



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, ILLINOIS 60604

AUG 30 2019

**DATE:**

**SUBJECT:** CLEAN AIR ACT INSPECTION REPORT  
Green Diesel Engineering, Commerce Township, Michigan

**FROM:** Sarah Clark, Environmental Engineer  
AECAR (IL/IN)

**THRU:** Nathan Frank, Section Chief  
AECAR (IL/IN)

**TO:** File

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**BASIC INFORMATION**

**Facility Name:** Green Diesel Engineering (GDE)

**Facility Location:** 1022 Rag St., Commerce Township, Michigan, 48390

**Date of Inspection:** July 9, 2019 (with a follow up call on July 16, 2019)

**EPA Inspector(s):**

1. Sarah Clark, Environmental Engineer
2. Marie St. Peter, Environmental Engineer

**Other Attendees**

1. Keith Cavallini, President, GDE

**Contact Email Address:** keith@greendieselengineering.com

**Purpose of Inspection:** Assess compliance with the Clean Air Act (CAA) Title II

**Facility Type:** Diesel automotive parts manufacturer and seller

**Regulations Central to Inspection:** CAA Section 205(p)(3)(A) and 203(a)(3)(B) - motor vehicle tampering and defeat device prohibitions.

**Arrival Time:** 3:05 PM

**Departure Time:** 4:40 PM

**Inspection Type:**

- ☒ Unannounced Inspection  
☐ Announced Inspection

**OPENING CONFERENCE**

- ☒ Credentials Presented  
☒ CBI warning to facility provided

Unless otherwise noted, the following information was obtained verbally from Mr. Cavallini during either the July 9, 2019 inspection or a follow up call on July 16, 2019. Information under the "Staff Interview" portion of this inspection report is delineated based on when the information was gathered.

**Company Ownership:** Keith Cavallini is the registered agent for GDE. During the inspection, Mr. Cavallini identified himself as the president of GDE.

**Process Description:**

GDE is a seller of diesel engine vehicle tunes (tunes) through the website "www.greenDieselEngineering.com." According to Mr. Cavallini, GDE only conducts the research and development (R&D) of these tunes. A separate, confidential company, which Mr. Cavallini referred to as "Company X," conducts the engineering and mechanical work. Mr. Cavallini further explained that this work is contracted out by GDE to Company X.

**Staff Interview:****July 9, 2019 Inspection Opening Conference**

Mr. Cavallini informed EPA that he is the sole employee at GDE. He said that GDE has been in operation for 10 years but that GDE has only operated at this facility, 1032 Rig Street, since 2012. This is GDE's sole location and the facility is shared with Company X. When asked for Company X's actual name, Mr. Cavallini declined to provide it, stating that it was confidential information due to Company X conducting other work for original engine manufacturers (OEMs). He did not clarify what OEM work had been conducted by Company X.

Mr. Cavallini informed EPA that prior to being the president of GDE, he worked as a diesel calibrations engineer for at least 20 years. During that time, he worked for OEMs and helped develop many engines. Mr. Cavallini said he was familiar with emissions testing because in his previous roles, he had been involved with the emissions testing of the engines/vehicles he helped develop. However, for the work he currently does, Mr. Cavallini does not use an emissions lab.

According to Mr. Cavallini, GDE does not regularly service vehicles in the shop. He said that GDE sells the tunes it has developed for various diesel engines. When EPA asked for more specific information about the tunes GDE sells, Mr. Cavallini referenced the GDE website as an

accurate source of information on the matter while also identifying the following automotive manufacturer makes and model years (MY's) as being compatible with a GDE tune:

2009 and newer Chrysler vehicles, including the Liberty, Cherokee, Grand Cherokee EcoDiesel, and Ram 1500 EcoDiesel;  
2002-2008 Sprinter vans;  
2005-2008 Mercedes;  
2000-2006 and 2011-2014 Volkswagen vehicles, including the Golf, Jetta, and Beetle;  
2016-2018 General Motors Company Colorado; and  
2016-2018 Chevrolet Canyon.

Mr. Cavallini stated that most of GDE's tunes are intended to improve fuel efficiency. He explained that customers want to recuperate the cost of the tune through savings in fuel. To estimate fuel efficiency, Mr. Cavallini prefers to use a scale to compare the weight of the fuel tank before and after a test. Mr. Cavallini mentioned that he uses personal vehicles for testing. In addition to the fuel tank method, Mr. Cavallini also described an alternative, less accurate method that could be used to estimate fuel usage; this method uses INCA software to back calculate fuel usage through the fuel used per stroke. Mr. Cavallini acknowledged to EPA that most of GDE's tunes also resulted in the better performance of a vehicle as well. When asked what he meant by "better performance," Mr. Cavallini stated that he meant the time it takes a vehicle to go from "0-60."

When asked about more "official methods" of emissions testing, Mr. Cavallini stated that he did not need to emissions test because the tunes he sells are for off-road use only. He explained that emissions testing is expensive and estimated that the testing costs approximately \$1,000/day and requires approximately two weeks to complete. Mr. Cavallini said that the California Air Resources Board (CARB) is suing him, and that he assumed EPA's inspection was due to a letter he recently received from CARB. Mr. Cavallini then explained that CARB had previously contacted him about sales to California, and that as a result of his previous interactions with CARB, since 2017, he has taken measures to restrict sales to California by collecting and screening customer information. Specifically, he stated that the sales system will not accept a California billing address, shipping address, or credit card. Mr. Cavallini also explained that he is currently implementing a new requirement for customers to provide their drivers registration as well.

When asked what he was doing to ensure his products were being sold for off-road use only, Mr. Cavallini discussed a waiver that all customers sign. By signing the waiver, which includes "a hundred questions," Mr. Cavallini said GDE's customers were certifying the tunes were being used for off-road use only. Also, Mr. Cavallini explained that if he suspects someone of "gaming the system" (bypassing the California sales restriction), he will send that person a "DocuSign." When EPA asked Mr. Cavallini to print a copy of the waiver, Mr. Cavallini explained that the waiver was contained on a seven-page Google Form and would be difficult to print. Instead, Mr. Cavallini used his laptop to show EPA the first page of form. EPA observed that the first page of the form requested customer contact information and would not allow the user to proceed to the next page without all the requested information filled in.

EPA learned of two ways that GDE tunes can be installed onto a vehicle: through a flash programmer tool or through direct installation onto an electronic control module (ECM). Mr. Cavallini showed EPA a flash programmer tool (see photos 4-5). The flash programmer tool consists of a touchscreen module and a cable used to connect to a vehicle through a data link connector. Mr. Cavallini explained that customers can go to the GDE website, download the flash programmer tool which GDE will then physically mail to the customer. Once received from GDE, the customer then connects the flash programmer tool to their vehicle through the data link connector to "pull the stock tune" (i.e., the OEM calibration). The customer then emails the "stock tune" to GDE. Upon receipt of the email, Mr. Cavallini modifies the customer's "stock tune" to create the GDE tune which is then sent back electronically to the customer. Mr. Cavallini explained that the flash programmer tool holds both the stock and GDE tunes, allowing the customer to switch back and forth between tunes as desired. Mr. Cavallini stated that the flash programmer tool denotes which tune is active by showing an asterisk next to that tune. Though the flash programmer tool is not directly installed onto the engine, Mr. Cavallini informed EPA that the tune is locked to the customer's vehicle identification number (VIN). This results in a single tune only being able to be used on one vehicle.

The other method of tune installation requires GDE and/or the customer to physically mail an ECM (see July 16, 2019 Phone Call section for more information). While in Mr. Cavallini's office, EPA observed a pile of ECMs and United States Postal Service Priority Mail boxes piled on a credenza. When asked about the ECMs, Mr. Cavallini said that most of the vehicles use the flash programmer tool and that only the EcoDiesel tune uses ECM shipping. Mr. Cavallini said that he typically tries to avoid direct installation of ECMs as it is time consuming.

#### July 16, 2019 Phone Call

On July 16, 2019, EPA and Mr. Cavallini spoke over the phone for the purpose of clarifying some details regarding tune functionality, testing, and installation and to provide some more details about the truck EPA inspected at GDE's facility (see "Data Collected and Observations" section).

During this call, Mr. Cavallini explained that the flash programmer tool he showed EPA during the inspection was compatible with all of the engines for which GDE sells tunes except the EcoDiesel (this only applies to the EcoDiesel ECM; later, Mr. Cavallini clarified that the flash programmer tool is compatible with the EcoDiesel transmission control unit for the purpose of installing transmission tunes). Instead, GDE's EcoDiesel (ECM) tune is only available by direct modification of an ECM (i.e., the tune is installed on an ECM through a bench flash). To perform this bench flash, Mr. Cavallini said that he buys blank ECMs from Mopar. Additionally, if a customer so wishes, Mr. Cavallini said that GDE can install the tune onto a customer-supplied ECM. Only after obtaining the vehicle's VIN and injector bar codes can Mr. Cavallini install the tune. When asked why the EcoDiesel tune was limited to bench flash installation, Mr. Cavallini explained that there are no robust flash programmer tools on the market compatible with the EcoDiesel ECM. The flash programmer tool that GDE uses is made by AlienTech.

Mr. Cavallini also informed EPA that customers now need to provide their vehicle registration when purchasing a tune. He also mentioned that he was in the process of developing a new

website that will be more robust. Mr. Cavallini further explained that before customers can purchase any product from the GDE website, they have to sign a waiver stating that the purchase is for "off-road use only."

EPA then spoke to Mr. Cavallini about the inspection that EPA conducted on a black 2014 MY Ram 1500 truck with a 5.0L diesel ("EcoDiesel") engine (Black Ram 1500) at the GDE facility (see "Data Collected and Observations" section). Mr. Cavallini told EPA that GDE does not own that truck; he also said that GDE does not own the red truck that was parked outside in the parking lot (see photos 1-3). He stated that "Company X" owned these vehicles. EPA asked Mr. Cavallini whether the Black Ram 1500 had a tuned ECM, to which he replied that he would have to check; he clarified that he has not used this ECM in months but that he could pull the ECM and check the data that is on it to check whether it was tuned or stock. Mr. Cavallini explained that he uses the Black Ram 1500 for setting up ECMs to check that the module runs before sending the tuned ECM to the customer. He explained that this truck does not run much otherwise. Mr. Cavallini also informed EPA that, as we were walking up to the Black Ram 1500 during the July 9, 2019 inspection, he had noticed that the ECM was unplugged, so he plugged it in. Mr. Cavallini agreed to send EPA the serial number for the ECM installed in the Black Ram 1500 and to let EPA know whether the ECM was tuned or not.

EPA also asked Mr. Cavallini for some clarification regarding the different updates and add-on features GDE offers on its website. Specifically, EPA asked in what type of scenarios someone would buy an update. In response to this question, Mr. Cavallini described a situation wherein a customer initially buys a basic GDE tune, such as the "Hot Tune," and then moves to a mountain at which time they decide they want to purchase additional add-on features. He explained that GDE would then charge the customer the cost of all additional add-on features and a \$50 fee to perform a "reflash" of a flash programmer tool or ECM. For an EcoDiesel engine, Mr. Cavallini clarified that the customer would have to either mail in their ECM or exchange ECMs. EPA then asked Mr. Cavallini to explain what the "off-road" feature involves. He responded, "that's for those people changing exhaust systems. I assume they're going to the track or live in the boonies somewhere." EPA then requested that Mr. Cavallini confirm that there were no other options which change the vehicle's exhaust; he confirmed and added that he "tries to dissuade people from doing that."

Finally, EPA asked Mr. Cavallini about the "EcoDiesel AEM Tune Update" and the "Ram 1500 EcoDiesel Tune Update" tunes listed on GDE's website. Specifically, EPA asked if the "AEM" and the "Ram 1500" updates listed on the website were the same thing. Mr. Cavallini confirmed. EPA also asked if a customer must have previously purchased the more expensive EcoDiesel "Hot Tune" listed on the GDE website before being able to purchase the cheaper (i.e., \$50 base price) "AEM" and/or "Ram 1500" updates. Mr. Cavallini also confirmed this, and stated GDE only offers one tune—the Hot Tune—for EcoDiesel engines. EPA and Mr. Cavallini then discussed why GDE sells the same update tune under two separate names, the "AEM" and the "Ram 1500". Mr. Cavallini explained that he was making it clear to customers, who have received the Approved Emissions Modification and had their previously purchased GDE tunes overwritten, that they were able to re-install their GDE tune onto their EcoDiesel

## TOUR INFORMATION

**EPA toured the facility:** Yes

### Data Collected and Observations:

Prior to entering the facility, EPA observed several pick-up trucks, a sedan, and an SUV in the parking lot (see photos 1-3). During the opening conference, EPA heard another person in the facility; Mr. Cavallini explained that this other person was a contractor and not a GDE employee. Mr. Cavallini showed EPA an example flash programmer tool, including the cable used to connect the device to the motor vehicle and the box in which the device is shipped (see photos 4-5).

Following the opening conference, Mr. Cavallini showed EPA past a separate office and toward the bays of the facility. Occasionally, EPA saw another man, the contractor, as he walked around the facility conducting other business. In the first bay, EPA observed several machine tools and engine components. Mr. Cavallini explained that he was working on a proprietary new fuel injection system. In the furthest bay, EPA observed a chassis dynamometer (see photo 6) with a green Jeep Wrangler Unlimited Rubicon parked on the rollers; Mr. Cavallini expressed concern for the privacy the owner of the vehicle and drove the vehicle off of the rollers prior to EPA photographing the dynamometer. Mr. Cavallini said that he was testing a new transmission tune that had not been released yet.

In a central bay of the facility, EPA inspected a black 2014 MY Ram 1500 truck with a 3.0L diesel engine (Black Ram 1500) (see photos 7-11). Mr. Cavallini stood nearby as EPA conducted an on board diagnostics (OBD) scan while the vehicle was running. The OBD live data for the exhaust gas recirculation (EGR) system was monitored while idling and while revving the engine. The OBD output indicated that the "Commanded EGR Duty Cycle" was 0% (see photo 16). Mr. Cavallini stated that this truck was owned by Company X. To EPA inspector Clark, Mr. Cavallini pointed out the EGR valve (see photo 41). The turbocharger was not immediately visible; however, Mr. Cavallini explained that the turbocharger is positioned toward the back of the engine. He demonstrated this by showing inspector Clark a separate, torn down engine in the first bay of the facility. Mr. Cavallini stated that it was an identical engine with an identical turbocharger as that contained in the Black Ram 1500 (photo 42).

Following the vehicle inspection, as EPA and Mr. Cavallini returned to Mr. Cavallini's office for the closing conference, EPA saw the contractor working in the separate office. Along one wall of the office, EPA observed a shelf containing stacks of cardboard boxes identical to the flash programmer tool box Mr. Cavallini showed EPA during the opening conference.

**Photos and/or Videos:** were taken during the inspection.

- Photos containing confidential business information (CBI) are marked accordingly in Appendix A.

**Field Measurements:** were taken during this inspection.

- OBD scans and a vehicle inspection log were completed on one vehicle, the Black Ram 1500, during the inspection and are maintained in the case file (see Attachments 1 and 2).

### RECORDS REVIEW

No documents generated by, or on behalf of, GDE were reviewed on site.

### CLOSING CONFERENCE

During the closing conference, EPA discussed next steps and how EPA might communicate with Mr. Cavallini moving forward. EPA asked if he would like to review any of the photos taken during the inspection; Mr. Cavallini declined.

In a follow up email sent July 16, 2019, Mr. Cavallini requested to review the photos. EPA sent Mr. Cavallini the photos via email on July 16, 2019, at which time EPA requested a conference call with Mr. Cavallini. In an email sent on July 16, 2019, Mr. Cavallini agreed to meet with EPA over the phone and requested that the photos of the "red truck, license plates, and VIN" be claimed as confidential as these vehicles are not GDE property.

### SIGNATURES

Report Author: Sandra Clark Date: 8/23/2019  
Section Chief: Joseph R. [Signature] Date: 8/30/19  
Matthew [Signature]

**Facility Name:** Green Diesel Engineering

**Facility Location:** 1632 Rig St., Commerce Township, Michigan

**Date of Inspection:** July 9, 2019 (with a follow up call on July 16, 2019)

**APPENDICES AND ATTACHMENTS**

1. Appendix A: Digital Image Log
2. Attachment 1: ODI-R with photos and OBD II Scanner Results\*\*
3. Attachment 2: Physical/CHD Inspection Worksheet<sup>1</sup>

\*Contains CHD

<sup>1</sup>Enforcement Confidential

Facility Name: Green Diesel Engineering  
 Facility Location: 7032 Rip St., Commerce Township, Michigan  
 Date of Inspection: July 9, 2019 (with a follow up call on July 16, 2019)

**APPENDIX A: DIGITAL IMAGE LOG**

1. Inspector Name: Sara Clark	2. Date(s) of Inspection: July 9, 2019 (with a follow up call on July 16, 2019)
3. Company/Facility Name: Green Diesel Engineering	4. Street Address, City, State: 7032 Rip St., Commerce Township, Michigan
5. Number of Images: 42	6. Archival Record Location: CD-R labeled as "Green Diesel Engineering, Commerce Township, MI, Inspection Photos and OBD, July 9, 2019" Contains CBI

Image Number	File Name	Date and Time (EDT)	Latitude and Longitude	Description of Image
1	P7090001.JPG	2019:07:09 15:04:08	42.544867, -83.494682	Front of building prior to entry (CBI)
2	P7090002.JPG	2019:07:09 15:04:47	42.5448, -83.493877	Red truck (CBI)
3	P7090003.JPG	2019:07:09 15:06:08	42.544722, -83.493611	Parking lot (CBI)
4	P7090004.JPG	2019:07:09 15:21:59	42.544722, -83.493611	Flash programmer tool
5	P7090005.JPG	2019:07:09 15:22:16	42.544722, -83.493611	Flash programmer tool box
6	P7090006.JPG	2019:07:09 15:49:18	42.544722, -83.493611	Dyno
7	P7090007.JPG	2019:07:09 15:59:53	42.544722, -83.493611	Black Ram 1500 license plate (CBI)
8	P7090008.JPG	2019:07:09 16:00:52	42.544722, -83.493611	Black Ram 1500 chassis sticker (CBI)
9	P7090009.JPG	2019:07:09 16:00:55	42.544722, -83.493611	Black Ram 1500 chassis sticker
10	P7090010.JPG	2019:07:09 16:01:53	42.544722, -83.493611	Black Ram 1500 front
11	P7090011.JPG	2019:07:09 16:03:58	42.544722, -83.493611	Black Ram 1500 engine
12	P7090012.JPG	2019:07:09 16:04:05	42.544722, -83.493611	Black Ram 1500 angled view
13	P7090013.JPG	2019:07:09 16:04:17	42.544722, -83.493611	Black Ram 1500 tire and loading information
14	P7090014.JPG	2019:07:09 16:05:01	42.544722, -83.493611	Black Ram 1500 dash

**Facility Name:** Green Diesel Engineering

**Facility Location:** 1932 Rig St., Commerce Township, Michigan

**Date of Inspection:** July 9, 2019 (with a follow up cal. on July 16, 2019)

15	P7090015.JPG	2019:07:09 16:05:07	42.544722, -83.493611	Black Ram 1500 odometer
16	P7090016.JPG	2019:07:09 16:10:03	42.544722, -83.493611	Black Ram 1500 OBD scan tool screen
17	P7090017.JPG	2019:07:09 16:10:47	42.544722, -83.493611	Black Ram 1500 label
18	P7090018.JPG	2019:07:09 16:10:55	42.544722, -83.493611	Black Ram 1500 emission control information
19	P7090019.JPG	2019:07:09 16:11:18	42.544722, -83.493611	Black Ram 1500 engine
20	P7090020.JPG	2019:07:09 16:11:25	42.544722, -83.493611	Black Ram 1500 engine
21	P7090021.JPG	2019:07:09 16:11:56	42.544722, -83.493611	Black Ram 1500 aftertreatment
22	P7090022.JPG	2019:07:09 16:12:00	42.544722, -83.493611	Black Ram 1500 aftertreatment
23	P7090023.JPG	2019:07:09 16:12:02	42.544722, -83.493611	Black Ram 1500 aftertreatment
24	P7090024.JPG	2019:07:09 16:12:05	42.544722, -83.493611	Black Ram 1500 aftertreatment and muffler
25	P7090025.JPG	2019:07:09 16:12:12	42.544722, -83.493611	Black Ram 1500 aftertreatment
26	P7090026.JPG	2019:07:09 16:12:15	42.544722, -83.493611	Black Ram 1500 aftertreatment
27	P7090027.JPG	2019:07:09 16:13:25	42.544722, -83.493611	Black Ram 1500 DEF port
28	P7090028.JPG	2019:07:09 16:13:50	42.544722, -83.493611	Black Ram 1500 aftertreatment
29	P7090029.JPG	2019:07:09 16:14:06	42.544722, -83.493611	Black Ram 1500 aftertreatment
30	P7090030.JPG	2019:07:09 16:14:14	42.544722, -83.493611	Black Ram 1500 aftertreatment
31	P7090031.JPG	2019:07:09 16:15:31	42.544722, -83.493611	Black Ram 1500 aftertreatment sensors
32	P7090032.JPG	2019:07:09 16:15:36	42.544722, -83.493611	Black Ram 1500 aftertreatment sensors
33	P7090033.JPG	2019:07:09 16:15:46	42.544722, -83.493611	Black Ram 1500 aftertreatment sensors
34	P7090034.JPG	2019:07:09 16:15:50	42.544722, -83.493611	Black Ram 1500 aftertreatment sensors

**Facility Name:** Green Diesel Engineering

**Facility Location:** 1033 Rig St., Commerce Township, Michigan

**Date of Inspection:** July 9, 2019 (with a follow up call on July 16, 2019)

35	P7090035.JPG	2019-07-09 16:15:57	42.544722, -83.493611	Black Ram 1500 dual exhaust
36	P7090036.JPG	2019-07-09 16:16:28	42.544722, -83.493611	Black Ram 1500 aftertreatment
37	P7090037.JPG	2019-07-09 16:16:30	42.544722, -83.493611	Black Ram 1500 aftertreatment
38	P7090038.JPG	2019-07-09 16:16:41	42.544722, -83.493611	Black Ram 1500 blurry photo
39	P7090039.JPG	2019-07-09 16:16:50	42.544722, -83.493611	Black Ram 1500 aftertreatment sensors
40	P7090040.JPG	2019-07-09 16:17:04	42.544722, -83.493611	Black Ram 1500 aftertreatment sensors
41	P7090041.JPG	2019-07-09 16:18:06	42.544722, -83.493611	Black Ram 1500 EGR valve
42	P7090042.JPG	2019-07-09 16:27:18	42.544722, -83.493611	Torn down engine, turbocharger