



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

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OFFICE OF  
ENFORCEMENT AND  
COMPLIANCE ASSURANCE

*VIA CERTIFIED MAIL  
RETURN RECEIPT REQUESTED*

Volkswagen AG  
Audi AG  
Porsche AG  
Volkswagen Group of America, Inc.  
Porsche Cars North America, Inc.  
Thru:

David Geanacopoulos  
Executive Vice President Public Affairs and  
General Counsel  
Volkswagen Group of America, Inc.  
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Joseph Folz  
Vice President, General Counsel and  
Secretary  
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Stuart Johnson  
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Engineering and Environmental Office  
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Walter J. Lewis  
Manager, Regulatory Affairs  
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980 Hammond Drive, Suite 1000  
Atlanta, GA 30328

Re: Notice of Violation

Dear Mr. Geanacopoulos, Mr. Johnson, Mr. Folz, and Mr. Lewis:

The United States Environmental Protection Agency (EPA) has investigated and continues to investigate Volkswagen AG, Audi AG, Porsche AG, Volkswagen Group of America, Inc., and Porsche Cars North America, Inc., (collectively, VW) for compliance with the Clean Air Act (CAA), 42 U.S.C. §§ 7401–7671q, and its implementing regulations. As detailed in this Notice of Violation (NOV), the EPA has determined that VW manufactured and installed defeat devices

in certain model year 2014 – 2016 diesel light-duty vehicles equipped with 3.0 liter engines. These defeat devices bypass, defeat, or render inoperative elements of the vehicles' emission control system that exist to comply with CAA emission standards. Therefore, VW violated section 203(a)(3)(B) of the CAA, 42 U.S.C. § 7522(a)(3)(B). Additionally, the EPA has determined that, due to the existence of the defeat devices in these vehicles, these vehicles do not conform in all material respects to the vehicle specifications described in the applications for the certificates of conformity that purportedly cover them. Therefore, VW also violated section 203(a)(1) of the CAA, 42 U.S.C. § 7522(a)(1), by selling, offering for sale, introducing into commerce, delivering for introduction into commerce, or importing these vehicles, or for causing any of the foregoing acts.

### Law Governing Alleged Violations

This NOV arises under Part A of Title II of the CAA, 42 U.S.C. §§ 7521–7554, and the regulations promulgated thereunder. In creating the CAA, Congress found, in part, that “the increasing use of motor vehicles . . . has resulted in mounting dangers to the public health and welfare.” CAA § 101(a)(2), 42 U.S.C. § 7401(a)(2). Congress' purpose in creating the CAA, in part, was “to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population,” and “to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution.” CAA § 101(b)(1)–(2), 42 U.S.C. § 7401(b)(1)–(2). The CAA and the regulations promulgated thereunder aim to protect human health and the environment by reducing emissions of nitrogen oxides (NOx) and other pollutants from mobile sources of air pollution. Nitrogen oxides are a family of highly reactive gases that play a major role in the atmospheric reactions with volatile organic compounds (VOCs) that produce ozone (smog) on hot summer days. Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. Breathing ozone can also worsen bronchitis, emphysema, and asthma. Children are at greatest risk of experiencing negative health impacts from exposure to ozone.

The EPA's allegations here concern light-duty motor vehicles for which 40 C.F.R. Part 86 sets emission standards and test procedures and section 203 of the CAA, 42 U.S.C. § 7522, sets compliance provisions. Light-duty vehicles must satisfy emission standards for certain air pollutants, including NOx. 40 C.F.R. § 86.1811-04. The EPA administers a certification program to ensure that every vehicle introduced into United States commerce satisfies applicable emission standards. Under this program, the EPA issues certificates of conformity (COCs), and thereby approves the introduction of vehicles into United States commerce.

To obtain a COC, a light-duty vehicle manufacturer must submit a COC application to the EPA for each test group of vehicles that it intends to enter into United States commerce. 40 C.F.R. § 86.1843-01. The COC application must include, among other things, a list of all auxiliary emission control devices (AECDs) installed on the vehicles. 40 C.F.R. § 86.1844-01(d)(11). An AECD is “any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system.” 40 C.F.R. § 86.1803-01. The COC application must also include “a justification for each AECD,

the parameters they sense and control, a detailed justification of each AECD that results in a reduction in effectiveness of the emission control system, and [a] rationale for why it is not a defeat device.” 40 C.F.R. § 86.1844-01(d)(11).

A defeat device is an AECD “that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal vehicle operation and use, unless: (1) Such conditions are substantially included in the Federal emission test procedure; (2) The need for the AECD is justified in terms of protecting the vehicle against damage or accident; (3) The AECD does not go beyond the requirements of engine starting; or (4) The AECD applies only for emergency vehicles . . . .” 40 C.F.R. § 86.1803-01.

Motor vehicles equipped with defeat devices, such as those at issue here, cannot be certified. EPA, *Advisory Circular Number 24: Prohibition on use of Emission Control Defeat Device* (Dec. 11, 1972); *see also* 40 C.F.R. §§ 86-1809-01, 86-1809-10, 86-1809-12. Electronic control systems which may receive inputs from multiple sensors and control multiple actuators that affect the emission control system’s performance are AECDs. EPA, *Advisory Circular Number 24-2: Prohibition of Emission Control Defeat Devices – Optional Objective Criteria* (Dec. 6, 1978). “Such elements of design could be control system logic (i.e., computer software), and/or calibrations, and/or hardware items.” *Id.*

“Vehicles are covered by a certificate of conformity only if they are in all material respects as described in the manufacturer’s application for certification . . . .” 40 C.F.R. § 86.1848-10(c)(6). Similarly, COCs issued by EPA, including those issued to VW, state expressly, “[t]his certificate covers only those new motor vehicles or vehicle engines which conform, in all material respects, to the design specifications” described in the application for that COC. *See also* 40 C.F.R. §§ 86.1844-01 (listing required content for COC applications), 86.1848-01(b) (authorizing the EPA to issue COCs on any terms that are necessary or appropriate to assure that new motor vehicles satisfy the requirements of the CAA and its regulations).

The CAA makes it a violation “for any person to manufacture or sell, or offer to sell, or install, any part or component intended for use with, or as part of, any motor vehicle or motor vehicle engine, where a principal effect of the part or component is to bypass, defeat, or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this subchapter, and where the person knows or should know that such part or component is being offered for sale or installed for such use or put to such use.” CAA § 203(a)(3)(B), 42 U.S.C. § 7522(a)(3)(B); 40 C.F.R. § 86.1854-12(a)(3)(ii). Additionally, manufacturers are prohibited from selling, offering for sale, introducing into commerce, delivering for introduction into commerce, or importing, any new motor vehicle unless that vehicle is covered by an EPA-issued COC. CAA § 203(a)(1), 42 U.S.C. § 7522(a)(1); 40 C.F.R. § 86.1854-12(a)(1). It is also a violation to cause any of the foregoing acts. CAA § 203(a), 42 U.S.C. § 7522(a); 40 C.F.R. § 86-1854-12(a).

## Alleged Violations

Each VW vehicle identified by the table below has AECDs that were not described in the application for the COC that purportedly covers the vehicle. Specifically, VW manufactured and installed software in the electronic control module (ECM) of each vehicle that causes the vehicle to perform differently when the vehicle is being tested for compliance with EPA emission standards than in normal operation and use.

When this software determines the vehicle has begun the FTP 75 Federal emission test procedure, it directs the vehicle to employ a low NOx temperature conditioning mode. A status bit in the software indicates that a “temperature conditioning” mode is active. In this low NOx temperature conditioning mode, the vehicle operates under a number of emission control parameters, including injection timing, exhaust gas recirculation rate, and common rail fuel pressure in such a way that the parameters yield low engine-out NOx emissions and high exhaust temperatures. The high exhaust temperatures heat the selective catalytic reduction system (“catalyst”) and improve the catalyst’s ability to reduce tailpipe NOx emissions. In this low NOx temperature conditioning mode, the combination of low engine-out NOx and improved catalyst performance results in tailpipe NOx emissions that are below the applicable emissions standard.

However, the software employs a “timer” that coincides with the low NOx temperature conditioning mode. At exactly one second after the completion of the initial phases of the FTP 75 Federal emissions test procedure (1,370 seconds, which is when the vehicle would normally be turned off), this software directs the vehicle to cease low NOx temperature conditioning mode. The “temperature conditioning” status bit switches to zero, and a second status bit indicates the activation of “transition to normal mode.” In this “normal mode,” the emission control system is immediately less effective. Compared to the low NOx temperature conditioning mode, the vehicle employs a different injection timing, exhaust gas recirculation rate, and common rail fuel pressure. This yields higher levels of NOx from the engine and reduced exhaust temperatures.

In addition, when the vehicle starts under conditions that the software determines *are not* the beginning of the FTP 75 Federal emission test procedure, the vehicle does not use the low NOx temperature conditioning mode at all. Instead, the emission control parameters are set consistent with the “normal mode.”

In sum, as soon as the vehicle senses that it is not being tested, it uses “normal mode.” In “normal mode,” tailpipe emissions of NOx are up to 9 times the applicable NOx standard levels, depending on model type and type of drive cycle (e.g., city, highway).

This NOV is based on vehicle emission testing performed by the EPA’s National Vehicle and Fuel Emissions Laboratory, California Air Resources Board’s Hagen-Smit Laboratory, and Environment Canada’s River Road Laboratory. This testing was performed since EPA’s announcement on September 25, 2015, that it would perform additional testing “using driving cycles and conditions that may reasonably be expected to be encountered in normal operation

and use, for the purposes of investigating a potential defeat device.” EPA, *EPA Conducted Confirmatory Testing* (Sept. 25, 2015).

VW knew or should have known that the software described above bypasses, defeats, or renders inoperative elements of the vehicle design related to compliance with the CAA emission standards. This is apparent given the design of these defeat devices. As described above, the software was designed to track federal test procedures and cause emission control systems to underperform when the software determined that the vehicle was not being tested.

VW’s software described above includes one or more AECs that were neither described nor justified in the applicable COC applications, and are illegal defeat devices. Therefore each vehicle identified by the table below does not conform in a material respect to the vehicle specifications described in the COC application. As such, VW violated section 203(a)(1) of the CAA, 42 U.S.C. § 7522(a)(1), each time it sold, offered for sale, introduced into commerce, delivered for introduction into commerce, or imported (or caused any of the foregoing with respect to) one of the new motor vehicles within these test groups. Additionally, VW violated section 203(a)(3)(B) of the CAA, 42 U.S.C. § 7522(a)(3)(B), each time it manufactured and installed into these vehicles an ECM equipped with the software described above.

The vehicles are identified by the table below. All vehicles are equipped with 3.0 liter diesel engines.

<b>Model Year</b>	<b>EPA Test Group</b>	<b>Make and Model(s)</b>
2014	EADX03.02UG	VW Touareg
2015	FPRX03.0CDD	Porsche Cayenne
2016	GVGAJ03.0NU4	Audi A6 Quattro, A7 Quattro, A8, A8L, and Q5

### Enforcement

The EPA’s investigation into this matter is continuing. The above table represents specific violations that the EPA believes, at this point, are sufficiently supported by evidence to warrant the allegations in this NOV. The EPA may find additional violations as the investigation continues.

The EPA is authorized to refer this matter to the United States Department of Justice for initiation of appropriate enforcement action. Among other things, persons who violate section 203(a)(3)(B) of the CAA, 42 U.S.C. § 7522(a)(3)(B), are subject to a civil penalty of up to \$3,750 for each violation that occurred on or after January 13, 2009; CAA § 205(a), 42 U.S.C. § 7524(a); 40 C.F.R. § 19.4. In addition, any manufacturer who, on or after January 13, 2009, sold, offered for sale, introduced into commerce, delivered for introduction into commerce, imported, or caused any of the foregoing acts with respect to any new motor vehicle that was not covered by an EPA-issued COC is subject, among other things, to a civil penalty of up to \$37,500 for each violation. CAA § 205(a), 42 U.S.C. § 7524(a); 40 C.F.R. § 19.4. The EPA may

seek, and district courts may order, equitable remedies to further address these alleged violations. CAA § 204(a), 42 U.S.C. § 7523(a).

The EPA is available to discuss this matter with you. Please contact Meetu Kaul, the EPA attorney assigned to this matter, to discuss this NOV. Ms. Kaul can be reached as follows:

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Sincerely,



Susan Shinkman  
Director  
Office of Civil Enforcement

Copy:

Todd Sax, California Air Resources Board  
Walter Benjamin Fisherow, United States Department of Justice  
Stuart Drake, Kirkland & Ellis LLP