

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend





#### Component Diesel Engine

Fluid

PETRO CANADA DURON SHP 10W30 (--- QTS)

## 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

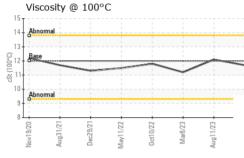
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0110883	PCA0102191	PCA0092510
Sample Date		Client Info		20 Dec 2023	11 Aug 2023	08 Mar 2023
Machine Age	mls	Client Info		202048	202048	176965
Oil Age	mls	Client Info		202048	25083	152354
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	9	15	13
Chromium	ppm	ASTM D5185m	>20	0	<1	<1
Nickel	ppm		>4	<1	0	<1
Titanium	ppm	ASTM D5185m		0	0	0
Silver	ppm	ASTM D5185m	>3	ء <1	0	0
Aluminum	ppm	ASTM D5185m	>20	2	2	4
Lead	ppm	ASTM D5185m	>40	0	0	<1
Copper	ppm	ASTM D5185m	>330	1	0	1
Tin	ppm	ASTM D5185m	>15	<1	0	<1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current	history1 0	history2 4
	ppm ppm					
Boron Barium	ppm	ASTM D5185m	2	6	0	4
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m	2 0	6 0	0 0	4
Boron Barium	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50	6 0 60	0 0 66	4 0 62
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0	6 0 60 <1	0 0 66 0	4 0 62 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950	6 0 60 <1 896	0 0 66 0 1014	4 0 62 <1 867
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950 1050	6 0 60 <1 896 1051	0 0 66 0 1014 1280	4 0 62 <1 867 1123
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995	6 0 60 <1 896 1051 1044	0 0 66 0 1014 1280 1109	4 0 62 <1 867 1123 952
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	2 0 50 0 950 1050 995 1180	6 0 60 <1 896 1051 1044 1256	0 0 66 0 1014 1280 1109 1463	4 0 62 <1 867 1123 952 1166
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 ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600	6 0 60 <1 896 1051 1044 1256 2907	0 0 66 0 1014 1280 1109 1463 4024	4 0 62 <1 867 1123 952 1166 2778
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	2 0 50 950 1050 995 1180 2600	6 0 60 <1 896 1051 1044 1256 2907 current	0 0 66 0 1014 1280 1109 1463 4024 history1	4 0 62 <1 867 1123 952 1166 2778 history2
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 ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>	2 0 50 950 1050 995 1180 2600 limit/base >25	6 0 60 <1 896 1051 1051 1044 1256 2907 current 7	0 0 66 0 1014 1280 1109 1463 4024 history1 7	4 0 62 <1 867 1123 952 1166 2778 history2 6
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	2 0 50 950 1050 995 1180 2600 limit/base >25	6 0 60 <1 896 1051 1044 1256 2907 current 7 2 2 4	0 0 66 0 1014 1280 1109 1463 4024 history1 7 0 0 0 0	4 0 62 <1 867 1123 952 1166 2778 history2 6 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>limit/base</b> >25 >20 <b>limit/base</b> >3	6 0 60 <1 896 1051 1044 1256 2907 <i>current</i> 7 2 4 <i>current</i> 0.6	0 0 66 0 1014 1280 1109 1463 4024 <b>history1</b> 7 0 0 0 <b>history1</b> 0.6	4 0 62 <1 867 1123 952 1166 2778 history2 6 0 4 history2 0.5
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>limit/base</b> >25 >20 <b>limit/base</b> >3	6 0 60 <1 896 1051 1044 1256 2907 <i>current</i> 7 2 907 <i>current</i> 4 <i>current</i> 0.6 8.8	0 0 66 0 1014 1280 1109 1463 4024 history1 7 0 0 0 <i>history1</i> 0.6 9.1	4 0 62 <1 867 1123 952 1166 2778 history2 6 0 4 history2 0.5 8.8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>limit/base</b> >25 >20 <b>limit/base</b> >3	6 0 60 <1 896 1051 1044 1256 2907 <i>current</i> 7 2 4 <i>current</i> 0.6	0 0 66 0 1014 1280 1109 1463 4024 <b>history1</b> 7 0 0 0 <b>history1</b> 0.6	4 0 62 <1 867 1123 952 1166 2778 history2 6 0 4 history2 0.5
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 <b>TS</b> ppm ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600 <i>limit/base</i> >25 >20 <i>limit/base</i> >3 >20	6 0 60 <1 896 1051 1044 1256 2907 <i>current</i> 7 2 907 <i>current</i> 4 <i>current</i> 0.6 8.8	0 0 66 0 1014 1280 1109 1463 4024 history1 7 0 0 0 <i>history1</i> 0.6 9.1	4 0 62 <1 867 1123 952 1166 2778 history2 6 0 4 history2 0.5 8.8
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 <b>TS</b> ppm ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 1050 955 1050 995 1180 2600 <b>imit/base</b> >25 <b>imit/base</b> >3 >20 >3 >30	6 0 60 <1 896 1051 1044 1256 2907 <i>current</i> 7 2 4 4 <i>current</i> 0.6 8.8 20.0	0 0 66 0 1014 1280 1109 1463 4024 history1 7 0 0 0 <b>history1</b> 0.6 9.1 20.4	4 0 62 <1 867 1123 952 1166 2778 history2 6 0 4 <b>history2</b> 0.5 8.8 20.0
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	ASTM D5185m ASTM D7844 *ASTM D7624	2 0 0 50 0 950 1050 995 1180 2600 2600 255 20 220 20 3 20 20 3 3 20 3 3 20 3 3 20 3 3 3 20 3 3 3 20 3 3 3 20 3 3 3 3	6 0 60 <1 896 1051 1044 1256 2907 <i>current</i> 7 2 907 <i>current</i> 0.6 8.8 20.0	0 0 66 0 1014 1280 1109 1463 4024 <b>history1</b> 7 0 0 0 <b>history1</b> 0.6 9.1 20.4 <b>history1</b>	4 0 62 <1 867 1123 952 1166 2778 history2 6 0 4 <b>history2</b> 0.5 8.8 20.0 <b>history2</b>



# **OIL ANALYSIS REPORT**

Base Number 8.0 7.0 - 1.0 0.0 May11/22 -/lar8/23 -Nov19/20 Aug31/21 Dec29/21



	VISUAL		method	limit/base		history1	history2
	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
1 1	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	NONE	NONE	NONE	NONE
23				NORML		NORML	NORML
Aug11/23 Dec20/23	Appearance	scalar	*Visual		NORML		
Di Ai	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
	Free Water	scalar	*Visual		NEG	NEG	NEG
	FLUID PROP		method	limit/base	current	history1	history2
	Visc @ 100°C	cSt	ASTM D445	12.00	11.7	12.1	11.2
	GRAPHS Ferrous Alloys						
	<sup>70</sup> T						
Aug11/23	60 - iron nickel						
Au	50						
	E 40						
	E 30						
	20						
	10		<u> </u>				
	0						
	/20 1/21-	122	/23 -	1/23			
	Nov19/20 Aug31/21 Dec29/21	May11/22 0ct10/22	Mar8/23 Aug 11/23	Dec20/23			
	Non-ferrous Met	2	4				
	10 <sub>T</sub>						
	copper						
	8 - tin						
	6						
	u dd						
	4						
		-					
	2-						
		(PERSONAL PROPERTY OF THE PERSON OF	Silling and	and the state of t			
	0	11/22	#8/23 -	20/23			
	Nov19/20 -	May11/22 - 0ct10/22 -	Mar8/23 Aug11/23	Dec20/23			
	0	May11 Oct10	Mar8/23 Aug11/23	Dec20/23	Base Number	r	
	Viscosity @ 1000	May11 Oct10	Mar8/23	Dec20/23	Base Number	r	
	Viscosity @ 1000	May11 Oct10	Mar8/23	8.		-	$\sim$
	Viscosity @ 1000	May11 Oct10	Mar8/23 Aug 11/23	8.		r	$\sim$
	Viscosity @ 1000	May11 Oct10	Mar6/23 Aug11/23	8.			$\sim$
	Viscosity @ 1000	May11 Oct10	Mar6/23	8.			$\geq$
	Viscosity @ 1000	May11 Oct10	Mar623	8.			
	12/16/2000 100 00 100 00 100 00 100 00 100 00 100 00	May11 Oct10	Mar623	8. 7. (0,6.) YBON B5. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.			
	Viscosity @ 1000 12/162390 Viscosity @ 1000 15 14 33 12 12 12 12 12 12 12 12 12 12	May11 Oct10	Mar623	8. 7. (0,6. HOX 5. but 4. 4.			
	Viscosity @ 1000 15 14 Abnormal 13 13 13 10 Abnormal	May11 Oct10		8: 7: (0)(6) 5: 5: 5: 5: 5: 5: 5: 5: 5: 5: 5: 5: 5:			
	Viscosity @ 1000 15 14 Abnormal 13 10 9 6 10 10 10 10 10 10 10 10 10 10	Dotto		8. 7. (0,6. HOX 5. b) 4. 3. W 3. 82. 1. 1. 0.			8123
	Viscosity @ 1000 15 14 Abnormal 13 13 13 10 Abnormal	May11 Oct10	Mar6/23 Mar6/23 Mar6/23 Mar6/23 Aug 11/23 Aug 11/23	8. 7. (D)(6.) 5. 5. 0 0 0 0 0 5. 5. 5. 0 5. 1. 8 8 2. 1.			Mar6/23
	Viscosity @ 100° 10761700 100° 100° 100° 100° 100° 100° 100°	May11/22  Oct10/22  Oct10  Oct10	Mar6/23	8: 7: (6)(6). 5: 5: 6)(6)(6) 9: 8: 8: 9: 1: 1: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0:	Aug31/21	May11/220ct10/220ct10/220	4
boratory mple No.	Viscosity @ 1000 15 14 Abnormal 13 10 9 6 10 10 10 10 10 10 10 10 10 10	May11/22  Oct10/22  Oct10  Oct10	EZULIONY EZQUEW son Ave., Ca	8: 7: (6)(6). 5: 5: 6)(6)(6) 9: 8: 8: 9: 1: 1: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0:	Aug31/21	0ct10/22 0ct10/22	4
boratory mple No.	<sup>1</sup> 12/16 <sup>239</sup> <sup>1</sup> 12/16 <sup>239</sup> <sup>1</sup> 12/16 <sup>239</sup> <sup>1</sup> 12/16 <sup>100</sup> <sup>1</sup> 12/10 <sup>100</sup> <sup>1</sup> 12/16 <sup>100</sup> <sup>1</sup>	0ct10 Madii	EZULIDINY Son Ave., Ca	84 71 (PhQ) Bull Jaquing 31 aquing 32 11 Ecclopped ry, NC 27511	Aug31/21	2711/ <sup>ke</sup> W 100 INDEPE	JMBIA DIVISIC
boratory mple No. b Number ique Number	Viscosity @ 100° Viscosity @ 100° Ahnomal	- 501 Madii Recieved	czygerw son Ave., Ca d : 03 c ed : 04 c	Ry, NC 2751: Jan 2024	Aug 31/21	UTE & CO - COLU 100 INDEPEI 100 INDEPEI	JMBIA DIVISIO NDENCE BLV COLUMBIA, S US 292 <sup>-</sup>
boratory mple No. b Number que Number st Package	Viscosity @ 100° <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup>	501 Madii Recieved Diagnos	czigetw son Ave., Ca d : 03 c ed : 04 c tician : Wes	ry, NC 2751: Jan 2024 Jan 2024 s Davis	Aug 31/21	TTE & CO - COLU 100 INDEPEI	JMBIA DIVISIO NDENCE BLV COLUMBIA, S US 2921

To discuss this same \* - 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)

Certificate L2367

Submitted By: Paul Riddick Page 2 of 2

F: