

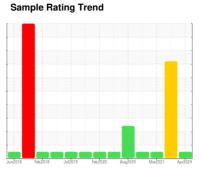
# **OIL ANALYSIS REPORT**



KEMP QUARRIES / BCS - STILLWELL [70210] CRSH042

Diesel Engine

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





# DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor. ( Customer Sample Comment: Changed fluid and filters )

All component wear rates are normal.

## Contamination

There is no indication of any contamination in the

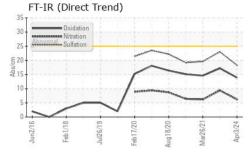
### **Fluid Condition**

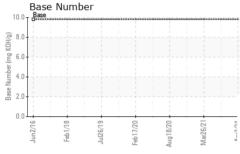
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

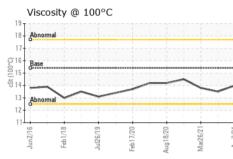
	N SHP 15W40 (	····,					
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Date   Client Info   93 Apr 2024   01 Jul 2021   26 Mar 2021	Sample Number		Client Info		PCA0109277	PCA0038182	PCA0038278
Oil Age         hrs         Client Info         956         0         0           Oil Changed Status         Client Info         Changed Changed Changed Changed Changed Sample Status         Changed NoRMAL SEVERE         NORMAL SEVERE         NORMAL NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >5         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0	Sample Date		Client Info		03 Apr 2024	01 Jul 2021	26 Mar 2021
Coli   Changed   Changed   Changed   Changed   Changed   NORMAL   SEVERE   NORMAL	Machine Age	hrs	Client Info		956	10762	10363
CONTAMINATION	Oil Age	hrs	Client Info		956	0	0
CONTAMINATION	Oil Changed		Client Info		Changed	Changed	Changed
Fuel	•				_		
Water Glycol         WC Method WC Method         >0.2         NEG NEG NEG         NEG NEG         NEG NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         51         ▲ 220         8           Chromium         ppm         ASTM D5185m         >20         4         ▲ 20         <1           Nickel         ppm         ASTM D5185m         >2         <1         <1         <1         <1           Titanium         ppm         ASTM D5185m         >2         <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         <1         <1         <1         <1         <1 <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
WEAR METALS	Fuel		WC Method	>5	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         4         ▲ 20         <1	WEAR METAL	S	method	limit/base	current	history1	history2
Chromium	lron	ppm	ASTM D5185m	>100	51	<u>^</u> 220	8
Titanium	Chromium		ASTM D5185m	>20	4	<u>^</u> 20	<1
Silver	Nickel	ppm	ASTM D5185m	>2	<1	<1	0
Aluminum ppm ASTM D5185m >25 4 20 <1 Lead ppm ASTM D5185m >40 4 13 1 Copper ppm ASTM D5185m >330 28 91 6 Tin ppm ASTM D5185m >15 3 8 1 Antimony ppm ASTM D5185m >0 0 0 Cadmium ppm ASTM D5185m 0 0 <1 0 Cadmium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Titanium	ppm	ASTM D5185m	>2	<1	1	<1
Lead         ppm         ASTM D5185m         >40         4         13         1           Copper         ppm         ASTM D5185m         >330         28         91         6           Tin         ppm         ASTM D5185m         >15         3         8         1           Antimony         ppm         ASTM D5185m          0         0           Vanadium         ppm         ASTM D5185m         0         0         <1         0           Cadmium         ppm         ASTM D5185m         0         0         6         4           Boron         ppm         ASTM D5185m         0         0         6         4           Barium         ppm         ASTM D5185m         0         0         0         0           Molydenum         ppm         ASTM D5185m         0         0         0         0           Manganesium         ppm         ASTM D5185m         0100         940         862         81           Calcicium         ppm         ASTM D5185m         1070         1292         2468         1036           Phosphorus         ppm         ASTM D5185m         1150         1049         968	Silver	ppm	ASTM D5185m	>2	0	<1	0
Copper         ppm         ASTM D5185m         >330         28         91         6           Tin         ppm         ASTM D5185m         >15         3         8         1           Antimony         ppm         ASTM D5185m          0         0           Vanadium         ppm         ASTM D5185m         0         <1         0           Cadmium         ppm         ASTM D5185m         0         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         0         6         4           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         2         6         <1           Magnesium         ppm         ASTM D5185m         0         2         6         <1           Magnesium         ppm         ASTM D5185m         1010         940         862         814           Calcium         ppm         ASTM D5185m         1070         1292         2468         1036	Aluminum	ppm	ASTM D5185m	>25	4	_ 20	<1
Copper         ppm         ASTM D5185m         >330         28         91         6           Tin         ppm         ASTM D5185m         >15         3         8         1           Antimony         ppm         ASTM D5185m          0         0           Vanadium         ppm         ASTM D5185m         0         <1         0           Cadmium         ppm         ASTM D5185m         0         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         0         6         4           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         2         6         <1           Magnesium         ppm         ASTM D5185m         0         2         6         <1           Magnesium         ppm         ASTM D5185m         1010         940         862         814           Calcium         ppm         ASTM D5185m         1070         1292         2468         1036	Lead	ppm	ASTM D5185m	>40	4	13	1
Tin	Copper		ASTM D5185m	>330	28	91	6
Antimony			ASTM D5185m	>15	3	8	1
Vanadium         ppm         ASTM D5185m         0         <1	Antimony		ASTM D5185m			0	0
Cadmium         ppm         ASTM D5185m         <1	-		ASTM D5185m		0	<1	0
Boron ppm ASTM D5185m 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cadmium		ASTM D5185m		<1	0	0
Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         62         58         52           Manganese         ppm         ASTM D5185m         0         2         6         <1           Magnesium         ppm         ASTM D5185m         1010         940         862         814           Calcium         ppm         ASTM D5185m         1070         1292         2468         1036           Phosphorus         ppm         ASTM D5185m         1150         1049         968         916           Zinc         ppm         ASTM D5185m         1270         1193         1124         1075           Sulfur         ppm         ASTM D5185m         2060         3125         2495         2457           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         251         <1           Sodium         ppm         ASTM D5185m         >20         3         8         <1           INFRA-RED	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         62         58         52           Manganese         ppm         ASTM D5185m         0         2         6         <1	Boron	ppm	ASTM D5185m	0	0	6	4
