

State of California
AIR RESOURCES BOARD

**VOLUNTARY SOFTWARE UPGRADE PROGRAM
DISCUSSION PAPER**

Date of Release: March 16, 2004
Scheduled for Consideration: March 25, 2004

This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

BACKGROUND

Heavy-duty vehicles are a significant source of smog-forming pollutants. The Air Resources Board (ARB) has recently proposed regulations to control the “off-cycle” emissions from these engines. The Heavy-Duty Diesel Engine Software Upgrade (Chip Reflash) Regulation was originally published on September 5, 2003. The regulation would require owners and operators of trucks, school buses, and motor homes with 1993-1998 model year heavy-duty diesel engines to upgrade their engine control software. The Board heard the original proposal at its December 11, 2003, public meeting. However, at that time, the Board did not vote on the proposed rulemaking, as Governor Schwarzenegger had directed state agencies to review regulations for their impacts on business (Executive Order S-2-03). That review has been completed.

At the December board hearing, a number of board members expressed frustration that the Low NOx Software had not been installed on more vehicles. Board members talked about the human health mandate to reduce the excess NOx emissions, and the public’s need for these reductions. One member expressed the desire that the parties “just figure out how to fix it and go out and fix it.” Executive Officer Catherine Witherspoon explained that staff was in discussions with the engine manufacturers about finding ways to have the truckers come in voluntarily to achieve the same goal as the regulation. The California Trucking Association and the Engine Manufacturers Association both spoke in support of a voluntary program instead of a regulation.

Environmental organizations testified in support of a regulatory program. The Union of Concerned Scientists testified in support of a regulation, but urged that, should staff proceed with a voluntary proposal, that it have a “goal of delivering similar emission reductions on a similar schedule as what this regulation would require. And most importantly have a regulatory backstop so we can be certain at the end of the day we deliver on the emission reductions.”

Since the December board hearing, staff has continued a dialogue with the engine manufacturers, the California Trucking Association, and environmental organizations. That input has led to the development of a proposed voluntary program.

This Voluntary Program discussion paper is intended to complement, rather than replace, the staff reports on the heavy-duty diesel software upgrade regulation, which were released on September 5, 2003, and February 6, 2004. The Board will consider both the proposed voluntary program and the proposed regulation at a public hearing commencing March 25, 2004. It is staff’s intent that the proposed regulation be adopted as a “backstop” measure, but that engine manufacturers also be given an opportunity to comply on their own. If the latter approach is successful, the backstop regulation would not go into legal effect.

**SECTION A
VOLUNTARY SOFTWARE UPGRADE
PROGRAM DESCRIPTION**

March 16, 2004
Proposed Voluntary Software Upgrade Program

I. Program Overview

The proposed Voluntary Software Upgrade Program (Voluntary Program) would be a joint program with participation by the engine manufacturers, the California Trucking Association (CTA), and the Air Resources Board (ARB). Engine manufacturers subject to the Settlement Agreements and participating in this program include Caterpillar, Cummins, Detroit Diesel Corporation, International, Mack, Renault and Volvo. ARB staff will present the voluntary program to the Board for its consideration at a board hearing in March 2004. At that time, ARB staff will also present a proposed Heavy Duty Diesel Engine Software Upgrade (Chip Reflash) for adoption as a backstop measure. If the Board directs staff to proceed with the Voluntary Program, staff will withhold filing the regulation with the Office of Administrative Law (OAL) pending Board review of the voluntary program. ARB staff will work with CTA and the engine manufacturers to implement the Voluntary Program.

ARB staff will report to the Board on the status of the Voluntary Program in early December 2004. The Board will evaluate whether the Voluntary Program has met its first target, and whether it is sustainable and likely to meet future targets. If the Board determines that the Voluntary Program has met its first target and is sustainable, the voluntary program will continue, and ARB staff will not submit the backstop regulation to OAL. ARB staff will continue to evaluate the voluntary program with respect to program targets and sustainability through 2006.

Engine manufacturers will request in writing that their dealers install the Low NOx Rebuild Software under the Voluntary Program on California registered eligible engines, at no cost to the vehicle owner/operator, whenever a vehicle owner comes in for service or upon request, unless the owner/operator declines.¹ Engine manufacturers will reimburse their California dealers for the labor associated with installing Low NOx Rebuild Software, even if the installation is done at a time other than engine rebuild.

The CTA will encourage its members to have the Low NOx Rebuild installed under the voluntary program. CTA will promote the voluntary program through press releases, at membership meetings, and through reflash events.

- II. Program Evaluation:** ARB will evaluate the voluntary program for two main components: 1) achievement of program targets and 2) sustainability – the likelihood that the program can reach the next program target. ARB staff will evaluate and present this data to the Board, so that the Board can determine whether the program has met the target and is sustainable.

¹ Engine manufacturers to provide copies of these dealer letters to ARB by March 17, 2004

A. Targets: ARB staff will evaluate the number of vehicles reflashed and the emission benefits of the vehicles reflashed (both under the new voluntary program and under the existing Consent Decrees and Settlement Agreements). The emission benefits will be the primary consideration in evaluating achievement of the program targets. Staff will present this data to the Board for it to determine whether the trend indicates that continuation of the voluntary program is likely to be successful.

First Target

- **Number of Vehicles Reflashed before October 28, 2004** - Low NOx Rebuild Software upgrade installation rate of 35 percent of the California-registered reflashable engines (reflashable means that Low NOx Rebuild Software is available for that engine).
- **Emission Benefits from vehicles reflashed before October 28, 2004**, are at least 35 percent of the emission benefits of reflash from California-registered reflashable engines.

Second Target

- **Number of Vehicles Reflashed before May 31, 2005** - Low NOx Rebuild Software upgrade installation rate of 60 percent of the California-registered reflashable engines.
- **Emission Benefits from vehicles reflashed before May 31, 2005**, are at least 60 percent of the emission benefits of reflash from California-registered reflashable engines.

Third Target

- **Number of Vehicles Reflashed before January 31, 2006** - Low NOx Rebuild Software upgrade installation rate of 80 percent of the California-registered reflashable engines.
- **Emission Benefits from vehicles reflashed before January 31, 2006**, are at least 80 percent of the emission benefits of reflash from California-registered reflashable engines.

B. Sustainability: ARB staff will evaluate several factors and present them to the Board to help the Board determine the sustainability of the voluntary program. The primary considerations in evaluating sustainability will be the number of reflashes, the rate of reflashes, any trend in the number of reflashes, and the ability to verify that most reflashed engines are California engines. Other factors may be considered including:

- The number and location of dealers that are providing Low NOx Rebuild Software at no cost upon request.
- The number and location of dealers that are offering and installing the Low NOx Rebuild Software at any service event.
- Reflash rate in fleets and reflash rate in vehicles not in fleets.
- Reflash rate by engine manufacturers.

III. Outreach/ Promotion

- A. ARB** – Staff will mail a letter to the current list of California-registered 1993-1999 model year heavy-duty diesel vehicle owners describing the opportunity to minimize the air pollution emitted from eligible engines. Staff will explain that the Low NOx Rebuild Software can be installed at no cost to the dealer or to the vehicle owner/operator now. Staff will also explain the possibility that the Low NOx Rebuild Software may become a requirement, and that whether the software is offered at no cost to the vehicle owner/operator under a regulatory program could depend on the outcome of a legal dispute.
- B. CTA** - CTA plans to host Low NOx Rebuild Software installation events as well as to promote Low NOx Rebuild Software installations in other forums.
- C. Engine Manufacturers** – will request, in writing, that authorized dealers install Low NOx Rebuild Software at no cost to the vehicle owner/operator of a California Registered Vehicle upon any service event, unless owner/operator declines, or upon the request of the vehicle owner/operator.

IV. Other Program Details

A. Engine Manufacturers Commitment to Dealers:

- To provide Low NOx Rebuild Software at no cost to the dealers.
- To reimburse the dealers for their labor associated with the installation of the Low NOx Rebuild Software whether or not the installation occurs at time of rebuild, and for the same labor time for which they are reimbursed under the Consent Decrees and Settlement Agreements.

B. Program Baselines

- 1. Number of Engines:** There are about 42,000 reflashable engines in heavy heavy-duty vehicles, and between 8,000 and 15,000 reflashable engines in medium heavy-duty vehicles. As ARB staff gather more data and refine the

analysis of the registration data from the Department of Motor Vehicle (DMV) database, those numbers may change slightly. ARB staff are reviewing each of the DMV records for the 1993 through 1999 model year heavy duty diesel vehicles, and decoding their 17 digit Vehicle Identification Numbers (VINs) to determine which have reflashable engines.

2. Number of Reflashes Already Done: The number of reflashes already done will be determined based on reflashes reported to U.S. EPA through December 31, 2003, assuming the same rate of reflash in California as in the nation. Reflashes already done will count toward the reflash targets given in section II.A. of this document. An alternative method of accounting for reflashes already done by a manufacturer may be used, provided that ARB determines that the method more accurately reflects the number of reflashes done on California registered vehicles, and provided the reporting periods are adjusted with the reflashes reported under IV.D.1. so there is no double counting of reflashes.

C. Labeling: Same as under the Low NOx Rebuild Program in the Consent Decrees and Settlement Agreements, except that label references to rebuild may be deleted to avoid confusion as to whether the engine has been rebuilt.

D. Reporting of Low NOx Rebuild Software Installations:

1. Reflashes for California Registered Vehicles: Engine manufacturers to report Low NOx Rebuild Software installations electronically (preferably in an Excel spreadsheet) with the dealership name and address, the date of installation, vehicle identification numbers (VINs) (when a system is available to report such data, or whenever the engine manufacturer has the VIN to engine serial number (ESN) matches), the engine make and model year, and the ESN for each. Low NOx Rebuild Software upgrade installation in a California-registered vehicle. ARB will assess whether an installation is in California-registered vehicles by available VIN data, by matching VIN data to ESN data, or by statistical analysis. Engine manufacturers to provide report as follows:

- Submit report on or before September 7, 2004, of vehicles reflashed from January 1, 2004, to August 31, 2004.
- Submit a report on or before November 1, 2004, of vehicles reflashed from September 1, 2004, to October 27, 2004.
- Submit a report on June 7, 2005, of vehicles reflashed from October 28, 2004, to May 31, 2005.
- Submit a report on February 7, 2006, of vehicles reflashed from June 1, 2004, to January 31, 2006.

2. Engine Manufacturers Communications to Dealers: Engine manufacturers will send ARB draft copies of their initial communication to their dealers regarding the voluntary program by March 17, 2004, and final copies of their initial communications by April 12, 2004. In addition, engine manufacturers will send ARB copies of all communications sent to their dealers regarding the voluntary program.

3. Reflashes for Out-of-State Registered Vehicles: Engine manufacturers to report electronically (preferably in an Excel spread sheet) Low NOx Rebuild Software installations on out-of-state registered vehicles, by providing the dealership name and address, the date of installation, VINs (when the engine manufacturer has a system available to report such data, or whenever the engine manufacturer has the VIN to ESN matches), the engine make and model year, the ESN, and the International Registry Program (IRP) record of mileage in California for 2003 or 2004 for the reflashed vehicle.

E. Credit for Out-of-State Vehicle Reflashes: Adjusted credit for Low NOx Rebuild Software upgrades installed in out-of-state registered vehicles will be counted toward the voluntary program targets:

- after an initial 60 percent goal is reached with software upgrades installed in vehicles registered in-state, and
- if the Low NOx Rebuild Software is installed after the start of the voluntary program, and
- only for vehicle engines for which engine manufacturers have provided to the ARB the IRP records of mileage in California for 2003 or 2004 for the reflashed engine including VINs (when the engine manufacturer has a system available to report such data, or whenever the engine manufacturer has the VIN to ESN matches) and ESN for tracking purposes, along with the engine model year and the date of the reflash with Low NOx Rebuild Software (See IV.C.3. above).
- ARB will determine the credit adjustment for the reflash on an out-of-state vehicle, with input from the engine manufacturers, by taking the 2003 or 2004 California IRP mileage for that vehicle and estimating the future mileage expected in California for vehicles in interstate commerce.

F. Sunset Provision

- Reporting under the voluntary program will sunset on December 31, 2006 or upon adoption of the proposed Chip Reflash regulation.

- Engine manufacturers will continue to provide the Low NOx Rebuild Software at time of service (unless owner/operator declines) or upon request of the vehicle owner/operator at no cost to the dealer or to the vehicle owner/operator for California-registered vehicles unless ARB adopts the proposed Chip Reflash regulation.

G. Adoption of the Proposed Chip Reflash Regulation

- If, upon evaluation of the progress of the Voluntary Program toward meeting any program target, the Board directs the ARB staff to file the regulation with OAL, staff will recommend 15-day or other changes to the regulation so as to exclude from the regulation all owners of engines produced by engine manufacturers that the Board determines have met the applicable program targets and sustainability goals. Owners of engines subject to the voluntary program will be evaluated for progress on the second and third targets.

H. Reserved Rights

- ARB acknowledges that by participating in the Voluntary Program the engine manufacturers are not conceding that they have an obligation to provide free reflash software upgrades if the installation is done at a time other than engine rebuild and that the engine manufacturers reserve their rights if a regulation is adopted.
- Engine manufacturers acknowledge that by ARB staff presenting this Voluntary Program to the Board and by the Board considering and potentially directing the staff to implement this Voluntary Program, ARB is not conceding that manufacturers have no obligation to provide free reflash software upgrades if the installation is done at a time other than engine rebuild, and that the ARB reserves its rights if a regulation is adopted.
- ARB and the engine manufacturers acknowledge that this Voluntary Program does not change the applicability or interpretation of any federal, state, or local law, or of the provisions of the federal consent decrees and California settlement agreements, including but not limited to federal and state anti-tampering prohibitions.
- ARB and the engine manufacturers acknowledge that the final determination of whether the voluntary program has met its targets and is sustainable shall be made by the ARB governing board.

SECTION B
VOLUNTARY SOFTWARE UPGRADE PROGRAM
QUESTIONS AND ANSWERS

General Program

1. What are the main advantages of a voluntary program?

Under a voluntary program, truckers would receive the Low NOx software upgrade free of charge and could arrange to have the installation done at a time that's convenient to them. A voluntary program achieves more immediate emission benefits than the regulation would through 2004 and through most of 2005. The voluntary program has the same in-state emission benefits as the regulation has in 2010. The voluntary program eliminates the uncertainty as to who pays the cost of a Low NOx software upgrade, and eliminates the risk of a lawsuit.

2. Voluntary emission reduction programs don't always achieve the high level of compliance that a regulation does. What reasons are there to believe that this voluntary program could be successful?

This voluntary program has the support of the trucking association, and the cooperation of the engine manufacturers and the truck dealers. Through the DMV registration database, ARB can and would reach out to all potential participants individually. ARB staff would encourage truckers to have the software installed, free of charge, under the voluntary program. If there is not good compliance under the voluntary program, truckers and engine manufacturers face the certainty that ARB will move forward with a regulatory program.

Cost

1. What would a Low NOx software upgrade cost under the voluntary program?

A Low NOx software upgrade would be free of charge under the voluntary program.

2. What would a Low NOx software upgrade cost under the regulatory program?

The ARB staff believes the applicable Consent Decrees and Settlement Agreements require the engine manufacturers to supply the Low NOx software at no added cost whenever it is requested. The engine manufacturers disagree, and sent ARB a dispute resolution letter (signed by all but one engine manufacturer) to that effect. Therefore, whether the software upgrade is free under a regulatory program would likely depend on the outcome of litigation.

Schedule

1. What is the compliance schedule for truck software upgrades under the proposed regulation?

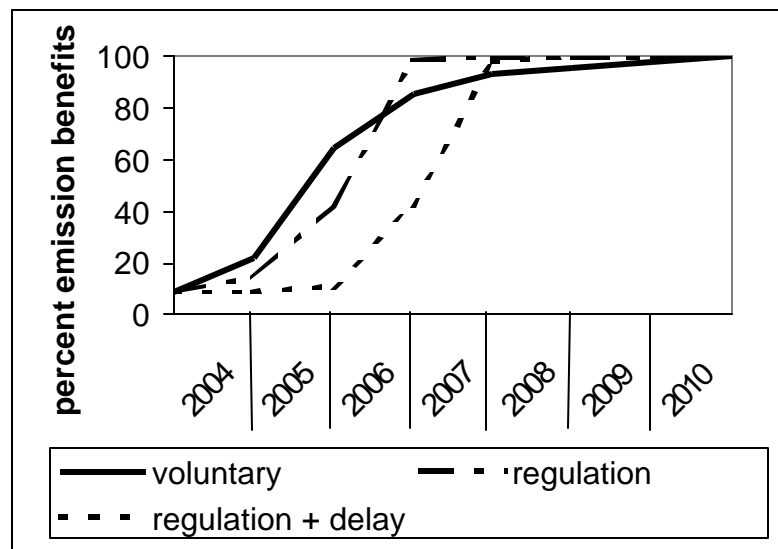
1993-1994 model years	By April 30, 2005
1995-1996 model years	By August 31, 2005
1997-1998 model years	By December 31, 2005 (except MHDDEs)
1997-1998 model year MHDDEs	By December 31, 2006

2. What is the compliance schedule for truck software upgrades under the proposed voluntary program?

Percent of In-State Truck Emission Benefits Achieved	Date
35%	By October 28, 2004
60%	By May 31, 2005
80%	By January 31, 2006
100%	By 2010

3. How do the emission benefit compliance schedules of the voluntary program and the regulation compare?

The voluntary program would achieve more immediate emission benefits than the regulation would through 2004 and through most of 2005. Any delay in implementation of the regulation, such as may occur if a lawsuit were filed by the engine manufacturers, would widen the gap – as shown below. Under the voluntary program, software would continue to be installed whenever a truck comes in for service (unless the owner or operator declines). All trucks are



expected to come in for service between now and 2010. Therefore, the voluntary program is expected to achieve 100 percent compliance and to have the same in-state emission benefits as the regulation has in 2010.

Number of Vehicles

1. How many 1993-1998 heavy-duty diesel vehicles are registered in California?

There are about 100,000 heavy-duty diesel vehicles with 1993 through 1998 model year diesel engines registered in California. About half of those are heavy heavy-duty vehicles, and about half are medium heavy-duty vehicles.

2. How many California registered reflashable engines are there?

Staff believes approximately 50,000 to 57,000 heavy-duty diesel engines registered in California are reflashable. Starting with about 100,000 heavy-duty engines, staff adjusted for different compliance options and a low-volume exemption established in the Settlement Agreements. This reduced the number of possible reflashable engines to about 85,000 (42,000 heavy heavy-duty and 43,000 medium heavy-duty). Further refinement was necessary for the medium heavy-duty vehicle estimates. After excluding mechanical engines and non-consent decree manufacturers' engines, staff estimates that there are between 8,000 and 15,000 reflashable medium heavy-duty engines. Mechanical engines are not reflashable nor do they exhibit high off cycle emissions.

Under the voluntary program it is very important to know how many California-registered reflashable engines there are for each manufacturer – both for ARB's tracking purposes and for manufacturers' business reasons. Therefore, the ARB staff has been working through the database to decode the 17 digit VIN numbers – more than 100,000 of them – and determine reflashable engine counts. When that process is finished, ARB will have a very detailed and accurate inventory.

Emission Benefits

1. What are the estimated emissions benefits from in-state vehicles under the regulation and voluntary program?

The estimated statewide emission benefits of the proposed regulation and voluntary proposal are shown in the table below. The emission benefits of the voluntary program would exceed the benefits of the regulation for the 2004 and 2005 ozone season. In the 2006 ozone season, the benefits of the regulation would exceed the voluntary program if there were no delay. The benefits of the regulation and of the voluntary program would be identical in 2010.

Statewide Benefits of Software Upgrade From California-Registered Vehicles (tons per day NOx)

	Regulation	Voluntary Program**
2004 ozone season	0	11
2005 ozone season	15*	21
2006 ozone season	33*	26
2010 ozone season	21	21

* Assuming no delay in implementation

** If successful

2. What are the estimated South Coast State Implementation Plan (SIP) emission benefits under the regulation and voluntary program?

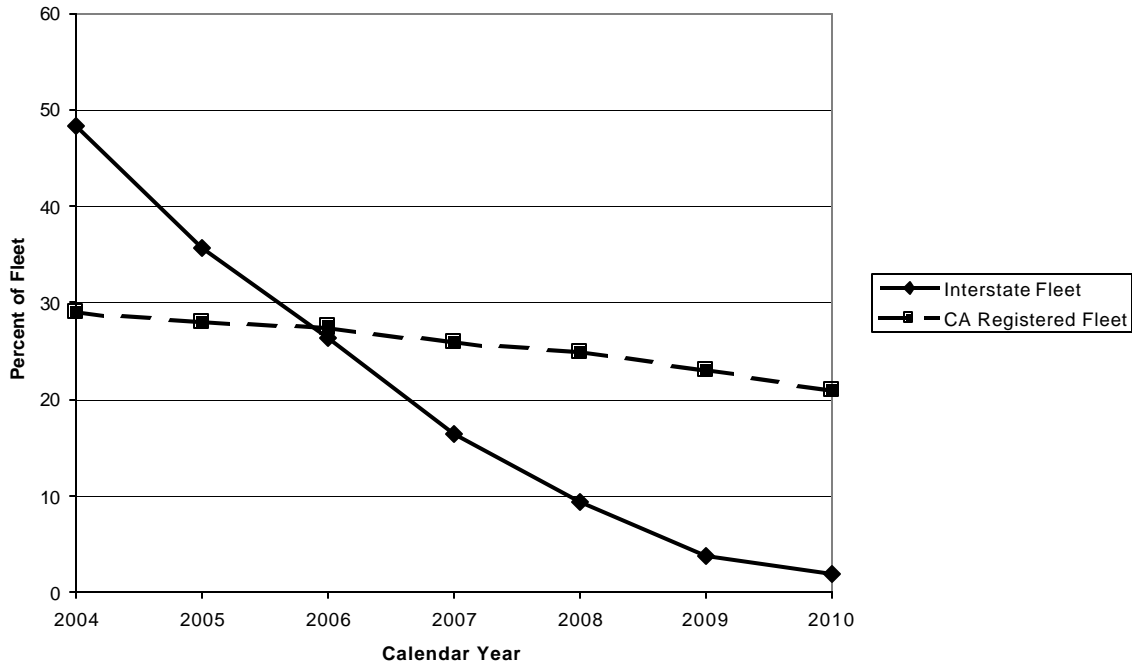
The estimated emissions benefit under both the regulation and the voluntary program from California registered medium heavy-duty and heavy heavy-duty vehicles is 8.3 tons per day NOx in the South Coast Air Basin in 2010.

Out-of-State Vehicles

1. How does the per vehicle contribution for an out-of-state reflash compare to the in-state contribution?

An out-of-state reflash, on average, is only worth 3 percent of what an in-state reflash is worth in terms of California emissions benefits. That is because out-of-state trucks travel much fewer miles in California than trucks that are registered in this state. In addition, newer vehicles tend to operate in interstate commerce, and as they age they are typically sold into local service, which typically would not be in California. The figure below shows that the number of 1993 through 1998 vehicles in interstate service is expected to decline rapidly between now and 2010.

**Percent of Interstate Fleet and CA Registered Fleet Comprised of
1993-1998 Vehicles Between 2004 and 2010**



2. Why were out-of-state vehicles not included in the voluntary program?

Two reasons. First, because there are many more out-of-state trucks than California-registered trucks and the per vehicle benefit of the reflash in California is small. Second, because manufacturers would commit to providing the Low NOx software free for California-registered vehicles only. Accordingly, the voluntary program is limited to California-registered vehicles (although there is limited provision for credit for out-of-state vehicles; see Program Description IV.E.).

STAFF RECOMMENDATION

The ARB staff recommends that the Board hereby adopts new Section 2011 in new Article 3.5, within Chapter 1, Division 3, Title 13, California Code of Regulations (CCR); and amends sections 2180.1, 2181, 2184, 2185, 2186, 2192, and 2194 of Article 1 within Chapter 3.5, Division 3, Title 13, CCR, as set forth in Attachment A. Staff also recommends that the Board direct the Executive Officer to return to the Board in December 2004 with an evaluation of the results of the voluntary program described in Attachment B for Board review, and further direct the Executive Officer to withhold filing of the adopted regulatory sections with OAL until after the Board has reviewed the evaluation of the voluntary program.