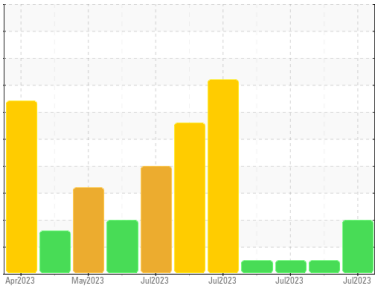
OIL ANALYSIS REPORT

Sample Rating Trend



ISO

Area
RIG 879
Machine Id
R879-P-02-NKL
Component
Pump
Fluid
GEAR OIL ISO 320 (--- GAL)

DIAGNOSIS

Recommendation
We recommend you service the filters on this component. Resample at the next service interval to monitor.

Wear
All component wear rates are normal.

Contamination
There is a high amount of particulates present in the oil.

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

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**KL0012131**	KL0012129	KL0012133
Sample Date		Client Info		**19 Jul 2023**	17 Jul 2023	16 Jul 2023
Machine Age	days	Client Info		**45126**	45124	45123
Oil Age	days	Client Info		**0**	0	0
Oil Changed		Client Info		**N/A**	N/A	N/A
Sample Status				**ABNORMAL**	---	---

WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>500	**23**	▲ 421	▲ 400
Chromium	ppm	ASTM D5185m	>7	**0**	▲ 4	▲ 4
Nickel	ppm	ASTM D5185m		**0**	<1	<1
Titanium	ppm	ASTM D5185m		**<1**	2	2
Silver	ppm	ASTM D5185m		**0**	0	0
Aluminum	ppm	ASTM D5185m	>25	**1**	▲ 41	▲ 40
Lead	ppm	ASTM D5185m	>35	**0**	0	0
Copper	ppm	ASTM D5185m	>50	**1**	17	16
Tin	ppm	ASTM D5185m	>5	**0**	<1	<1
Vanadium	ppm	ASTM D5185m		**<1**	<1	<1
Cadmium	ppm	ASTM D5185m		**0**	0	0

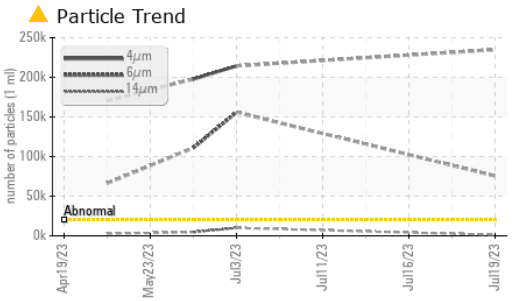
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	50	**14**	23	20
Barium	ppm	ASTM D5185m	15	**0**	26	24
Molybdenum	ppm	ASTM D5185m	15	**<1**	4	4
Manganese	ppm	ASTM D5185m		**<1**	3	3
Magnesium	ppm	ASTM D5185m	50	**2**	43	42
Calcium	ppm	ASTM D5185m	50	**16**	▲ 194	▲ 183
Phosphorus	ppm	ASTM D5185m	350	**184**	174	175
Zinc	ppm	ASTM D5185m	100	**13**	116	117
Sulfur	ppm	ASTM D5185m	12500	**10423**	11151	11299

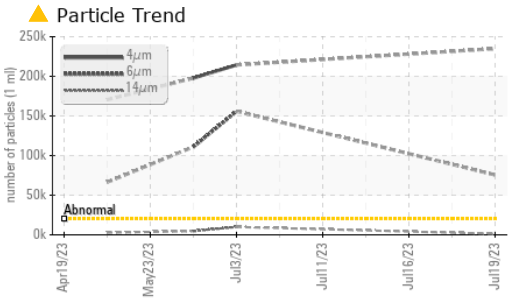
CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>50	**14**	⬢ 172	⬢ 162
Sodium	ppm	ASTM D5185m		**106**	1698	1591
Potassium	ppm	ASTM D5185m	>20	**0**	22	21

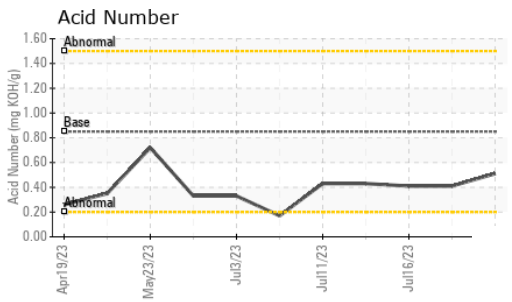
FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647	>20000	▲ **234889**	---	---
Particles >6µm		ASTM D7647	>5000	▲ **75606**	---	---
Particles >14µm		ASTM D7647	>640	▲ **1192**	---	---
Particles >21µm		ASTM D7647	>160	▲ **179**	---	---
Particles >38µm		ASTM D7647	>40	**3**	---	---
Particles >71µm		ASTM D7647	>10	**0**	---	---
Oil Cleanliness		ISO 4406 (c)	>21/19/16	▲ **25/23/17**	---	---

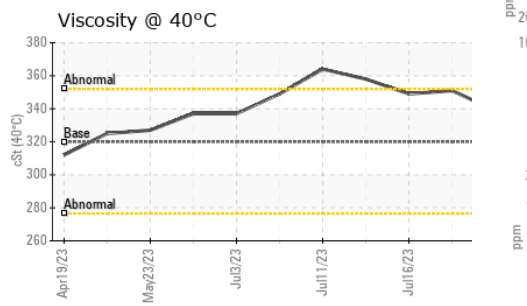
FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045	0.85	**0.51**	0.41	0.41

OIL ANALYSIS REPORT



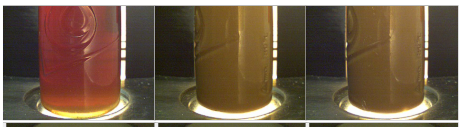




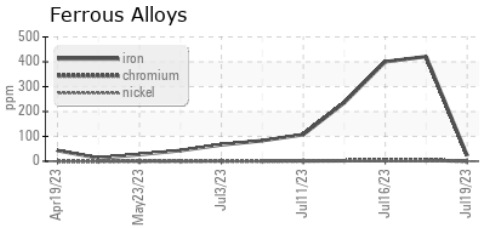


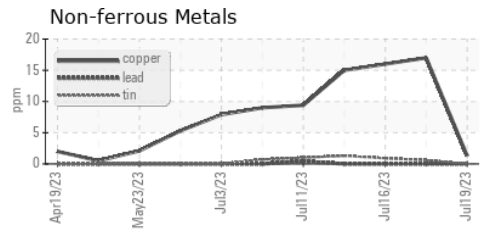
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Appearance	scalar	*Visual	NORML	**NORML**	▲ MILKY	▲ MILKY
Odor	scalar	*Visual	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	*Visual		**NEG**	▲ 0.2%	▲ 0.2%
Free Water	scalar	*Visual		**NEG**	NEG	NEG

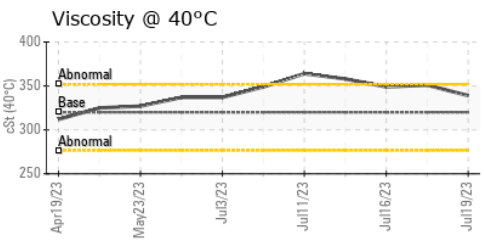
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	320	**339**	351	349

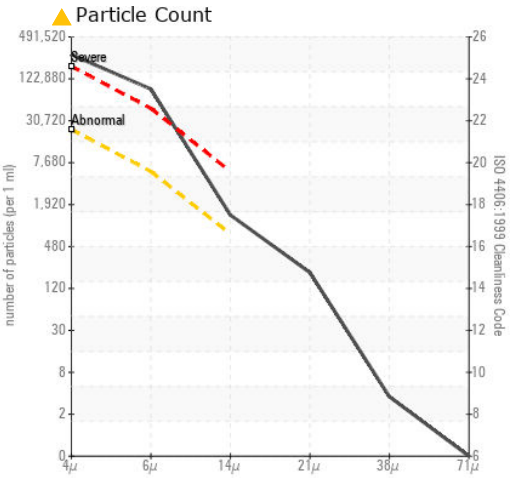
SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

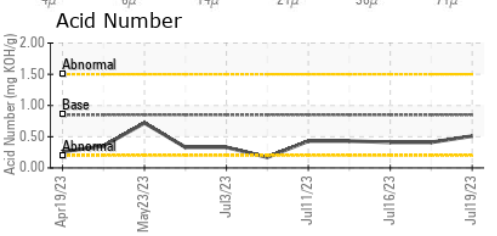
GRAPHS











Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : KL0012131 **Received** : 21 Jul 2023
Lab Number : 05904314 **Diagnosed** : 24 Jul 2023
Unique Number : 10565670 **Diagnostician** : Doug Bogart
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)

PATTERSON - UTI DRILLING
9915 WEST INDUSTRIAL
MIDLAND, TX
US 79706
Contact: MICHEAL EASTMAN
micheal.eastman@patenergy.com
T: (325)716-8686
F: (432)561-9388