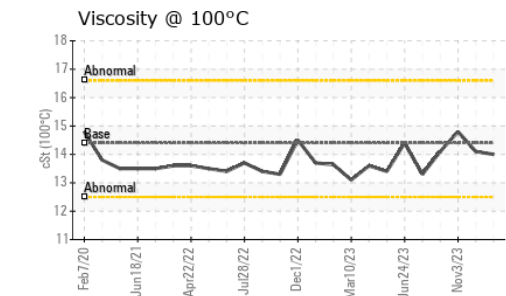
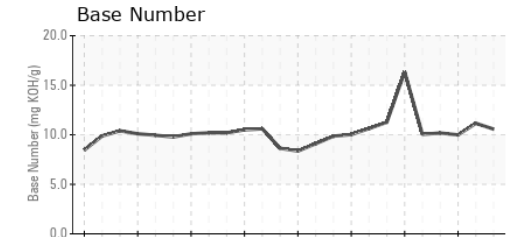
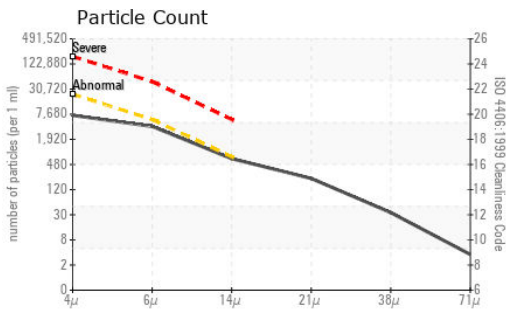
There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable.

Silicon	ppm	ASTM D5185m	>25	<b>6</b>	8	8
Potassium	ppm	ASTM D5185m	>20	<b>0</b>	2	<1
Fuel		WC Method	>5	<b>&lt;1.0</b>	<1.0	<1.0
Water		WC Method	>0.2	<b>NEG</b>	NEG	NEG
Glycol		WC Method		<b>NEG</b>	NEG	NEG
Soot %	%	*ASTM D7844	>3	<b>0.1</b>	0.1	0.1
Nitration	Abs/cm	*ASTM D7624	>20	<b>5.0</b>	4.8	4.4
Sulfation	Abs/.1mm	*ASTM D7415	>30	<b>22.8</b>	22.3	22.3
Particles >4µm		ASTM D7647	>20000	<b>6281</b>	1923	2114
Particles >6µm		ASTM D7647	>5000	<b>3422</b>	1047	1152
Particles >14µm		ASTM D7647	>640	<b>582</b>	178	196
Particles >21µm		ASTM D7647	>160	<b>196</b>	60	66
Particles >38µm		ASTM D7647	>40	<b>30</b>	9	10
Particles >71µm		ASTM D7647	>10	<b>3</b>	1	1
Oil Cleanliness		ISO 4406 (c)	>21/19/16	<b>20/19/16</b>	18/17/15	18/17/15
Silt	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Debris	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Appearance	scalar	*Visual	NORML	<b>NORML</b>	NORML	NORML
Odor	scalar	*Visual	NORML	<b>NORML</b>	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	<b>NEG</b>	NEG	NEG

**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.

Sodium	ppm	ASTM D5185m	>50	<b>1</b>	0	2
Boron	ppm	ASTM D5185m		<b>355</b>	382	337
Barium	ppm	ASTM D5185m		<b>0</b>	0	0
Molybdenum	ppm	ASTM D5185m		<b>135</b>	123	118
Manganese	ppm	ASTM D5185m		<b>0</b>	<1	<1
Magnesium	ppm	ASTM D5185m		<b>770</b>	657	651
Calcium	ppm	ASTM D5185m		<b>1793</b>	1470	1398
Phosphorus	ppm	ASTM D5185m		<b>823</b>	664	691
Zinc	ppm	ASTM D5185m		<b>980</b>	816	818
Sulfur	ppm	ASTM D5185m		<b>3377</b>	2574	2740
Oxidation	Abs/.1mm	*ASTM D7414	>25	<b>15.6</b>	15.5	15.0
Base Number (BN)	mg KOH/g	ASTM D2896		<b>10.57</b>	11.16	9.99
Visc @ 100°C	cSt	ASTM D445	14.4	<b>14.0</b>	14.1	14.8



Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : KL0013888  
**Lab Number** : 06125812  
**Unique Number** : 10939963  
**Test Package** : MOB 2 ( Additional Tests: PrtCount )

**Received** : 21 Mar 2024  
**Tested** : 25 Mar 2024  
**Diagnosed** : 25 Mar 2024 - Don Baldrige

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)

**CITADEL DRILLING**  
 7550 W 120  
 ODESSA, TX  
 US 79763

Contact: MIKE COMBDEN  
 mcombden@citadelldrilling.com

T: (780)955-5509

F: