



#### Machine Id 1612-5419-6003

DIAGNOSTICS

Component Gearbox Fluid PETRO CANADA SYNDURO SHB ISO150 (5 LTR)

### COMPONENT CONDITION SUMMARY



#### RECOMMENDATION

Check seals and/or filters for points of contaminant entry. 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. Resample in 30-45 days to monitor this situation.

PROBLEMATIC	TEST RESULT	S			
Sample Status			SEVERE	SEVERE	NORMAL
Particles >4µm	ASTM D7647	>20000	🔺 151919	9339343	267083
Particles >6µm	ASTM D7647	>5000	91059	98246	174523
Particles >14µm	ASTM D7647	>640	🔺 2649	<u> </u>	12607
Particles >21µm	ASTM D7647	>160	<u> </u>	207	1666
Oil Cleanliness	ISO 4406 (c)	>21/19/16	• 24/24/19	<b>e</b> 26/24/18	25/25/21

Customer Id: INCVOS Sample No.: PC0070666 Lab Number: 02590404 Test Package: IND 2



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To discuss the diagnosis or test data: Wes Davis +1 905-569-8600 x223 wesd@wearcheck.ca

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

RECOMMENDED	ACTIONS			
Action	Status	Date	Done By	Description
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 Seals			?	Check seals and/or filters for points of contaminant entry.

#### HISTORICAL DIAGNOSIS

03 Jul 2022 Diag: Wes Davis

10 Jan 2022 Diag: Kevin Marson

acceptable levels.

# ISO

Check seals and/or filters for points of contaminant entry. 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. Resample in 30-45 days to monitor this situation.All component wear rates are normal. Particles >6µm are severely high. Particles >4µm are severely high. Oil Cleanliness are severely high. Particles >14µm are abnormally high. The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to





Resample at the next service interval to monitor. Please specify the component make and model with your next sample. All component wear rates are normal. The water content is negligible. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. Viscosity of sample indicates oil is within ISO 150 range, advise investigate. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.





## **OIL ANALYSIS REPORT**

Sample Rating Trend

ISO

#### Machine Id 1612-5419-6003 Component

Gearbox

#### Fluid PETRO CANADA SYNDURO SHB ISO150 (5 LTR)

#### DIAGNOSIS

#### Recommendation

Check seals and/or filters for points of contaminant entry. 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. Resample in 30-45 days to monitor this situation.

#### Wear

All component wear rates are normal.

#### Contamination

There is a high amount of silt (particulates < 14 microns in size) present in the oil.

#### Fluid Condition

The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

5 LTR)			012	1.1100	22	
		Jan	2022	JUIZUZZ SepZU	La ta ta un ad	history O
SAMPLE INFORM	ALION	method	limit/base	current	history1	history2
Sample Number		Client Info		PC0070666	PC0040014	PC0039895
Sample Date		Client Info		27 Sep 2023	03 Jul 2022	10 Jan 2022
Machine Age	hrs	Client Info		0	0	0
Oil Age	hrs	Client Info		0	0	0
Oil Changed		Client Info		Not Changd	N/A	N/A
Sample Status				SEVERE	SEVERE	NORMAL
WEAR METALS	S	method	limit/base	current	history1	history2
PQ		ASTM D8184*		59	1	36
Iron	ppm	ASTM D5185(m)	>200	73	97	230
Chromium	ppm	ASTM D5185(m)	>15	<1	0	<1
Nickel	ppm	ASTM D5185(m)	>15	<1	0	<1
Titanium	ppm	ASTM D5185(m)		0	<1	<1
Silver	ppm	ASTM D5185(m)		<1	0	0
Aluminum	ppm	ASTM D5185(m)	>25	1	1	3
Lead	ppm	ASTM D5185(m)	>100	0	<1	<1
Copper	ppm	ASTM D5185(m)	>200	<1	4	2
Tin	ppm	ASTM D5185(m)	>25	0	0	0
Antimony	ppm	ASTM D5185(m)	>5	0	<1	0
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
ADDITIVES Boron	ppm	method ASTM D5185(m)	limit/base	current 2	history1 <1	history2 <1
ADDITIVES Boron Barium	ppm ppm	method ASTM D5185(m) ASTM D5185(m)	limit/base	current 2 <1	history1 <1 0	history2 <1 0
ADDITIVES Boron Barium Molybdenum	ppm ppm ppm	Method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base 5.0	current 2 <1 0	history1 <1 0 0	history2 <1 0 0
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm ppm	methodASTM D5185(m)ASTM D5185(m)ASTM D5185(m)ASTM D5185(m)	limit/base	current 2 <1 0 0	history1 <1 0 0 <1	history2 <1 0 0 2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	methodASTM D5185(m)ASTM D5185(m)ASTM D5185(m)ASTM D5185(m)ASTM D5185(m)	limit/base 5.0 5.0	current           2           <1           0           0           6	history1 <1 0 0 <1 4	history2 <1 0 0 2 12
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base 5.0 5.0 5.0 5.0	Current 2 <1 0 0 6 3	history1 <1 0 0 <1 4 2	history2 <1 0 0 2 12 7
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base 5.0 5.0 5.0 100	Current 2 <1 0 0 6 3 143	history1 <1 0 0 <1 4 2 42	history2 <1 0 0 2 12 7 27
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	methodASTM 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)	limit/base 5.0 5.0 5.0 100 5.0	current           2           <1           0           6           3           143           4	<1         0         0         <1         4         2         42         3	<1         0         2         12         7         27         3
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	methodASTM D5185(m)ASTM D5185(m)	limit/base 5.0 5.0 5.0 100 5.0 1900	2 <1 0 0 6 3 143 4 6005	history1 <1 0 <1 4 2 42 3 2275	history2 <1 0 0 2 12 7 27 3 1798
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 5.0 100 5.0 1900	Current 2 <1 0 0 6 3 143 4 6005 <1	history1 <1 0 <1 4 2 42 3 2275 <1	<1         0         2         12         7         27         3         1798         <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 100 5.0 1900 limit/base	2         <1         0         6         3         143         4         6005         <1         current	history1         <1         0         <1         4         2         42         3         2275         <1         history1	<1         0         2         12         7         27         3         1798         <1         history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 5.0 100 5.0 1900 limit/base >50	2         <1         0         6         3         143         4         6005         <1         Current         20	history1         <1         0         <1         4         2         42         3         2275         <1         history1         6	<1         0         2         12         7         27         3         1798         <1         history2         11
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 5.0 100 5.0 1900 limit/base >50	2         <1         0         6         3         143         4         6005         <1         current         20         37	history1         <1         0         <1         4         2         42         3         2275         <1         history1         6         39	<1         0         2         12         7         27         3         1798         <1         history2         11         106
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 100 5.0 1900 limit/base >50 >20	Current 2 <1 0 0 6 3 143 4 6005 <1 Current 20 37 1	<1         0         <1         4         2         42         3         2275         <1         history1         6         39         2	<1         0         2         12         7         27         3         1798         <1         history2         11         106         5
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 5.0 100 5.0 1900 5.0 1900 <b>limit/base</b> >20 <b>limit/base</b>	Current 2 </th <th>history1         &lt;1         0         &lt;1         4         2         42         3         2275         &lt;1         history1         6         39         2         history1</th> <th>&lt;1         0         12         7         27         3         1798         &lt;1         history2         11         106         5         history2</th>	history1         <1         0         <1         4         2         42         3         2275         <1         history1         6         39         2         history1	<1         0         12         7         27         3         1798         <1         history2         11         106         5         history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4um	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 5.0 100 5.0 1900 5.0 1900 200 200 200 20000	2         <1         0         6         3         143         4         6005         <1         20         37         1         current         20         37         1         current         1         1         1	history1         <1         0         <1         4         2         42         3         2275         <1         history1         6         39         2         history1         339343	<1         0         2         12         7         27         3         1798         <1         history2         11         106         5         history2         267083
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 5.0 100 5.0 1900 5.0 1900 200 2000 20000 >5000	Current         2         <1         0         6         3         143         4         6005         <1         20         37         1         Current         20         37         1         Current         91059	history1         <1         0         <1         4         2         42         3         2275         <1         history1         6         39         2         history1            98246	<1         0         2         12         7         27         3         1798         <1         history2         11         106         5         history2         267083         174523
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >6µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)	limit/base 5.0 5.0 5.0 100 5.0 1900 5.0 1900 5.0 1900 20 20 20 20 20 20 2000 25000 25000 25000 2640	2         <1         0         6         3         143         4         6005         <1         Current         20         37         1         Current         1         Current         91059         2649	<1         0         0         0         0         4         2         42         3         2275         <1         history1         6         39         2         history1            \$339343         \$98246         1691	<1         0         2         12         7         27         3         1798         <1         history2         11         106         5         history2         267083         174523         12607
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)           ASTM D7647           ASTM D7647           ASTM D7647	limit/base 5.0 5.0 5.0 100 5.0 1900 5.0 1900 5.0 1900 5.0 1900 5.0 20 10 10 10 10 10 10 10 10 10 10 10 10 10	2         <1         0         6         3         143         4         6005         <1         20         37         1         20         37         1         20         37         1         20         37         20         37         1         0         0         20         37         1         0         0         20         37         1         0         20         37         1         0         20         37         1         0         0         1059         2649         226	<1         0         0         <1         4         2         42         3         2275         <1         history1         6         39         2         history1         6         39         2         history1         6         39         2         history1         2         1691         207	<1         0         12         12         7         27         3         1798         <1         history2         11         106         5         history2         267083         174523         12607         1666
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >4µm Particles >21µm Particles >38µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)           ASTM D7647           ASTM D7647           ASTM D7647           ASTM D7647           ASTM D7647           ASTM D7647	limit/base 5.0 5.0 5.0 100 5.0 1900 5.0 1900 5.0 1900 5.0 1900 5.0 1900 5.0 1900 1900 1900 1900 1900 1900 1900 19	2         <1         0         6         3         143         4         6005         <1         20         37         1         Current         20         37         1         Current         ●1059         ●2649         ●226         6	<1         0         0         <1         4         2         42         3         2275         <1         history1         6         39         2         history1         6         39         2         history1         0         339343         98246         1691         207         1	<1         0         2         12         7         27         3         1798         <1         history2         11         106         5         history2         267083         174523         12607         1666         32
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANL Particles >4µm Particles >4µm Particles >14µm Particles >38µm Particles >71µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185(m)           ASTM D7647           ASTM D7647           ASTM D7647           ASTM D7647           ASTM D7647	limit/base 5.0 5.0 5.0 100 5.0 1900 5.0 1900 5.0 1900 5.0 1900 5.0 1900 5.0 1900 5.0 1900 5.0 1900 5.0 1900 1900 1900 1900 1900 1900 1900 19	2         <1         0         6         3         143         4         6005         <1         20         37         1         Current         20         37         1         Current         ▲ 151919         ● 91059         ▲ 2649         ▲ 3	<1         0         <1         4         2         42         3         2275         <1 <b>history1</b> 6         39         2 <b>history1</b> 6         399         2 <b>history1</b> 0         0	<1         0         2         12         7         27         3         1798         <1         1798         <1         5         history2         11         106         5         history2         267083         174523         12607         1666         32         0

Report Id: INCVOS [WCAMIS] 02590404 (Generated: 10/20/2023 10:37:40) Rev: 1



491,520 122,88 Ê 30,720 7,68

1.920

135

130

Abnormal

Particle Count

## **OIL ANALYSIS REPORT**

FLUID DEGRA	DATION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.3	0.50	0.26	0.19
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	VLITE	NONE	NONE
Debris	scalar	Visual*	NONE	NONE	VLITE	VLITE
Sand/Dirt	scalar	Visual*	NONE	NONE	NONE	NONE
Appearance	scalar	Visual*	NORML	NORML	NORML	MILKY
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	history
Visc @ 40°C	cSt	ASTM D7279(m)	148	156	146	149
Visc @ 100°C	cSt	ASTM D7279(m)	20.34	20.1	20.1	20.2
Viscosity Index (VI)	Scale	ASTM D2270*	159	149	159	157
SAMPLE IMAG	iES	method	limit/base	current	history1	history
Color						leod - pli
				0		



Vale - Voisey's Bay Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 CALA Sample No. : PC0070666 Received : 19 Oct 2023 Voisey's Bay Mine Site, P.O. Box 7001, Stn. C Happy Valley U Lab Number : 02590404 Diagnosed : 20 Oct 2023 Goose Bay, NL ISO 17025:2017 Accredited Laboratory Unique Number : 5659470 Diagnostician : Wes Davis 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 Т: 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. F: x:

ul3/22

Sep27/23