

### **OIL ANALYSIS REPORT**



# JOHN DEERE E-39 (S/N FF800CX971080)

Diesel Engine

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

#### 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

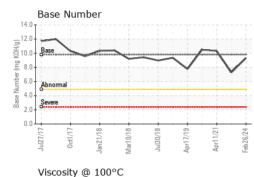
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

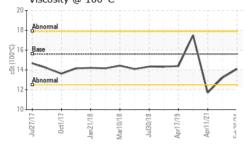
Sample Number		Client Info		PCA0113888	PCA0066219	PCA0040449
Sample Date		Client Info		26 Feb 2024	03 Nov 2022	11 Apr 2021
Machine Age	hrs	Client Info		17699	17519	0
Oil Age	hrs	Client Info		600	500	0
Oil Changed		Client Info		Changed	Changed	N/A
Sample Status				NORMAL	SEVERE	NORMAL
				-		
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>2.1	<1.0	<1.0	0.3
Water		WC Method	>0.21	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	0.0
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>51	31	53	8
Chromium	ppm	ASTM D5185m	>11	2	4	<1
Nickel	ppm	ASTM D5185m	>5	<1	0	<1
Titanium	ppm	ASTM D5185m		0	<1	<1
Silver	ppm	ASTM D5185m	>3	0	0	<1
Aluminum	ppm	ASTM D5185m	>31	2	3	2
Lead	ppm	ASTM D5185m	>26	5	8	2
Copper	ppm	ASTM D5185m	>26	19	<b>1</b> 67	4
Tin	ppm	ASTM D5185m	>4	3	<b>5</b>	1
Antimony	ppm	ASTM D5185m				<1
Vanadium	ppm	ASTM D5185m		<1	0	<1
Cadmium	ppm	ASTM D5185m		0	0	<1
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 5	history1 16	history2 164
	ppm ppm		limit/base			
Boron		ASTM D5185m	limit/base	5	16	164
Boron Barium	ppm	ASTM D5185m ASTM D5185m	limit/base	5 0	16 0	164 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	5 0 61	16 0 72	164 0 165
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	5 0 61 <1	16 0 72 1	164 0 165 1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	5 0 61 <1 1221	16 0 72 1 983	164 0 165 1 793
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	5 0 61 <1 1221 1346	16 0 72 1 983 1197	164 0 165 1 793 1253
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	limit/base	5 0 61 <1 1221 1346 1075	16 0 72 1 983 1197 1041	164 0 165 1 793 1253 909
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	5 0 61 <1 1221 1346 1075 1529	16 0 72 1 983 1197 1041 1286	164 0 165 1 793 1253 909 1101
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 ASTM D5185m		5 0 61 <1 1221 1346 1075 1529 2865	16 0 72 1 983 1197 1041 1286 3509	164 0 165 1 793 1253 909 1101 2832
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 ASTM D5185m	limit/base	5 0 61 <1 1221 1346 1075 1529 2865 current	16 0 72 1 983 1197 1041 1286 3509 history1	164 0 165 1 793 1253 909 1101 2832 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	limit/base	5 0 61 <1 1221 1346 1075 1529 2865 current 5	16 0 72 1 983 1197 1041 1286 3509 history1 8	164 0 165 1 793 1253 909 1101 2832 history2 12
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	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 <b>method</b> ASTM D5185m ASTM D5185m	limit/base >22 >31	5 0 61 <1 1221 1346 1075 1529 2865 <u>current</u> 5 2	16 0 72 1 983 1197 1041 1286 3509 history1 8 3	164 0 165 1 793 1253 909 1101 2832 history2 12 12 14
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >22 >31 >20	5 0 61 <1 1221 1346 1075 1529 2865 current 5 2 2 <1	16 0 72 1 983 1197 1041 1286 3509 history1 8 3 0	164 0 165 1 793 1253 909 1101 2832 history2 12 12 14 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >22 >31 >20 limit/base	5 0 61 <1 1221 1346 1075 1529 2865 <b>current</b> 5 2 2 <1 <b>current</b>	16 0 72 1 983 1197 1041 1286 3509 history1 8 3 0 bistory1	164 0 165 1 793 1253 909 1101 2832 history2 12 14 4 4
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	limit/base >22 >31 >20 limit/base >3	5 0 61 <1 1221 1346 1075 1529 2865 <i>current</i> 5 2 2 <1 <i>current</i> 0.6	16 0 72 1 983 1197 1041 1286 3509 history1 8 3 0 history1 1	164 0 165 1 793 1253 909 1101 2832 history2 12 12 14 4 4 history2 0.1
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	ASTM D5185m ASTM D5185m	limit/base >22 >31 >20 limit/base >3 >20	5 0 61 <1 1221 1346 1075 1529 2865 <i>current</i> 5 2 2 5 2 <1 <i>current</i> 0.6 8.8	16 0 72 1 983 1197 1041 1286 3509 history1 8 3 3 0 history1 1 1 10.1	164 0 165 1 793 1253 909 1101 2832 history2 12 12 14 4 4 history2 0.1 5.6
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	limit/base >22 >31 >20 limit/base >3 >20 >30	5 0 61 <1 1221 1346 1075 1529 2865 <i>current</i> 5 2 2 1 2 2 3 1 <i>current</i> 0.6 8.8 20.7	16 0 72 1 983 1197 1041 1286 3509 history1 8 3 0 history1 1 1 10.1 22.3	164 0 165 1 793 1253 909 1101 2832 history2 12 12 14 4 4 <u>history2</u> 0.1 5.6 20.3
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 D7844 *ASTM D7624 *ASTM D7415	limit/base >22 >31 >20 limit/base >3 >20 >30	5 0 61 <1 1221 1346 1075 1529 2865 <i>current</i> 5 2 <1 <i>current</i> 0.6 8.8 20.7	16 0 72 1 983 1197 1041 1286 3509 history1 8 3 0 history1 1 1 10.1 22.3 history1	164 0 165 1 793 1253 909 1101 2832 history2 12 12 14 4 4 history2 0.1 5.6 20.3 history2



## **OIL ANALYSIS REPORT**

VISUAI





	VISUAL		method	limit/base	current	history1	history2	
	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE	
$\sim n$	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	
Jul30/18 - Apr17/19 - Apr11/21 - Feb26/24 -	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
Jul3 Apr1 Apr1 Feb2	Odor	scalar	*Visual	NORML	NORML	NORML	NORML	
	Emulsified Water	scalar	*Visual	>0.21	NEG	NEG	NEG	
	Free Water	scalar	*Visual		NEG	NEG	NEG	
				line it //e e e e				
Λ	FLUID PROPE		method	limit/base	current	history1	history2	
	Visc @ 100°C	cSt	ASTM D445	15.6	14.1	13.2	11.7	
	GRAPHS							
V	Iron (ppm)			100	Lead (ppm)			
	200 Severe	+		100	Severe			
Jul30/18 Apr17/19 Apr11/21	150			80				
Ap Ar	톱 100-			E 60				
	50 Abnormal			40	Abnormal			
				20				
	18 18 18 18 18 18 18 18 18 18 18 18 18 1	V18-	1/21	124	/17	/18	- 12/I	
	Jul27/17 Oct1/17 Jan21/18	Mar10/18 Jul30/18	Apr17/19 Apr11/21	Feb26/24	Jul27/17 Oct1/17 Jan21/18	Mar10/18 Jul30/18	Apr17/19 Apr11/21	
	Aluminum (ppm)	~			Chromium (pr			
	60 Severe			25				
	50			20	Severe			
	40 E 30 B 30			E 15	Abar			
	20			<sup>a</sup> 10	Abnormal			
	10-			5	<b>-</b>			
	Jui27/17 0ct1/17 Jan21/18	Mar10/18 Jul30/18	Apr17/19	Feb26/24	Jul27/17 0ct1/17 Jan21/18	Mar10/18 Jul30/18	Apr17/19 Apr11/21	
		N T	A	£	,	W r	A, A	
	Copper (ppm)			40	Silicon (ppm)			
				1	Severe			
	150 - Severe			A 30	Abnormal			
	툞 100			톱 20			Λ	
	50 Abnormal		/	10				
	Abnormal		$\sim$			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
		Mar10/18 - Jul30/18 -	Apr17/19 -	Feb26/24	Jul27/17- Oct1/17- Jan21/18 -	Mar10/18 - Jul30/18 -	Apr17/19 - Apr11/21-	
	Jul2 0c	Mar1 Jul3	Apr1 Apr1	Feb2	Jul2 Oc Jan2	Mar1 Jul3	Apr1 Apr1	
	Viscosity @ 100°C	2			Base Number			
	18 Abnormal				1			
			Λ	0.01 (mg KOH/g)	Base	<u> </u>		
	00000000000000000000000000000000000000			per (n			$\sim$ $\sim$	
	Automa			- Mn 5.0				
	12				Severe			
		/18+	- 61/, - 12/1			/18-	- 12/1	
	Jui27/17 0ct1/17 Jan21/18	Mar1 0/18 Jul3 0/18	Apr17/19 Apr11/21	Feb 26/24	Jul27/17 0ct1/17 Jan21/18	Mar10/18 Jul30/18	Apr17/19 Apr11/21	
Laboratory Sample No. Lab Number	: 06104517 Tes		eived : 29 Feb 2024			RAP METAL SERVICES (SMS Mill Services L 250 WEST U.S. HWY CHESTERTON, US 463 Contact: WALTER MURP/		
L2367 Unique Number Test Package		Diagn	iosed 101	War 2024 - W	les Davis	Contract MAA		

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

F: