

# **OIL ANALYSIS REPORT**

Sample Rating Trend

# NORMAL



Machine Id **PECM03BE** Component

Biogas Engine

CHEVRON HDAX 6500 LFG GAS ENGINE OIL (150 GAL)

# 2020 Feb221 Mez021 Sep2021 Nev2021 Feb2022 Apr2023 Jun2023



Sample Number     Client Info     WC0788305     WC0788336     WC0788341       Sample Date     Iten Info     18 Aug 2023     04 Aug 2023     24 Jul 2023       Machine Age     hrs     Client Info     55081     54751     54494       Oil Age     hrs     Client Info     655     142     100       Oil Changed     Client Info     Not Changd     Not Changd     Not Changd     Not Changd       Sample Status     Client Info     MAChing     Not Changd     Sot Cange     Not Changd </th <th></th> <th></th> <th>c2020 Feb20</th> <th>21 Mar2021 Sep2021</th> <th>Nov2021 Feb2023 Apr2023</th> <th>Jun2023</th> <th></th>			c2020 Feb20	21 Mar2021 Sep2021	Nov2021 Feb2023 Apr2023	Jun2023	
Sample Date     Client Info     16 Aug 2023     04 Aug 2023     24 Jul 2023       Machine Age     hrs     Client Info     55081     54751     54494       Oil Age     hrs     Client Info     655     142     100       Oil Changed     Client Info     Not Changd     Not Changd     Not Changd     Not Changd       CONTAMINATION     method     Imnt/base     current     history1     history2       Fuel     WC Method     >4.0     <1.0     <1.0     <1.0     <1.0       Glycol     WC Method     >4.0     <1.0     <1.0     <1.0     <1.0       Glycol     WC Method     >4.0     <1.0     <1.0     <1.0     <1.0       Gromom     ppm     ASTM 05185m     >2     <1     0     0     <1     <1     <1     0     <1     <1     0     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1     <1	SAMPLE INFORM	<b>IATION</b>	method	limit/base	current	history1	history2
Machine Age     hrs     Client Info     55081     54751     54494       Oil Age     hrs     Client Info     655     142     100       Oil Changed     Client Info     Not Changd     Not Changd     Not Changd     Not Changd       Sample Status     Image     Client Info     NORMAL	Sample Number		Client Info		WC0788305	WC0788336	WC0788341
Oil Age     hrs     Client Info     655     142     100       Oil Changed     Client Info     Not Changd     Not Changd     Not Changd       Sample Status     Imit/Dase     current     history1     history2       Fuel     WC Method     >4.0     <1.0	Sample Date		Client Info		18 Aug 2023	04 Aug 2023	24 Jul 2023
Oil Changed     Client Info     Not Changd     Not Changd     Not Changd     Nor MAL     Nor MAL       CONTAMINATION     method     imit/base     current     history1     history2       Fuel     WC Method     >4.0     <1.0     <1.0     <1.0     <1.0       Glycol     WC Method     >4.0     <1.0     <1.0     <1.0     <1.0       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >15     3     2     <1     0       Nockel     ppm     ASTM D5185m     >5     0     0     0     <1       Auminum     ppm     ASTM D5185m     >6     2     1     1       Copper     ppm     ASTM D5185m     >6     2     1     1       Vanadium     ppm     ASTM D5185m     6     2     1     1       Copper     ppm     ASTM D5185m     6     2     1     1       Vanadium     ppm	Machine Age	hrs	Client Info		55081	54751	54494
Sample Status     NORMAL     NORMAL     NORMAL     NORMAL       CONTAMINATION     method     imit/base     current     history1     history2       Fuel     WC Method     >4.0     <1.0	Oil Age	hrs	Client Info		655	142	100
CONTAMINATION     method     imit/base     current     history1     history2       Fuel     WC Method     >4.0     <1.0	Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Fuel     WC Method     >4.0     <1.0     <1.0     <1.0       Glycol     WC Method     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >15     3     2     <1     0       Nickel     ppm     ASTM D5185m     >2     <1     0     0       Silver     ppm     ASTM D5185m     >5     0     0     0       Astm D5185m     >6     3     <1     2     1     1       Copper     ppm     ASTM D5185m     >6     2     1     1     1       Tin     ppm     ASTM D5185m     >6     2     1     1     1       Vanadium     ppm     ASTM D5185m     0     0     0     0     0       Addition     ppm     ASTM D5185m     4     2     2     1     1       Vanadium     ppm     ASTM D5185m     2     2	Sample Status				NORMAL	NORMAL	NORMAL
Glycol     WC Method     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >15     3     2     <1	CONTAMINATIO	N	method	limit/base	current	history1	history2
WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >15     3     2     <1	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Iron     ppm     ASTM D5185m     >15     3     2     <1       Chromium     ppm     ASTM D5185m     >4     <1	Glycol		WC Method		NEG	NEG	NEG
Chromium     ppm     ASTM D5185m     >4     <1     <1     0       Nickel     ppm     ASTM D5185m     >2     <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel     ppm     ASTM D5185m     >2     <1     0     0       Titanium     ppm     ASTM D5185m     55     0     0     0     <1	Iron	ppm	ASTM D5185m	>15	3	2	<1
Titanium     ppm     ASTM D5185m     0     0     <1       Silver     ppm     ASTM D5185m     >5     0     0     0       Aluminum     ppm     ASTM D5185m     >6     3     <1	Chromium	ppm	ASTM D5185m	>4	<1	<1	0
Silver     ppm     ASTM D5185m     >5     0     0     0       Aluminum     ppm     ASTM D5185m     >6     3     <1	Nickel	ppm	ASTM D5185m	>2	<1	0	0
Aluminum     ppm     ASTM D5185m     >6     3     <1     2       Lead     ppm     ASTM D5185m     >9     8     <1	Titanium	ppm	ASTM D5185m		0	0	<1
Lead     ppm     ASTM D5185m     >9     8     <1     <1       Copper     ppm     ASTM D5185m     >6     2     1     1       Tin     ppm     ASTM D5185m     >4     2     2     1       Vanadium     ppm     ASTM D5185m     0     0     <1	Silver	ppm	ASTM D5185m	>5	0	0	0
Copper     ppm     ASTM D5185m     >6     2     1     1       Tin     ppm     ASTM D5185m     >4     2     2     1       Vanadium     ppm     ASTM D5185m     0     0     <1	Aluminum	ppm	ASTM D5185m	>6	3	<1	2
Tin     ppm     ASTM D5185m     >4     2     2     1       Vanadium     ppm     ASTM D5185m     0     0     0     <1	Lead	ppm	ASTM D5185m	>9	8	<1	<1
Tin     ppm     ASTM D5185m     >4     2     2     1       Vanadium     ppm     ASTM D5185m     0     0     <1	Copper	ppm	ASTM D5185m	>6	2	1	1
Cadmium     ppm     ASTM D5185m     0     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     4     4     2     0       Barium     ppm     ASTM D5185m     0     0     0     0       Magnesium     ppm     ASTM D5185m     2     <1     <1     <1       Magnesium     ppm     ASTM D5185m     2     <1     <1     <1     <1       Calcium     ppm     ASTM D5185m     19     26     19     <1     <1444     <1       Magnesium     ppm     ASTM D5185m     1941     1895     1844       Phosphorus     ppm     ASTM D5185m     289     299     281       Zinc     ppm     ASTM D5185m     3087     3211     2837       Solifon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >20     1     <1		ppm	ASTM D5185m	>4	2	2	1
ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     4     4     2       Barium     ppm     ASTM D5185m     0     0     0       Malganese     ppm     ASTM D5185m     2     <1	Vanadium	ppm	ASTM D5185m		0	0	<1
Boron     ppm     ASTM D5185m     4     4     2       Barium     ppm     ASTM D5185m     0     0     0       Molybdenum     ppm     ASTM D5185m     2     <1	Cadmium	ppm	ASTM D5185m		0	0	0
Barium     ppm     ASTM D5185m     0     0     0       Molybdenum     ppm     ASTM D5185m     2     <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum     ppm     ASTM D5185m     2     <1     <1       Manganese     ppm     ASTM D5185m     <1	Boron	ppm	ASTM D5185m		4	4	2
Marganese     ppm     ASTM D5185m     <1     <1     <1     <1       Magnesium     ppm     ASTM D5185m     19     26     19       Calcium     ppm     ASTM D5185m     1941     1895     1844       Phosphorus     ppm     ASTM D5185m     289     299     281       Zinc     ppm     ASTM D5185m     379     363     324       Sulfur     ppm     ASTM D5185m     3087     3211     2837       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >20     1     <1	Barium	ppm	ASTM D5185m		0		0
Magnesium     ppm     ASTM D5185m     19     26     19       Calcium     ppm     ASTM D5185m     1941     1895     1844       Phosphorus     ppm     ASTM D5185m     289     299     281       Zinc     ppm     ASTM D5185m     3087     3211     2837       Sulfur     ppm     ASTM D5185m     3087     3211     2837       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >20     1     <1	Molybdenum	ppm	ASTM D5185m		2	<1	<1
Calcium     ppm     ASTM D5185m     1941     1895     1844       Phosphorus     ppm     ASTM D5185m     289     299     281       Zinc     ppm     ASTM D5185m     379     363     324       Sulfur     ppm     ASTM D5185m     3087     3211     2837       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >20     1     <1	Manganese	ppm	ASTM D5185m		<1		
Phosphorus     ppm     ASTM D5185m     289     299     281       Zinc     ppm     ASTM D5185m     379     363     324       Sulfur     ppm     ASTM D5185m     3087     3211     2837       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >20     1     <1	Magnesium	ppm	ASTM D5185m		19	26	19
Zinc     ppm     ASTM D5185m     379     363     324       Sulfur     ppm     ASTM D5185m     3087     3211     2837       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >20     1     <1	Calcium	ppm	ASTM D5185m		1941	1895	1844
Sulfur     ppm     ASTM D5185m     3087     3211     2837       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >20     1     <1	Phosphorus	ppm	ASTM D5185m		289	299	281
CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     >20     1     <1	Zinc	ppm	ASTM D5185m		379	363	324
Silicon     ppm     ASTM D5185m     >181     153     140     97       Sodium     ppm     ASTM D5185m     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     <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	Sulfur	ppm	ASTM D5185m		3087	3211	2837
Sodium     ppm     ASTM D5185m     0     <1     <1       Potassium     ppm     ASTM D5185m     >20     1     <1	CONTAMINANTS	;	method	limit/base	current	history1	history2
Potassium     ppm     ASTM D5185m     >20     1     <1     0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0.1     0     0       Nitration     Abs/cm     *ASTM D7624     >20     6.6     6.4     5.7       Sulfation     Abs/.1mm     *ASTM D7415     >30     21.9     20.8     18.1       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     13.9     12.9     10.3       Acid Number (AN)     mg KOH/g     ASTM D8045     1.2     1.52     1.38     0.84	Silicon	ppm	ASTM D5185m	>181	153	140	97
INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     0.1     0     0       Nitration     Abs/cm     *ASTM D7624     >20     6.6     6.4     5.7       Sulfation     Abs/.tmm     *ASTM D7415     >30     21.9     20.8     18.1       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.tmm     *ASTM D7414     >25     13.9     12.9     10.3       Acid Number (AN)     mg KOH/g     ASTM D8045     1.2     1.52     1.38     0.84	Sodium	ppm	ASTM D5185m		0	<1	<1
Soot %     %     *ASTM D7844     0.1     0     0       Nitration     Abs/cm     *ASTM D7624     >20     6.6     6.4     5.7       Sulfation     Abs/.1mm     *ASTM D7415     >30     21.9     20.8     18.1       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     13.9     12.9     10.3       Acid Number (AN)     mg KOH/g     ASTM D8045     1.2     1.52     1.38     0.84	Potassium	ppm	ASTM D5185m	>20	1	<1	0
Nitration     Abs/cm     *ASTM D7624     >20     6.6     6.4     5.7       Sulfation     Abs/.tmm     *ASTM D7415     >30     21.9     20.8     18.1       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.tmm     *ASTM D7414     >25     13.9     12.9     10.3       Acid Number (AN)     mg KOH/g     ASTM D8045     1.2     1.52     1.38     0.84	INFRA-RED		method	limit/base	current	history1	history2
Sulfation     Abs/.1mm     *ASTM D7415     >30     21.9     20.8     18.1       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     13.9     12.9     10.3       Acid Number (AN)     mg KOH/g     ASTM D8045     1.2     1.52     1.38     0.84	Soot %	%	*ASTM D7844		0.1	0	0
FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     13.9     12.9     10.3       Acid Number (AN)     mg KOH/g     ASTM D8045     1.2     1.52     1.38     0.84	Nitration	Abs/cm	*ASTM D7624	>20	6.6	6.4	5.7
Oxidation     Abs/.1mm     *ASTM D7414     >25     13.9     12.9     10.3       Acid Number (AN)     mg KOH/g     ASTM D8045     1.2     1.52     1.38     0.84	Sulfation	Abs/.1mm	*ASTM D7415	>30	21.9	20.8	18.1
Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.52 1.38 0.84	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Base Number (BN)     mg KOH/g     ASTM D2896     4.5     3.78     4.43     4.72	Oxidation	Abs/.1mm	*ASTM D7414	>25	13.9	12.9	10.3

#### DIAGNOOIO

## 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 AN level is acceptable for this fluid. The condition of the oil is suitable for further service.



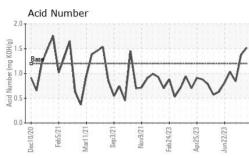
Abnorma

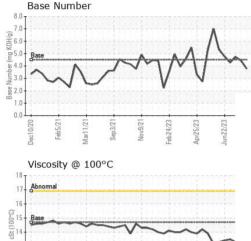
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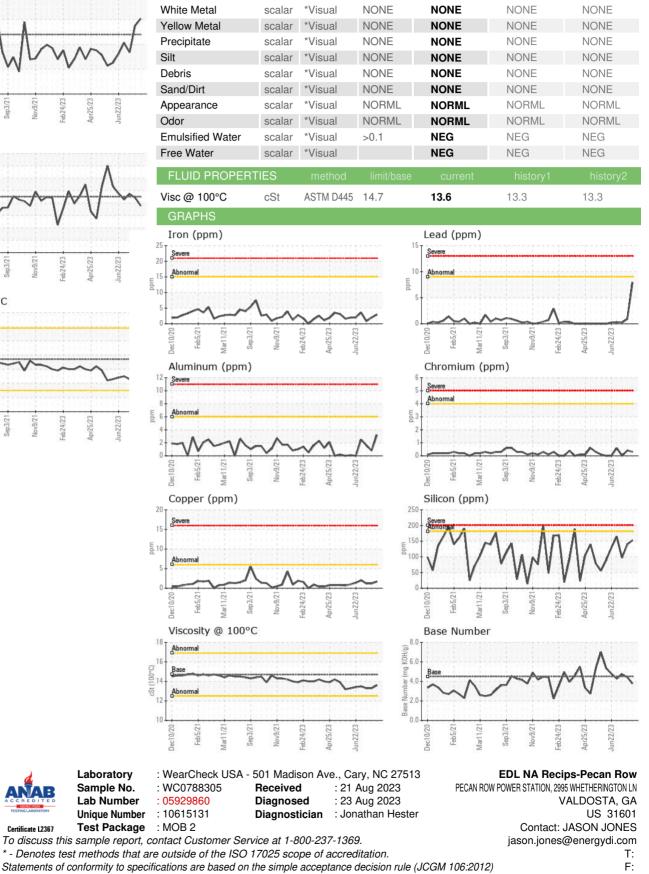
# **OIL ANALYSIS REPORT**





eb24/23

pr25/23



Certificate L2367