



Winston H. Hickox
Agency Secretary

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman

1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov



Gray Davis
Governor

DATE: May 30, 2003

TO: ALL INTERESTED PARTIES

SUBJECT: NOTICE – HEAVY-DUTY DIESEL ENGINE SOFTWARE UPGRADE WORKSHOP

A workshop will be held to discuss the Air Resources Board (ARB) staff's proposal to require a heavy-duty diesel engine software upgrade for applicable 1993 - 1998 model year engines. This software upgrade will reduce the excess pollution from these trucks and buses.

In the 1990's, engine manufacturers utilized computer-based strategies on engines in trucks, school buses, urban buses, and motor homes that allowed the engines to comply with emission limits under certification conditions but also allowed increased oxides of nitrogen (NOx) emissions during highway driving. The United States Environmental Protection Agency (U.S. EPA) and ARB consider these strategies to be defeat devices (a.k.a. dual mapping and transient sensing algorithms) that result in off-cycle emissions.

In 1998, the following manufacturers signed Consent Decrees with the U.S. EPA, the Department of Justice (DOJ), and the ARB: Caterpillar, Cummins, Detroit Diesel, Navistar, Mack/Renault, and Volvo. The Consent Decrees stipulate penalties, additional certification requirements, an October 2002 deadline for meeting 2004 model year standards, in-use testing, offset and incentive programs, and the Low NOx Rebuild Program.

The Low NOx Rebuild Program contained in the Consent Decrees is simply engine software upgrades, applicable to specified 1993 - 1998 model year electronically-controlled engines, designed to reduce the increased NOx emissions. The Consent Decrees require low NOx rebuild kits to be installed at the time of normal engine rebuild (typically around 200,000 to 300,000 miles of service.) The engine manufacturers have complied with the provisions of the Low NOx Rebuild Program by providing the low NOx rebuild kits (i.e. engine software) to dealers and distributors. However, less than four percent of the applicable engines have low NOx rebuild kits installed instead of the nearly one hundred percent that were expected. As diesel engines have become increasingly durable, fewer rebuilds are being performed or are performed at higher

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mileage intervals. Therefore, excess NOx emissions continue to be emitted. In order to reduce NOx emissions, staff has developed a proposal to require engine software upgrade on all applicable 1993 - 1998 model year engines.

Staff will outline their proposed regulation for engine software upgrade on applicable 1993 - 1998 model year heavy-duty engines and give the original engine manufacturers, dealers and distributors, trucking industry representatives, environmental groups, and the public an opportunity to comment on the proposal. The workshop will be held at the time and location shown below:

Date: June 25, 2003
Time: 1:30 p.m. to 3:30 p.m.
Location: Cal/EPA Building
Sierra Hearing Room
1001 "I" Street
Sacramento, California 95814

If you would like to make a formal presentation during the workshop or if you have special accommodation or language needs, please contact Ms. Lisa Jennings, Planning and Regulatory Development Section, at (916) 322-6913 or ljenninq@arb.ca.gov. In the interest of time, presentations should be limited to ten minutes. TTY/TDD/Speech-to-Speech users may dial 7-1-1- for the California Relay Service.

We have also enclosed an outreach brochure developed for 1993 - 1998 model year truck owners that includes some additional information about the regulatory proposal.

Sincerely,

/s/

Tom Cackette
Chief Deputy Executive Officer



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Agency Secretary

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Mail-Out #MSC 03-06

Dear Truck Owner/Operator:

Your 1993-1998 Model Year Diesel Engine May Have A Software Problem

Introduction: You are receiving this letter because the California Air Resources Board (ARB or Board) is proposing a regulation which, if adopted, would require owners/operators of most 1993 through 1998 model year heavy-duty diesel engines (HDDE) to install new engine software. ARB's mission is to protect human health through the control of air pollution from stationary and mobile sources. As such, ARB has oversight authority for HDDE emissions.

Air pollution emitted from HDDEs is controlled in part by a computer software program contained in the electronic control module (ECM). These programs control engine parameters to ensure that the engine operates as cleanly and efficiently as possible.

Background: Most truck engines built from 1993 through 1998 contained software that allows considerably more oxides of nitrogen (NOx) to be emitted than is legally allowed. NOx emissions cause smog pollution. These 1993 through 1998 model year engines need to be reprogrammed to reduce the amount of NOx that is emitted. Lower NOx emissions will also aid in meeting federal air quality standards and aid in ensuring that California receives federal highway funding.

Low NOx software has been developed by seven engine manufacturers. Caterpillar, Cummins, and Renault have software for 1993 through 1998 model year heavy-duty diesel truck engines. Detroit Diesel, Mack, and Volvo have software for 1994 through 1998 model year heavy-duty diesel truck engines. International (formerly Navistar) has low NOx software for their 1998 model year heavy-duty diesel truck engines. This software is currently required to be installed in an applicable vehicle's ECM whenever the engine is rebuilt. Some owners/operators have had low NOx software installed in their engines prior to rebuild as well.

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California Environmental Protection Agency

Regulatory Process: ARB staff held a kick-off workshop to introduce a proposed regulatory measure, which would require owners/operators of all 1993 through 1998 model year HDDEs with low NOx software available to install it before set deadlines in 2004. A second workshop to discuss this proposed regulatory measure has been scheduled for June 25, 2003. The Board will consider adoption of the proposed regulatory measure at a hearing in fall 2003. All interested parties are welcomed to attend both the upcoming workshop and the board hearing.

Outreach: Trucking associations and dealers have been notified regarding this proposed regulatory measure. This letter is an attempt to reach owners and operators of 1993 through 1998 HDDE vehicles.

Questions and Answers: Below are some questions and answers designed to help you better understand this proposed regulatory measure:

- **How do I tell if my engines are affected?**
Check the engine manufacturer and engine model in your truck. Most 1993-1998 model year heavy-duty diesel truck engines have low NOx software available. Compare your engine manufacturer and model with the attached list. If you find your engine on the list, low NOx software is available for your engine.
- **How do I get the software installed?**
Go to your local engine dealer/repair facility and request the low NOx software for your engine. Dealers might be willing to arrange for installation at the trucking facility, particularly for larger fleets.
- **How much will it cost?**
The low NOx software is free to anyone who requests it. The cost to the vehicle owner is the owner's time and the time that the vehicle is out of service.
- **How long will it take?**
The low NOx software takes about 15 to 30 minutes to install on your ECM. Additional time is required for driving to and from the dealer/repair facility. There may also be wait time, which could be reduced or eliminated by scheduling your visit. Also, there should be no additional time attributed to installing the low NOx software if it is done at the same time as other service.

- **When do I have to have the software installed?**

If the Board adopts the regulation as proposed, the low NOx software must be installed between April and December 2004, depending on the model year of your vehicle. Our proposals are as follows:

1993-1994 Model Year by April 30, 2004
1995-1996 Model Year by August 31, 2004
1997-1998 Model Year by December 31, 2004

The low NOx software is available now. You may decide to have the software installed now, especially if your truck is getting other maintenance or repair service.

- **How will the new software affect fuel economy?**

Manufacturers have reported negligible fuel economy differences. Several fleets have had the low NOx software installed prior to rebuild and have reported no noticeable differences in their fuel use. However, there is a potential for a minor fuel economy penalty. We expect the average fuel economy penalty, if any, to be below one percent.

- **How will the new software affect the operation of my vehicle?**

The low NOx software should have no adverse affects on the operation of your vehicle, according to the manufacturers.

- **What if I have more questions?**

You can contact ARB by phone or by mail, or search our website. Here is the information that you need:

California Air Resources Board
P. O. Box 2815
Sacramento, CA 95814

ARB website: www.arb.ca.gov

Low NOx software webpage: www.arb.ca.gov/msprog/hdsoftware/hdsoftware.htm

Contact Person: Lisa Jennings
Phone Number: (916) 322-6913
E-mail Address: ljennings@arb.ca.gov

Thank you for taking the time out to read this letter and for doing your part to maintain clean air for the people of our state.

Attachments

Attachment

Low NOx Software Heavy-Duty Diesel Engine Manufacturer and Model List		
Make and Year	Engine Model	Notes
Caterpillar 1993 – 1998	3406E	Engine Serial Number (ESN) 5EK05767 and up
Caterpillar 1993 – 1998	3406E	ESN: 6TS00097 and up
Caterpillar 1993 – 1998	3406E	ESN: 1LW00001 through 1LW33262
Caterpillar 1993 – 1998	3406E	ESN: Reman 4AS00001 through 4AS00385
Caterpillar 1993 – 1998	3126	ESN: 1WM00210 through 1WM26819
Caterpillar 1993 – 1998	3126	ESN: 4ES000226 through 4ES00454
Caterpillar 1993 – 1998	3126	ESN: Reman 6RW00001 and up
Caterpillar 1993 – 1998	3126B	ESN: 7AS00001 through 7AS37588
Caterpillar 1993 – 1998	3116	ESN: 8WL00297 through 8WL07351
Caterpillar 1993 – 1998	3176B	ESN: 9CK00647 through 9CK32795
Caterpillar 1993 – 1998	3176B	ESN: Reman 3LZ00001 and up
Caterpillar 1993 – 1998	C-10	ESN: 2PN01000 through 2PN07278
Caterpillar 1993 – 1998	C-10	ESN: 8YS00449 through 8YS07060
Caterpillar 1993 – 1998	C-10	ESN: Reman AKB00001 and up
Caterpillar 1993 – 1998	C-12	ESN: 1YN01200 through 1YN12844
Caterpillar 1993 – 1998	C-12	ESN: 9NS00372 through 9NS19786
Caterpillar 1993 – 1998	C-12	ESN: Reman ALS00001 and up
Cummins 1993 – 1998	ISB 403J	Critical Parts List Number (CPL) 2451
Cummins 1993 – 1998	ISB 403K	CPL 2446, 2447, 2448, 2449, 2450
Cummins 1993 – 1998	M11 353B	CPL 1855
Cummins 1993 – 1998	M11 353D	CPL 1856, 1857
Cummins 1993 – 1998	M11 353E	CPL 2037
Cummins 1993 – 1998	M11 353F	CPL 2036
Cummins 1993 – 1998	M11 353K	CPL 2370
Cummins 1993 – 1998	M11 353J	CPL 2371
Cummins 1993 – 1998	N14 093A1	CPL 2391
Cummins 1993 – 1998	N14 093A2	CPL 2390
Cummins 1993 – 1998	N14 093A3	CPL 2389
Cummins 1993 – 1998	N14 093M	CPL 1573
Cummins 1993 – 1998	N14 093P	CPL 1574
Cummins 1993 – 1998	N14 093U	CPL 1809, 1844
Cummins 1993 – 1998	N14 093V	CPL 1807, 1987
Cummins 1993 – 1998	N14 093W	CPL 2025
Cummins 1993 – 1998	N14 093X	CPL 2026
Cummins 1993 – 1998	N14 093Y	CPL 2027
Detroit Diesel Corp. 1994 – 1998	6067-GK60	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-GK28	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-TK60	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-TK28	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-PK60	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-PK28	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-WK60	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-WK28	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-SK60	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-SK28	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-EK60	Engine Serial Number 6R157655 through 6R472018
Detroit Diesel Corp. 1994 – 1998	6067-EK28	Engine Serial Number 6R157655 through 6R472018

**Low NOx Software
Heavy-Duty Diesel Engine Manufacturer and Model List**

Make and Year	Engine Model	Notes
Mack 1994 – 1998	EM7-275	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	EM7-300	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-300	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-310/330	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-330/350	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-350	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-355/380	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-375	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-400	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-427	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-454	Engine Serial Numbers 4B through 8R
Mack 1994 – 1998	E7-460	Engine Serial Numbers 4B through 8R
Renault 1993 –1998	MIDR06.02.26	
Navistar/International 1998	DT 466E	Engine Family Number (EFN) WNVXH0466FNA
Navistar/International 1998	DT 466E	EFN: WNVXH0466CCB, WNVXH0466FNC
Navistar/International 1998	DT 466E	EFN: WNVXH0466CCD
Navistar/International 1998	530E	EFN: WNVXH0530FNA, WNVXH0530CCB
Navistar/International 1998	530E	EFN: WNVXH0530FNC, WNVXH0530CCD
Volvo 1994 – 1998	VE D12	Engine Family Name (EFN) RVT12.EJDBRA
Volvo 1994 – 1998	VE D12	EFN: SVT12.EJDBRA, TVT12.EJDBRA
Volvo 1994 – 1998	VE D12A	EFN: WVT12.EJDBRA
Volvo 1994 – 1998	VE D12B-345 EPG	EFN: WVTXH12.150S
Volvo 1994 – 1998	VE D12B-385 EPG	EFN: WVTXH12.150S
Volvo 1994 – 1998	VE D12B-425 EPG	EFN: WVTXH12.150S
Volvo 1994 – 1998	VE D12B-345 VEB	EFN: WVTXH12.150S
Volvo 1994 – 1998	VE D12B-385 VEB	EFN: WVTXH12.150S
Volvo 1994 – 1998	VE D12B-425 VEB	EFN: WVTXH12.150S
Volvo 1994 – 1998	VE D7C-275	EFN: WVTXH07.350S
Volvo 1994 – 1998	VE D7C-300	EFN: WVTXH07.350S