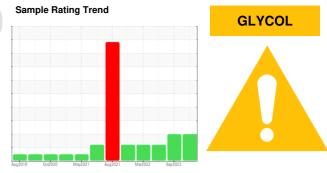


## **OIL ANALYSIS REPORT**



Area KEMP QUARRIES / HULBERT Machine Id OHT097 Component Diesel Engine

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

SAMPLE INFORI		method	limit/base	current	history1	history
	WATER OF		111100030			
Sample Number		Client Info		PCA0109178	PCA0086800	PCA00618
Sample Date		Client Info		10 Feb 2024	29 Sep 2023	02 Dec 202
Machine Age	hrs	Client Info		35540	35032	34585
Oil Age	hrs	Client Info		0	34585	0
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				ABNORMAL	ABNORMAL	ABNORM
CONTAMINAT	ION	method	limit/base	current	history1	history
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history
Iron	ppm	ASTM D5185m	>100	32	30	27
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	<1	<1	<1
Titanium	ppm	ASTM D5185m	>2	<1	0	0
Silver	ppm	ASTM D5185m		0	0	0
Aluminum	ppm	ASTM D5185m		1	1	1
Lead	ppm	ASTM D5185m		6	7	3
Copper	ppm	ASTM D5185m		A 327	<u> </u>	104
Tin	ppm	ASTM D5185m		0	0	0
Vanadium	ppm	ASTM D5185m	210	0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history
Boron	ppm	ASTM D5185m	0	3	2	15
Barium	ppm	ASTM D5185m	0	0	0	0
Molybdenum	ppm	ASTM D5185m	60	104	94	79
Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Magnesium	ppm	ASTM D5185m	1010	1098	923	939
Calcium	ppm					
	ppm	ASTM D5185m	1070		976	
FOOSDOOUIS	nnm	ASTM D5185m	1070	1131	976 944	1049
Phosphorus	ppm	ASTM D5185m	1150	1131 1171	944	1049 1001
Zinc Sulfur	ppm ppm ppm			1131		1049
Zinc	ppm ppm	ASTM D5185m ASTM D5185m	1150 1270	1131 1171 1444	944 1208	1049 1001 1295 3427
Zinc Sulfur	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	1150 1270 2060 limit/base	1131 1171 1444 3309	944 1208 2679	1049 1001 1295 3427
Zinc Sulfur CONTAMINAN	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m method	1150 1270 2060 limit/base	1131 1171 1444 3309 current	944 1208 2679 history1	1049 1001 1295 3427 history
Zinc Sulfur CONTAMINAN Silicon	ppm ppm ITS ppm	ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	1150 1270 2060 limit/base >25	1131 1171 1444 3309 current 6	944 1208 2679 history1 7	1049 1001 1295 3427 history 7
Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	1150 1270 2060 limit/base >25	1131 1171 1444 3309 current 6 ▲ 392	944 1208 2679 history1 7 ▲ 356	1049 1001 1295 3427 history 7 245
Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m	1150 1270 2060 limit/base >25	1131 1171 1444 3309 <u>current</u> 6 ▲ 392 26	944 1208 2679 history1 7 356 23	1049 1001 1295 3427 history 7 245 16 NEG
Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol	ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D2982	1150 1270 2060 limit/base >25 >20	1131 1171 1444 3309 current 6 ▲ 392 26 NEG	944 1208 2679 history1 7 ▲ 356 23 NEG	1049 1001 1295 3427 history 7 245 16 NEG
Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED	ppm ppm TS ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D2982 method	1150 1270 2060  imit/base >25 >20  imit/base >3	1131 1171 1444 3309 current 6 ▲ 392 26 NEG current	944 1208 2679 history1 7 356 23 NEG history1	1049 1001 1295 3427 history 7 ▲ 245 16 NEG history
Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot %	ppm ppm TS ppm ppm ppm %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D2982 method *ASTM D7844	1150 1270 2060 <b>limit/base</b> >25 >20 <b>limit/base</b> >3 >20	1131 1171 1444 3309 current 6 ▲ 392 26 NEG current 0.7	944 1208 2679 7 ▲ 356 23 NEG history1 0.9	1049 1001 1295 3427 history 7 ▲ 245 16 NEG history 0.6
Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot % Nitration	ppm ppm TS ppm ppm ppm % %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D2982 *ASTM D2982 *ASTM D7844 *ASTM D7624	1150 1270 2060 <b>limit/base</b> >25 >20 <b>limit/base</b> >3 >20	1131 1171 1444 3309 current 6 ▲ 392 26 NEG current 0.7 11.1	944 1208 2679	1049 1001 1295 3427 history 7 ▲ 245 16 NEG history 0.6 9.5 21.7
Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Glycol INFRA-RED Soot % Nitration Sulfation	ppm ppm TS ppm ppm ppm % %	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D2982 *ASTM D2982 *ASTM D7844 *ASTM D7624	1150 1270 2060 >25 >20 >20 limit/base >3 >20 >30	1131 1171 1444 3309 current 6 ▲ 392 26 NEG current 0.7 11.1 20.6	944 1208 2679 history1 7 356 23 NEG history1 0.9 10.0 20.8	1049 1001 1295 3427 history 7 ▲ 245 16 NEG history 0.6 9.5

# DIAGNOSIS

We advise that you check for the source of the coolant leak. Check for low coolant level. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

Fluid

### 🔺 Wear

The copper level is abnormal. In the absence of other significant wear metals, suspect copper due to sources other than wear (i.e. cooling core).

#### Contamination

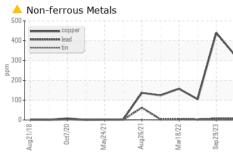
Sodium and/or potassium levels are high.

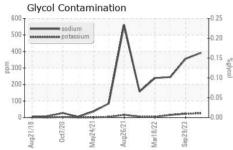
#### Fluid Condition

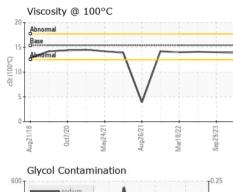
The BN result indicates that there is suitable alkalinity remaining in the oil.

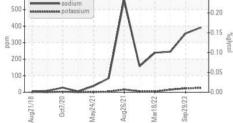


# **OIL ANALYSIS REPORT**









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tals	VISUAL		method	limit/base	current	history1	history2
A	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
$\sim$	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
/21	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
May24/21 Aug26/21 Mar18/22 Sep29/23	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
~ ~ ~ ~ ~ ~	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
nation	Free Water		*Visual	>0.2	NEG	NEG	NEG
Α		scalar			NEG	NEG	NEG
10.20	FLUID PROPE		method	limit/base	current	history1	history2
0.15 gr	Visc @ 100°C	cSt	ASTM D445	15.4	13.9	14.0	14.1
0.10 °	GRAPHS						
-0.05	Iron (ppm)				Lead (ppm)		
0.00	250 200 Severe			10	Severe		
Aug26/21 Mar18/22 Sep29/23	200 -			- 80			
Au	E 150 100 - Abnormal			E 60	Abarana	Λ	
°C						/	
	50	~	$\sim$	2		/	
	0ct7/20	5/21-	3/22 -	( (7)	ug21/18	4/21- 5/21-	3/22 +
	Aug21/18 0ct7/20 May24/21	Aug26/21	Mar18/22	c 7 dae	Aug21/18 0ct7/20	May24/21 Aug26/21	Mar18/22 Sep29/23
$\langle \cdot \rangle$	Aluminum (ppm)				Chromium (p		_
	50 T			50	°T:		
•	40 - Severe			- 41	0 - Severe		
	e <sup>30</sup> 20			الم <sup>3</sup>	0-		
May24/21 Aug26/21 Mar18/22 Sep29/23	20-			2	0 - Abnormal		
Ma Ma Sei	10-			10	0		
nation	20	21	22-		20 + 18	/21- /21-	23
0.25	Aug21/18 0ct7/20 May24/21	Aug26/21	Mar18/22	/c > da	Aug21/18 0ct7/20	May24/21 Aug26/21	Mar18/22 Sep29/23
-0.20	∡ Copper (ppm)	4	2 0	0	⊲ Silicon (ppm)	2	2 0
-0.15 22	500 T			80			
0.15 %dycol	400 -		/	G	0		
IV	E 300 -		1				
-0.05	E 200 -		/	톱.41	Abnormal		
0.00	100-		$\sim$	2			
Aug26/21 Mar18/22 Sep29/23			5 5				3
A W S	Aug21/18 - 0ct7/20 -	Aug26/21	Mar18/22	7/670	Aug21/18 0ct7/20	May24/21 Aug26/21	Mar18/22 Sep29/23
		Au	Ma 2	0	A	_	Ser
	Viscosity @ 100°C				Base Number		
	Base			(B/HC			~
	g 15 Abeoma			¥10.0	0 Base		
	2. 00 01 01 02 01 01 0 0 0 0 0 0 0 0 0 0 0	$\backslash /$		Base Number (mg KOH(g) 10.1			
	<sup>33</sup> 5-	V		<sup>ID</sup> 5.0	U <b>1</b>		
	0						
	Aug21/18 - 0ct7/20 - May24/21 -	Aug26/21	Mar18/22	23/23	Aug21/18 0ct7/20	May24/21 Aug26/21	Mar18/22 Sep29/23
	Aug Oc May	Aug	Mar	dbo	Aug	May Aug	Mar
Laboratory	: WearCheck USA - 501	l Madico		NC 27512	Komn (	)uarries - Kom	p Stone - Hulbert
Sample No.	: PCA0109178	Recei		Mar 2024	Kemp G		17801 Hwy 80
Lab Number	: 06107922	Teste		6 Mar 2024			Hulbert, OK
Unique Number		Diagr		Mar 2024 - Jonat	than Hester		US 74441
	: MOB 1 ( Additional Te						Contact:
To discuss this sample report, * - Denotes test methods that						hulbert@	kempstone.com T:
Statements of conformity to sp					rule (JCGM 106	5:2012)	F:
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