

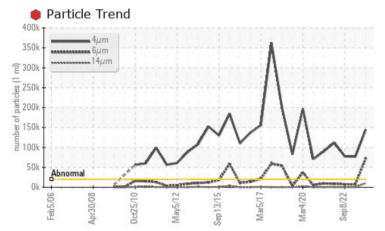
PROBLEM SUMMARY

Area 1314 Machine Id MILL FEED CONVEYOR Component

Gearbox

PETRO CANADA ENDURATEX SYNTHETIC EP 220 (50 LTR)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend you service the filters on this component. Confirm the source of the lubricant being utilized for top-up/fill. Resample in 30-45 days to monitor this situation.

PROBLEMATIC TEST RESULTS							
Sample Status				SEVERE	ABNORMAL	ABNORMAL	
Lithium	ppm	ASTM D5185(m)		<u> </u>	<u> </u>	<u> </u>	
Particles >4µm		ASTM D7647	>20000	🔺 144364	A 76537	A 77491	
Particles >6µm		ASTM D7647	>5000	e 71847	6924	▲ 7482	
Particles >14µm		ASTM D7647	>640	🛑 10298	395	114	
Particles >21µm		ASTM D7647	>160	e 3239	105	30	
Particles >38µm		ASTM D7647	>40	A 308	0	2	
Particles >71µm		ASTM D7647	>10	<u> </u>	0	1	
Oil Cleanliness		ISO 4406 (c)	>21/19/16	• 24/23/21	🔺 23/20/16	🔺 23/20/14	

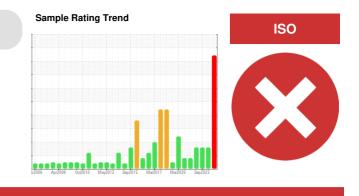
Customer Id: INCVOS Sample No.: PC0070110 Lab Number: 02590402 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Kevin Marson +1 (289)291-4644 x4644 Kevin.Marson@wearcheck.com

To change component or sample information: Gloria Gonzalez +1 (289)291-4643 x4643 <u>gloria.gonzalez@wearcheck.com</u>



RECOMMENDE	D ACTIONS			
Action	Status	Date	Done By	Description
Change Fluid			?	We recommend that you drain the oil from the component if this has not already been done.
Change Filter			?	We recommend you service the filters on this component.
Resample			?	Resample in 30-45 days to monitor this situation.
Check Breathers			?	The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather.
Check Dirt Access			?	We advise that you check all areas where contaminants can enter the system.
Check Fluid Source			?	Confirm the source of the lubricant being utilized for top-up/fill.

HISTORICAL DIAGNOSIS

27 Apr 2023 Diag: Kevin Marson





We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. We recommend an early resample to monitor this condition.All component wear rates are normal. Particles >4 μ m and oil cleanliness are abnormally high. Particles >6 μ m are notably high. Lithium (Li) level abnormal at 26ppm., indicates possible grease contamination. The AN level is acceptable for this fluid. The oil is no longer serviceable due to the presence of contaminants.



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08 Sep 2022 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. We recommend an early resample to monitor this condition.All component wear rates are normal. Particles >4µm and oil cleanliness are abnormally high. Particles >6µm are notably high. Lithium (Li) level abnormal at 29ppm., indicates possible grease contamination. The AN level is acceptable for this fluid. The oil is no longer serviceable due to the presence of contaminants.

04 Jul 2022 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. We recommend an early resample to monitor this condition.All component wear rates are normal. Particles $>4\mu$ m and oil cleanliness are abnormally high. Particles $>6\mu$ m are notably high. Lithium (Li) level abnormal at 27ppm., indicates possible grease contaminants.



Report Id: INCVOS [WCAMIS] 02590402 (Generated: 10/20/2023 10:51:16) Rev: 1



OIL ANALYSIS REPORT

Area 1314 Machine Id MILL FEED CONVEYOR Component

Gearbox

PETRO CANADA ENDURATEX SYNTHETIC EP 220 (50 LTR)

DIAGNOSIS

Recommendation

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend you service the filters on this component. Confirm the source of the lubricant being utilized for top-up/fill. Resample in 30-45 days to monitor this situation.

Wear

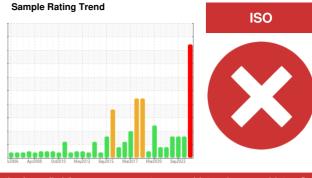
All component wear rates are normal.

Contamination

Lithium (Li) level abnormal at 33ppm., indicates possible grease contamination. There is a high amount of particulates (2 to 100 microns in size) present in the oil.

Fluid Condition

The AN level is acceptable for this fluid. The oil is no longer serviceable due to the presence of contaminants.



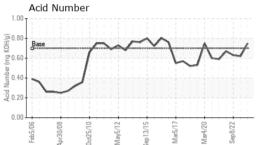
SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PC0070110	PC0040305	PC0040266
Sample Date		Client Info		11 Sep 2023	27 Apr 2023	08 Sep 2022
Machine Age	yrs	Client Info		0	0	0
Oil Age	yrs	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				SEVERE	ABNORMAL	ABNORMAL
WEAR METAL	S	method	limit/base	current	history1	history2
PQ		ASTM D8184*		0	0	0
Iron	ppm	ASTM D5185(m)	>200	18	11	12
Chromium	ppm	ASTM D5185(m)	>15	0	0	0
Nickel	ppm	ASTM D5185(m)	>15	<1	<1	<1
Titanium	ppm	ASTM D5185(m)		0	0	<1
Silver	ppm	ASTM D5185(m)		<1	0	0
Aluminum	ppm	ASTM D5185(m)	>25	<1	<1	<1
Lead	ppm	ASTM D5185(m)	>100	0	0	0
Copper	ppm	ASTM D5185(m)	>200	2	<1	<1
Tin	ppm	ASTM D5185(m)	>25	0	0	0
Antimony	ppm	ASTM D5185(m)	>5	<1	1	2
Vanadium	ppm	ASTM D5185(m)		0	0	0
Beryllium	ppm	ASTM D5185(m)		0	0	0
Cadmium	ppm	ASTM D5185(m)		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
				current	nistory i	motory
Boron	ppm	ASTM D5185(m)	33	14	13	13
	ppm ppm		33			
Boron		ASTM D5185(m)	33	14	13	13
Boron Barium	ppm	ASTM D5185(m) ASTM D5185(m)	33	14 <1	13 0	13 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5	14 <1 0	13 0 0	13 0 0
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5	14 <1 0 0	13 0 0 0	13 0 0 0
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5 5 5 437	14 <1 0 0 <1	13 0 0 0 <1	13 0 0 0 <1
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5 5 5 437	14 <1 0 0 <1 2	13 0 0 0 <1 0	13 0 0 0 <1 1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5 5 5 437	14 <1 0 0 <1 2 467	13 0 0 0 <1 0 469	13 0 0 0 <1 1 488
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5 5 5 437 5	14 <1 0 0 <1 2 467 24	13 0 0 0 <1 0 469 14	13 0 0 0 <1 1 488 14
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5 5 5 437 5	14 <1 0 <1 2 467 24 2638	13 0 0 0 <1 0 469 14 2633	13 0 0 0 <1 1 488 14 2444
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5 5 5 437 5 5000	14 <1 0 <1 2 467 24 2638 ▲ 33	13 0 0 0 <1 0 469 14 2633 ▲ 26	13 0 0 <1 1 488 14 2444 ▲ 29
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	33 5 5 5 437 5 5000 Iimit/base	14 <1 0 0 <1 2 467 24 2638 ▲ 33 current	13 0 0 0 <1 0 469 14 2633 ≥6 history1	13 0 0 0 <1 1 488 14 2444 ≥29 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	33 5 5 5 437 5 5000 Iimit/base	14 <1 0 0 <1 2 467 24 2638 ▲ 33 <u>current</u> 10	13 0 0 0 <1 0 469 14 2633 26 26 history1 9	13 0 0 0 <1 1 488 14 2444 ≥444 ≥9 history2 7
Boron Barium Molybdenum Manganese Magnesium Calcium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	33 5 5 5 5 437 5 5000 limit/base >50	14 <1 0 0 <1 2 467 24 2638 ▲ 33 Current 10 <1	13 0 0 3 4 1 4 69 14 2 6 3 2 6 2 6	13 0 0 <1 1 488 14 2444 ▲ 29 ► 13 7 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	33 5 5 5 437 5 5000 limit/base >50	14 <1 0 0 <1 2 467 24 2638 ▲ 33 <u>current</u> 10 <1 1	13 0 0 0 <1 0 469 14 2633 ▲ 26 history1 9 0 2	13 0 0 0 <1 1 488 14 2444 ≥ 2444 ≥ 29 history2 7 < 7 <1 1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	33 5 1 5 5 437 5 5000 1 imit/base >50 20 1 imit/base	14 <1 0 0 <1 2 467 24 2638 33 Current 10 <1 1 Current	13 0 0 0 <1 0 469 14 2633 ▲ 26 history1 9 0 2 history1	13 0 0 (0 <1 1 488 14 2444 ≥9 history2 7 <1 1 1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	33 5 5 4 3 5 5 5 000 1 1 1 1 1 1 2 0 1 1 1 1 1 2 0 0 1 1 1 1	14 <1 0 0 <1 2 467 24 2638 ▲ 33 Current 10 <1 1 1 Current ▲ 144364	13 0 0 0 4 1 4 69 14 2 6 33 2 6 bistory1 9 0 2 2 bistory1	13 0 0 0 <1 1 488 14 2444 ≥9 history2 7 <1 1 1 history2 ∧ 77491
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	33 5 5 5 437 5 5000 imit/base >50 20 imit/base >20 imit/base >200	14 <1 0 0 <1 2 467 24 2638 ▲ 33 Current 10 <1 1 1 Current ▲ 144364 ▲ 144364	13 0 0 0 4 1 4 6 9 14 2 6 33 2 6 history1 9 0 2 history1 9 0 2 history1 0 2 2	13 0 0 0 <1 1 488 14 2444 ≥ 29 history2 7 <1 1 1 1 history2 2 7 <1 1 1 2 4 2 9
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >6µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647	33 5 5 5 437 5 5000 imit/base >50 20 imit/base >20 imit/base >200	14 <1 0 0 <1 2 467 24 2638 ▲ 33 Current 10 <1 1 Current 1 1 Current ▲ 144364 ● 71847 ● 10298	13 0 0 0 4 1 4 69 14 2 6 33 2 6 6 2 0 2 0 2 0 2 0 2 0 2 0 2 0 0 2 0 0 2 0 0 2 0 0 2 0 0 2 0 0 2 0	13 0 0 0 <1 1 488 14 2444 ≥ 29 history2 7 <1 1 1 × 1 2 × 7 × 1 2 × 1 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	33 5 5 5 5 437 5 5000 limit/base >50 20 limit/base >20 limit/base >200 limit/base >20000 >5000 >5000	14 <1 0 0 <1 2 467 24 2638 33 Current 10 <1 1 1 Current 10 <1 1 1 0 <1 1 1 0 <1 1 0 <1 1 0 <1 1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 1 0 <1 1 0 <1 1 1 0 <1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	13 0 0 0 3 10 469 14 2633 ▲ 26 history1 9 0 2 history1 4 9 0 2 7 6 9 0 2 2 history1	13 0 0 0 <1 1 488 14 2444 ≥ 29 bistory2 7 <1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1



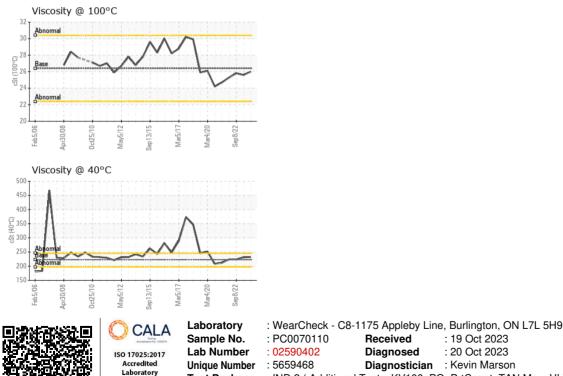
OIL ANALYSIS REPORT

91,520 Severe 22,880	ticle Coun				26 24
30,720 Abnon	nal				22
7,680			_		-20
1,920-		-	1		-18
480 -					-16
120-					14
30 -					-12
8-					-10
2-					-8
0 4µ	6µ	14µ	21µ	38µ	71µ
400k 350k 300k 2200k 2200k 150k 100k	4μm 6μm 14μm	~	\mathcal{M}	M	\sim
	ormai			11	1

FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.7	0.75	0.62	0.63
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	VLITE	NONE	NONE
Silt	scalar	Visual*	NONE	NONE	NONE	NONE
Debris	scalar	Visual*	NONE	VLITE	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
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	223	232	231	224
Visc @ 100°C	cSt	ASTM D7279(m)	26.39	26.0	25.6	25.8
Viscosity Index (VI)	Scale	ASTM D2270*	151	143	141	146
SAMPLE IMAG	iES	method	limit/base	current	history1	history2
				Set Lill		
Color						







Goose Bay, NL Diagnosed : 20 Oct 2023 Diagnostician : Kevin Marson CA A0P 1C0 Test Package : IND 2 (Additional Tests: KV100, PQ, PrtCount, TAN Man, VI) Contact: Robert Feltham To discuss this sample report, contact Customer Service at 1-800-268-2131. robert.feltham@vale.com Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

: 19 Oct 2023

Received

Bottom

Report Id: INCVOS [WCAMIS] 02590402 (Generated: 10/20/2023 10:51:17) Rev: 1

Contact/Location: Robert Feltham - INCVOS

Voisey's Bay Mine Site, P.O. Box 7001, Stn. C Happy Valley

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F: x:

Vale - Voisey's Bay