



OIL ANALYSIS REPORT

WEAR	ABNORMAL
CONTAMINATION	ABNORMAL
FLUID CONDITION	NORMAL

Area
RIG 2
Machine Id
Component
WHITE STAR 2450 R2-P-01G-NKL
Fluid
Gearbox Oil (--- GAL)

RECOMMENDATION

We advise that you check all areas where dirt can enter the system. We recommend you service the filters on this component if applicable. We recommend an early resample to monitor this condition. We were unable to perform a particle count due to a high concentration of particles present in this sample.

WEAR

Gear wear is indicated.

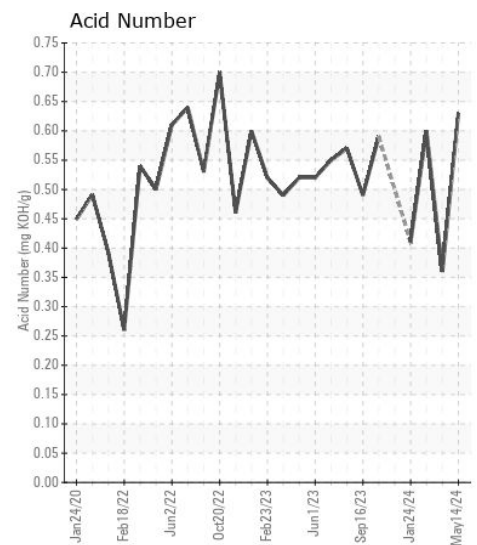
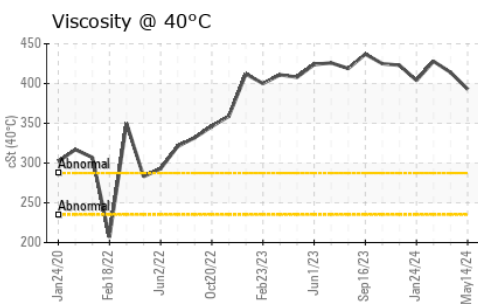
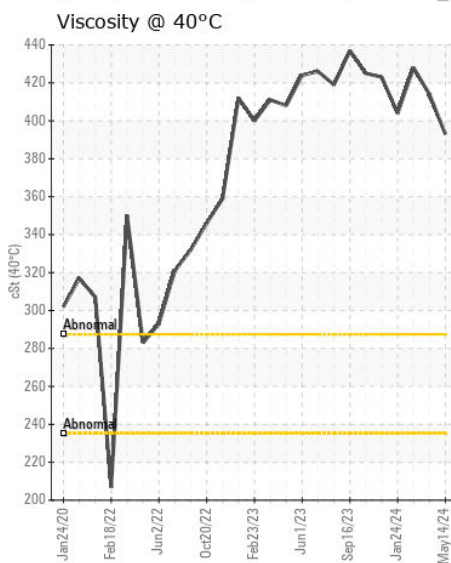
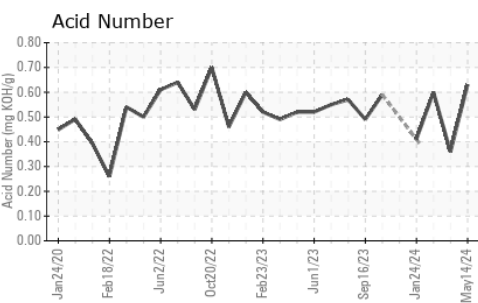
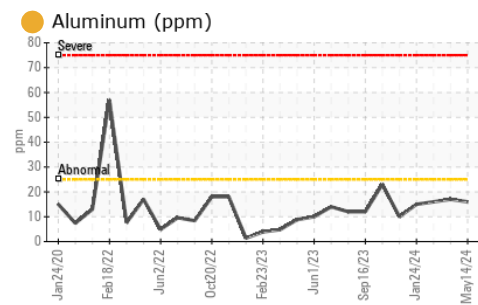
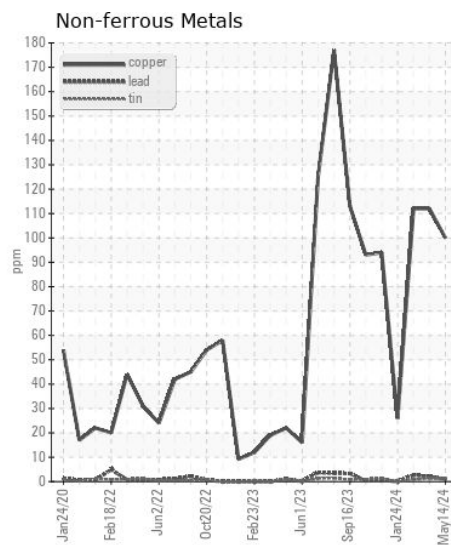
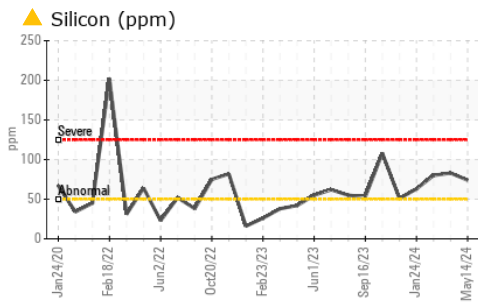
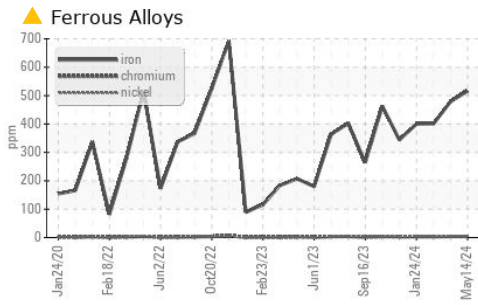
CONTAMINATION

Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress. There is a high amount of visible silt present in the sample.

FLUID CONDITION

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		KL0014256	KL0014239	KL0013899
Sample Date		Client Info		14 May 2024	03 Apr 2024	15 Feb 2024
Machine Age	days	Client Info		45416	45375	45337
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	▲ 516	▲ 479	▲ 401
Chromium	ppm	ASTM D5185m	>10	4	4	3
Nickel	ppm	ASTM D5185m	>10	4	4	3
Titanium	ppm	ASTM D5185m		1	2	1
Silver	ppm	ASTM D5185m		0	0	0
Aluminum	ppm	ASTM D5185m	>25	● 16	● 17	● 16
Lead	ppm	ASTM D5185m	>50	1	2	3
Copper	ppm	ASTM D5185m	>200	100	112	112
Tin	ppm	ASTM D5185m	>10	1	1	<1
Vanadium	ppm	ASTM D5185m		0	<1	<1
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Silicon	ppm	ASTM D5185m	>50	▲ 74	▲ 83	▲ 80
Potassium	ppm	ASTM D5185m	>20	29	31	30
Water		WC Method	>0.2	NEG	NEG	NEG
Particles >4µm		ASTM D7647		---	---	646879
Particles >6µm		ASTM D7647	>5000	---	---	▲ 439539
Particles >14µm		ASTM D7647	>640	---	---	▲ 5564
Particles >21µm		ASTM D7647	>160	---	---	131
Particles >38µm		ASTM D7647	>40	---	---	0
Particles >71µm		ASTM D7647	>10	---	---	0
Oil Cleanliness		ISO 4406 (c)	>19/16	---	---	▲ 26/20
Silt	scalar	*Visual	NONE	▲ HEAVY	▲ MODER	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	NEG
Sodium	ppm	ASTM D5185m		398	399	420
Boron	ppm	ASTM D5185m		48	20	19
Barium	ppm	ASTM D5185m		85	96	97
Molybdenum	ppm	ASTM D5185m		220	269	288
Manganese	ppm	ASTM D5185m		5	4	3
Magnesium	ppm	ASTM D5185m		65	57	31
Calcium	ppm	ASTM D5185m		228	187	130
Phosphorus	ppm	ASTM D5185m		261	266	218
Zinc	ppm	ASTM D5185m		125	86	63
Sulfur	ppm	ASTM D5185m		8756	8361	7601
Acid Number (AN)	mg KOH/g	ASTM D8045		0.63	0.36	0.60
Visc @ 40°C	cSt	ASTM D445		393	414	428



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : KL0014256
Lab Number : 06191003
Unique Number : 11047755
Test Package : MOB 2 (Additional Tests: FT-IR, Glycol, KV100, PrtCount, TBN)

Received : 24 May 2024
Tested : 30 May 2024
Diagnosed : 30 May 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 I20
 ODESSA, TX
 US 79763

Contact: MIKE COMBDEN
 mcombden@citadeldrilling.com

T: (780)955-5509

F: