

# **OIL ANALYSIS REPORT**

## Sample Rating Trend







# <sup>Machine Id</sup> (S/N GZJ00315)

Component
Natural Gas Engine

PETRO CANADA SENTRON CG 40 (145 GAL)

#### DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor. ( Customer Sample Comment: Total oil added 3 gal)

#### Wear

All component wear rates are normal.

### Contamination

Fuel content negligible. There is no indication of any contamination in the oil.

### **Fluid Condition**

The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sample Date	RON CG 40 (145	GAL)	w2008 Feb2022	Mar2022 Apr2022 May202	2 Junž022 Julž022 Augž022 Sepž	022 Oct2022	
Client Info	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         113923         113758         113620           Oil Age         hrs         Client Info         140         258         120           Oil Changed         Client Info         N/A         N/A         N/A         NOT Changd           Sample Status         Description         Normal         ABNORMAL         ATTENTION           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         2         3         <1           Chromium         ppm         ASTM D5185m         >50         2         3         <1         history2           Iron         ppm         ASTM D5185m         >2         0         0         <1         1           Chromium         ppm         ASTM D5185m         >9         2         <1         2           Lead         ppm         ASTM D5185m         >30 <td>Sample Number</td> <td></td> <td>Client Info</td> <td></td> <th>WC0699057</th> <td>WC0699050</td> <td>WC0699049</td>	Sample Number		Client Info		WC0699057	WC0699050	WC0699049
Oil Age         hrs         Client Info         140         258         120           Oil Changed         Client Info         N/A         N/A         N/A         Not Changed           Sample Status         Client Info         N/A         N/A         N/A         NORMAL         ABNORMAL         ATTENTION           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         2         3         <1	Sample Date		Client Info		24 Oct 2022	17 Oct 2022	11 Oct 2022
Oil Age         hrs         Client Info         140         258         120           Oil Changed         Client Info         N/A         N/A         N/A         Not Changed           Sample Status         Client Info         N/A         N/A         N/A         NORMAL         ABNORMAL         ATTENTION           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         2         3         <1		hrs	Client Info				
Contament   Con							
NORMAL   ABNORMAL   ATTENTION   CONTAMINATION   method   limit/base   current   history1   history2	•		Client Info		-		Not Changd
Water         WC Method         >0.1         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >50         2         3         <1           Chromium         ppm         ASTM D5185m         >4         0         2         <1           Nickel         ppm         ASTM D5185m         >2         0         0         <1           Silver         ppm         ASTM D5185m         3         0         0         <1           Silver         ppm         ASTM D5185m         9         2         <1         2           Aluminum         ppm         ASTM D5185m         >9         2         <1         2           Lead         ppm         ASTM D5185m         >9         2         <1         2           Lead         ppm         ASTM D5185m         9         2         <1         2           Lead         ppm         ASTM D5185m         0         <1         <1         <1           Copper         ppm         ASTM D5185m         0         <2         2         2         2	Sample Status						
WEAR METALS	CONTAMINATION	٧	method	limit/base	current	history1	history2
Iron	Water		WC Method	>0.1	NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >4         0         2            Nickel         ppm         ASTM D5185m         >2         0         0         <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>50	2	3	<1
Titanium	Chromium	ppm	ASTM D5185m	>4	0	2	<1
Silver	Nickel	ppm	ASTM D5185m	>2	0	0	<1
Aluminum         ppm         ASTM D5185m         >9         2         <1         2           Lead         ppm         ASTM D5185m         >30         <1	Titanium	ppm	ASTM D5185m		0	0	<1
Lead         ppm         ASTM D5185m         >30         <1         4         1           Copper         ppm         ASTM D5185m         >35         2         6         3           Tin         ppm         ASTM D5185m         >4         2         2         2           Vanadium         ppm         ASTM D5185m         0         <1         <1           Cadmium         ppm         ASTM D5185m         0         0         2         1         <1           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         0         26         20           Barium         ppm         ASTM D5185m         1         0         0         0           Molybdenum         ppm         ASTM D5185m         2         2         28         13           Manganese         ppm         ASTM D5185m         1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1 <td>Silver</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;3</td> <th>0</th> <td>0</td> <td>0</td>	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper         ppm         ASTM D5185m         >35         2         6         3           Tin         ppm         ASTM D5185m         >4         2         2         2           Vanadium         ppm         ASTM D5185m         0         <1	Aluminum	ppm	ASTM D5185m	>9	2	<1	2
Tin	Lead	ppm	ASTM D5185m	>30	<1	4	1
Vanadium         ppm         ASTM D5185m         0         <1         <1           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         0         26         20           Barium         ppm         ASTM D5185m         1         0         0         0           Molybdenum         ppm         ASTM D5185m         2         2         28         13           Manganese         ppm         ASTM D5185m         2         2         28         13           Magnesium         ppm         ASTM D5185m         9         13         12         22           Calcium         ppm         ASTM D5185m         9         13         12         22           Calcium         ppm         ASTM D5185m         9         13         12         22           Calcium         ppm         ASTM D5185m         292         273         268         270           Zinc         ppm         ASTM D5185m         342         326         330         329	Copper	ppm	ASTM D5185m	>35	2	6	3
Vanadium Cadmium         ppm ASTM D5185m         0         <1         <1           Cadmium         ppm ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm ASTM D5185m         0         0         26         20           Barium         ppm ASTM D5185m         1         0         0         0           Molybdenum         ppm ASTM D5185m         2         2         28         13           Manganese         ppm ASTM D5185m         2         2         28         13           Magnesium         ppm ASTM D5185m         9         13         12         22           Calcium         ppm ASTM D5185m         9         13         12         22           Calcium         ppm ASTM D5185m         2712         2870         2759         2711           Phosphorus         ppm ASTM D5185m         292         273         268         270           Zinc         ppm ASTM D5185m         292         273         3486         3635           CONTAMINANTS         method         limit/base         current         history1         history2 <td>Tin</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;4</td> <th>2</th> <td>2</td> <td>2</td>	Tin	ppm	ASTM D5185m	>4	2	2	2
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         0         26         20           Barium         ppm         ASTM D5185m         1         0         0         0           Molybdenum         ppm         ASTM D5185m         2         2         28         13           Manganese         ppm         ASTM D5185m         1         <1	Vanadium		ASTM D5185m		0	<1	<1
Boron ppm ASTM D5185m 0 0 26 20  Barium ppm ASTM D5185m 1 0 0 0  Molybdenum ppm ASTM D5185m 2 2 2 28 13  Manganese ppm ASTM D5185m 9 13 12 22  Calcium ppm ASTM D5185m 2712 2870 2759 2711  Phosphorus ppm ASTM D5185m 292 273 268 270  Zinc ppm ASTM D5185m 342 326 330 329  Sulfur ppm ASTM D5185m 2575 3847 3486 3635  CONTAMINANTS method limit/base current history1 history2  Silicon ppm ASTM D5185m >+100 90 ▲ 163 79  Sodium ppm ASTM D5185m >20 0 22 6  Fuel % ASTM D3524 >4.0 0.2 0.2 0.2  INFRA-RED method limit/base current history1 history2  Soot % % "ASTM D7844 0.1 0.1 0.1 0.1  Nitration Abs/cm "ASTM D7844 0.1 0.1 0.1 0.1  Nitration Abs/m "ASTM D7844 0.1 0.1 0.1 0.1 0.1  Nitration Abs/m "ASTM D7844 0.1 0.1 0.1 0.1 0.1  Nitration Abs/m "ASTM D7844 0.1 0.1 0.1 0.1 0.1 0.1  Nitration Abs/m "ASTM D7844 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	Cadmium		ASTM D5185m		0	0	
Barium         ppm         ASTM D5185m         1         0         0         0           Molybdenum         ppm         ASTM D5185m         2         2         28         13           Manganese         ppm         ASTM D5185m         1         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         2         2         28         13           Manganese         ppm         ASTM D5185m         1         <1         <1         <1           Magnesium         ppm         ASTM D5185m         9         13         12         22           Calcium         ppm         ASTM D5185m         2712         2870         2759         2711           Phosphorus         ppm         ASTM D5185m         292         273         268         270           Zinc         ppm         ASTM D5185m         292         273         268         270           Zinc         ppm         ASTM D5185m         342         326         330         329           Sulfur         ppm         ASTM D5185m         2575         3847         3486         3635           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         90         △ 163         79           Sodium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D5185m         >20	Boron	ppm	ASTM D5185m	0	0	26	20
Manganese         ppm         ASTM D5185m         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         <1 <td>Barium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>1</td> <th>0</th> <td>0</td> <td>0</td>	Barium	ppm	ASTM D5185m	1	0	0	0
Magnesium         ppm         ASTM D5185m         9         13         12         22           Calcium         ppm         ASTM D5185m         2712         2870         2759         2711           Phosphorus         ppm         ASTM D5185m         292         273         268         270           Zinc         ppm         ASTM D5185m         342         326         330         329           Sulfur         ppm         ASTM D5185m         2575         3847         3486         3635           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D5185m         20         0         22         0.2           Soot %         *ASTM D7844         0.1         0.1	Molybdenum	ppm	ASTM D5185m	2	2	28	13
Calcium         ppm         ASTM D5185m         2712         2870         2759         2711           Phosphorus         ppm         ASTM D5185m         292         273         268         270           Zinc         ppm         ASTM D5185m         342         326         330         329           Sulfur         ppm         ASTM D5185m         2575         3847         3486         3635           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D3524         >4.0         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         4.5         5.1         4.7           Nitration         Abs/:mm	Manganese	ppm	ASTM D5185m	1	<1	<1	<1
Calcium         ppm         ASTM D5185m         2712         2870         2759         2711           Phosphorus         ppm         ASTM D5185m         292         273         268         270           Zinc         ppm         ASTM D5185m         342         326         330         329           Sulfur         ppm         ASTM D5185m         2575         3847         3486         3635           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D3524         >4.0         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         4.5         5.1         4.7           Nitration         Abs/:mm	-	ppm	ASTM D5185m	9	13	12	22
Phosphorus         ppm         ASTM D5185m         292         273         268         270           Zinc         ppm         ASTM D5185m         342         326         330         329           Sulfur         ppm         ASTM D5185m         2575         3847         3486         3635           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D3524         >4.0         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415	Calcium		ASTM D5185m	2712	2870	2759	2711
Zinc         ppm         ASTM D5185m         342         326         330         329           Sulfur         ppm         ASTM D5185m         2575         3847         3486         3635           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D5185m         >20         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0.1         0.1           Nitration         Abs/.mm         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415         >30	Phosphorus		ASTM D5185m	292	273	268	270
Sulfur         ppm         ASTM D5185m         2575         3847         3486         3635           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Sodium         ppm         ASTM D5185m         >+100         90         ▲ 163         79           Potassium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D5185m         >20         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0.1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.6         18.7         17.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414	·		ASTM D5185m	342		330	329
Silicon       ppm       ASTM D5185m       >+100       90       ▲ 163       79         Sodium       ppm       ASTM D5185m       15       ▲ 337       ● 146         Potassium       ppm       ASTM D5185m       >20       0       22       6         Fuel       %       ASTM D3524       >4.0       0.2       0.2       0.2       0.2         INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       *ASTM D7844       0.1       0.1       0.1         Nitration       Abs/cm       *ASTM D7624       >20       4.5       5.1       4.7         Sulfation       Abs/.1mm       *ASTM D7415       >30       16.6       18.7       17.3         FLUID DEGRADATION       method       limit/base       current       history1       history2         Oxidation       Abs/.1mm       *ASTM D7414       >25       8.4       9.3       8.8         Acid Number (AN)       mg KOH/g       ASTM D8045       0.98       0.81       0.83       0.74			ASTM D5185m	2575	3847	3486	3635
Sodium         ppm         ASTM D5185m         15         337         146           Potassium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D3524         >4.0         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0.1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.6         18.7         17.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	CONTAMINANTS		method	limit/base	current	history1	history2
Sodium         ppm         ASTM D5185m         15         ▲ 337         ● 146           Potassium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D3524         >4.0         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0.1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.6         18.7         17.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	Silicon	ppm	ASTM D5185m	>+100	90	<b>▲</b> 163	79
Potassium         ppm         ASTM D5185m         >20         0         22         6           Fuel         %         ASTM D3524         >4.0         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0.1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.6         18.7         17.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	Sodium		ASTM D5185m		15	<b>▲</b> 337	<b>146</b>
Fuel         %         ASTM D3524         >4.0         0.2         0.2         0.2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.1         0.1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.6         18.7         17.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74				>20			
Soot %         %         *ASTM D7844         0.1         0.1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.6         18.7         17.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	Fuel		ASTM D3524	>4.0	0.2	0.2	0.2
Nitration         Abs/cm         *ASTM D7624         >20         4.5         5.1         4.7           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.6         18.7         17.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         16.6         18.7         17.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	Soot %	%	*ASTM D7844		0.1	0.1	0.1
FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	Nitration	Abs/cm	*ASTM D7624	>20	4.5	5.1	4.7
Oxidation         Abs/.1mm         *ASTM D7414         >25         8.4         9.3         8.8           Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	Sulfation	Abs/.1mm	*ASTM D7415	>30	16.6	18.7	17.3
Acid Number (AN)         mg KOH/g         ASTM D8045         0.98         0.81         0.83         0.74	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
. ,	Oxidation	Abs/.1mm	*ASTM D7414	>25	8.4	9.3	8.8
Base Number (BN)         mg KOH/g         ASTM D2896         8.1         7.40         7.92         7.62	Acid Number (AN)	mg KOH/g	ASTM D8045	0.98	0.81	0.83	0.74
	Base Number (BN)	mg KOH/g	ASTM D2896	8.1	7.40	7.92	7.62



# **OIL ANALYSIS REPORT**







Laboratory Sample No.

Lab Number

: 05677420 Unique Number: 10191991

cSt (100°C)

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0699057 Received : 26 Oct 2022

**Tested** Diagnosed Test Package : MOB 2 ( Additional Tests: FuelDilution, PercentFuel )

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)



74265 Bombing Range Road Boardman, OR

4.0 Base M 2.0 0.0

Oct11/22 Sep 12/22

: 27 Oct 2022

: 31 Oct 2022 - Don Baldridge

US 97818 Contact: Blain Middleton

bmiddleton@archaea.energy T: (541)481-3232

F: