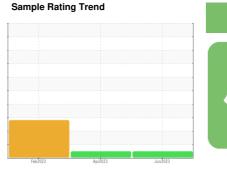


# **OIL ANALYSIS REPORT**





NORMAL



413030 MACK GRANITE

Diesel Engine

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

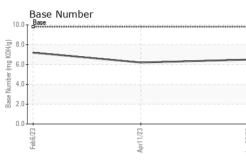
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

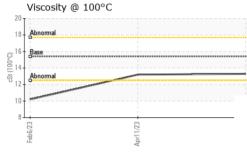
SAMPLE INFORI	MATION	method	limit/base	current	history 1	history 2
Sample Number		Client Info		GFL0087118	GFL0056611	GFL0056663
Sample Date		Client Info		28 Jun 2023	11 Apr 2023	06 Feb 2023
Machine Age	hrs	Client Info		1885	1283	2515
Oil Age	hrs	Client Info		1127	525	1757
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	ABNORMAL
CONTAMINAT	ION	method	limit/base	current	history 1	history 2
Fuel		WC Method	>3.0	<1.0	<1.0	0.5
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	9	method	limit/base	current	history 1	history 2
Iron		ASTM D5185m	>120	15	11	38
Chromium	ppm	ASTM D5185m	>120	<1	<1	2
Nickel	ppm	ASTM D5185m	>20	<1	<1	4
Titanium	ppm ppm	ASTM D5185m		0	0	4 <1
Silver		ASTM D5185m	>2	۰ <1	1	<1
Aluminum	ppm ppm	ASTM D5185m	>20	2	4	< 1 ▲ 15
Lead	ppm	ASTM D5185m	>20	2 <1	0	<1
Copper	ppm	ASTM D5185m	>330	44	207	198
Tin	ppm	ASTM D5185m	>15	1	0	4
Vanadium	ppm	ASTM D5185m	>15	0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
	ppm			-	-	-
		method			history 1	history 2
ADDITIVES	nnm	method	limit/base	current	history 1	history 2
Boron	ppm	ASTM D5185m	0	3	11	181
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	3 0	11 0	181 <1
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	3 0 75	11 0 60	181 <1 109
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	3 0 75 <1	11 0 60 <1	181 <1 109 4
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	3 0 75 <1 1043	11 0 60 <1 829	181 <1 109 4 703
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	3 0 75 <1 1043 1244	11 0 60 <1 829 1169	181 <1 109 4 703 1313
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	0 0 60 0 1010 1070 1150	3 0 75 <1 1043 1244 1143	11 0 60 <1 829 1169 907	181 <1 109 4 703 1313 644
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	3 0 75 <1 1043 1244	11 0 60 <1 829 1169	181 <1 109 4 703 1313
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	0 0 60 0 1010 1070 1150 1270 2060	3 0 75 <1 1043 1244 1143 1405 3424	11 0 60 <1 829 1169 907 1129 3045	181 <1 109 4 703 1313 644 813 2510
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	0 0 60 1010 1070 1150 1270 2060	3 0 75 <1 1043 1244 1143 1405	11 0 60 <1 829 1169 907 1129	181 <1 109 4 703 1313 644 813
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 1010 1070 1150 1270 2060	3 0 75 <1 1043 1244 1143 1405 3424 <i>current</i> 7	11 0 60 <1 829 1169 907 1129 3045 history 1 7	181 <1 109 4 703 1313 644 813 2510 history 2 ▲ 56
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	0 0 60 1010 1070 1150 1270 2060 kimit/base >25	3 0 75 <1 1043 1244 1143 1405 3424 current	11 0 60 <1 829 1169 907 1129 3045 history 1	181 <1 109 4 703 1313 644 813 2510 history 2
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	0 0 60 1010 1070 1150 1270 2060 kimit/base >25	3 0 75 <1 1043 1244 1143 1405 3424 current 7 3	11 0 60 <1 829 1169 907 1129 3045 history 1 7 <1	181 <1 109 4 703 1313 644 813 2510 history 2 ▲ 56 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>limit/base</b> >25	3 0 75 <1 1043 1244 1143 1405 3424 current 7 3 14 current	11 0 60 <1 829 1169 907 1129 3045 history 1 7 <1 8 history 1	181 <109 4 703 1313 644 813 2510 <b>history 2</b> 56 3 38 38
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	0 0 0 1010 1070 1150 1270 2060 2060 225 >25 >20 Limit/base >20	3 0 75 <1 1043 1244 1143 1405 3424 <i>current</i> 7 3 14 <i>current</i> 0.4	11 0 60 <1 829 1169 907 1129 3045 history 1 7 <1 8 history 1 0.2	181 <1 109 4 703 1313 644 813 2510 history 2 ▲ 56 3 38 history 2 0.3
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 TS ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <i>limit/base</i> >25 >20 <i>limit/base</i> >4 >20	3 0 75 <1 1043 1244 1143 1405 3424 <i>current</i> 7 3 14 <i>current</i> 0.4 8.0	11 0 60 <1 829 1169 907 1129 3045 history 1 7 <1 8 history 1 0.2 7.7	181 <1 109 4 703 1313 644 813 2510 history 2 56 3 38 history 2 0.3 10.3
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 <b>imit/base</b> >25 <b>imit/base</b> >4 >20 >30	3 0 75 <1 1043 1244 1143 1405 3424 <u>current</u> 7 3 14 <u>current</u> 0.4 8.0 20.6	11 0 60 <1 829 1169 907 1129 3045 history 1 7 <1 8 <u>history 1</u> 0.2 7.7 17.9	<ul> <li>181</li> <li>&lt;1</li> <li>109</li> <li>4</li> <li>703</li> <li>1313</li> <li>644</li> <li>813</li> <li>2510</li> <li>history 2</li> <li>56</li> <li>3</li> <li>38</li> <li>history 2</li> <li>0.3</li> <li>10.3</li> <li>23.8</li> </ul>
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 D7844 *ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 2060 225 220 220 imit/base >4 >20 >30	3 0 75 <1 1043 1244 1143 1405 3424 <i>current</i> 7 3 424 <i>current</i> 0.4 8.0 20.6 <i>current</i>	11 0 60 <1 829 1169 907 1129 3045 history 1 7 <1 8 history 1 0.2 7.7 17.9 history 1	<ul> <li>181</li> <li>&lt;1</li> <li>109</li> <li>4</li> <li>703</li> <li>1313</li> <li>644</li> <li>813</li> <li>2510</li> <li>history 2</li> <li>56</li> <li>3</li> <li>38</li> <li>history 2</li> <li>0.3</li> <li>10.3</li> <li>23.8</li> <li>history 2</li> </ul>
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 2060 225 20 220 20 20 20 20 20 20 20 20 20 20 20	3 0 75 <1 1043 1244 1143 1405 3424 <u>current</u> 7 3 14 <u>current</u> 0.4 8.0 20.6	11 0 60 <1 829 1169 907 1129 3045 history 1 7 <1 8 <u>history 1</u> 0.2 7.7 17.9	181 <1 109 4 703 1313 644 813 2510 bistory 2 ▲ 56 3 38 bistory 2 0.3 10.3 23.8



# **OIL ANALYSIS REPORT**

VISUAL





			method	limit/base	current	history 1	history 2
	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	NONE	NONE	NONE
	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
1/23		scalar	*Visual	NORML	NORML	NORML	NORML
Apr11/23	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
	Free Water	scalar	*Visual	20.L	NEG	NEG	NEG
	FLUID PROPE		method	limit/base	current	history 1	history 2
	Visc @ 100°C	cSt	ASTM D445		13.3	13.2	▲ 10.2
	GRAPHS						
	Ferrous Alloys						
	40 iron						
Apr11/23	35 30						
4	25						
	Ē_20						
	15						
	10	1-					
	5-						
		Weever and the second sec					
	Feb6/23	Apr11/23		Jun28/23			
	ם	Apr1		Jun2			
	Non-ferrous Meta	ls					
	250 copper						
	200 -	_					
	150						
	ш dd						
	ш dd						
	토 100-						
	Б 100 50 0	23		33			
	토 100-	kpr11/23		un28/23			
	Edd 100	April 1/23		Jun28/23			
	Б 100 50 0				Base Number		
	Viscosity @ 100°C			2000 2000 2000 2000 2000 2000 2000 200			
	الله 100 50 0 Viscosity @ 100°C 19 18 4bnormal 17			10.0	Base		
	Uiscosity @ 100°C			10.0	Base		
	Uiscosity @ 100°C			10.0	Base		
	Uiscosity @ 100°C			10.0	Base		
	الماري المالي ماري الماري ماري الماري مماري مماري مالماري مماري مماري مماري مماري مماري ممار			10.0	Base		
	Uiscosity @ 100°C			0.0 0.8 0.0 0.0 0.0 0.0 0.0	Base		
	Uiscosity @ 100°C			10.0 (0)HOX 6.0 Juny see 8 2.0	Base		
	Uiscosity @ 100°C			10.0 (0)HOX Bull Jaquing 4.0 880 940 940 940 940 940 940 940 940 940 94	Base	1/23	
	Uiscosity @ 100°C			10.0 (0)HOX 6.0 Juny see 8 2.0	Base	April 1/23	

Submitted By: Craig Johnson

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