



# OIL ANALYSIS REPORT

WEAR	<b>NORMAL</b>
CONTAMINATION	<b>NORMAL</b>
FLUID CONDITION	<b>NORMAL</b>

Area  
**RIG 6**  
Machine Id  
**R6-CHANGE SHACK NKL**  
Component  
**Diesel Engine**  
Fluid  
**DIESEL ENGINE OIL SAE 40 (--- GAL)**

## RECOMMENDATION

Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		<b>KL0013875</b>	KL0013188	KL0013175
Sample Date		Client Info		<b>20 Feb 2024</b>	05 Jan 2024	18 Nov 2023
Machine Age	days	Client Info		<b>45342</b>	45297	45248
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>4</b>	4	8
Chromium	ppm	ASTM D5185m	>20	<b>&lt;1</b>	<1	0
Nickel	ppm	ASTM D5185m	>4	<b>0</b>	<1	0
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>4</b>	3	3
Lead	ppm	ASTM D5185m	>40	<b>&lt;1</b>	<1	0
Copper	ppm	ASTM D5185m	>330	<b>&lt;1</b>	<1	1
Tin	ppm	ASTM D5185m	>15	<b>&lt;1</b>	<1	0
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

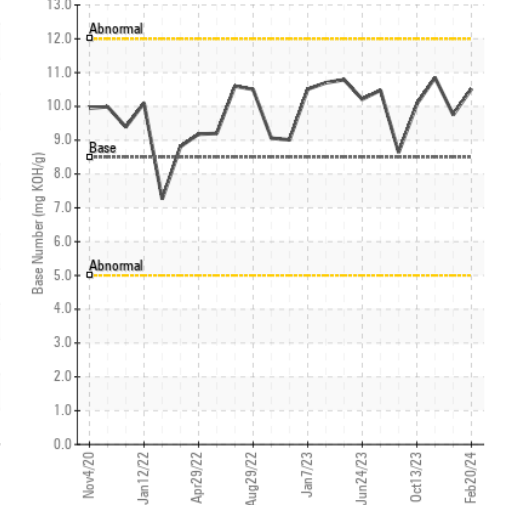
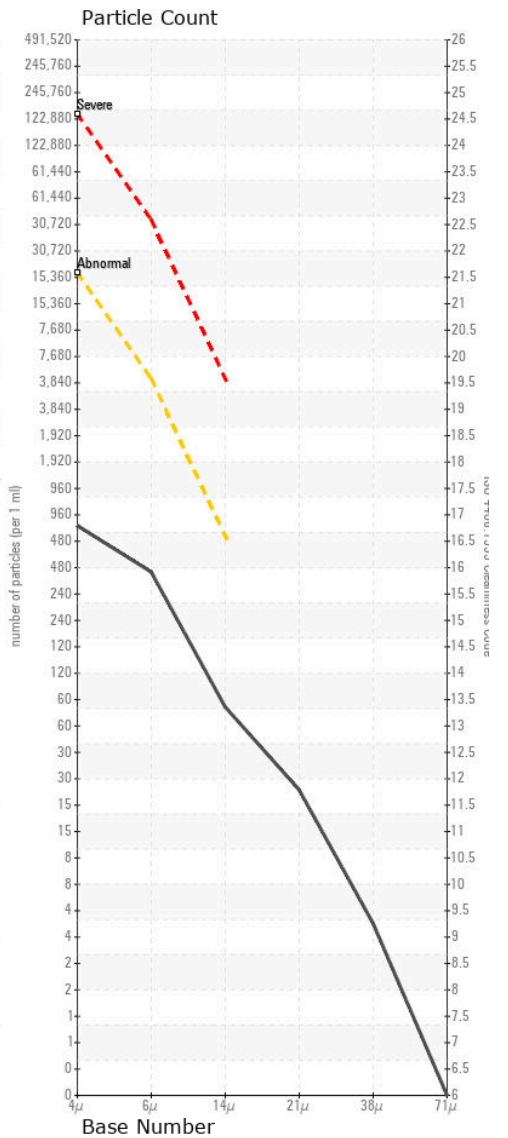
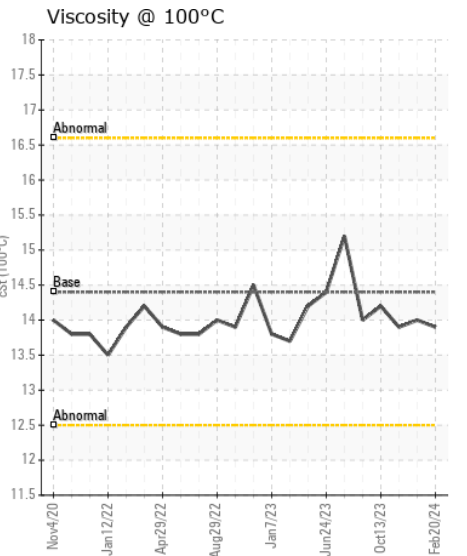
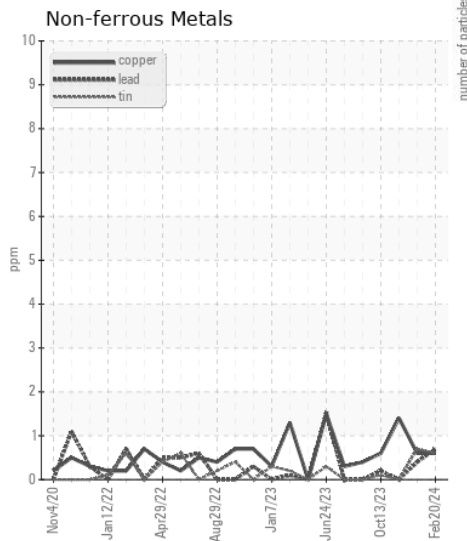
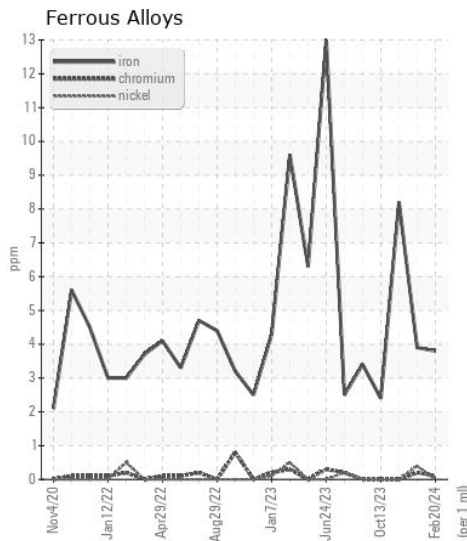
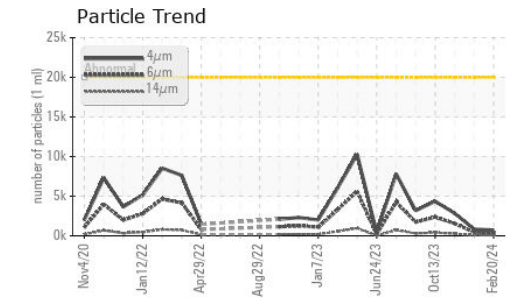
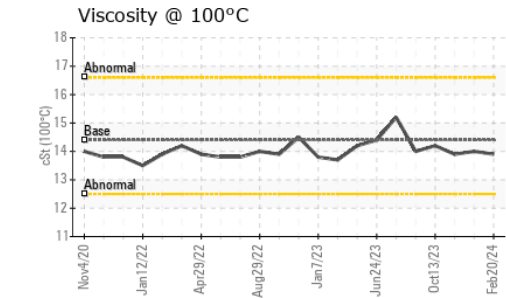
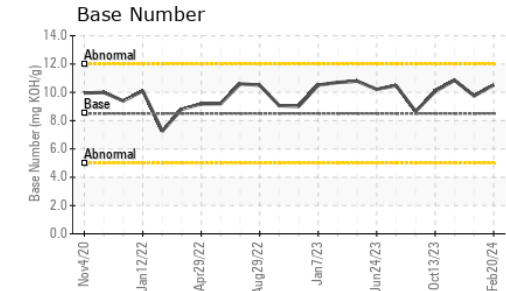
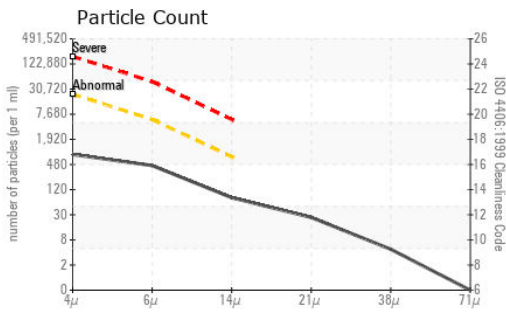
The amount and size of particulates present in the system are acceptable. There is no indication of any contamination in the oil.

