

ONE HUNDRED FOURTEENTH CONGRESS
Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
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MEMORANDUM

October 5, 2015

To: Subcommittee on Oversight and Investigations Democratic Members and Staff
Fr: Committee on Energy and Commerce Democratic Staff
Re: Hearing on “Volkswagen Emissions Cheating Allegations: Initial Questions”

On Thursday, October 8, 2015, at 10:00 a.m. in room 2123 of the Rayburn House Office Building, the Subcommittee on Oversight and Investigations will hold a hearing titled “Volkswagen Emissions Cheating Allegations: Initial Questions.” The hearing will review the circumstances surrounding Volkswagen’s violations of emissions standards.

According to the Environmental Protection Agency (EPA):

EPA issued a notice of violation (NOV) of the Clean Air Act (CAA) to Volkswagen AG, Audi AG, and Volkswagen Group of America, Inc. on September 18, 2015. The NOV alleges that four-cylinder Volkswagen and Audi diesel cars from model years 2009-2015 include software that circumvents EPA emissions standards for certain air pollutants. The software produced by Volkswagen is a “defeat device,” as defined by the Clean Air Act.¹

The defeat device took the form of software that, according to the agency, “sensed” when the vehicles were undergoing emissions testing and ensured emissions control systems were operating to pass. During normal road use, the software would “switch” to a different mode.²

¹ United States Environmental Protection Agency, *Notices of Violations - Volkswagen* (accessed Oct. 2, 2015).

² Letter from Phillip A. Brooks, Director, Air Enforcement Division, Office of Civil Enforcement, Environmental Protection Agency, to David Geanacopoulos, Executive Vice President Public Affairs and General Counsel, Volkswagen Group of America, Inc. and Stuart Johnson, General Manager, Engineering and Environmental Office, Volkswagen Group of America (Sept. 18, 2015); United States Environmental Protection Agency, *Notices of Violations - Volkswagen – FAQs* (accessed Oct. 2, 2015).

According to EPA, when operating in road mode these vehicles produced nitrogen oxide (NOx) emissions up to 40 times more than emission standards allow.³

Almost half a million cars in the United States may be affected. The vehicles involved, include: VW Jetta TDI (MY 2009 – 2015); VW Jetta SportWagen TDI (Model Years 2009-2014); VW Golf TDI (Model Years 2010-2015); Audi A3 (Model Years 2010 – 2015); VW Golf SportWagen TDI (Model Year 2015); VW Beetle TDI and VW Beetle Convertible TDI (Model Years 2012-2015); and VW Passat TDI (Model Years 2012-2015).⁴

I. BACKGROUND

A. Volkswagen Corporate Structure

Volkswagen Aktiengesellschaft (Volkswagen AG) is the parent company of the Volkswagen Group, which comprises 12 brands (including Volkswagen Passenger Vehicles).⁵ Each brand operates as an independent entity.⁶ Volkswagen Group of America is a wholly owned subsidiary of Volkswagen AG that “houses the U.S. operations of ... Audi, Bugatti, Lamborghini and Volkswagen, as well as VW Credit, Inc.”⁷ Volkswagen Group of America has approximately 6,000 employees in the United States and operates a manufacturing plant in Chattanooga, Tennessee.⁸

B. The Clean Air Act and NOx Emissions

The Clean Air Act (CAA) was enacted to protect public health and welfare and to “initiate and accelerate a national research and development program to achieve the prevention and control of air pollution.”⁹ The CAA regulates air emissions from stationary and mobile sources and requires EPA to establish National Ambient Air Quality Standards and hazardous pollutant emission standards for “criteria” pollutants.¹⁰

³ United States Environmental Protection Agency, *Notices of Violations - Volkswagen* (accessed Oct. 2, 2015).

⁴ *Id.*

⁵ Volkswagen Aktiengesellschaft, *Structure and Business Activities* (accessed Oct. 2, 2015).

⁶ Volkswagen Aktiengesellschaft, *The Group* (accessed Oct. 2, 2015).

⁷ Volkswagen Group of America, *About Volkswagen Group of America, Inc.* (accessed Oct. 2, 2015).

⁸ *Id.*

⁹ 42 U.S.C. § 7401(b).

¹⁰ United States Environmental Protection Agency, *Summary of the Clean Air Act* (accessed Sept. 30, 2015); Congressional Research Service, *Environmental Laws: Summaries of Major Statutes Administered by the Environmental Protection Agency* (Dec. 20, 2013); 42 U.S.C. § 7401 et seq.; United States Environmental Protection Agency, *Nitrogen Oxides (NOx) Control Regulations* (accessed Sept. 30, 2015).

Nitrogen oxide (NOx) is one of the six major air pollutants classified as criteria pollutants.¹¹ Nitrogen oxides are a family of poisonous, highly reactive gases that form when fuel is burned at high temperatures.¹² Among other sources, NOx pollution is emitted by automobiles.¹³

C. Diesel Engines and Pollution Controls

Diesel engines are primarily used in large trucks, agricultural and construction equipment, boats, and trains due to their durability, efficiency, and ability to provide high torque for moving heavy loads.¹⁴ Light passenger vehicles with diesel engines are popular in Europe and have increased in popularity in the U.S. in recent years due to their fuel economy benefits and “clean diesel” technologies.¹⁵

Diesel fuel is more energy dense than regular gasoline, and diesel engines use a more efficient combustion process to produce more torque.¹⁶ Diesel engines can achieve much higher fuel economy by combining the more energy-dense fuel with the more efficient combustion process. However, these engines also produce more pollution, in particular NOx. This results in a “diesel dilemma” for pollution control, as noted by researchers at the University of California-Davis:

Changes to reduce NOx emissions increase particulate emissions, and vice versa: high temperatures and additional oxygen reduce particulate levels, but increase NOx formation ... [and] adjusting the engine for greater economy results in higher NOx. The challenge for engine manufacturers is to reduce both NOx and particulates, *and* retain diesel's superior fuel efficiency. [emphasis in the original]¹⁷

¹¹ United States Environmental Protection Agency, *Nitrogen Dioxide Basic Information* (accessed Sept. 30, 2015).

¹² United States Environmental Protection Agency, *Nitrogen Oxides (NOx) Control Regulations* (accessed Sept. 30, 2015).

¹³ *Id.*

¹⁴ Christie-Joy Brodrick, Daniel Sperling, and Harry A. Dwyer, *Clean Diesel: Overcoming Noxious Fumes*, Institute of Transportation Studies at the University of California, Davis (Fall 2001).

¹⁵ Alex Davies, *The Real Winner in the VW Diesel Scandal? Hybrid Cars*, *Wired* (Sept. 24, 2015).

¹⁶ Tia Ghose, *Volkswagen Scandal: Why Is It So Hard to Make Clean Diesel Cars?*, *Live Science* (Sept. 24, 2015).

¹⁷ CRS Insight, *EPA's In-Use Emissions Testing and Volkswagen's Defeat Devices* (Sept. 25, 2015); Christie-Joy Brodrick, Daniel Sperling, and Harry A. Dwyer, *Clean Diesel: Overcoming Noxious Fumes*, Institute of Transportation Studies at the University of California, Davis (Fall 2001).

D. EPA and CARB Certification, Testing, and Enforcement

1. Certificates of Conformity

All new cars sold in the United States must have an EPA-issued “Certificate of Conformity” to demonstrate compliance with the CAA and all applicable EPA regulations.¹⁸ New cars cannot be sold in the U.S. without this certificate.¹⁹

Similarly, new motor vehicles and engines must be certified by the California Air Resources Board (CARB) for emission compliance before they are legal for sale, use, or registration in California.²⁰ CARB, California’s clean air agency, sets and enforces its own emission standards.²¹ Because California had adopted emission standards prior to passage of the CAA, they are the only state permitted to set their own emissions standards. Other states are permitted to follow CARB standards or use the federal ones, but not set their own.²²

The certification process begins when a manufacturer submits an application for certification to EPA and CARB.²³ The agencies require manufacturers to provide detailed information to show that they have met all of the applicable requirements to qualify for certification. Manufacturers must attest to the accuracy and integrity of the data and other documentation they submit, and they face severe penalties if they are found to have misled the agencies.²⁴

2. Testing

EPA and CARB’s emission regulations specify test procedures to measure engine or vehicle emission levels.²⁵ The agencies use the test results to determine compliance with the

¹⁸ U.S. Environmental Protection Agency, *Release of Auto Manufacturer Expanded Testing Guidance Letter, Final Remarks as Prepared* (Sept. 25, 2015) (Prepared Press Remarks).

¹⁹ *Id.*

²⁰ California Environmental Protection Agency Air Resources Board, *Mobile Sources Certification Programs* (accessed on Oct. 1, 2015).

²¹ California Environmental Protection Agency Air Resources Board, *Introduction to the Air Resources Board* (accessed on Oct. 1, 2015).

²² Congressional Research Service, *California’s Waiver Request to Control Greenhouse Gases Under the Clean Air Act* (Aug. 20, 2007).

²³ U.S. Environmental Protection Agency, *Release of Auto Manufacturer Expanded Testing Guidance Letter, Final Remarks as Prepared* (Sept. 25, 2015) (Prepared Press Remarks) and U.S. Environmental Protection Agency, *Emission Standards Reference Guide* (accessed on Oct. 1, 2015).

²⁴ *Id.*

²⁵ *Id.*

applicable emission standards. This testing is performed by manufacturers, who submit detailed testing data to EPA. The agency runs spot checks on about 15% of models each year to verify the data from manufacturers.²⁶

In addition to initial testing and certification, automakers must test vehicles after production through in-use testing, generally on privately used vehicles or engines. If the in-use testing reveals problems, “EPA would work with the manufacturer to fix them, either through voluntary manufacturer action or, if necessary, through an ordered emissions recall.”²⁷ EPA also conducts its own limited “surveillance testing” at its laboratory in Ann Arbor, Michigan.²⁸ EPA selects vehicles for such testing based on manufacturer in-use testing data, EPA certification data, consumer complaints, and random selection.²⁹ The Clean Air Act prohibits “defeat devices” designed to circumvent emissions standards and testing procedures.³⁰

The emissions tests for certification and in-use occur in a lab on a dynamometer — a treadmill for cars — that changes speeds at a programmed interval known as a “drive cycle” while a device measures pollutants from the tailpipe.³¹ These EPA “treadmill” tests are standardized so that all vehicles are held to the same standard. Testing protocols have known practices and profiles simulating various driving conditions.³²

In addition to the standardized lab testing, EPA has developed a portable emissions measurement system (PEMS) that can conduct on-road emissions testing.³³ EPA deploys this portable emissions testing equipment for harmful emissions such as NOx, based on the vehicle areas most prone to NOx pollutants.³⁴ EPA reported that the heavy-duty diesel truck market’s annual NOx emissions “dwarf the inventory from light-duty diesels.”³⁵ Light duty diesel

²⁶ Jason Keyser, *US regulator developed test that finally caught VW cheating but didn't widely use it on cars*, Associated Press (Oct. 2, 2015) and Jeff Plungis, *Petition Seeks Overhaul of U.S. EPA Testing Following VW Scandal*, Bloomberg Business (Oct. 1, 2015).

²⁷ CRS Insight, *EPA’s In-Use Emissions Testing and Volkswagen’s Defeat Devices* (Sept. 25, 2015).

²⁸ *Id.*

²⁹ *Id.*

³⁰ 42 U.S.C. § 7522(a)(3)(B).

³¹ Jason Keyser, *US regulator developed test that finally caught VW cheating but didn't widely use it on cars*, Associated Press (Oct. 2, 2015).

³² *Id.*

³³ *Id.*

³⁴ U.S. Environmental Protection Agency, *Release of Auto Manufacturer Expanded Testing Guidance Letter, Final Remarks as Prepared* (Sept. 25, 2015) (Prepared Press Remarks).

³⁵ *Id.*

passenger cars (those at issue in the VW case) account for less than one percent of on-highway diesel NOx emissions and make up less than one percent of the U.S. light-duty auto fleet.³⁶

3. Enforcement

EPA has a range of enforcement options available to address violations of the CAA provisions on defeat devices and certificates of conformity, including referral to the Department of Justice (DOJ) and levying civil fines.³⁷ Violators of the provisions prohibiting “defeat devices” are subject to civil penalties up to \$3,750 for each violation. In addition, manufacturers violating certificate of conformity provisions are subject to a civil penalty of up to \$37,500 for each violation.³⁸ CARB also has its own enforcement program and sanctions.

In response to enforcement proceedings, automakers often voluntarily recall the vehicles and/or settle with EPA and DOJ. For example, the agencies settled with Honda and Ford in 1998 for fines and pollution mitigation. EPA has also caught manufacturers installing defeat devices on several other occasions, including VW (1973), Chrysler (1973), General Motors (1995), and Hyundai/Kia (2014); heavy-duty engine manufacturers Caterpillar, Cummins, Detroit Diesel, Mack, Navistar, Renault and Volvo (1998); and parts manufacturers Casper's Electronics (2013) and Edge Products (2013).³⁹

II. VOLKSWAGEN 2015 VIOLATION AND ADMISSION OF DEFEAT DEVICE

In May 2014, West Virginia University's Center for Alternative Fuels, Engines & Emissions published a study commissioned by the International Council on Clean Transportation (ICCT) on emissions testing of light-duty diesel vehicles in the United States.⁴⁰ The study was designed to do on-road emissions testing of three vehicles using a PEMS and to compare those findings to vehicle performance during emissions standard testing. The study found that real-world NOx emissions exceeded EPA standards by a factor of 15 to 35 for a MY 2012 Jetta and by a factor of five to 20 for a MY 2013 Passat.⁴¹

³⁶ *Id.*

³⁷ Letter from Phillip A. Brooks, Director, Air Enforcement Division, Office of Civil Enforcement, Environmental Protection Agency, to David Geanacopoulos, Executive Vice President Public Affairs and General Counsel, Volkswagen Group of America, Inc. and Stuart Johnson, General Manager, Engineering and Environmental Office, Volkswagen Group of America, Inc. (Sept. 18, 2015).

³⁸ *Id.*

³⁹ CRS Insight, *EPA's In-Use Emissions Testing and Volkswagen's Defeat Devices*. (Sept. 25, 2015).

⁴⁰ West Virginia University Center for Alternative Fuels, Engines & Emissions, *In-Use Emissions Testing of Light-Duty Diesel Vehicles in the United States* (May 15, 2014).

⁴¹ Letter from Phillip A. Brooks, Director, Air Enforcement Division, Office of Civil Environment, Environmental Protection Agency, to David Geanacopoulos, Executive Vice President Public Affairs and General Counsel, Volkswagen Group of America, and Stuart

Following publication of the study, VW told CARB and EPA that the increased emissions were due to technical issues and unexpected in-use conditions.⁴² VW continued testing, and in December 2014, proposed to EPA and CARB a recalibration fix to resolve the technical issues.⁴³ That month, VW issued a voluntary recall of 500,000 vehicles to resolve, among other things, the real world NOx driving issue.⁴⁴

In May 2015, CARB began testing on the efficacy of the recall.⁴⁵ CARB found that VW's proposed technical issues could not explain the higher emissions found during testing, and that in some cases, the recalibration fix still resulted in the vehicle failing the NOx standard.⁴⁶ In July 2015, CARB shared its testing results with VW and EPA.

EPA and CARB stated that they would not approve certificates of conformity for VW's 2016 model year vehicles until the problems could be explained.⁴⁷ At that time, VW admitted that it had "designed and installed a defeat device in these vehicles in the form of a sophisticated software algorithm that detected when a vehicle was undergoing emissions testing."⁴⁸

On September 18, 2015, the EPA issued an NOV to VW for non-compliance with the CAA and its implementing regulations.⁴⁹ The NOV alleges two violations of the Clean Air Act: (1) the defeat devices "bypass, defeat, or render inoperative elements of the vehicles emission control system that exist to comply with CAA emissions standards;" and (2) VW violated the CAA by "selling, offering for sale, introducing into commerce, delivering for introduction into commerce, or importing" vehicles that do not conform to the vehicle specifications described in the certificates of conformity.

Johnson, General Manager, Engineering and Environmental Office, Volkswagen Group of America (Sept. 18, 2015).

⁴² *Id.*

⁴³ Letter from Annette Hebert, Chief, Emissions Compliance, Automotive Regulations and Science Division, California Air Resources Board, to David Geanacopoulos, Executive Vice President Public Affairs and General Counsel, Volkswagen Group of America, and Stuart Johnson, General Manager, Engineering and Environmental Office, Volkswagen Group of America (Sept. 18, 2015).

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ Letter from Phillip A. Brooks, Director, Air Enforcement Division, Office of Civil Environment, Environmental Protection Agency, to David Geanacopoulos, Executive Vice President Public Affairs and General Counsel, Volkswagen Group of America, and Stuart Johnson, General Manager, Engineering and Environmental Office, Volkswagen Group of America (Sept. 18, 2015).

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Id.*

EPA is authorized to refer this matter to the Department of Justice (DOJ) for enforcement action. Also on September 18, CARB initiated an enforcement investigation of VW and the alleged violations of federal and state law.⁵⁰

On September 22, VW revealed that 11 million vehicles worldwide contain the defeat device.⁵¹ A remedy has not yet been announced.⁵²

On September 25, EPA announced to all manufacturers that it will be conducting additional testing of all vehicles.⁵³ The testing will use driving cycles and conditions encountered in normal operation of a vehicle. This additional testing will encompass at least 28 diesel-powered models.⁵⁴

III. WITNESSES

Panel I

Michael Horn
President and CEO
Volkswagen Group of America, Inc.

Panel II

Chris Grundler
Director, Office of Transportation and Air Quality
Environmental Protection Agency

Phil Brooks
Director, Air Enforcement Division
Environmental Protection Agency

⁵⁰ Letter from Annette Hebert, Chief, Emissions Compliance, Automotive Regulations and Science Division, California Air Resources Board, to David Geanacopoulos, Executive Vice President Public Affairs and General Counsel, Volkswagen Group of America, Inc. and Stuart Johnson, General Manager, Engineering and Environmental Office, Volkswagen Group of America, Inc. (Sept. 18, 2015).

⁵¹ William Boston and Sarah Sloat, *Volkswagen Emissions Scandal Relates to 11 Million Cars*, Wall Street Journal (Sept. 22, 2015).

⁵² Volkswagen, *Volkswagen Diesel Information* (accessed Oct. 1, 2015).

⁵³ Letter from Byron J. Bunker, Director, Compliance Division, Office of Transportation and Air Quality, Environmental Protection Agency, to Vehicle Manufacturers (Sept. 25, 2015).

⁵⁴ Barney Jopson and Robert Wright, *EPA extends VW diesel emissions probe to other brands in US*, Financial Times (Oct. 2, 2015).