# **PROBLEM SUMMARY**



# Machine Id 822011-162

Component Diesel Engine Fluid PETRO CANADA DURON SHP 15W40 (--- LTR)

# COMPONENT CONDITION SUMMARY



## RECOMMENDATION

No corrective action is recommended at this time. We recommend an early resample to monitor this condition.

PROBLEMATIC TEST RESULTS						
Sample Status				SEVERE	SEVERE	ABNORMAL
Aluminum	ppm	ASTM D5185m	>20	🛑 51	• 166	<b>1</b> 21

Customer Id: GFL656 Sample No.: GFL0096494 Lab Number: 05999780 Test Package: FLEET



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*To discuss the diagnosis or test data:* Don Baldridge +1 <u>don.b505@comcast.net</u>

*To change component or sample information:* Customer Service +1 1-800-237-1369 <u>customerservice@wearcheck.com</u>

RECOMMENDED	RECOMMENDED ACTIONS						
Action	Status	Date	Done By	Description			
Resample			?	We recommend an early resample to monitor this condition.			

## HISTORICAL DIAGNOSIS





Oil and filter change at the time of sampling has been noted. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.Piston, ring and cylinder wear is indicated. There is no

oil. The condition of the oil is acceptable for the time in service.



### 07 Feb 2023 Diag: Don Baldridge

18 Jul 2023 Diag: Don Baldridge



No corrective action is

No corrective action is recommended at this time. We recommend an early resample to monitor this condition.Piston, ring and cylinder wear is indicated. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the



### WEAR



### 29 Jul 2022 Diag: Don Baldridge

We advise that you check the fuel injection system. Oil and filter change at the time of sampling has been noted. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.Piston, ring and cylinder wear is indicated. There is an abnormal amount of solids and carbon present in the oil. Light fuel dilution occurring. The BN result indicates that there is suitable alkalinity remaining in the oil.





# **OIL ANALYSIS REPORT**

Sample Rating Trend



Machine Id 822011-162

Component Diesel Engine Fluid

PETRO CANADA DURON SHP 15W40 (--- LTR)

# DIAGNOSIS

### Recommendation

No corrective action is recommended at this time. We recommend an early resample to monitor this condition.

# 🛡 Wear

The aluminum level is severe for time on oil.

### 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 acceptable for the time in service.

SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0096494	GFL0061993	GFL0061979
Sample Date		Client Info		02 Nov 2023	18 Jul 2023	07 Feb 2023
Machine Age	hrs	Client Info		20175	20122	0
Oil Age	hrs	Client Info		53	600	0
Oil Changed		Client Info		Not Changd	Changed	N/A
Sample Status				SEVERE	SEVERE	ABNORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>2.0	<b>~10</b>	<1.0	<10
Glycol		WC Method	22.0	NEG	NEG	NEG
	C	mothod	limit/bass	ourropt	history(1	biotony2
	3	method	iinii/base	current	nistory i	nistoryz
Iron	ppm	ASTM D5185m	>100	86	298	▲ 114
Chromium	ppm	ASTM D5185m	>20	2	10	3
Nickel	ppm	ASTM D5185m	>4	<1	2	0
Litanium	ppm	ASTM D5185m		<1	<1	<1
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	<b>5</b> 1	<b>1</b> 66	<u> </u>
Lead	ppm	ASTM D5185m	>40	5	31	2
Copper	ppm	ASTM D5185m	>330	4	13	5
Tin	ppm	ASTM D5185m	>15	<1	2	<1
Vanadium	ppm	ASTM D5185m		0	<1	0
Cadmium	ppm	ASTM D5185m		<1	0	0
						bister
ADDITIVES		methoa	limit/base	current	history1	nistory2
Boron	ppm	ASTM D5185m	0	current 14	history1 24	9
Boron Barium	ppm ppm	ASTM D5185m ASTM D5185m	0 0	14 5	history1 24 0	9 0
Boron Barium Molybdenum	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	14 5 67	0 103	9 0 67
Boron Barium Molybdenum Manganese	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	current       14       5       67       <1	103 3	9 0 67 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	current 14 5 67 <1 953	nistory1 24 0 103 3 1422	9 0 67 <1 937
ADDITIVES 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	current       14       5       67       <1       953       1161	nistory1       24       0       103       3       1422       1867	9 0 67 <1 937 1161
ADDITIVES 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 ASTM D5185m	0 0 60 0 1010 1070 1150	14   5   67   <1   953   1161   1179	Nistory1   24   0   103   3   1422   1867   1604	9 0 67 <1 937 1161 1064
ADDITIVES 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 ASTM D5185m	10000000000000000000000000000000000000	14   5   67   <1   953   1161   1179   1267	Nistory1       24       0       103       3       1422       1867       1604       1863	9 0 67 <1 937 1161 1064 1272
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	IIMI//Dase       0       60       0       1010       1070       1150       1270       2060	current   14   5   67   <1   953   1161   1179   1267   3554	Phistory1     24     0     103     3     1422     1867     1604     1863     4117	9 0 67 <1 937 1161 1064 1272 3241
ADDITIVES Boron Barium Molybdenum Maganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm 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 ASTM D5185m	IImit/base 0 60 0 1010 1070 1150 1270 2060 Iimit/base	14     5     67     <1     953     1161     1179     1267     3554     current	Phistory1     24     0     103     3     1422     1867     1604     1863     4117     history1	9 0 67 <1 937 1161 1064 1272 3241 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm 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 ASTM D5185m	IImit/base 0 60 0 1010 1070 1150 1270 2060 Iimit/base >25	14   5   67   <1   953   1161   1179   1267   3554   current   9	nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22	9     0     67     <1     937     1161     1064     1272     3241     history2     6
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b>	ASTM D5185m ASTM D5185m	IIMI//base     0     60     0     1010     1070     1150     1270     2060     limit/base     >25	14   5   67   <1   953   1161   1179   1267   3554   current   9   4	nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22     13	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b>	ASTM D5185m ASTM D5185m	IIMI/Jase 0 0 60 0 1010 1070 1150 1270 2060 Iimit/base >25 >20	current   14   5   67   <1   953   1161   1179   1267   3554   current   9   4	Nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22     13     3	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3     3
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b> ppm ppm	ASTM D5185m ASTM D5185m	IImit/base 0 0 60 0 1010 1070 1150 1270 2060 Iimit/base >25 >20 Iimit/base	14     5     67     <1     953     1161     1179     1267     3554     current     9     4     4     current	Nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22     13     3     history1	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3     3
ADDITIVES 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	IImit/base 0 0 60 0 1010 1070 1150 1270 2060 Iimit/base >25 >20 Iimit/base >3	current     14     5     67     <1     953     1161     1179     1267     3554     current     9     4     current     0.7	Nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22     13     3     history1     2.8	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3     history2     1
ADDITIVES 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	Method       ASTM D5185m	IImit/base 0 0 60 0 1010 1070 1150 1270 2060 Iimit/base >25 >20 Iimit/base >3 >20	current     14     5     67     <1     953     1161     1179     1267     3554     current     9     4     current     0.7     8.6	Nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22     13     3     history1     2.8     20.1	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3     history2     1     937
ADDITIVES 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	IImit/base     0     60     0     1010     1070     1150     1270     2060     limit/base     >25     >20     limit/base     >3     >20     >30	current     14     5     67     <1     953     1161     1179     1267     3554     current     9     4     current     0.7     8.6     21.8	Nistory1     24     0     103     3     1422     1867     1604     1863     4117 <b>history1</b> 22     13     3     history1     2.8     20.1     41.2	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3     history2     1     9.7     22.6
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAD	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	IImit/base 0 0 60 0 1010 1070 1150 1270 2060 Iimit/base >25 >20 Iimit/base >3 >20 >30 Iimit/base	current     14     5     67     <1     953     1161     1179     1267     3554     current     9     4     current     0.7     8.6     21.8     current	Nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22     13     3     history1     2.8     20.1     41.2	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3     history2     1     9.7     22.6     history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm ppm ppm ppm	Method       ASTM D5185m       ASTM D7844       *ASTM D7415       method       *ASTM D7415	IImit/base 0 0 0 1010 1070 1150 1270 2060 Iimit/base >25 S20 Iimit/base >3 >20 S3 >20 S3 S3 S20 S3 S3 S20 S3 S3 S20 S3 S3 S3 S3 S3 S3 S3 S3 S3 S3	current     14     5     67     <1     953     1161     1179     1267     3554     current     9     4     current     0.7     8.6     21.8     current	Nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22     13     3     history1     2.8     20.1     41.2     history1	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3     history2     1     9.7     22.6     history2     17.5
ADDITIVES     Boron     Barium     Molybdenum     Manganese     Magnesium     Calcium     Phosphorus     Zinc     Sulfur     CONTAMINAN     Silicon     Sodium     Potassium     INFRA-RED     Soot %     Nitration     Sulfation     FLUID DEGRAM     Oxidation	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm ppm ppm ppm ppm pp	Method       ASTM D5185m       ASTM D7844       *ASTM D7415       method       *ASTM D7414	IImit/base 0 0 0 1010 1070 1150 1270 2060 Iimit/base >25 Salary Sa	current     14     5     67     <1     953     1161     1179     1267     3554     current     9     4     0.7     8.6     21.8     current     17.6	Nistory1     24     0     103     3     1422     1867     1604     1863     4117     history1     22     13     3     history1     2.8     20.1     41.2     history1     38.7     7.4	9     0     67     <1     937     1161     1064     1272     3241     history2     6     3     history2     1     9.7     22.6     history2     17.5     9.6



# **OIL ANALYSIS REPORT**





			11 11 11		1 A	
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	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
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	history2
Visc @ 100°C	cSt	ASTM D445	15.4	13.3	15.7	13.4
GRAPHS						
Ferrous Alloys						
	Å					
50 - chromium	$\Lambda$					
00-		Λ				
50		/				
50						
00		$\vee$				
			Thus, and			
May15/20 - Jul30/20 - Sep22/20 - Feb2/21-	Jan20/22 -	Jui29/22 - Feb7/23 - Jui18/23 -	Nov2/23 -			
Non-ferrous Meta	ls					
35 conner						
30 - lead						



To discuss this sample report, contact Customer Service at 1-800-237-1369.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

T: (540)727-0887

F:

<sup>\* -</sup> Denotes test methods that are outside of the ISO 17025 scope of accreditation.