



OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL

Area
RIG 1
Machine Id
R1-CHANGE SHACK NKL
Component
Diesel Engine
Fluid
CHEVRON 15W40 (--- GAL)

RECOMMENDATION

Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		KL0014069	KL0013140	KL0012897
Sample Date		Client Info		12 Dec 2023	03 Nov 2023	29 Sep 2023
Machine Age	hrs	Client Info		45272	45233	45196
Oil Age	hrs	Client Info		0	0	0
Filter Age	hrs	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				NORMAL	ATTENTION	ATTENTION

WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>100	12	17	22
Chromium	ppm	ASTM D5185m	>20	1	<1	<1
Nickel	ppm	ASTM D5185m	>4	1	<1	<1
Titanium	ppm	ASTM D5185m		<1	<1	<1
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	6	7	0
Lead	ppm	ASTM D5185m	>40	1	<1	<1
Copper	ppm	ASTM D5185m	>330	4	3	5
Tin	ppm	ASTM D5185m	>15	1	<1	<1
Vanadium	ppm	ASTM D5185m		0	<1	0
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE

CONTAMINATION

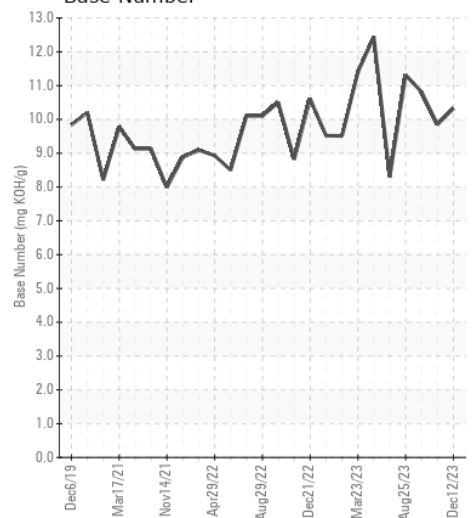
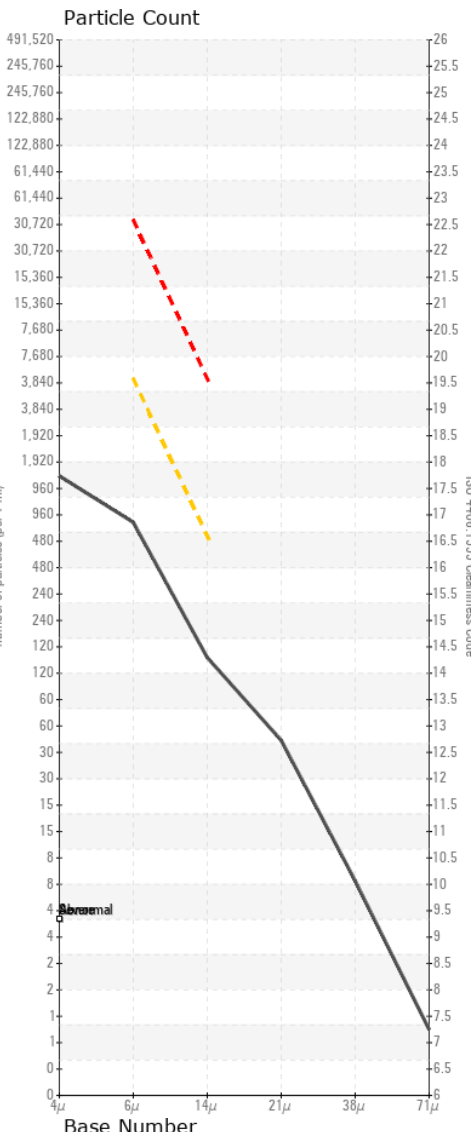
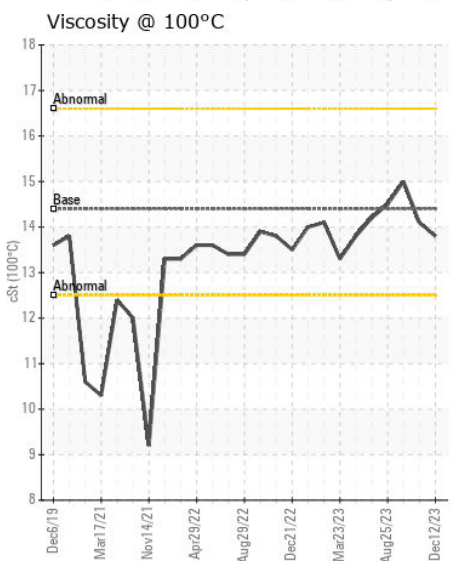
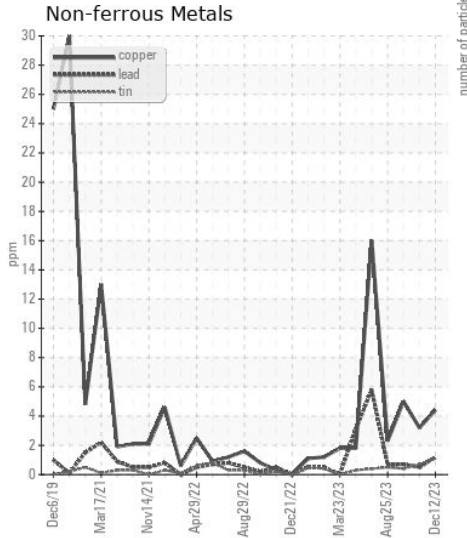
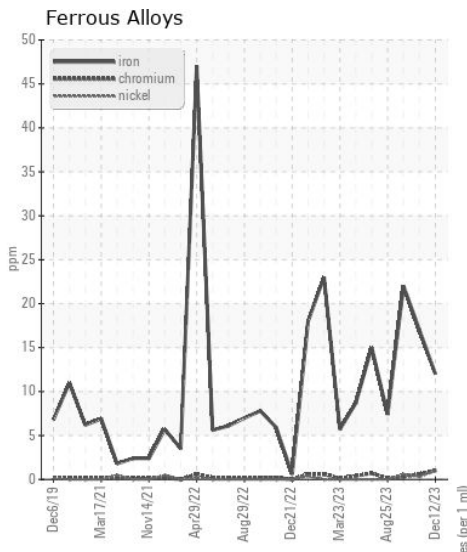
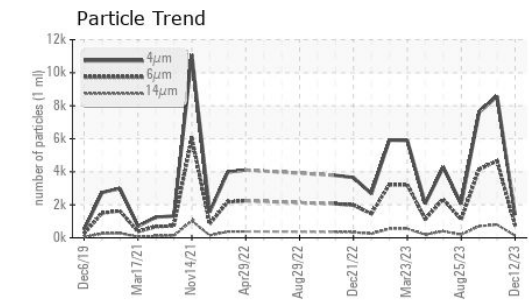
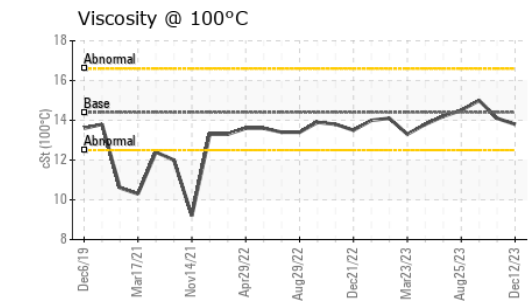
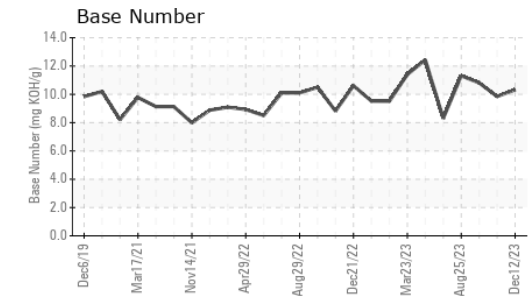
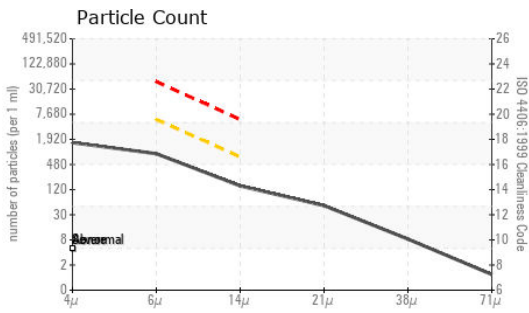
There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable.

Silicon	ppm	ASTM D5185m	>25	23	20	14
Potassium	ppm	ASTM D5185m	>20	3	<1	3
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844	>3	0.2	0.1	0.1
Nitration	Abs/cm	*ASTM D7624	>20	6.4	5.7	4.6
Sulfation	Abs/.1mm	*ASTM D7415	>30	22.8	22.8	20.9
Particles >4µm		ASTM D7647		1401	8560	7612
Particles >6µm		ASTM D7647	>5000	763	4663	4147
Particles >14µm		ASTM D7647	>640	130	▲ 794	▲ 706
Particles >21µm		ASTM D7647	>160	44	▲ 267	▲ 238
Particles >38µm		ASTM D7647	>40	7	▲ 41	37
Particles >71µm		ASTM D7647	>10	1	4	4
Oil Cleanliness		ISO 4406 (c)	>19/16	17/14	▲ 19/17	▲ 19/17
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	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	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	>50	1	7	17
Boron	ppm	ASTM D5185m		330	327	356
Barium	ppm	ASTM D5185m		0	<1	4
Molybdenum	ppm	ASTM D5185m		120	121	131
Manganese	ppm	ASTM D5185m		1	<1	<1
Magnesium	ppm	ASTM D5185m		656	680	573
Calcium	ppm	ASTM D5185m		1513	1517	1342
Phosphorus	ppm	ASTM D5185m		657	705	676
Zinc	ppm	ASTM D5185m		809	843	759
Sulfur	ppm	ASTM D5185m		2806	2752	3200
Oxidation	Abs/.1mm	*ASTM D7414	>25	16.5	15.9	14.2
Base Number (BN)	mg KOH/g	ASTM D2896		10.32	9.85	10.81
Visc @ 100°C	cSt	ASTM D445	14.4	13.8	14.1	15.0



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : KL0014069 **Received** : 08 Jan 2024
Lab Number : 06055031 **Diagnosed** : 10 Jan 2024
Unique Number : 10820980 **Diagnostician** : Sean Felton
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 120
 ODESSA, TX
 US 79763

Contact: MIKE COMBDEN
 mcombden@citadelldrilling.com

T: (780)955-5509

F: