



OIL ANALYSIS REPORT

WEAR	ABNORMAL
CONTAMINATION	ABNORMAL
FLUID CONDITION	NORMAL

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

RECOMMENDATION

We advise that you check all areas where dirt can enter the system. Resample at the next service interval to monitor.

WEAR

Gear wear is indicated.

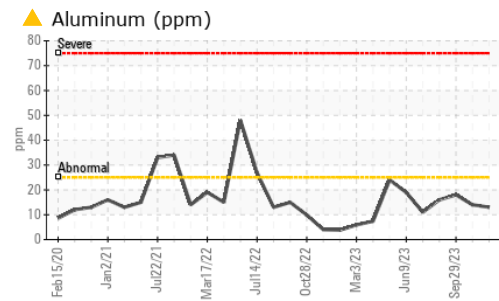
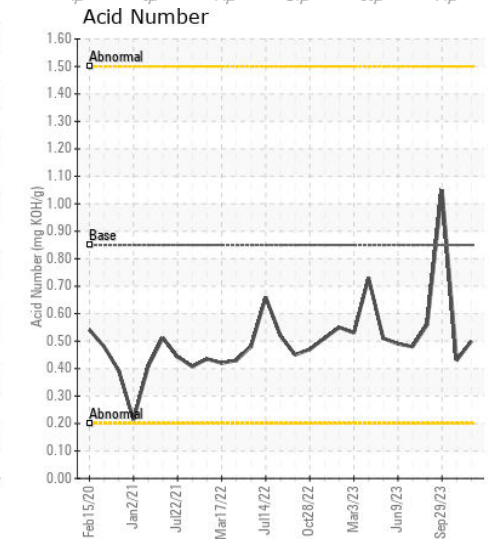
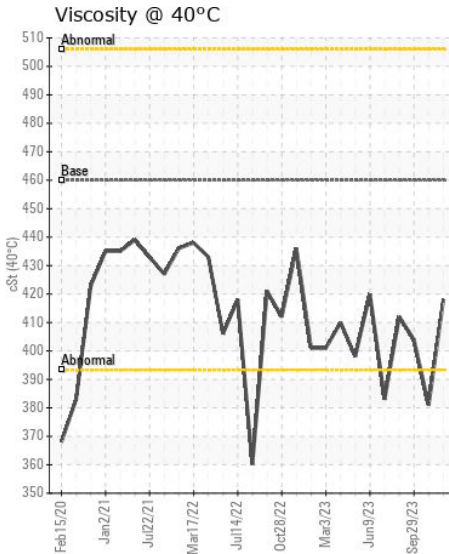
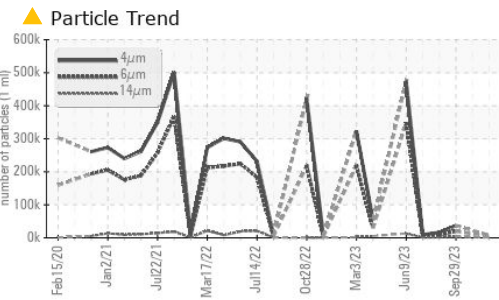
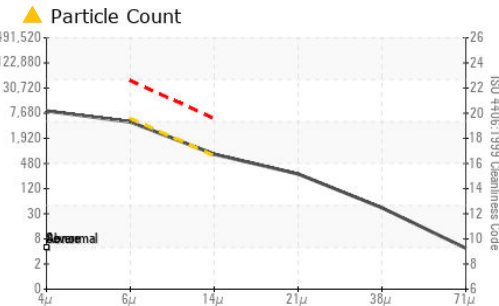
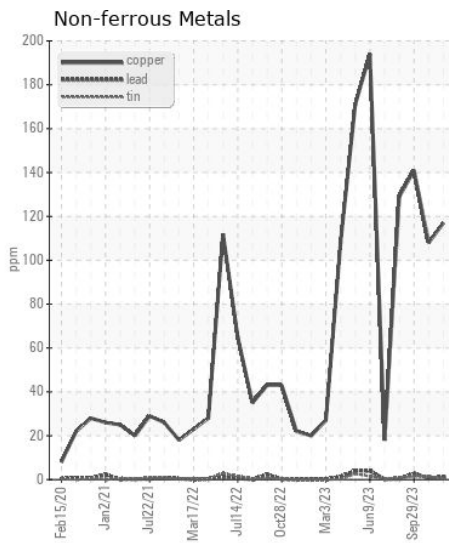
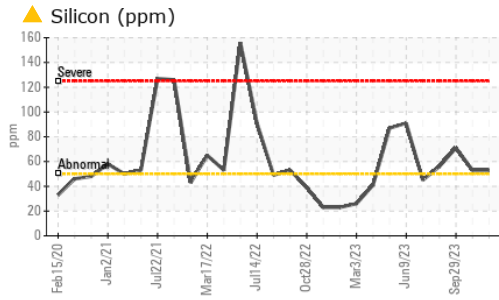
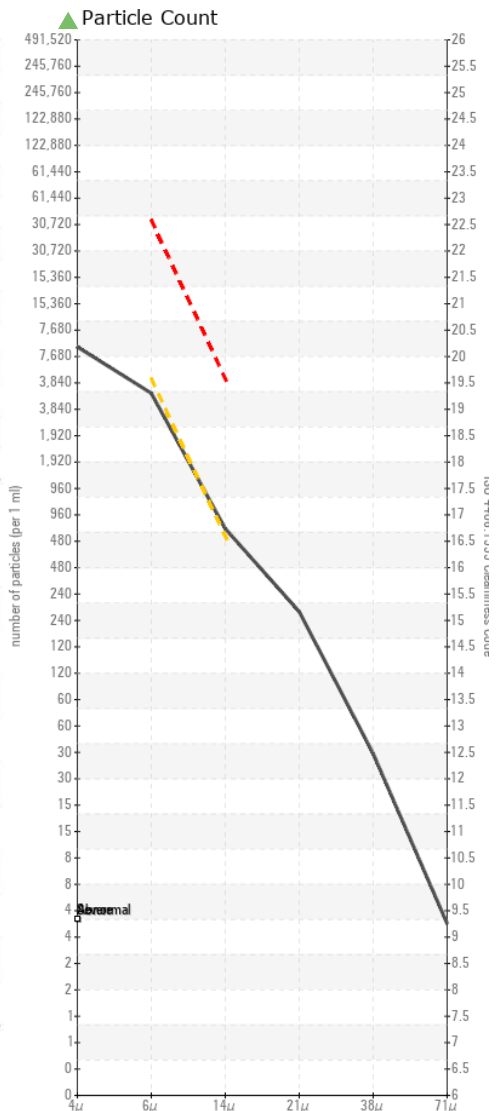
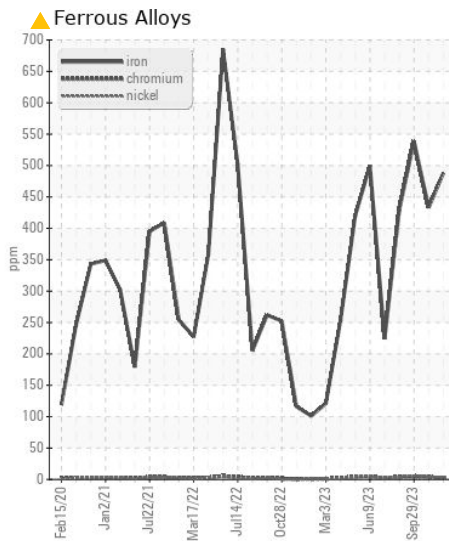
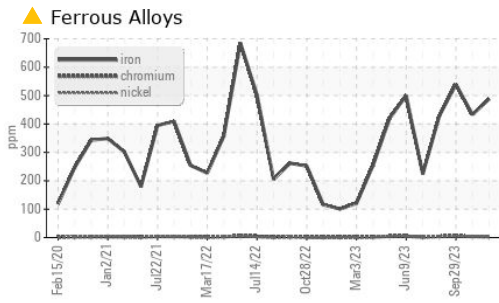
CONTAMINATION

There is a moderate amount of particulates present in the oil. Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress.

FLUID CONDITION

The AN level is acceptable for this fluid.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		KL0013978	KL0013087	KL0012987
Sample Date		Client Info		12 Dec 2023	03 Nov 2023	29 Sep 2023
Machine Age	days	Client Info		45272	45233	45196
Oil Age	days	Client Info		0	0	0
Filter Age	days	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Filter Changed		Client Info		N/A	N/A	N/A
Sample Status				ABNORMAL	ABNORMAL	ABNORMAL
Iron	ppm	ASTM D5185m	>200	▲ 488	▲ 433	▲ 539
Chromium	ppm	ASTM D5185m	>10	3	4	5
Nickel	ppm	ASTM D5185m	>10	4	4	6
Titanium	ppm	ASTM D5185m		0	<1	<1
Silver	ppm	ASTM D5185m		0	0	0
Aluminum	ppm	ASTM D5185m	>25	▲ 13	▲ 14	▲ 18
Lead	ppm	ASTM D5185m	>50	1	<1	3
Copper	ppm	ASTM D5185m	>200	117	108	141
Tin	ppm	ASTM D5185m	>10	<1	1	2
Vanadium	ppm	ASTM D5185m		0	0	0
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Silicon	ppm	ASTM D5185m	>50	▲ 53	▲ 53	▲ 71
Potassium	ppm	ASTM D5185m	>20	10	9	13
Water		WC Method	>0.2	NEG	NEG	NEG
Particles >4µm		ASTM D7647		7586	---	36921
Particles >6µm		ASTM D7647	>5000	4133	---	▲ 20113
Particles >14µm		ASTM D7647	>640	▲ 703	---	▲ 3423
Particles >21µm		ASTM D7647	>160	▲ 237	---	▲ 1153
Particles >38µm		ASTM D7647	>40	37	---	▲ 178
Particles >71µm		ASTM D7647	>10	4	---	▲ 18
Oil Cleanliness		ISO 4406 (c)	>19/16	▲ 19/17	---	▲ 22/19
Silt	scalar	*Visual	NONE	NONE	▲ HEAVY	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
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	0.2%
Sodium	ppm	ASTM D5185m		151	114	149
Boron	ppm	ASTM D5185m	50	30	57	32
Barium	ppm	ASTM D5185m	15	25	24	33
Molybdenum	ppm	ASTM D5185m	15	86	99	133
Manganese	ppm	ASTM D5185m		3	4	4
Magnesium	ppm	ASTM D5185m	50	38	90	65
Calcium	ppm	ASTM D5185m	50	122	220	167
Phosphorus	ppm	ASTM D5185m	350	254	281	261
Zinc	ppm	ASTM D5185m	100	68	133	110
Sulfur	ppm	ASTM D5185m	12500	6735	6571	6226
Acid Number (AN)	mg KOH/g	ASTM D8045	0.85	0.50	0.43	1.051
Visc @ 40°C	cSt	ASTM D445	460	418	381	404



Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : KL0013978 **Received** : 08 Jan 2024
Lab Number : 06054773 **Diagnosed** : 11 Jan 2024
Unique Number : 10820722 **Diagnostician** : Don Baldrige
Test Package : MOB 2 (Additional Tests: PrtCount)

CITADEL DRILLING
 7550 W 120
 ODESSA, TX
 US 79763
 Contact: MIKE COMBDEN
 mcombden@citadelldrilling.com
 T: (780)955-5509
 F:

Certificate L2367
 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)