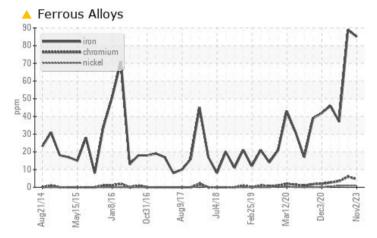


# **PROBLEM SUMMARY**



Machine Id **3507** Component **Diesel Engine** Fluid **PETRO CANADA DURON SHP 15W40 (10 GAL)** 

# COMPONENT CONDITION SUMMARY



# RECOMMENDATION

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

PROBLEMATI	C TEST	<b>FRESULT</b>	S			
Sample Status				ABNORMAL	ABNORMAL	NORMAL
Iron	ppm	ASTM D5185m	>75	<u> </u>	<u> </u>	37

Customer Id: GFL028 Sample No.: GFL0068129 Lab Number: 06003347 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data: Angela Borella +1 800-237-1369 angela.borella@wearcheckusa.com

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

RECOMMENDE	O ACTIONS			
Action	Status	Date	Done By	Description
Change Fluid			?	Oil and filter change at the time of sampling has been noted.
Change Filter			?	Oil and filter change at the time of sampling has been noted.

# HISTORICAL DIAGNOSIS



## 24 May 2023 Diag: Jonathan Hester

We advise that you check the fuel injection system. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.Piston, ring and cylinder wear is indicated. There is a moderate amount of fuel present in the oil. Fuel is present in the oil and is lowering the viscosity. The BN result indicates that there is suitable alkalinity remaining in the oil.



view report

### 28 Apr 2021 Diag: Jonathan Hester



Resample at the next service interval to monitor.All component wear rates are normal. 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 suitable for further service.

#### 07 Apr 2021 Diag: Wes Davis





Resample at the next service interval to monitor.All component wear rates are normal. 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 suitable for further service.







# **OIL ANALYSIS REPORT**

WEAR

# Machine Id 3507

Component Diesel Engine

Fluid

# PETRO CANADA DURON SHP 15W40 (10 GAL)

# DIAGNOSIS

#### A Recommendation

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

## 🔺 Wear

The iron level is abnormal. All other component wear rates are normal.

# Contamination

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

## Fluid Condition

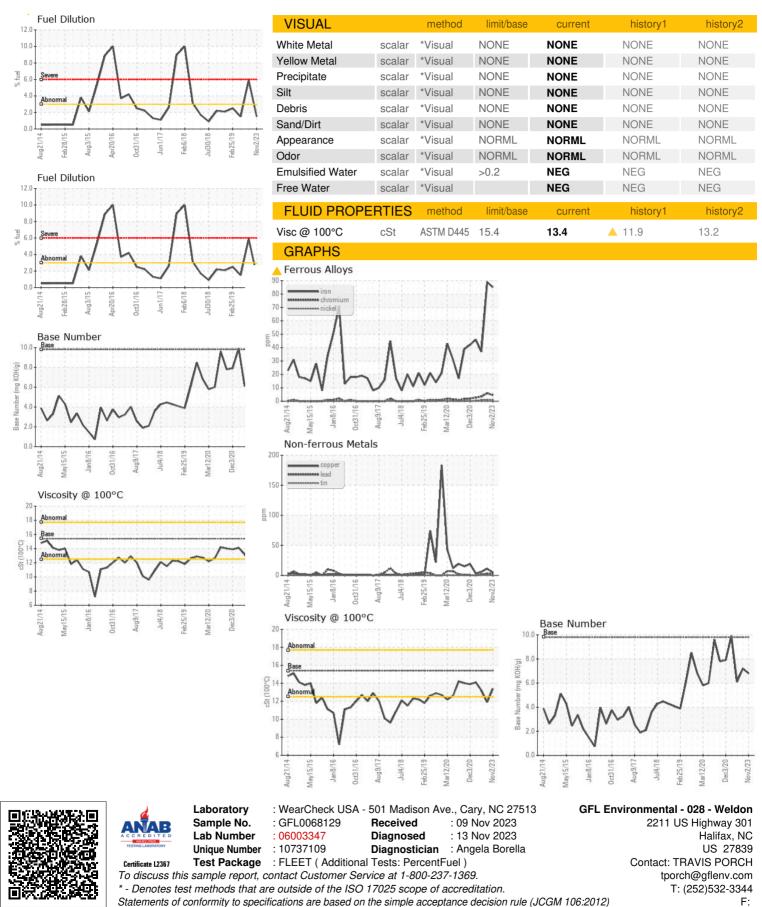
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.



Oil ChangedClient InfoChangedChangedNot ChangedSample StatusImit PaseABNORMALABNORMALNORMALCONTAMINATIONmethodlimit/basecurrenthistory1history2GlycolWC MethodImit/basecurrenthistory1history2WEAR METALSmethodlimit/basecurrenthistory1history2IronppmASTM D5185m>75▲ 85▲ 8937ChromiumppmASTM D5185m>25▲ 64NickelppmASTM D5185m>2<1<1<1TitaniumppmASTM D5185m>20<1<1SliverppmASTM D5185m>20<1<1AluminumppmASTM D5185m>253222CopperppmASTM D5185m>253222CopperppmASTM D5185m>40<1<1TinppmASTM D5185m>40<1<1VanadiumppmASTM D5185m00<1<2BoronppmASTM D5185m000<1BariumppmASTM D5185m0000MolybdenumppmASTM D5185m0000MolybdenumppmASTM D5185m012<1MagnesiumppmASTM D5185m1010873487 <th>SAMPLE INFORM</th> <th>MATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age     hrs     Client Info     5579     4645     79892       Oil Age     hrs     Client Info     600     656     305       Oil Age     hrs     Client Info     Changed     Changed     Not Changed       Sample Status     Imitbbas     current     History1     History2       Glycol     WC Method     Imitbbas     current     History1     History2       Glycol     WC Method     Imitbbas     current     History1     History2       Iron     ppm     ASTM D5185m     >5     A 6     4     4       Nickel     ppm     ASTM D5185m     >2     c1     c1 </th <th>Sample Number</th> <td></td> <td>Client Info</td> <td></td> <th>GFL0068129</th> <td>PCA0077269</td> <td>PCA0047665</td>	Sample Number		Client Info		GFL0068129	PCA0077269	PCA0047665
Machine Age     hrs     Client Info     5579     4645     79892       Oil Age     hrs     Client Info     600     656     305       Oil Agage     Kranged     Not Changed     Not Changed     Not Changed       Sample Status     method     imit/base     current     history1     history2       Glycol     WC Method     NEG     NEG     NEG     NEG       WEAR METALS     method     imit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >5     6     6     4       Nickel     ppm     ASTM D5185m     >2     0     <1     <1       Silver     ppm     ASTM D5185m     >2     0     <1     <1       Auminum     ppm     ASTM D5185m     >2     0     <1     <1       Copper     ppm     ASTM D5185m     >2     0     <1     <1       Copper     ppm     ASTM D5185m     >4     0     <1     <1<       Copo	Sample Date		Client Info		02 Nov 2023	24 May 2023	28 Apr 2021
Oli Changed Sample Status     Client Info     Changed ABNORMAL     Not Changed ABNORMAL     Not Changed ABNORMAL     Not Changed NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Glycol     WC Method     method     limit/base     current     history1     history2       Glycol     WC Method     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >75     & 85     & 89     37       Chromium     ppm     ASTM D5185m     >2     c1     c1     c1       Nickel     ppm     ASTM D5185m     >2     o     c1     c1       Silver     ppm     ASTM D5185m     >2     o     c1     c1     c1       Lead     ppm     ASTM D5185m     >100     5     111     6       Antimony     ppm     ASTM D5185m     0     0     0     c1       Qambinum     ppm     ASTM D5185m     0     10     2     c1 <th>Machine Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>5579</th> <th>4645</th> <th>79892</th>	Machine Age	hrs	Client Info		5579	4645	79892
Sample Status     Imit Point     ABNORMAL     ABNORMAL     NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Glycol     WC Method     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >75     A 85     89     37       Chromium     ppm     ASTM D5185m     >75     5     6     4       Nickel     ppm     ASTM D5185m     >2     0     <1     <1       Silver     ppm     ASTM D5185m     >15     9     19     10       Lead     ppm     ASTM D5185m     >15     9     11     6     11       Antimony     ppm     ASTM D5185m     >10     0     <1     1       Vanadium     ppm     ASTM D5185m     0     0     0     <10       Antimony     ppm     ASTM D5185m     0     0     0     0 <t< th=""><th>Oil Age</th><th>hrs</th><th>Client Info</th><th></th><th>600</th><th>656</th><th>305</th></t<>	Oil Age	hrs	Client Info		600	656	305
CONTAMINATION     method     limit/base     current     history1     history2       Glycol     WC Method     NEG     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >75     A     85     A     89     37       Chromium     ppm     ASTM D5185m     >4     1     1     <1     1       Chromium     ppm     ASTM D5185m     >2     <1     <1     <1     1       Muminum     ppm     ASTM D5185m     >2     0     <1     <1     1     1       Lead     ppm     ASTM D5185m     >2     0     <1     1 <th>Oil Changed</th> <th></th> <th>Client Info</th> <th></th> <th>Changed</th> <th>Changed</th> <th>Not Changd</th>	Oil Changed		Client Info		Changed	Changed	Not Changd
Glycol     WC Method     NEG     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m<>75     A     85     A     89     37       Chromium     ppm     ASTM D5185m     >4     1     1     <1       Titanium     ppm     ASTM D5185m     >2     <1     <1     <1       Silver     ppm     ASTM D5185m<>25     3     2     2     <1     <1     <1       Aluminum     ppm     ASTM D5185m<>25     3     2     2     2       Copper     ppm     ASTM D5185m<>25     3     2     2     2       Vanadium     ppm     ASTM D5185m<>4     0     <1     1     1       Vanadium     ppm     ASTM D5185m     0     0     0     <1     1       Vanadium     ppm     ASTM D5185m     0     0     0     0     1     2     1     2 </th <th>Sample Status</th> <th></th> <th></th> <th></th> <th>ABNORMAL</th> <th>ABNORMAL</th> <th>NORMAL</th>	Sample Status				ABNORMAL	ABNORMAL	NORMAL
WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185n     >75     ▲ 85     ▲ 89     37       Chromium     ppm     ASTM D5185n     >4     1     1     <1       Nickel     ppm     ASTM D5185n     >2     <1     <1     <1       Titanium     ppm     ASTM D5185n     >2     0     <1     <1       Aluminum     ppm     ASTM D5185n     >2     0     <1     <1       Lead     ppm     ASTM D5185n     >2     3     2     2     2       Copper     ppm     ASTM D5185n     >100     5     11     6     1       Antimony     ppm     ASTM D5185n     0     0     <1     1       Vanadium     ppm     ASTM D5185n     0     0     0     <1       Vanadium     ppm     ASTM D5185n     0     10     40     2       Barium     ppm     ASTM D5185n     0 <th>CONTAMINAT</th> <th>ION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	CONTAMINAT	ION	method	limit/base	current	history1	history2
Inn     ppm     ASTM D5185m     >75     ▲ 85     ▲ 89     37       Chromium     ppm     ASTM D5185m     >5     5     ▲ 6     4       Nickel     ppm     ASTM D5185m     >2     <1     1     1     <1       Titanium     ppm     ASTM D5185m     >2     0     <1     <1       Silver     ppm     ASTM D5185m     >2     0     <1     <1       Auminum     ppm     ASTM D5185m     >2     0     <1     <1       Lead     ppm     ASTM D5185m     >100     5     111     6       Tin     ppm     ASTM D5185m     >4     0     <1     <1       Vanadium     ppm     ASTM D5185m     0     0     0     <1       Cadmium     ppm     ASTM D5185m     0     10     40     2       Boron     ppm     ASTM D5185m     0     10     0     0       Magnesium     ppm     ASTM D5185m     0     11	Glycol		WC Method		NEG	NEG	NEG
Chromium     ppm     ASTM D5185m     >5     5     6     4       Nickel     ppm     ASTM D5185m     >4     1     1     <1       Titanium     ppm     ASTM D5185m     >2     <1     <1     <1       Silver     ppm     ASTM D5185m     >2     0     <1     <1       Aluminum     ppm     ASTM D5185m     >2     0     <1     <1       Aluminum     ppm     ASTM D5185m     >2     3     2     2       Copper     ppm     ASTM D5185m     >100     5     111     6       Tin     ppm     ASTM D5185m     >4     0     <1     <1       Antimony     ppm     ASTM D5185m     0     0     0     <1       Cadmium     ppm     ASTM D5185m     0     10     40     2       Barium     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     1010     873     487	WEAR METAL	S	method	limit/base	current	history1	history2
Chromium     ppm     ASTM D5185m     >5     5     6     4       Nickel     ppm     ASTM D5185m     >4     1     1     <1       Titanium     ppm     ASTM D5185m     >2     0     <1     <1       Silver     ppm     ASTM D5185m     >2     0     <1     <1       Aluminum     ppm     ASTM D5185m     >15     9     ▲19     10       Lead     ppm     ASTM D5185m     >15     9     ▲19     10       Lead     ppm     ASTM D5185m     >4     0     <1     <1       Antimony     ppm     ASTM D5185m     >4     0     <1     <1       Vanadium     ppm     ASTM D5185m     0     0     0     <1       Cadmium     ppm     ASTM D5185m     0     10     40     2       Barium     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     1010     873     487 <th>Iron</th> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;75</td> <th><b>A</b> 85</th> <td><b>A</b> 89</td> <td>37</td>	Iron	ppm	ASTM D5185m	>75	<b>A</b> 85	<b>A</b> 89	37
Nickel     ppm     ASTM D5185m     >4     1     1     <1	Chromium		ASTM D5185m	>5	5	<u> </u>	4
Silver   ppm   ASTM D5185m   >2   0   <1   <1     Aluminum   ppm   ASTM D5185m   >15   9   ▲ 19   10     Lead   ppm   ASTM D5185m   >25   3   2   2     Copper   ppm   ASTM D5185m   >4   0   <1   <1     Antimony   ppm   ASTM D5185m   >4   0   <1   <1     Antimony   ppm   ASTM D5185m     1   Vanadium   ppm   ASTM D5185m   0   0   <11   <1     Vanadium   ppm   ASTM D5185m   0   0   0   <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	Nickel		ASTM D5185m	>4	1	1	<1
Aluminum     ppm     ASTM D5185m     >15     9     ▲ 19     10       Lead     ppm     ASTM D5185m     >25     3     2     2       Copper     ppm     ASTM D5185m     >100     5     11     6       Tin     ppm     ASTM D5185m     >4     0     <1     <1       Antimony     ppm     ASTM D5185m       1     Vanadium       Vanadium     ppm     ASTM D5185m     0     0     0     <1       Cadmium     ppm     ASTM D5185m     0     0     0     <1       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     10     40     2       Barium     ppm     ASTM D5185m     0     11     2     <1       Magnesium     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     100     1255	Titanium	ppm	ASTM D5185m	>2	<1	<1	<1
Atuminum     ppm     ASTM D5185m     >15     9     ▲ 19     10       Lead     ppm     ASTM D5185m     >25     3     2     2       Copper     ppm     ASTM D5185m     >100     5     11     6       Tin     ppm     ASTM D5185m     >4     0     <1     <1       Antimony     ppm     ASTM D5185m       1     <1       Vanadium     ppm     ASTM D5185m     0     0     0     <1       Cadmium     ppm     ASTM D5185m     0     10     40     2       Boron     ppm     ASTM D5185m     0     10     40     2       Barium     ppm     ASTM D5185m     0     1     2     <1       Magnese     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1010     873     13 </th <th>Silver</th> <td></td> <td></td> <td>&gt;2</td> <th></th> <td>&lt;1</td> <td>&lt;1</td>	Silver			>2		<1	<1
Lead     ppm     ASTM D5185m     >25     3     2     2       Copper     ppm     ASTM D5185m     >100     5     111     6       Tin     ppm     ASTM D5185m     >4     0     <1     <1       Antimony     ppm     ASTM D5185m     0     0     <1     <1       Vanadium     ppm     ASTM D5185m     0     0     0     <1     <1       Cadmium     ppm     ASTM D5185m     0     10     40     2     <1       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     10     40     2       Barium     ppm     ASTM D5185m     0     10     0     0       Magnesium     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     1070     1255     1668     1720       Phosphorus     ppm     ASTM D5185m     127			ASTM D5185m			<u> </u>	10
Copper     ppm     ASTM D5185m     >100     5     111     6       Tin     ppm     ASTM D5185m     >4     0     <1     <1       Antimony     ppm     ASTM D5185m     0     0     <1     <1       Vanadium     ppm     ASTM D5185m     0     0     <1     <1       Cadmium     ppm     ASTM D5185m     0     0     0     <1       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     10     40     2       Barium     ppm     ASTM D5185m     0     10     0     0       Magnesium     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     100     1071     1078       Zinc     ppm     ASTM D5185m     1270     1264     1302	Lead						
Tin   ppm   ASTM D5185m   >4   0   <1	Copper		ASTM D5185m	>100		11	
Antimony     ppm     ASTM D5185m      1       Vanadium     ppm     ASTM D5185m     0     0     <1       Cadmium     ppm     ASTM D5185m     0     0     0     <1			ASTM D5185m	>4	0	<1	<1
Vanadium     ppm     ASTM D5185m     0     0     <1	Antimony		ASTM D5185m				1
Cadmium     ppm     ASTM D5185m     0     0     <<1	,		ASTM D5185m		0	0	<1
Boron     ppm     ASTM D5185m     0     10     40     2       Barium     ppm     ASTM D5185m     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     69     65     60       Manganese     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1070     1255     1668     1720       Phosphorus     ppm     ASTM D5185m     1270     1264     1302     1344       Sulfur     ppm     ASTM D5185m     2060     2907     3737     3393       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D5185m     >20	Cadmium		ASTM D5185m		0	0	<1
Barium     ppm     ASTM D5185m     0     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     69     65     60       Magnese     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1070     1255     1668     1720       Phosphorus     ppm     ASTM D5185m     1270     1264     1302     1344       Sulfur     ppm     ASTM D5185m     2060     2907     3737     3393       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D							
Barium     ppm     ASTM D5185m     0     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     69     65     60       Magnesium     ppm     ASTM D5185m     0     1     2     <1       Magnesium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1070     1255     1668     1720       Phosphorus     ppm     ASTM D5185m     1270     1264     1302     1344       Sulfur     ppm     ASTM D5185m     2060     2907     3737     3393       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D5324     >3.0     1.5     5.9     <1.0       INFRA-RED     method <td< th=""><th>ADDITIVES</th><th></th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	ADDITIVES		method	limit/base	current	history1	history2
Maganese   ppm   ASTM D5185m   0   1   2   <1		ppm					
Manganese     ppm     ASTM D5185m     0     1     2     <1	Boron		ASTM D5185m	0	10	40	2
Magnesium     ppm     ASTM D5185m     1010     873     487     496       Calcium     ppm     ASTM D5185m     1070     1255     1668     1720       Phosphorus     ppm     ASTM D5185m     1150     991     1071     1078       Zinc     ppm     ASTM D5185m     1270     1264     1302     1344       Sulfur     ppm     ASTM D5185m     2060     2907     3737     3393       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     16     10       Sodium     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D5324     >3.0     1.5     ▲ 5.9     <1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.8     0.7     0.3       Nitration     Abs/.1mm     *ASTM D762 </th <th>Boron Barium</th> <td>ppm</td> <td>ASTM D5185m ASTM D5185m</td> <td>0</td> <th>10 0</th> <td>40 0</td> <td>2</td>	Boron Barium	ppm	ASTM D5185m ASTM D5185m	0	10 0	40 0	2
Calcium     ppm     ASTM D5185m     1070     1255     1668     1720       Phosphorus     ppm     ASTM D5185m     1150     991     1071     1078       Zinc     ppm     ASTM D5185m     1270     1264     1302     1344       Sulfur     ppm     ASTM D5185m     2060     2907     3737     3393       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     16     10       Sodium     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D5185m     >20     13     5.9     <1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7624     >20	Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	10 0 69	40 0 65	2 0 60
Zinc     ppm     ASTM D5185m     1270     1264     1302     1344       Sulfur     ppm     ASTM D5185m     2060     2907     3737     3393       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     16     10       Sodium     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D524     >3.0     1.5     5.9     <1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.8     0.7     0.3       Nitration     Abs/.mm<*ASTM D7624     >20     11.2     10.4     7       Sulfation     Abs/.imm<*ASTM D7415     >30     24.1     24.	Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	10 0 69 1	40 0 65 2	2 0 60 <1
Zinc     ppm     ASTM D5185m     1270     1264     1302     1344       Sulfur     ppm     ASTM D5185m     2060     2907     3737     3393       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     16     10       Sodium     ppm     ASTM D5185m     >25     9     16     10       Sodium     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D3524     >3.0     1.5     ▲ 5.9     <1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.8     0.7     0.3       Nitration     Abs/cm     *ASTM D7624     >20     11.2     10.4     7       Sulfation     Abs/.1mm     *ASTM D7624     >20     11.2     10.4     7       Sulfation     Abs/.1mm     *ASTM D7415	Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	10 0 69 1 873	40 0 65 2 487	2 0 60 <1 496
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m<>2591610SodiumppmASTM D5185m102012PotassiumppmASTM D5185m<>2013235Fuel%ASTM D3524>3.01.5▲ 5.9<1.0INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>60.80.70.3NitrationAbs/cm*ASTM D7624>2011.210.47SulfationAbs/.tmm*ASTM D7415>3024.124.618.9FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	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	10 0 69 1 873 1255	40 0 65 2 487 1668	2 0 60 <1 496 1720
Silicon   ppm   ASTM D5185m   >25   9   16   10     Sodium   ppm   ASTM D5185m   10   20   12     Potassium   ppm   ASTM D5185m   >20   13   23   5     Fuel   %   ASTM D3524   >3.0   1.5   5.9   <1.0	Boron Barium Molybdenum Manganese Magnesium	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	10 0 69 1 873 1255 991	40 0 65 2 487 1668 1071	2 0 60 <1 496 1720 1078
Sodium     ppm     ASTM D5185m     10     20     12       Potassium     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D3524     >3.0     1.5     ▲ 5.9     <1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.8     0.7     0.3       Nitration     Abs/cm     *ASTM D7624     >20     11.2     10.4     7       Sulfation     Abs/.tmm     *ASTM D7415     >30     24.1     24.6     18.9       FLUID DEGRADATION     method     limit/base     current     history1     history2	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 1270	10 0 69 1 873 1255 991 1264	40 0 65 2 487 1668 1071 1302	2 0 60 <1 496 1720 1078 1344
Sodium     ppm     ASTM D5185m     10     20     12       Potassium     ppm     ASTM D5185m     >20     13     23     5       Fuel     %     ASTM D3524     >3.0     1.5     ▲ 5.9     <1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >6     0.8     0.7     0.3       Nitration     Abs/cm     *ASTM D7624     >20     11.2     10.4     7       Sulfation     Abs/.imm     *ASTM D7415     >30     24.1     24.6     18.9       FLUID DEGRADATION     method     limit/base     current     history1     history2	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	10 0 69 1 873 1255 991 1264 2907	40 0 65 2 487 1668 1071 1302 3737	2 0 60 <1 496 1720 1078 1344 3393
Fuel     %     ASTM D3524     >3.0     1.5     5.9     <1.0	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	10 0 69 1 873 1255 991 1264 2907 current	40 0 65 2 487 1668 1071 1302 3737 history1	2 0 60 <1 496 1720 1078 1344 3393 history2
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>60.80.70.3NitrationAbs/cm*ASTM D7624>2011.210.47SulfationAbs/.1mm*ASTM D715>3024.124.618.9FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	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 ASTM D5185m	0 0 60 1010 1070 1150 1270 2060	10 0 69 1 873 1255 991 1264 2907 current 9	40 0 65 2 487 1668 1071 1302 3737 history1 16	2 0 60 <1 496 1720 1078 1344 3393 history2 10
Soot %     %     *ASTM D7844     >6     0.8     0.7     0.3       Nitration     Abs/cm     *ASTM D7624     >20     11.2     10.4     7       Sulfation     Abs/.1mm     *ASTM D7415     >30     24.1     24.6     18.9       FLUID DEGRADATION     method     limit/base     current     history1     history2	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm	ASTM D5185m 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 Iimit/base >25	10 0 69 1 873 1255 991 1264 2907 current 9 10	40 0 65 2 487 1668 1071 1302 3737 history1 16 20	2 0 60 <1 496 1720 1078 1344 3393 history2 10 12
Nitration     Abs/cm     *ASTM D7624     >20     11.2     10.4     7       Sulfation     Abs/.1mm     *ASTM D7415     >30     24.1     24.6     18.9       FLUID DEGRADATION     method     limit/base     current     history1     history2	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 ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 <b>limit/base</b> >25	10 0 69 1 873 1255 991 1264 2907 current 9 10 10 13	40 0 65 2 487 1668 1071 1302 3737 history1 16 20 23	2 0 60 <1 496 1720 1078 1344 3393 history2 10 12 5
Nitration     Abs/cm     *ASTM D7624     >20     11.2     10.4     7       Sulfation     Abs/.1mm     *ASTM D7415     >30     24.1     24.6     18.9       FLUID DEGRADATION     method     limit/base     current     history1     history2	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b> ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 60 1010 1070 1150 1270 2060 limit/base >25 >20 >20	10 0 69 1 873 1255 991 1264 2907 current 9 10 13 1.5	40 0 65 2 487 1668 1071 1302 3737 history1 16 20 23 23 ▲ 5.9	2 0 60 <1 496 1720 1078 1344 3393 history2 10 12 5 5 <1.0
Sulfation   Abs/.1mm   *ASTM D7415   >30   24.1   24.6   18.9     FLUID DEGRADATION   method   limit/base   current   history1   history2	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	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 >3.0	10 0 69 1 873 1255 991 1264 2907 current 9 10 13 13 1.5 current	40 0 65 2 487 1668 1071 1302 3737 history1 16 20 23 23 ▲ 5.9	2 0 60 <1 496 1720 1078 1344 3393 history2 10 12 5 <<1.0 history2
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Sulfur Sulfur Solicon Sodium Potassium Fuel INFRA-RED Soot %	ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >6	10 0 69 1 873 1255 991 1264 2907 current 9 10 13 1.5 current 0.8	40 0 65 2 487 1668 1071 1302 3737 history1 16 20 23 ▲ 5.9 history1 0.7	2 0 60 <1 496 1720 1078 1344 3393 history2 10 12 5 <1.0 history2 0.3
Oxidation Abs/.1mm *ASTM D7414 >25 20.8 21.9 14.9	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm %	ASTM D5185m ASTM D3524 method *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 <b>limit/base</b> >25 >20 >3.0 <b>limit/base</b> >6 >20	10 0 69 1 873 1255 991 1264 2907 current 9 10 13 1.5 current 0.8 11.2	40 0 65 2 487 1668 1071 1302 3737 history1 16 20 23 ≥3 5.9 history1 0.7 10.4	2 0 60 <1 496 1720 1078 1344 3393 history2 10 12 5 <1.0 kistory2 0.3 7
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel 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>Iimit/base</b> >25 >20 >3.0 <b>Iimit/base</b> >6 >20 >20	10 0 69 1 873 1255 991 1264 2907 current 9 10 13 1.5 current 0.8 11.2 24.1	40 0 65 2 487 1668 1071 1302 3737 history1 16 20 23 ▲ 5.9 history1 0.7 10.4 24.6	2 0 60 <1 496 1720 1078 1344 3393 history2 10 12 5 <10 12 5 <<1.0 history2 0.3 7 18.9
Base Number (BN)     mg KOH/g     ASTM D2896     9.8     6.8     7.2     6.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel 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>Iimit/base</b> >25 >20 >3.0 <b>Iimit/base</b> >6 >20 >30 <b>Iimit/base</b>	10 0 69 1 873 1255 991 1264 2907 current 9 10 13 1.5 current 0.8 11.2 24.1 current	40 0 65 2 487 1668 1071 1302 3737 history1 16 20 23 ▲ 5.9 history1 0.7 10.4 24.6 history1	2 0 60 <1 496 1720 1078 1344 3393 history2 10 12 5 <1.0 kistory2 0.3 7 18.9 history2



# **OIL ANALYSIS REPORT**



Submitted By: TRAVIS PORCH

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