Silicon	ppm	ASTM D5185m	>25	<b>5</b>	7	7
Potassium	ppm	ASTM D5185m	>20	<b>&lt;1</b>	1	0
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>1</b>	0.7	0.7
Nitration	Abs/cm	*ASTM D7624	>20	<b>8.3</b>	6.9	7.1
Sulfation	Abs/.1mm	*ASTM D7415	>30	<b>24.7</b>	23.9	23.9
Particles >4µm		ASTM D7647	>20000	<b>731</b>	835	2845
Particles >6µm		ASTM D7647	>5000	<b>398</b>	455	1550
Particles >14µm		ASTM D7647	>640	<b>68</b>	77	264
Particles >21µm		ASTM D7647	>160	<b>23</b>	26	89
Particles >38µm		ASTM D7647	>40	<b>4</b>	4	14
Particles >71µm		ASTM D7647	>10	<b>0</b>	0	1
Oil Cleanliness		ISO 4406 (c)	>21/19/16	<b>17/16/13</b>	17/16/13	19/18/15
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	>216	<b>1</b>	0	5
Boron	ppm	ASTM D5185m	250	<b>307</b>	354	338
Barium	ppm	ASTM D5185m	10	<b>0</b>	0	<1
Molybdenum	ppm	ASTM D5185m	100	<b>129</b>	131	137
Manganese	ppm	ASTM D5185m		<b>&lt;1</b>	<1	0
Magnesium	ppm	ASTM D5185m	450	<b>679</b>	658	681
Calcium	ppm	ASTM D5185m	3000	<b>1465</b>	1453	1533
Phosphorus	ppm	ASTM D5185m	1150	<b>706</b>	728	714
Zinc	ppm	ASTM D5185m	1350	<b>859</b>	819	854
Sulfur	ppm	ASTM D5185m	4250	<b>2435</b>	2761	2504
Oxidation	Abs/.1mm	*ASTM D7414	>25	<b>18.6</b>	17.0	17.2
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	<b>10.52</b>	9.75	10.85
Visc @ 100°C	cSt	ASTM D445	14.4	<b>13.9</b>	14.0	13.9



Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : KL0013875  
**Lab Number** : 06105419  
**Unique Number** : 10903649  
**Test Package** : MOB 2 ( Additional Tests: PrtCount )

**Received** : 29 Feb 2024  
**Tested** : 06 Mar 2024  
**Diagnosed** : 06 Mar 2024 - Jonathan Hester

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

Contact: MIKE COMBDEN  
 mcombden@citadelldrilling.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)

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F: