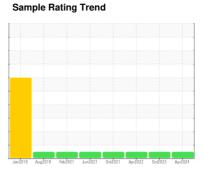


OIL ANALYSIS REPORT







DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. (Customer Sample Comment: PM-1 sampled fluid)

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

Fluid Condition

The condition of the oil is acceptable for the time in service.

Sample Number Client Info PCA0109340 PCA0087070 PCA0062498 Sample Date Client Info 04 Apr 2024 19 Oct 2023 05 Apr 2022 Machine Age hrs Client Info 17749 17273 16935 Oil Age hrs Client Info N/A Changed Not Changed Oil Changed Client Info N/A Changed Not Changed Sample Status NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >800 27 46 45 Chromium ppm ASTM D5185m >5 <1 0 0 Titanium ppm ASTM D5185m >15 <1 <1 0 Silver ppm ASTM D5185							
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 17749 17273 16935 Oil Age hrs Client Info 17749 17273 16717 Oil Changed Client Info N/A Changed Not Changed NoRMAL NORMAL	Sample Number		Client Info		PCA0109340	PCA0087070	PCA0062492
Oil Changed Dil Changed Sample Status Client Info 17749 17273 16717 Oil Changed Sample Status Client Info N/A Changed Not Changed Not Changed Not Changed Normal	Sample Date		Client Info		04 Apr 2024	19 Oct 2023	05 Apr 2022
Oil Changed Client Info N/A Changed Not Changed Normal Normal	Machine Age	hrs	Client Info		17749	17273	16935
NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history2 NEG N	Oil Age	hrs	Client Info		17749	17273	16717
NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history2	Oil Changed		Client Info		N/A	Changed	Not Changd
Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >800 27 46 45 Chromium ppm ASTM D5185m >10 <1 <1 <1 Nickel ppm ASTM D5185m >5 <1 0 0 Silver ppm ASTM D5185m >5 <1 0 0 Aluminum ppm ASTM D5185m >75 3 <1 1 Lead ppm ASTM D5185m >75 3 <1 1 Lead ppm ASTM D5185m >75 13 41 33 2 Actiniony ppm ASTM D5185m >8 1 3 2	-				NORMAL		NORMAL
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >800 27 46 45 Chromium ppm ASTM D5185m >5 <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium ppm ASTM D5185m >10 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <td>WEAR METAL</td> <td>.S</td> <td>method</td> <td>limit/base</td> <td>current</td> <td>history1</td> <td>history2</td>	WEAR METAL	.S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>800	27	46	45
Titanium	Chromium	ppm	ASTM D5185m	>10	<1	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>5	<1	0	0
Astropage	Titanium	ppm	ASTM D5185m	>15	<1	<1	0
Lead ppm ASTM D5185m >10 <1 0 <1 Copper ppm ASTM D5185m >75 13 41 33 Tin ppm ASTM D5185m >8 1 3 2 Antimony ppm ASTM D5185m >50 Vanadium ppm ASTM D5185m <1	Silver	ppm	ASTM D5185m	>2	0	0	<1
Copper ppm ASTM D5185m >75 13 41 33 Tin ppm ASTM D5185m >8 1 3 2 Antimony ppm ASTM D5185m >50 Vanadium ppm ASTM D5185m <1	Aluminum	ppm	ASTM D5185m	>75	3	<1	1
Tin	Lead	ppm	ASTM D5185m	>10	<1	0	<1
Antimony ppm ASTM D5185m >50	Copper	ppm	ASTM D5185m	>75	13	41	33
Antimony ppm ASTM D5185m >50	Tin	ppm	ASTM D5185m	>8	1	3	2
Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 2 22 169 158 Barium ppm ASTM D5185m 0 <1 19 0 Molybdenum ppm ASTM D5185m 0 <1 19 0 Manganese ppm ASTM D5185m 0 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 9 16 7 6 Calcium ppm ASTM D5185m 9 16 7 6 Calcium ppm ASTM D5185m 1099 938 997 1004 Zinc ppm ASTM D5185m 1245 1105 152 85 Sulfur ppm ASTM D5185m 7086 <	Antimony		ASTM D5185m	>50			
Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 2 22 169 158 Barium ppm ASTM D5185m 0 <1	•				<1	0	0
Boron	Cadmium						0
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 0 5 10 8 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 9 16 7 6 Calcium ppm ASTM D5185m 3114 3419 320 168 Phosphorus ppm ASTM D5185m 1099 938 997 1004 Zinc ppm ASTM D5185m 1245 1105 152 85 Sulfur ppm ASTM D5185m 7086 5318 33945 18706 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >20 1 0 <1 VISUAL method limit/base curren	Boron	ppm	ASTM D5185m	2	22	169	158
Manganese ppm ASTM D5185m 0 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Rarium	nnm	ACTM DE10Em	0	-1	19	0
Magnesium ppm ASTM D5185m 9 16 7 6 Calcium ppm ASTM D5185m 3114 3419 320 168 Phosphorus ppm ASTM D5185m 1099 938 997 1004 Zinc ppm ASTM D5185m 1099 938 997 1004 Zinc ppm ASTM D5185m 1245 1105 152 85 Sulfur ppm ASTM D5185m 7086 5318 33945 18706 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >20 1 0 <1	Danam	ppiii	HICOLCA INLOW	O	` '	10	U
Calcium ppm ASTM D5185m 3114 3419 320 168 Phosphorus ppm ASTM D5185m 1099 938 997 1004 Zinc ppm ASTM D5185m 1245 1105 152 85 Sulfur ppm ASTM D5185m 7086 5318 33945 18706 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >40 1 0 <1							
Calcium ppm ASTM D5185m 3114 3419 320 168 Phosphorus ppm ASTM D5185m 1099 938 997 1004 Zinc ppm ASTM D5185m 1245 1105 152 85 Sulfur ppm ASTM D5185m 7086 5318 33945 18706 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >40 1 0 <1	Molybdenum	ppm	ASTM D5185m	0	5	10	8
Phosphorus ppm ASTM D5185m 1099 938 997 1004 Zinc ppm ASTM D5185m 1245 1105 152 85 Sulfur ppm ASTM D5185m 7086 5318 33945 18706 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >20 1 0 <1	Molybdenum Manganese	ppm	ASTM D5185m ASTM D5185m	0	5 <1	10 <1	8 <1
Zinc ppm ASTM D5185m 1245 1105 152 85 Sulfur ppm ASTM D5185m 7086 5318 33945 18706 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >20 1 0 <1	Molybdenum Manganese Magnesium	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 9	5 <1 16	10 <1 7	8 <1 6
Sulfur ppm ASTM D5185m 7086 5318 33945 18706 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m >20 1 2 0 Potassium ppm ASTM D5185m >20 1 0 <1	Molybdenum Manganese Magnesium Calcium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 9 3114	5 <1 16 3419	10 <1 7 320	8 <1 6 168
Silicon ppm ASTM D5185m >400 15 5 3 Sodium ppm ASTM D5185m <1 2 0 Potassium ppm ASTM D5185m >20 1 0 <1 VISUAL method limit/base current history1 history2 White Metal scalar *Visual NONE NONE NONE LIGHT 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 NORML NORML NORML NORML Odor scalar *Visual NORML NORML NORML NORML	Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 9 3114 1099	5 <1 16 3419 938	10 <1 7 320 997	8 <1 6 168 1004
Sodium ppm ASTM D5185m <1 2 0 Potassium ppm ASTM D5185m >20 1 0 <1 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 NORML NORML NORML NORML Odor scalar *Visual NORML NORML NORML NORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 9 3114 1099 1245	5 <1 16 3419 938 1105	10 <1 7 320 997 152	8 <1 6 168 1004 85
PotassiumppmASTM D5185m>2010<1VISUALmethodlimit/basecurrenthistory1history2White Metalscalar*VisualNONENONENONELIGHTYellow Metalscalar*VisualNONENONENONENONEPrecipitatescalar*VisualNONENONENONENONESiltscalar*VisualNONENONENONENONEDebrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 9 3114 1099 1245 7086	5 <1 16 3419 938 1105 5318	10 <1 7 320 997 152 33945	8 <1 6 168 1004 85 18706
White Metal scalar *Visual NONE NONE NONE NONE LIGHT Yellow Metal scalar *Visual NONE NONE NONE NONE NONE Precipitate scalar *Visual NONE NONE NONE NONE NONE Silt scalar *Visual NONE NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NONE NONE Sand/Dirt scalar *Visual NONE NONE NONE NONE NONE Appearance scalar *Visual NONE NONE NONE NONE NONE Appearance scalar *Visual NORML NORML NORML NORML NORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 9 3114 1099 1245 7086	5 <1 16 3419 938 1105 5318	10 <1 7 320 997 152 33945 history1	8 <1 6 168 1004 85 18706 history2
White Metal scalar *Visual NONE NONE NONE LIGHT Yellow Metal scalar *Visual NONE NONE NONE NONE Precipitate scalar *Visual NONE NONE NONE NONE Silt scalar *Visual NONE NONE NONE NONE NONE Debris scalar *Visual NONE 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	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m method ASTM D5185m	0 0 9 3114 1099 1245 7086	5 <1 16 3419 938 1105 5318 current	10 <1 7 320 997 152 33945 history1	8 <1 6 168 1004 85 18706 history2 3
Yellow Metalscalar*VisualNONENONENONENONEPrecipitatescalar*VisualNONENONENONENONESiltscalar*VisualNONENONENONENONEDebrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 9 3114 1099 1245 7086 limit/base >400	5 <1 16 3419 938 1105 5318 current 15 <1	10 <1 7 320 997 152 33945 history1 5	8 <1 6 168 1004 85 18706 history2 3 0
Precipitatescalar*VisualNONENONENONENONESiltscalar*VisualNONENONENONENONEDebrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 9 3114 1099 1245 7086 limit/base >400	5 <1 16 3419 938 1105 5318 current 15 <1 1	10 <1 7 320 997 152 33945 history1 5 2	8 <1 6 168 1004 85 18706 history2 3 0 <1
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	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m Method ASTM D5185m	0 0 9 3114 1099 1245 7086 limit/base >400 >20 limit/base	5	10 <1 7 320 997 152 33945 history1 5 2 0 history1 NONE	8 <1 6 168 1004 85 18706 history2 3 0 <1 history2 LIGHT
Debrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal	ppm	ASTM D5185m Method *Visual *Visual	0 0 9 3114 1099 1245 7086 limit/base >400 >20 limit/base	5	10 <1 7 320 997 152 33945 history1 5 2 0 history1 NONE NONE	8 <1 6 168 1004 85 18706 history2 3 0 <1 history2 LIGHT NONE
Sand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal	ppm	ASTM D5185m Method *Visual *Visual	0 0 9 3114 1099 1245 7086 limit/base >400 >20 limit/base NONE	5	10 <1 7 320 997 152 33945 history1 5 2 0 history1 NONE NONE	8 <1 6 168 1004 85 18706 history2 3 0 <1 history2 LIGHT NONE
Appearancescalar*VisualNORMLNORMLNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m *Visual *Visual	0 0 9 3114 1099 1245 7086 Iimit/base >400 >20 Iimit/base NONE NONE	5	10 <1 7 320 997 152 33945 history1 5 2 0 history1 NONE NONE NONE	8 <1 6 168 1004 85 18706 history2 3 0 <1 LIGHT NONE NONE
Odor scalar *Visual NORML NORML NORML NORML	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m *Visual *Visual *Visual *Visual	0 0 9 3114 1099 1245 7086 limit/base >400 >20 limit/base NONE NONE	5	10 <1 7 320 997 152 33945 history1 5 2 0 history1 NONE NONE NONE NONE	8 <1 6 168 1004 85 18706 history2 3 0 <1 history2 LIGHT NONE NONE NONE
	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt Debris	ppm	ASTM D5185m method ASTM D5185m ASTM D5185m *Visual *Visual *Visual *Visual *Visual *Visual	0 0 9 3114 1099 1245 7086 Iimit/base >400 >20 Iimit/base NONE NONE NONE	5	10 <1 7 320 997 152 33945 history1 5 2 0 history1 NONE NONE NONE NONE NONE NONE	8 <1 6 168 1004 85 18706 history2 3 0 <1 LIGHT NONE NONE NONE
Emulsified Water scalar *Visual >0.2 NEG NEG NEG	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt	ppm	ASTM D5185m method ASTM D5185m ASTM D5185m *Visual *Visual *Visual *Visual *Visual *Visual *Visual *Visual	0 0 9 3114 1099 1245 7086 Iimit/base >400 >20 Iimit/base NONE NONE NONE NONE	5	10 <1 7 320 997 152 33945 history1 5 2 0 history1 NONE NONE NONE NONE NONE NONE NONE NON	8 <1 6 168 1004 85 18706 history2 3 0 <1 LIGHT NONE NONE NONE NONE NONE
	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium VISUAL White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m *Visual	0 0 9 3114 1099 1245 7086 limit/base >400 >20 limit/base NONE NONE NONE NONE NONE NONE NONE NON	5	10 <1 7 320 997 152 33945 history1 5 2 0 history1 NONE NONE NONE NONE NONE NONE NONE NON	8 <1 6 168 1004 85 18706 history2 3 0 <1 LIGHT NONE NONE NONE NONE NONE NORML

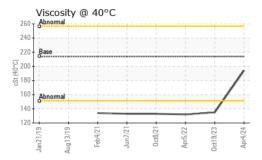
NEG

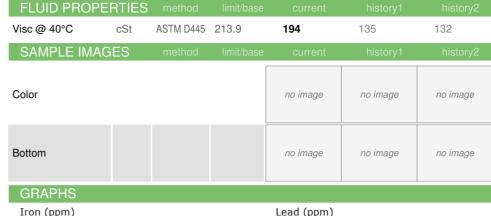
scalar *Visual

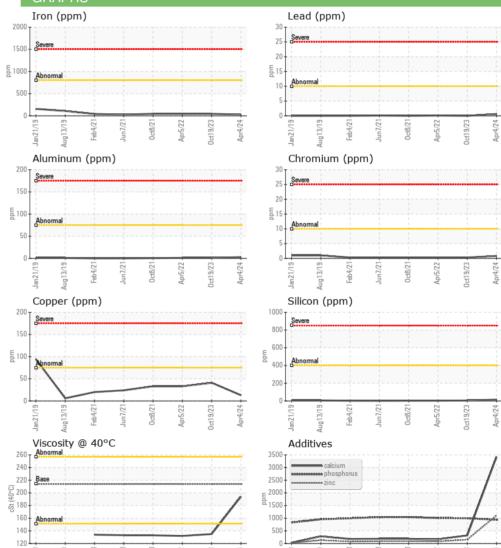
NEG



OIL ANALYSIS REPORT











Sample No.

Lab Number : 06149067 Unique Number : 10979145

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PCA0109340

Received **Tested** Diagnosed

: 15 Apr 2024 : 16 Apr 2024 : 17 Apr 2024 - Sean Felton

3395 W 50th St N Porter, OK US 74454 Contact:

Test Package : MOB 1 Certificate 12367 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)

muskogee@muskogeesand.com

Kemp Quarries - Muskogee Sand

Report Id: KEMPOR [WUSCAR] 06149067 (Generated: 04/17/2024 14:11:29) Rev: 1

Submitted By:

T:

F: