



# OIL ANALYSIS REPORT

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

Area  
**RIG 5**  
Machine Id  
Component  
**WHITE STAR 245 R5-P-02G NKL**  
Gearbox  
Fluid  
**GEAR OIL ISO 460 (--- GAL)**

## RECOMMENDATION

We recommend you service the filters on this component if applicable. Resample at the next service interval to monitor. We were unable to perform a particle count due to a high concentration of particles present in this sample.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		<b>KL0013851</b>	KL0013838	KL0013143
Sample Date		Client Info		<b>20 Mar 2024</b>	16 Feb 2024	11 Jan 2024
Machine Age	days	Client Info		<b>45326</b>	45338	45303
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>ABNORMAL</b>	ABNORMAL	ABNORMAL

## WEAR

Gear wear is indicated.

Iron	ppm	ASTM D5185m	>200	<b>▲ 405</b>	▲ 542	▲ 506
Chromium	ppm	ASTM D5185m	>10	<b>3</b>	4	4
Nickel	ppm	ASTM D5185m	>10	<b>4</b>	5	5
Titanium	ppm	ASTM D5185m		<b>&lt;1</b>	<1	<1
Silver	ppm	ASTM D5185m		<b>0</b>	0	0
Aluminum	ppm	ASTM D5185m	>25	<b>12</b>	● 16	● 14
Lead	ppm	ASTM D5185m	>50	<b>&lt;1</b>	3	<1
Copper	ppm	ASTM D5185m	>200	<b>104</b>	126	121
Tin	ppm	ASTM D5185m	>10	<b>&lt;1</b>	<1	1
Vanadium	ppm	ASTM D5185m		<b>0</b>	<1	0
White Metal	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE

## CONTAMINATION

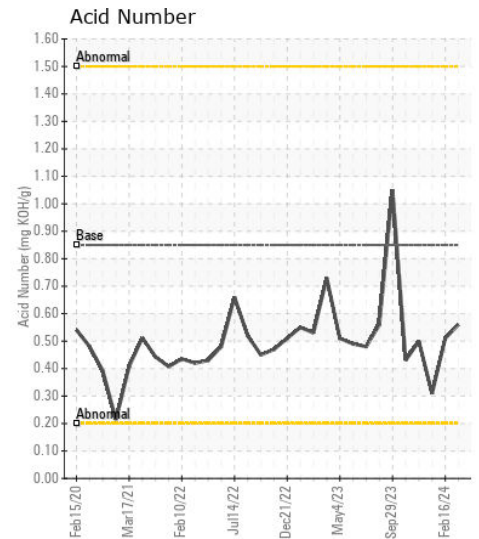
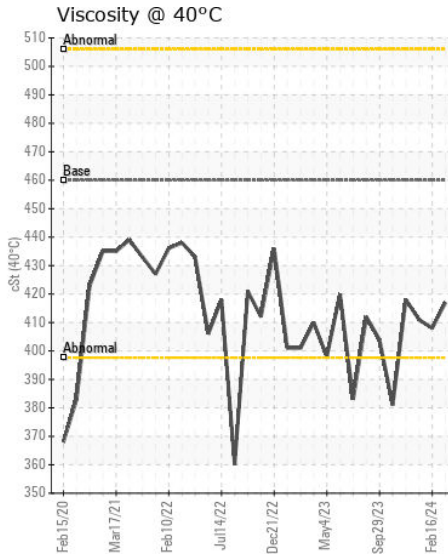
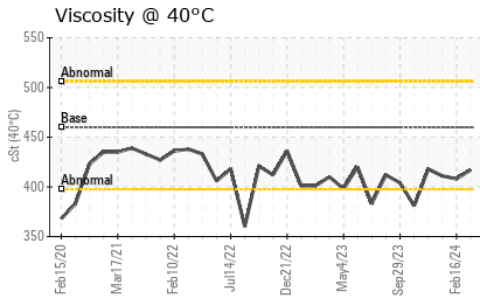
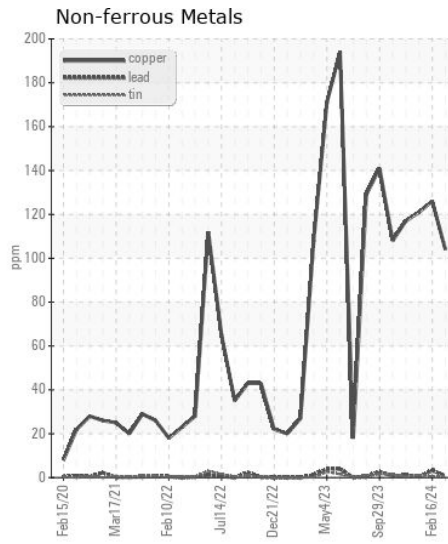
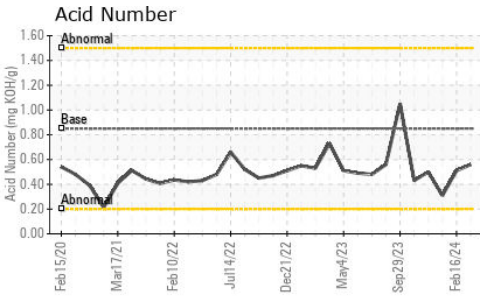
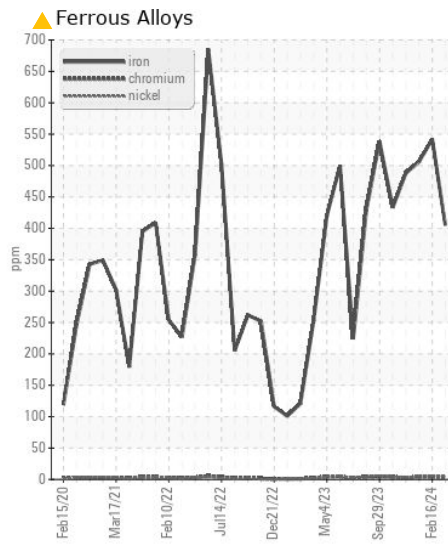
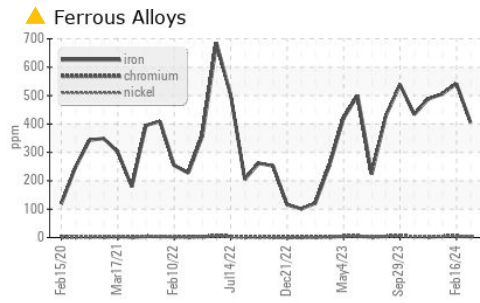
There is a moderate amount of visible silt present in the sample.

Silicon	ppm	ASTM D5185m	>50	<b>46</b>	▲ 62	▲ 60
Potassium	ppm	ASTM D5185m	>20	<b>11</b>	11	9
Water		WC Method	>0.2	<b>NEG</b>	NEG	NEG
Particles >4µm		ASTM D7647		<b>---</b>	552928	---
Particles >6µm		ASTM D7647	>5000	<b>---</b>	▲ 372360	---
Particles >14µm		ASTM D7647	>640	<b>---</b>	▲ 4259	---
Particles >21µm		ASTM D7647	>160	<b>---</b>	98	---
Particles >38µm		ASTM D7647	>40	<b>---</b>	1	---
Particles >71µm		ASTM D7647	>10	<b>---</b>	1	---
Oil Cleanliness		ISO 4406 (c)	>19/16	<b>---</b>	▲ 26/19	---
Silt	scalar	*Visual	NONE	<b>▲ MODER</b>	NONE	▲ MODER
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 AN level is acceptable for this fluid. The condition of the oil is acceptable for the time in service.

Sodium	ppm	ASTM D5185m		<b>149</b>	184	148
Boron	ppm	ASTM D5185m	50	<b>28</b>	36	33
Barium	ppm	ASTM D5185m	15	<b>18</b>	28	23
Molybdenum	ppm	ASTM D5185m	15	<b>57</b>	86	84
Manganese	ppm	ASTM D5185m		<b>3</b>	4	4
Magnesium	ppm	ASTM D5185m	50	<b>32</b>	58	45
Calcium	ppm	ASTM D5185m	50	<b>105</b>	177	133
Phosphorus	ppm	ASTM D5185m	350	<b>258</b>	240	174
Zinc	ppm	ASTM D5185m	100	<b>59</b>	106	79
Sulfur	ppm	ASTM D5185m	12500	<b>7255</b>	6051	6289
Acid Number (AN)	mg KOH/g	ASTM D8045	0.85	<b>0.56</b>	0.51	0.309
Visc @ 40°C	cSt	ASTM D445	460	<b>417</b>	408	411



Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : KL0013851 **Received** : 10 Apr 2024  
**Lab Number** : 06145280 **Tested** : 13 Apr 2024  
**Unique Number** : 10970088 **Diagnosed** : 13 Apr 2024 - Don Baldrige  
**Test Package** : MOB 2 ( Additional Tests: PrtCount )

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 I20  
 ODESSA, TX  
 US 79763  
 Contact: MIKE COMBDEN  
 mcombden@citadelldrilling.com  
 T: (780)955-5509  
 F: