

### **OIL ANALYSIS REPORT**

Sample Rating Trend

NORMAL

# Machine Id 223031-10

#### Component Diesel Engine

Fluid PETRO CANADA DURON SHP 15W40 (--- GAL)

#### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

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 condition of the oil is suitable for further service.

SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0100191	GFL0091248	GFL0091225
Sample Date		Client Info		21 Dec 2023	09 Nov 2023	05 Oct 2023
Machine Age	hrs	Client Info		446816	446816	606
Oil Age	hrs	Client Info		446816	600	600
Oil Changed		Client Info		N/A	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>2.0	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	0.0
WEAR METAL	S	method	limit/base	current	history1	history2
					· · · · · · · · · · · · · · · · · · ·	
Iron	ppm	ASTM D5185m	>100	2	14	6
Chromium	ppm		>20	0	<1	0
Nickel	ppm	ASTM D5185m	>4	0	1	<1
Titanium Silver	ppm	ASTM D5185m	. 0	0	<1 <1	0
	ppm	ASTM D5185m		0		0
Aluminum	ppm	ASTM D5185m ASTM D5185m	>20	<1	1	
Lead	ppm			0	0	<1
Copper	ppm		>330	0	<1	<1 0
Tin Vanadium	ppm		>15	0	<1	0
Cadmium	ppm	ASTM D5185m ASTM D5185m		0	0	0
Caumum	ppm	ASTIVI DOTIONI		U	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 0	current 0	history1 0	history2 3
	ppm ppm					
Boron		ASTM D5185m	0	0	0 0 62	3
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	0 0	0	3 <1 63 <1
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	0 0 63 0 995	0 0 62	3 <1 63
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	0 0 63 0	0 0 62 0 918 1018	3 <1 63 <1 911 1022
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150	0 0 63 0 995	0 0 62 0 918 1018 987	3 <1 63 <1 911 1022 1037
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270	0 0 63 0 995 1141	0 0 62 0 918 1018 987 1178	3 <1 63 <1 911 1022 1037 1222
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060	0 0 63 0 995 1141 1049	0 0 62 0 918 1018 987 1178 2861	3 <1 63 <1 911 1022 1037
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270	0 0 63 0 995 1141 1049 1207	0 0 62 0 918 1018 987 1178	3 <1 63 <1 911 1022 1037 1222 3315 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>	0 0 60 0 1010 1070 1150 1270 2060	0 0 63 0 995 1141 1049 1207 3201	0 0 62 0 918 1018 987 1178 2861 <b>history1</b> 8	3 <1 63 <1 911 1022 1037 1222 3315 history2 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 1010 1070 1150 1270 2060	0 0 63 0 995 1141 1049 1207 3201 current	0 0 62 0 918 1018 987 1178 2861 <b>history1</b> 8 2	3 <1 63 <1 911 1022 1037 1222 3315 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>	0 0 60 0 1010 1070 1150 1270 2060 <b>limit/base</b>	0 0 63 0 995 1141 1049 1207 3201 <i>current</i> 2	0 0 62 0 918 1018 987 1178 2861 <b>history1</b> 8	3 <1 63 <1 911 1022 1037 1222 3315 history2 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 <b>limit/base</b>	0 0 63 0 995 1141 1049 1207 3201 current 2 0	0 0 62 0 918 1018 987 1178 2861 <b>history1</b> 8 2	3 <1 63 <1 911 1022 1037 1222 3315 history2 3 14
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060 <b>limit/base</b> >25 >20	0 0 63 0 995 1141 1049 1207 3201 current 2 0 2	0 0 62 0 918 1018 987 1178 2861 history1 8 2 2 2	3 <1 63 <1 911 1022 1037 1222 3315 history2 3 14 143
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 2060 225 >25	0 0 63 0 995 1141 1049 1207 3201 current 2 0 2 2 0 2	0 0 62 0 918 1018 987 1178 2861 history1 8 2 2 2 2 history1	3 <1 63 <1 911 1022 1037 1222 3315 history2 3 14 143 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 limit/base >3	0 0 63 0 995 1141 1049 1207 3201 current 2 0 2 0 2 current 0.1	0 0 62 0 918 1018 987 1178 2861 history1 8 2 2 2 history1 0.7	3 <1 63 <1 911 1022 1037 1222 3315 history2 3 14 143 history2 0.1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 2060 225 220 220 1imit/base >22 20	0 0 63 0 995 1141 1049 1207 3201 current 2 0 2 0 2 0 2 0 2 0 1 4.7	0 0 62 0 918 1018 987 1178 2861 history1 8 2 2 2 history1 0.7 8.0	3 <1 63 <1 911 1022 1037 1222 3315 history2 3 14 143 history2 0.1 4.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	0 0 0 1010 1070 1150 1270 2060 2060 225 20 220 220 20 3 20 20 20 20 20 20 20 20 20 20 20 20 20	0 0 63 0 995 1141 1049 1207 3201 <i>current</i> 2 0 2 <i>current</i> 0.1 4.7 17.5	0 0 62 0 918 1018 987 1178 2861 history1 8 2 2 2 history1 0.7 8.0 19.9 history1	3 <1 63 <1 911 1022 1037 1222 3315 history2 3 14 143 history2 0.1 4.4 17.1 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 2060 225 20 225 20 20 320 33 20 20	0 0 63 0 995 1141 1049 1207 3201 current 2 0 2 2 0 2 2 current 0.1 4.7 17.5	0 0 62 0 918 1018 987 1178 2861 history1 8 2 2 2 <u>history1</u> 0.7 8.0 19.9	3 <1 63 <1 911 1022 1037 1222 3315 history2 3 14 143 history2 0.1 4.4 17.1



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## **OIL ANALYSIS REPORT**

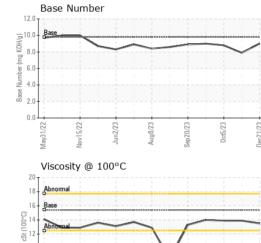
scalar

\*Visual

NONE

VISUAL

White Metal



Jun2/23

Nov15/22

Aug8/23	Sep20/23	0ct5/23 -	Sand/Dirt Appearance Odor	scalar scalar scalar	*Visual *Visual *Visual	NONE NORML NORML	NONE NORML NORML	NONE NORML NORML	NONE NORML NORML
°C			Emulsified Water Free Water	scalar scalar	*Visual *Visual	>0.2	NEG NEG	NEG NEG	NEG NEG
			FLUID PROPI		method	limit/base	current	history1	history2
$\sim$	r		Visc @ 100°C	cSt	ASTM D445		13.5	13.9	13.9
			GRAPHS						
	Y		Ferrous Alloys						
Aug8/23 -	Sep20/23 -	0ct5/23 -	30 - iron chromium	N	Λ				
Aug	Sept	00	25 - nickel						
				1	1				
				J		1			
				*	V				
			5-			1			
			lay31/22 lov15/22	Aug8/23	ep20/23	1/23			
			May31/22 Nov15/22 Jun2/23	Aug	Sep 20/23 0ct5/23	Dec21/23			
			Non-ferrous Meta	als					
			10 copper						
			8						
			8 - tin						
			8						
			8			~			
			8 - tin			$\mathbf{r}$			
			B - lead tin tin - lead	23					
			B - lead tin tin - lead	Aug6/23		Jec21/23			
			Marja1/122 mpm and marja			Dec21/23			
			B - lead tin tin - lead			Dec 2/123	Base Number		
			und tin tin tin tin tin tin tin tin			12	0		
			Uiscosity @ 100°			12	0 Base		
			Uiscosity @ 100° Constant			12	0 Base	_	
			Uiscosity @ 100° Constant			12	0 Base		
			B CZUIE			12	0 Base		
			B B C C C C C C C C C C C C C			10 10 10 10 10 10 10 10 10 10 10 10 10 1	0 - Base 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -		
			Uiscosity @ 100°	c	0ct5/23	12 10 10 10 10 10 10 10 10 10 10	0 - Base 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -		
			Uiscosity @ 100°	c	0ct5/23	12 10 10 10 10 10 10 10 10 10 10	0 - Base 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -		d5,223
			Uiscosity @ 100° Viscosity @ 100° 20 16 Base Coop)112 10			12 10 (6)HOX 8 10 10 10 10 10 10 10 10 10 10 10 10 10	0 0 0 0 0 0 0 0 0		Sep 2/0/2 Det5/2 Det2/1/2 Det2
		aboratory	Viscosity @ 100° 10	C	Sep20/23 Sep20/23 0.045/23	12 10 10 10 10 10 10 10 10 10 10	0 0 <b>Base</b> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Jun2/23 Aug8/23	<i>n</i> _
		-aboratory Sample No.	Uiscosity @ 100°	C	EZ/074b2 EZ/074	12 10 10 10 10 10 10 10 10 10 10	0 0 <b>Base</b> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	EZZgunn wrironmental - 1	66 - Phenix City
		Sample No. .ab Number	Viscosity @ 100° Viscosity @ 100° Viscosity @ 100° CZIEVEW Viscosity @ 100° CZIEVEW Viscosity @ 100° CZIEVEW Viscosity @ 100° CZIEVEW Viscosity @ 100° CZIEVEW CZIEVEW CZIEVEW Viscosity @ 100° CZIEVEW CZIEVE CZIEVEW CZIEVE CZIEVEW CZIEVEW CZIEVE CZIEVEW CZIEVE CZIEVE CZIEVEW CZIEVE C	C EZUBBAN 501 Madia Recieved Diagnose	EZ/02 <sup>db</sup> S son Ave., Ca d : 28 ed : 28	12 (0) (0) (0) (0) (0) (0) (0) (0)	0 0 <b>Base</b> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	tvironmental - 1 18 C	66 - Phenix City Id Brickyard Rd Phenix City, AL
		Sample No.	Uiscosity @ 100° Uiscosity @	C EZIGBINY 501 Madia Recieved	EZ/02 <sup>db</sup> S son Ave., Ca d : 28 ed : 28	12 10 10 10 10 10 10 10 10 10 10	0 0 <b>Base</b> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	tvironmental - 1 18 C	66 - Phenix City

NONE

NONE

NONE

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Submitted By: DARRIN WRIGHT