Manganese         ppm         ASTM D5185m         0         2         6         <1	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium         ppm         ASTM D5185m         1010         940         862         814           Calcium         ppm         ASTM D5185m         1070         1292         2468         1036           Phosphorus         ppm         ASTM D5185m         1150         1049         968         916           Zinc         ppm         ASTM D5185m         1270         1193         1124         1075           Sulfur         ppm         ASTM D5185m         2060         3125         2495         2457           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         251         <1           Sodium         ppm         ASTM D5185m         >20         3         0            Potassium         ppm         ASTM D5185m         >20         3         8         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm         *ASTM D7415 <th>Molybdenum</th> <td>ppm</td> <td>ASTM D5185m</td> <td>60</td> <th>62</th> <td>58</td> <td>52</td>	Molybdenum	ppm	ASTM D5185m	60	62	58	52
Calcium         ppm         ASTM D5185m         1070         1292         2468         1036           Phosphorus         ppm         ASTM D5185m         1150         1049         968         916           Zinc         ppm         ASTM D5185m         1270         1193         1124         1075           Sulfur         ppm         ASTM D5185m         2060         3125         2495         2457           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         251         <1           Sodium         ppm         ASTM D5185m         >20         3         0            Potassium         ppm         ASTM D5185m         >20         3         8         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.6         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm	Manganese	ppm	ASTM D5185m	0	2	6	<1
Phosphorus         ppm         ASTM D5185m         1150         1049         968         916           Zinc         ppm         ASTM D5185m         1270         1193         1124         1075           Sulfur         ppm         ASTM D5185m         2060         3125         2495         2457           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         ▲ 251         <1           Sodium         ppm         ASTM D5185m         >20         3         0           Potassium         ppm         ASTM D5185m         >20         3         8         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.6         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         23         19.6           FLUID DEGRADATION         *ASTM D7414         >2	Magnesium	ppm	ASTM D5185m	1010	940	862	814
Zinc         ppm         ASTM D5185m         1270         1193         1124         1075           Sulfur         ppm         ASTM D5185m         2060         3125         2495         2457           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         ▲ 251         <1           Sodium         ppm         ASTM D5185m         >20         3         0           Potassium         ppm         ASTM D5185m         >20         3         8         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.6         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         23         19.6           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 </th <th>Calcium</th> <th>ppm</th> <th>ASTM D5185m</th> <th>1070</th> <th>1292</th> <th>2468</th> <th>1036</th>	Calcium	ppm	ASTM D5185m	1070	1292	2468	1036
Sulfur         ppm         ASTM D5185m         2060         3125         2495         2457           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         ▲ 251         <1	Phosphorus	ppm	ASTM D5185m	1150	1049	968	916
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         ▲ 251         <1           Sodium         ppm         ASTM D5185m         0         3         0           Potassium         ppm         ASTM D5185m         >20         3         8         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.6         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         23         19.6           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         17.2         14.6	Zinc	ppm	ASTM D5185m	1270	1193	1124	1075
Silicon         ppm         ASTM D5185m         >25         49         ▲ 251         <1	Sulfur	ppm	ASTM D5185m	2060	3125	2495	2457
Sodium         ppm         ASTM D5185m         0         3         0           Potassium         ppm         ASTM D5185m         >20         3         8         <1           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.6         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         23         19.6           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         17.2         14.6	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         3         8         <1	Silicon	ppm	ASTM D5185m	>25	49	▲ 251	<1
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3         0.6         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         23         19.6           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         17.2         14.6	Sodium	ppm	ASTM D5185m		0	3	0
Soot %         %         *ASTM D7844         >3         0.3         0.6         0.1           Nitration         Abs/cm         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         23         19.6           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         17.2         14.6	Potassium	ppm	ASTM D5185m	>20	3	8	<1
Nitration         Abs/cm         *ASTM D7624         >20         6.2         9.4         6.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         23         19.6           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         17.2         14.6	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.3         23         19.6           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.9         17.2         14.6	Soot %	%	*ASTM D7844	>3	0.3	0.6	0.1
FLUID DEGRADATION method limit/base current history1 history2  Oxidation Abs/.1mm *ASTM D7414 >25 13.9 17.2 14.6		A la a /a sa	*ASTM D7624	>20	6.2	9.4	6.2
Oxidation	Nitration	ADS/CITI					
				>30	18.3	23	19.6
Base Number (BN) mg KOH/g ASTM D2896 9.8 9.1	Sulfation	Abs/.1mm	*ASTM D7415				
	Sulfation FLUID DEGRAD	Abs/.1mm	*ASTM D7415 method	limit/base	current	history1	history2



# **OIL ANALYSIS REPORT**





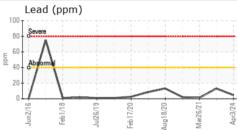


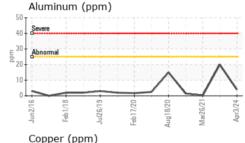
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

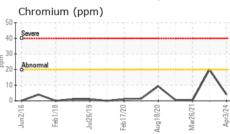
FLUID PROP	ERITES	method	ilmit/base		nistory i	nistoryz
Visc @ 100°C	cSt	ASTM D445	15.4	14.0	13.5	13.8

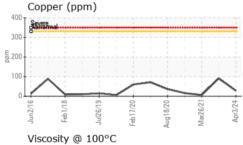
Iron (ppm)					
300					
E 200 - Severe					
100 - Abnormal				/	
	_			_/_	_\
Jun2/16 Feb1/18	Jul26/19	Feb17/20	Aug18/20	Mar26/21	Apr3/24
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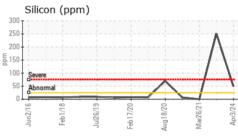
**GRAPHS** 

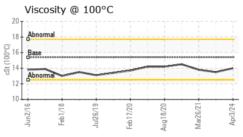


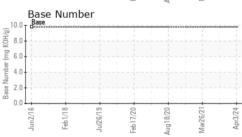














Certificate 12367

Sample No.

Laboratory

: PCA0109277 Lab Number : 06148407

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received

: 15 Apr 2024 **Tested** : 16 Apr 2024 Diagnosed

463917 Highway 100 Bunch, OK US 74931

Unique Number : 10978485 Test Package : MOB 1 ( Additional Tests: TBN )

: 17 Apr 2024 - Sean Felton

Contact: stilwell@bentoncountystone.com T:

Kemp Quarries - Benton County Stone - Stillwell

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

F: