California Environmental Protection Agency
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

PROPOSED AMENDMENTS TO THE REGULATION FOR IN-USE OFF-ROAD DIESEL-FUELED FLEETS AND IMPLEMENTATION UPDATE

Mobile Source Control Division
Heavy Duty Diesel In-Use Strategies Branch

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State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS

Public Hearing to Consider

PROPOSED MODIFICATIONS TO THE REGULATION FOR IN-USE OFF-ROAD DIESEL-FUELED FLEETS AND IMPLEMENTATION UPDATE

To be considered by the Air Resources Board at a meeting of the Board that will commence on January 22, 2009, and may continue to January 23, 2009, at

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State of California
AIR RESOURCES BOARD

PROPOSED MODIFICATIONS TO THE REGULATION FOR IN-USE OFF-ROAD DIESEL-FUELED FLEETS AND IMPLEMENTATION UPDATE

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EXECUTIVE SUMMARY

What is the purpose of this report?

This report serves several purposes. First, it describes proposed changes to the regulation for in-use off-road diesel fueled-fleets (the regulation). These amendments are limited and include extending the deadline for double credit for early particulate matter (PM) retrofits and several additional minor modifications that clarify the regulation.

Second, when the Air Resources Board (ARB or Board) approved the regulation on July 26, 2007, the Board directed staff to provide the Board a technology update report by January 2009 (ARB, 2007d). This report serves as that technology update.

Finally, this report updates the Board on how implementation of the regulation has proceeded in the year and a half since the regulation was approved by the Board. It summarizes the public outreach and reporting work that staff has done, and provides a status report on the Surplus Off-road Opt-in for NOx (SOON) program.

What modifications to the regulation is staff proposing?

To provide additional flexibility and clarity to the regulation, staff is proposing the following changes to the regulation:

- Extend the deadline for double credit for early PM retrofits by 10 months, from March 1, 2009, to January 1, 2010. This will also mean that fleets that ordered verified diesel emission control systems (VDECS) by September 1, 2009, would receive double credit even if their installation is delayed beyond January 1, 2010.
- Modify the changing fleet size requirements to not penalize fleets that change their designation from small fleets to larger fleets, and then subsequently become a small fleet again;
- Clarify that all sellers, not just dealers, of off-road vehicles must maintain records of the disclosure of regulation applicability;
- Clarify that the provision providing a delay for the turnover of Tier 1 and newer vehicles from the turnover requirements of the regulation applies only through the March 1, 2012 compliance deadline. This is consistent with staff's original intent for this provision; and
- Clarify the reporting requirements for VDECS.

Why should the deadline for early double PM credit be extended?

In originally providing this double credit in the regulation, staff intended to provide an incentive for fleets to take early action and achieve early PM reductions. The double credit provisions were also intended to help fleets spread out their costs by reducing the annual number of retrofits they would need to perform in the regulation's first compliance years. However, because it has taken longer than anticipated for additional

diesel particulate filters (DPFs), especially passive DPFs, to become verified, many fleets have been unable to take full advantage of the early credit provisions.

Why should the other modifications be made?

Since the regulation was adopted, in talking with affected fleets and stakeholders, ARB staff has determined that several sections of the regulation require clarification.

What are the emissions impacts of the proposed modifications?

Staff expects there to be little to no overall adverse impact on emissions from the proposed modifications. While the proposed change to extend the deadline for early double PM credit may also have a small disbenefit as many fleets take advantage of the extended double credit provisions (thereby decreasing the total number of retrofits completed by March 1, 2010), evidence from a number of sources indicates that many of the industries affected by the regulation (primarily the residential construction, rental, and airline industries) have reduced their activity since the regulation was adopted due to the current economic downturn, thereby potentially offsetting this impact. Available fuel use data supports this, showing total off-road diesel fuel consumption from all sources (off-road vehicles, locomotives, marine, etc.) down over 10 percent from year 2007 levels (BOE, 2008). However, staff cannot precisely quantify at this time the extent of the decline in emissions from off-road vehicles subject to the regulation due to the poor economy. To better understand the impact of current economic conditions on fleets affected by the regulation and their emissions, ARB staff is evaluating available data on vehicle activity, as well as attempting to evaluate whether fleets may have changed their turnover practices due to the poor economy. Staff will present their findings at the January 2009, Board meeting.

Overall, staff believes the proposed modifications may result in a slight positive effect on health, i.e., result in reduced health impact from poor air quality, because extending the early credit deadline so that it is usable by more fleets may encourage fleets of all sizes to retrofit earlier than they otherwise would, thereby achieving more immediate reductions in diesel PM. The earlier diesel PM is reduced, the more health benefits are achieved.

What will the cost impact of the proposed modifications be?

The proposed modification to extend the early double credit provision for PM VDECS should result in no adverse economic impacts, and instead should ease the burden of the regulation on affected fleets. This is because the proposed extension would help fleets spread out the costs of the regulation, without increasing the overall cost of the regulation. The proposed modification is expected to lower costs in 2010, the year of maximum expected annual regulation costs (ARB, 2007a). The other proposed modifications will not increase compliance costs for the regulation.

What did the Board direct staff to report back on by January, 2009?

In Resolution 07-19, the Board directed staff to, by January 2009, provide a technology update report on the status of VDECS that are available for installation to comply with the March 1, 2010 compliance date of the regulation (ARB, 2007d). The Board also directed staff to include an update on the number of devices that have been verified, the cost of those devices, and information on the ARB/South Coast Air Quality Management District/Mobile Source Air Pollution Reduction Review Committee Off-Road Diesel Retrofit Showcase (Showcase).

This is the first of four updates the Board directed staff to provide. Resolution 07-19 also directed staff to:

- By December, 2010, provide a status report on compliance with and enforcement of the March 1, 2010, compliance date for large fleets, including an analysis of the regulation's flexibility provisions and its economic impacts; and
- By December, 2013 and December, 2017, provide updates on compliance and enforcement for the periods March 1, 2010 through March 1, 2013, and March 1, 2013 through March 1, 2017, respectively, and updates on the progress of engine technology needed to comply with the regulation.

What diesel emission control strategies have been verified to date?

ARB's verification program[1] is intended to ensure that a device achieves the advertised emission reductions and meets minimum durability requirements. To receive ARB verification, the device manufacturer must submit data showing the device is effective and durable and warrant the VDECS and the engine against any damage caused by the device. ARB's verification procedure is a multi-level verification program consisting of PM reduction levels (Levels 1, 2, and 3) and optional oxides of nitrogen (NOx) reduction levels.

There are two main types of DPFs – passive and active. Passive DPFs use a catalyst to lower the PM ignition temperature, so no outside source of energy is required for regeneration. Unlike a passive DPF, an active DPF uses an external source of heat to burn off the accumulated PM. The most common sources of heat are (1) plugging in to pass a current through the filter medium, and (2) injecting and burning additional fuel. Nearly all vehicles can be retrofitted with an active DPF, although for many off-road applications DPFs that require plugging in are not feasible, so fuel-burner active DPFs like the HUSS Umwelttechnik FS_MK are the most broadly applicable. However, for many reasons including cost and ease of operation, many fleets find passive systems to be more desirable.

When the regulation was approved in July 2007, there were only three Level 3 DPFs verified for off-road use (all active DPFs). Of the types of systems verified by ARB, Level 3 systems are the most effective, reducing diesel PM by at least 85 percent. Since the adoption of the regulation, three additional systems have now been verified and are available:

- Caterpillar DPF,

[1] Title 13, California Code of Regulations (CCR), sections 2700-2710.

- DCL International Inc. DPF, and
- Engine Control Systems' Purifilter DPF.

What is the potential penetration of passive DPFs in the off-road fleet?

Until mid-October 2008, passive DPF systems were available to less than five percent of off-road vehicles and 11 percent of off-road vehicle horsepower (hp) covered by the regulation. However, in late October, ARB issued additional verifications, which significantly expanded the availability of passive off-road DPFs. Staff now estimates that up to 24 percent of all off-road vehicles and up to 60 percent of the horsepower of affected off-road vehicles could have passive DPFs installed.[2]

What is the cost of DPFs available today?

The vast majority of VDECS that have been installed in California so far are active systems. Current active VDECS costs range from below $14,000 for a less than 50 hp engine to nearly $50,000 for an engine over 500 hp. Very few passive DPFs have been installed so far, but the average cost for these passive installations on engines of 230 to 300 hp was about $21,000.

The current costs for DPFs are about 30 percent higher than the overall average cost over the life of the regulation for DPFs assumed in the initial staff report for the regulation (ARB, 2007a)[3]. However, the cost analysis in the initial staff report was based on estimates of the average prices for DPFs over the course of regulation (through year 2030). As the market for DPFs expands, staff expects the volume of sales, coupled with the increased number of DPF options fleets may choose from, to reduce retrofit costs relative to today's prices. In addition, staff also expects the expanded availability of passive DPFs in additional horsepower ranges to provide less costly retrofit solutions relative to today. Overall, staff expects these retrofit costs will lower over time, bring them in line with the estimated VDECS costs presented in the initial staff report.

What is the status of the Showcase?

Since 2007, staff in conjunction with the South Coast Air Quality Management District (SCAQMD) and the Mobile Source Air Pollution Reduction Review Committee (MSRC) has engaged in developing the Showcase program. This program is providing valuable experience to staff, fleets, and retrofit manufacturers on the challenges of retrofitting off-road vehicles, and is facilitating an increase in the number of available VDECS. To date, the Showcase has been funded at $4.9 million, including $3.7 million from the

[2] The percentages are upper-bounds in that they do not account for several factors, including the fact that some engines do not attain sufficient exhaust temperatures to be retrofit with passive DPFs.

[3] This estimate weights current active DPF costs by 70 percent and current passive DPF costs by 30 percent, which is the original distribution of active versus passive DPFs assumed in the staff report.

MSRC, and $1.2 million from the SCAQMD. As of early November 2008, 18 fleets with 202 vehicles have applied and been accepted to participate in the Showcase. Of the eighteen participating fleets, thirteen are privately-owned, and five are public. In addition, 14 emission control manufacturers with 26 systems are participating in the Showcase. The 26 systems include 11 active DPFs and 15 passive DPFs. Seven of these systems reduce NOx as well as PM, and six of the systems include fuel borne catalysts. The vehicles participating in the Showcase include off-road engines with a full range of emission standard tier levels, from the highest emitting uncertified Tier 0 engines to the cleanest new Tier 3 engines. Also, there are systems included in the Showcase that are seeking verification for engines of all certification tiers.

To date, over 60 vehicles have been datalogged, and 9 vehicles have been retrofit, which is slower than originally anticipated. A variety of circumstances - including contracts taking longer than expected, participating vehicles having reduced usage or being pulled from service or retired, and installation designs being more complicated than anticipated - have pushed back the timeline from what was originally anticipated. However, staff estimates that all the vehicles participating in the Showcase will be retrofit by mid-2009.

In addition to the Showcase, ARB staff is participating in another off-road demonstration project with the United States Environmental Protection Agency (U.S. EPA) known as the Supplemental Environmental Project (SEP). Its goals are identical to the Showcase, and it is funded with $700,000 in settlement funds from two U.S. EPA enforcement cases. Thus far, 22 vehicles have been retrofit through the SEP and an additional 16 are expected to be retrofit in the next three months. In both the Showcase and SEP programs, fleets have been satisfied with the operation and reliability of the DECS.

What major milestones in implementation of the regulation have been achieved?

First, staff conducted 13 free training seminars throughout the state including at the following locations:

- San Luis Obispo
- Bakersfield
- Redding
- Nevada City
- Fresno
- Riverside
- San Diego
- El Monte
- Sacramento
- San Jose
- Ventura
- Oakland
- South Lake Tahoe

More than 12,000 flyers were distributed to publicize the seminars, and about 1,300 stakeholders attended.

Staff has also made presentations to over 15 groups, such as the National Association of Demolition Contractors and California Golf Course Superintendents Association. In addition, staff has met individually with dozens of individual stakeholders and fleets, and

attended nine conferences and workshops to distribute information regarding the regulation.

ARB also formed an advisory group, called the off-road implementation advisory group (ORIAG), in March 2008, to assist staff with outreach and implementation. ORIAG has had three general meetings and has formed the following subcommittees:

- Safety,
- Diesel emission control strategies (DECS),
- Fleets,
- Outreach, and
- Diesel Off-road On-line Reporting System (DOORS).

ORIAG has also created a guidance document review group, which reviews guidance documents and answers to frequently asked questions before ARB releases them to the public. The input from the ORIAG members and subcommittees has proved invaluable in implementing the regulation.

Staff is also currently working with the Contractors State License Board (CSLB) to have information about the off-road regulation inserted into their contractor renewal letters. Staff expects to be able to reach approximately 15,000 contractors each month through CSLB renewal letters.

Finally, staff has built an electronic reporting system called DOORS to enable fleet owners to report their fleet information to the ARB. Staff has been strongly encouraging fleets to voluntarily report early. As of November 17, 2008, 64 fleets have reported information for over 7,100 vehicles, and a number of fleets have begun labeling their vehicles with Equipment Identification Numbers.

What is the status of obtaining authorization from U.S. EPA to enforce the regulation?

Two provisions in the regulation became enforceable as soon as the regulation became effective on June 15, 2008: a five minute limit on unnecessary idling for off-road diesel vehicles, and the requirement for sellers located in California to disclose in writing that the vehicle sold may be subject to the regulation. ARB enforcement staff has begun auditing vehicle dealerships and auction sites and performing unannounced construction site inspections to enforce these two provisions.

However, to fully enforce the regulation's performance and recordkeeping requires, under section 209(e) of the federal Clean Air Act (CAA), ARB needs to obtain formal authorization from U.S. EPA. ARB submitted a request for authorization from U.S. EPA on August 12, 2008. On October 7, 2008, U.S. EPA published notice of its intent to consider California's request in the Federal Register (U.S. EPA, 2008) at a hearing in Washington DC on October 27, 2008. Staff attended the hearing and gave a presentation explaining why U.S. EPA should issue such authorization. The comment period for U.S. EPA's consideration of the authorization request was originally

scheduled to end November 28, 2008, but has now been extended until December 19, 2008 (U.S. EPA, 2008a; U.S.EPA, 2008b).

I. INTRODUCTION

The purpose of this report is to update the Air Resources Board (ARB or Board) on the status of retrofit technology available to fleets to comply with the Regulation for In-Use Off-Road Diesel-Fueled Fleets (the regulation). This report also discusses the efforts taken by staff to implement the regulation. Finally, this report describes a number of minor modifications and clarifications to the regulation that are being proposed by staff.

A. Background

The regulation was approved by the Board on July 26, 2007, and when implemented will reduce emissions of diesel particulate matter (PM) and oxides of nitrogen (NOx) from in-use off-road diesel vehicles that operate in California. The regulation is codified at California Code of Regulations (CCR), title 13, sections 2449 through 2449.3. The regulation will significantly reduce the public's exposure to diesel PM and NOx emissions from the nearly 180,000 off-road diesel vehicles that operate in California by requiring fleet owners to accelerate turnover to cleaner engines and install exhaust retrofits (ARB, 2007a). The regulation supports the Diesel Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles, which was adopted by the Board on September 30, 2000 and the 2007 State Implementation Plans for the South Coast and San Joaquin Valley air basins (ARB, 2000; ARB, 2007c).

The scope of the regulation is far reaching; affecting vehicles of dozens of types used in over 8,000 fleets, in industries as diverse as construction, air travel, manufacturing, landscaping, and ski resorts, as well as public agencies. The regulation will affect, among others, the warehouse with one diesel forklift, the landscaper with a fleet of a dozen diesel mowers, the county that maintains rural roads, the landfill with a fleet of dozers, as well as the large construction firm or government fleet with hundreds of diesel loaders, graders, scrapers, and rollers.

The regulation's requirements vary depending on the size of the fleet and on the vintage of its vehicles. Fleets are defined in the regulation as small, medium, or large based on their total statewide horsepower. The regulation requires that the largest fleets, which have the most significant emissions and are most able to rapidly understand and absorb the costs of compliance, are required to meet the most stringent requirements. The smallest fleets, and local municipal fleets located in low-population counties, are required to meet the least stringent provisions.

B. Report Overview

In approving the regulation, the Board directed staff in Resolution 07-19 to provide the Board, by January 2009, with a technology update on the status of diesel emission control strategies that have been verified by ARB and are available for installation to comply with the March 1, 2010, compliance date of the regulation (ARB, 2007d). Additionally, the Board directed that the update include information on the number of devices that have been verified, the cost of those devices, and the status of the ARB/South Coast Air Quality Management District/Mobile Source Air Pollution

Reduction Review Committee Off-Road Diesel Retrofit Showcase (Showcase). This report also includes an update on the status of implementation of the regulation, including information on public outreach, reporting, enforcement, the status on the Surplus Off-Road Opt-In for NOx (SOON) program, and the activities of the Off-Road Implementation Advisory Group (ORIAG). Additionally, as part of this update staff is proposing to modify the regulation by extending the double credit deadline for the early installation of Verified Diesel Emission Control Strategies (VDECS) from March 1, 2009, to January 1, 2010. Staff is also proposing a few additional modifications to the regulation to clarify certain provisions of the regulation. A full description of these proposed changes is provided in Chapter IV, and the proposed regulatory language is provided in Appendix A.

II. TECHNOLOGY UPDATE

This chapter discusses ARB's verification program for diesel emission control systems (DECS), the status of current off-road verifications, ongoing off-road demonstration programs, the number of VDECS that have been installed to date, the cost of available VDECS, and VDECS safety.

A. ARB's Verification Program

The regulation only requires the installation of a retrofit device that has been verified under ARB's verification program. ARB's verification program, previously adopted by the Board and codified at title 13, CCR, sections 2700 through 2710, is intended to ensure that a device achieves the advertised emission reductions and meets minimum durability requirements. Also, to receive ARB verification, the device manufacturer is required to warrant the VDECS and the engine against any damage caused by the device. ARB's verification procedure is a multi-level verification program consisting of three PM reduction levels and optional NOx reduction levels. The regulation gives credit for Level 2 and Level 3 PM devices, which achieve at least 50 percent and 85 percent PM reductions, respectively.

B. Status of Current Off-Road Verifications

1. Off-road verifications

There are several types of diesel particulate filter (DPF) technologies that are available to meet the requirements of the regulation. DPF technology that uses a catalyst to lower the PM ignition temperature is termed a passive DPF, because no outside source of energy is required for regeneration. Unlike a passive DPF, an active DPF system uses an external source of heat to oxidize the accumulated PM. The most common methods of generating additional heat for oxidation involve electrical regeneration by passing a current through the filter medium (i.e., a plug-in system), injecting and burning additional fuel to provide additional heat for particle oxidation, or adding a fuel-borne catalyst or other reagent to initiate regeneration. Some active systems collect and store diesel PM over the course of a full shift and are regenerated at the end of the shift with the vehicle or equipment shut off.

Currently, there are six Level 3 DPFs verified for off-road use. Table 1 below lists all the current VDECS for off-road vehicles. All of the VDECS shown in Table 1 are Level 3 DPFs. Three of these -- the Caterpillar diesel particulate filter (DPF), the DCL International Inc. DPF, and Engine Control Systems' Purifilter DPF – have recently been verified and entered the market after the off-road regulation was adopted in July 2007. The Caterpillar DPF's verification was also recently expanded to include track-type vehicles.

Table 1: Currently Verified Level 3 Off-Road DPFs

Product	Type (Active or Passive)	Applicability	Max Allowable PM Certification Level of Engine
Caterpillar DPF	Passive	Verified for some 1996-2008, 175-600 hp, non-exhaust gas recirculation (EGR)	Less than or equal to 0.2 grams per brake-horsepower hour (g/bhp-hr)
Cleaire Horizon	Active; Plug-In	Conditionally verified for many 2007 and older, non-EGR, less than 15 liters	Less than or equal to 0.4 g/bhp-hr
DCL MINE-X Sootfilter	Passive	Conditionally verified for some 1996-2008, 175-300 hp, non-EGR, rubber tired	Less than or equal to 0.15 g/bhp-hr
Engine Control System Combifilter	Active; Plug-In	Verified for many 2007 and older, 25-300 hp (certain conditions) or 175-300 hp, non-EGR, rubber-tired	Less than or equal to 0.45 g/bhp-hr
Engine Control Systems' Purifilter	Passive	Conditionally verified for some 1996-2008, 50-750 hp, non-EGR	0.01 to 0.2 g/bhp-hr
HUSS Umwelttechnik FS_MK	Active; Fuel Burner	Verified for most off-road diesel engines through 2008, most hp, non-EGR	No restrictions

In addition to the Level 3 DPFs listed above, there is one Level 2 off-road VDECS[4]. It consists of a diesel oxidation catalyst (DOC) used with an emulsified diesel fuel.

Although the availability of off-road VDECS is increasing, VDECS have become available at a slower pace than staff anticipated. This lack of off-road verifications is due to a number of reasons, including:

- It is challenging to find the proper vehicles and engines for off-road demonstration programs to ensure the broadest verification possible for each system (discussed in further detail later in this Chapter);
- It is difficult to accrue the number of hours necessary for datalogging due to lower equipment activity related to the current economy;
- Some manufacturers have limited the resources they have invested in off-road verifications, focusing more on the verification of on-road systems; and

[4] Although this device is still listed on ARB's verification website, the manufacturer of this product withdrew it from the market several years ago.

- The Showcase has had a slower start than anticipated (discussed later in this Chapter).

While it is difficult to predict with certainty, ARB staff anticipates that more off-road VDECS will become available in the near future. There are over 30 systems currently in the verification process for off-road applications, with several systems in the final stages of verification. Nearly all are Level 3 systems. Approximately five systems will reduce NOx, either alone or in concert with PM reductions. In addition, some manufacturers with current off-road VDECS are working to expand the scope of their verifications.

2. Scope of off-road verifications

As part of their assessment, staff has estimated the scope of applicability of the current off-road VDECS. To do this, staff conducted an analysis using the statewide off-road inventory to estimate the fraction of vehicles in the statewide fleet that could potentially be retrofit with currently verified off-road retrofits (ARB, 2006). Although a device may be verified for a specific engine, it may not always be verified or appropriate for the application in which the vehicle is used. Because of this, staff considers this analysis as an upper bound estimate of the number of off-road vehicles in the statewide fleet that could be retrofit with currently available off-road VDECS.

To develop this estimate, staff used the following information:

- The verification letters (also referred to as Executive Orders) for each off-road VDECS. The Executive Orders specify the horsepower, model year, emissions levels, and whether the device can be used with engines equipped with EGR.
- Letters from VDECS manufacturers exempting certain vehicle types or models from retrofitting under the Carl Moyer program (Bruenke, 2007a; Bruenke, 2007b; Bruenke, 2008a; Bruenke, 2008b; Bruenke, 2008c; Bruenke, 2008d; Luksik, 2008). Staff's analysis assumes that such exempted vehicle types or models cannot be retrofit.

Appendix B of this report contains further detail about how staff estimated the current extent of verifications.

Of the six Level 3 verifications, the Huss active fuel burner system verification has the broadest application. It is verified for most off-road diesel engines through 2008, as long as the engine does not come equipped with EGR and is not in one of the high horsepower applications for which Huss has indicated its system is not feasible. These high horsepower applications include several models of scrapers and dozers, but affect only about 1.5 percent of the total statewide fleet (see Appendix B). While from a technical perspective nearly all vehicles could be retrofit with the Huss or other active systems, as discussed below, fleets have expressed operational concerns regarding the use of active systems.

For a number of reasons, many fleets find active systems to be undesirable; the reasons for this include the need for external power, the requirement to shut a vehicle down for filter regeneration, and cost. The use of plug-in active systems, such as the

Cleaire Horizon and ECS Combifilter, that require access to high voltage electrical power are challenging for vehicles that may be used away from a power source. For example, if a loader is operating at a remote construction site, and does not return to a central facility each night, it may not be feasible for that fleet to install a plug-in DPF on that loader because there is no on-site access to electricity for filter regeneration. On the other hand, fuel burner systems, such as Huss's active DPF fuel burner system, avoid this issue since they do not require an external source of power. However, despite this, such systems are also not desired by many fleets, especially ones with older, lower tier vehicles, because the vehicles have to be turned off so the filter can be regenerated. Sometimes this filter regeneration interval can be frequent enough, in some cases approaching every few hours, to make use of the vehicle inconvenient or impractical (Porcher, 2008). In addition, as described later, active systems are generally more expensive than passive systems. However, active systems are still appropriate in many applications, and represent a majority of the systems currently installed on off-road vehicles.

Until recently, less than five percent of the vehicles and 11 percent of off-road vehicle horsepower covered by the regulation had passive DPF systems available.[5] In late October 2008, a new ECS system was verified, and the verification for the Caterpillar passive VDECS was significantly expanded; staff now estimates that up to 24 percent of the vehicles and up to 60 percent of the horsepower of affected off-road vehicles are capable of having a passive VDECS installed.[5, 6] However, due to the late date of verifications, fleets, as presently adopted, had less than two weeks[7] to order these systems, which are now available for a wider variety of vehicles, and secure guaranteed double PM VDECS credit under the regulation. As is discussed later, this is the primary rationale for staff's proposal to extend the early PM credit provisions of the regulation.

C. Status of Current Off-road Demonstration Programs

ARB staff is actively involved with three DECS demonstration programs: the Showcase, a United States Environmental Protection Agency (U.S. EPA) Supplemental Environmental Project (SEP), and a snowcat demonstration project. These programs are providing valuable experience to staff, fleets, and retrofit manufacturers on the challenges of retrofitting off-road vehicles, and are facilitating an increase in the number of verified off-road DECS.

[5] The percentages estimated are the maximum possible percent of vehicles and engines that could be retrofit. They do not account for factors such as that some engines do not attain sufficient temperature to be retrofit with passive VDECS. Also, they do not fully account for the fact that one passive VDECS, the Caterpillar DPF, was verified only for rubber tired applications. ARB's inventory data do not allow staff to subtract out tracked vehicles for vehicle types such as loaders that can be either tracked or rubber tired (ARB, 2006).

[6] It is estimated that in 2010, approximately 35,000 or 18 percent of the vehicles in the statewide fleet will need VDECS to comply with the regulation; by 2011, approximately 60,000 or 30 percent of the statewide fleet will need VDECS (ARB, 2007b).

[7] Less than two weeks from the date of the verifications.

1. Showcase

a) *Overview*

In anticipation of the need for additional verified DECS for off-road equipment, ARB, in conjunction with the South Coast Air Quality Management District (SCAQMD) and the Mobile Source Air Pollution Reduction Review Committee (MSRC), is administering the Showcase. Stakeholders in the Showcase include retrofit device manufacturers, fleet operators, other local air pollution control districts in California, and U.S. EPA.

The goals of the Showcase project are to:

- Demonstrate the effectiveness and durability of DECS on off-road vehicles;
- Increase the number of VDECS for off-road applications;
- Support the regulation through increased availability of VDECS;
- Introduce DECS to off-road fleets;
- Provide early reductions of emissions from off-road vehicles; and
- Gain additional experience with the installation and use of DECS on off-road vehicles.

The Showcase has been funded for $4.9 million, including $3.7 million from the MSRC, and $1.2 million for devices which control NOx from the SCAQMD. Additional information about the Showcase, including background, current status, vehicle data, photos, and datalogging results are available at the web site http://www.arb.ca.gov/diesel/showcase/showcase.htm.

b) *Current Status*

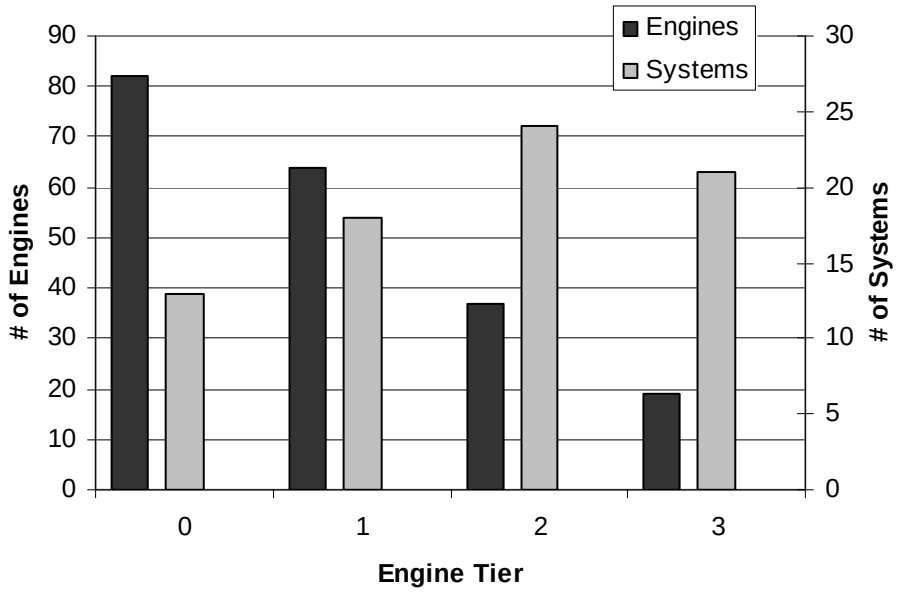
The Showcase covers a diverse combination of devices and vehicles in an effort to demonstrate and verify as many devices as possible covering a broad array of vehicles and applications. Vehicles were selected to represent a full range of vehicle types affected by the off-road regulation, as well as a full range of engine sizes. Additional information is provided in Tables 1 and 2 of Appendix C. As of early November 2008, 18 fleets with 202 vehicles have applied and been accepted to participate in the Showcase. Thirteen of the fleets are privately-owned, and five are public. The participating fleets are listed in Table 3 of Appendix C.

Participation in the Showcase by fleet owners provides them with a number of benefits. First, fleet owners are able to gain valuable experience with DECS with little or no capital outlay on their part. In addition, fleet participants are able to accumulate early double PM retrofit credits to be used to offset future fleet retrofit requirements.

Fourteen emission control manufacturers with 26 systems are participating in the Showcase. The 26 systems include 11 active DPFs and 15 passive DPFs. Seven of the systems reduce NOx as well as PM, and six of the systems include fuel borne catalysts. As shown in Figure 1 below, the vehicles participating in the Showcase include off-road engines with a full range of engine tier levels, from the highest emitting uncertified Tier 0 engines to the newest, cleanest Tier 3 engines. Some of the systems included in the Showcase are seeking verification for engines of all tiers, while others

are limited to newer engines. The list of participating emission control manufacturers is located in Table 4 of Appendix C.

Figure 1: Showcase Installations of DECS



As of November 2008, over 60 engines have been datalogged, as described below, and 9 engines have been retrofitted through the Showcase. Tables 1 and 2 of Appendix C include a list of the vehicle types and engines that have been retrofit so far, and a list of vehicle types and engines that are remaining to be retrofitted. It will be several more months until all vehicles are retrofitted.

In the initial stages of the Showcase, staff anticipated that all vehicles would have been datalogged, installation designs completed, and most retrofits installed by November 2008. However, a variety of circumstances have pushed back this timeline. The primary reasons for the delay are:

- Contracts took much longer to execute than expected;
- Economic effects (vehicles had reduced usage or were pulled from service or retired);
- Fleets requested a change of vehicles;
- Installation designs were more complicated than anticipated, in some cases increasing the price;
- The exhaust temperatures required an active device when initially a passive device had been planned; and
- A few devices were removed prior to installation as the manufacturers felt they needed further development.

However, the data gathered thus far has provided a significant increase in knowledge regarding the applications of DECS on off-road vehicles. For example, during the

development of the regulation, staff estimated that most off-road engines (approximately 70 percent) would require an active, rather than passive, DPF (ARB, 2007b). However, datalogging of engine temperature and backpressure through the Showcase program indicates that over three-quarters of datalogged engines produce sufficiently high exhaust temperatures that would support the use of a passive DPF. This is encouraging because passive devices tend to be significantly less expensive than active DPFs and - as discussed above - are typically more desirable to fleets. Individual datalogging results are available on the Showcase website listed above; one example is included in Appendix C (Figure 1 and Figure 2).

2. U.S. EPA's Supplemental Environmental Project

Three refineries in Northern and Southern California, in collaboration with the U.S. EPA and the ARB, have agreed to provide funding for retrofitting off-road vehicles with DECS. The refineries are providing the funding through the U.S. EPA SEP program, under which a violator offsets excess pollution by funding emission reductions projects in the immediate vicinity of the violation.

The goals of the SEP are similar to the Showcase. The SEP will complement the Showcase by filling gaps in the test vehicle matrix that were unable to be addressed in the Showcase (see Appendix C, Table 10 for the matrix of vehicles).

The SEP project is divided into three stages – SEP I through SEP III - with total funding of $700,000. The funding for each SEP stage and the scope and status of each is shown in Table 2.

Table 2: SEP Funding and Number of Engines Retrofitted

SEP	Funding	# of Fleets	# of Engines	Status as of Early Nov
I	$300,000	3	15	DECS Installed
II	$200,000	3	11	DECS Installed
III	$200,000	4	12	Datalogging vehicle exhaust temperatures

Tables 5 and 6 of Appendix C include a list of the vehicle types and engine sizes that have been retrofit so far in SEP I and SEP II; a list of vehicle types and engine sizes that are proposed to be retrofit in SEP III is also included in Table 7 of Appendix C.

Similar to the Showcase, fleet owners are able to gain valuable experience with DECS with little or no capital outlay on their part. In addition, fleet participants are able to accumulate early PM retrofit credits to be used to offset future fleet retrofit requirements. However, the SEP – unlike the Showcase – offers only single, not double, retrofit credit.[8]

[8] The U.S. EPA specified that fleets should only receive single credit for DECS installations funded through the SEP, because the funding was intended to offset emissions violations at the three refineries.

SEP information including vehicle data, photos and datalogging results are available at the web site http://www.arb.ca.gov/diesel/showcase/showcase.htm. Tables 8 and 9 of Appendix C list the fleets and emissions controls manufacturers participating in the SEP, respectively.

3. Snowcat demonstration project

A typical off-road engine in California operates at low elevations and in mild temperatures. The DECS verification procedures do not require testing at high elevations or in low ambient air temperatures. During the development of the regulation, some stakeholders raised concerns that under these conditions, DECS would not perform well. To evaluate these concerns, during the winter of 2007/2008, twelve snowcats used for snow grooming operations were datalogged at the three northern California ski resorts shown in Table 3.

Table 3: Snowcat Project Locations and Number of Vehicles

Ski Resort	Number of Vehicles Datalogged
Sugar Bowl	2
North Star	5
Mammoth	5

Snowcat engines operate a majority of the time under medium to heavy load. Many ski resorts have some slopes so steep that the snowcats must winch themselves up and down those slopes because the treads alone do not provide sufficient traction. Based on staff's evaluation of datalogged information, staff determined that despite the high elevation and low ambient air temperature that snowcats are typically subject to, their engine exhaust temperatures are high enough that passive DPFs can be used. In fact, one resort has already installed passive DPFs on some of their snowcats.

Snowcat demonstration project information including vehicle data, photos and datalogging results are available at the web site http://www.arb.ca.gov/diesel/showcase/showcase.htm.

4. Overall findings of the demonstration programs

The most significant finding of the Showcase, SEP, and Snowcat demonstration programs to date has been that more vehicles than expected have sufficiently high exhaust gas temperatures to be retrofit with passive devices. Every engine in every vehicle participating in these retrofit demonstration programs has or will be datalogged for 5 to 7 days. The datalogging tracks the characteristics of the exhaust by recording temperature and backpressure. Analysis of the over 110 vehicles datalogged to date demonstrates that over three-quarters of these engines produce sufficiently high

exhaust temperatures to support the use of a passive DPF.[9] Passive devices tend to be significantly less expensive than active DPFs and less complicated, therefore they are often more desirable to fleets.

The Showcase and SEP programs have also demonstrated that off-road retrofits are durable and can function well while effectively reducing diesel PM pollution on a wide variety of vehicle types. Thirty devices have been installed on a wide diversity of vehicle types including tractors, graders, loaders, backhoes, excavators, and scrapers, and all the retrofit devices are working well. In addition, these demonstration programs have highlighted the need to ensure proper installation, as there were a limited number of installation issues, such as exhaust leaks, encountered during installation; however, these issues have been or are in the process of being resolved.[10] Despite these issues, the overwhelming reaction of fleets participating in these demonstration programs to retrofits has been extremely positive.

Over the next 6 to 12 months in the Showcase and SEP programs, staff plans to complete the following tasks:

- Install devices onto the remaining off-road vehicles;
- Continue datalogging to gather exhaust temperature data;
- Monitor the performance of the devices;
- Measure emissions during vehicle operation with an on-board portable emissions measurement system (PEMS); and
- Survey the fleet owners and operators regarding their opinions concerning operation of the retrofits.

Staff is continuing to work with retrofit manufacturers participating in these demonstration programs to develop the data necessary to demonstrate the durability and performance of their products in support of verification. Staff is also optimistic that the information and lessons learned through these demonstration programs regarding the installation and operation of off-road retrofits can be used broadly by affected fleets and retrofit installers to assist them during the implementation of the regulation.

D. Total Number of VDECS installations

To date, staff estimates that about 430 off-road vehicles have been retrofit in California with a Level 3 off-road VDECS, including dozers, loaders, excavators, backhoes, graders, and tractors. Because there is as yet no requirement for fleets or VDECS installers to report each VDECS installation to ARB, staff does not have details on each installation or an exact count of how many VDECS have been installed. However, staff has interviewed VDECS manufacturers to obtain an estimate of how many retrofits are already in place, and will have a better sense of the actual number of installations once

[9] The Showcase and SEP did not capture smaller horsepower engines, and smaller horsepower engines will likely require active DPFs.

[10] At the time of this report's writing, thirty devices were installed and one device which encountered difficulties during installation was awaiting final installation.

fleets begin reporting in the spring of 2009 (Halloran, 2008; Jerman, 2008; Brown, 2008; Swenson, 2008; Surma, 2008).

E. Cost of Verified Diesel Emission Control Strategies

Table 4 below shows the current average costs[11] for purchase and installation of active VDECS based on data from three VDECS installers (Cox, 2008; Ostrander, 2008; Cram, 2008), and the Carl Moyer program database (CARL, 2008). The data shown in Table 4 is for 194 of the estimated 430 VDECS installations that have occurred to date on off-road vehicles in California.

Table 4: Summary of Active VDECS Costs in 2008

Engine Horsepower Range	Active VDECS Cost in 2008
< 50	$13,800
50-120	$15,500
121-175	$19,300
176-250	$19,100
251-400	$44,600
401-500	$44,800
500+	$48,400

The data indicates that the cost to apply an active VDECS to a vehicle shows a distinct jump at around 250 horsepower. This substantial increase in cost is largely due to the necessity of using multiple canisters or larger filter sizes for engines above 250 horsepower.

Very few passive VDECS have been sold in California because they were verified only recently. Therefore, there are insufficient data to determine the average costs over a full range of engine horsepowers. Staff has cost data on a handful of installations of passive VDECS that have been installed on engines of approximately 230 to 300 horsepower, and the average cost for these passive installations was about $21,000. ARB staff will continue to collect information on VDECS costs, as more passive systems are purchased and installed.

The current costs for installed VDECS[12] are, on average, about 30 percent higher than initially estimated by staff during the development of the regulation (ARB, 2007b). However, staff's initial cost analysis was based on estimates of the average prices for VDECS over the entire course of the regulation. As the market for VDECS expands, staff expects the volume of sales, as well as the increased number of VDECS options fleets may choose from, to lower overall retrofit costs. Staff also expects the availability of passive VDECS in additional horsepower ranges to provide less costly solutions where the application supports the use of a passive system. Staff expects these lower

[11] Cost of VDECS unit plus installation.
[12] Assuming a distribution of 30 percent passive DFPs and 70 percent active DPFs.

cost solutions will lower the overall costs of DPFs over time, bringing them in line with the estimated VDECS costs presented in the initial staff report.

F. VDECS Safety

During the development of the regulation, staff recognized that some VDECS installations could present potential safety hazards and that in some cases it would not be possible to install a VDECS safely. Potential safety issues include significant visibility impairment, thermal hazards, and compromising the structural integrity or center of gravity of the vehicle, with visibility impairment likely to be the most common issue. Recognizing these potential safety hazards, the regulation includes provisions to exempt a vehicle from the VDECS requirements if one can not be installed safely. Under the regulation, a fleet owner may request that the Executive Officer review and determine whether a VDECS should not be considered the highest level VDECS available because of potential conflict with other safety and health requirements. As part of these provisions, there is also an appeals process for any party whose request has been denied.

Staff is currently working with staff from the California Occupational Safety and Health Administration (Cal\OSHA), the Mining Safety and Health Administration (MSHA), and organized labor to develop the protocol for evaluating claims of unsafe installation of VDECS. Cal\OSHA and MSHA staff have been helpful in assisting staff in compiling a summary of all relevant safety regulations. Cal\OSHA staff has attended Off-road Implementation Advisory Group (ORIAG, described in Chapter III) safety committee meetings. Cal\OSHA and MSHA staff have also agreed to work with ARB as part of a group that will review safety appeals. Staff also anticipates working with this group to develop amendments necessary to Cal\OSHA regulations to establish more objective criteria for determining whether a specific VDECS installation presents an unsafe condition.

III. IMPLEMENTATION UPDATE

This chapter describes staff's ongoing efforts to implement the regulation.

A. Public Outreach

Since the regulation was approved in July 2007, staff has been working with affected industry stakeholders and other interested parties on its implementation.

1. Training seminars

Since July 2008, staff conducted thirteen free training seminars throughout the state including in:

- San Luis Obispo,
- Bakersfield,
- Redding,
- Nevada City,
- Fresno,
- Riverside,
- San Diego,
- El Monte,
- Sacramento,
- San Jose,
- Ventura,
- Oakland, and
- South Lake Tahoe.

More than 12,000 flyers were distributed to publicize the seminars, local newspapers helped publicize the trainings, and approximately 1,300 stakeholders attended the training sessions. The Sacramento training seminar was also webcast so interested parties could participate remotely via computer. Each seminar lasted approximately three hours and provided a detailed explanation of the regulation and assistance on how fleets should address the regulation's reporting requirements. The seminars also provided interested fleets with the opportunity to speak with representatives from companies who manufacture or install off-road VDECS. A list of the seminar locations and attendance is included in Table 1 of Appendix D.

ARB staff distributed feedback forms at each of the twelve training sessions. On a scale of 1 to 5, with five being the highest, participants ranked the training as a 4.6 when asked if they thought it was worthwhile and worth their time to attend. Staff has another three training sessions currently scheduled and expected to be completed by the end of 2008 in Fortuna, Victorville and Sacramento, and plans to conduct additional training sessions in 2009.

2. Other outreach and assistance

Since the regulation was approved, staff has been making every effort to reach and inform interested parties about the regulation. Over the past year and a half, staff has

conducted approximately 28 meetings with individual fleets and dealerships in a one-on-one setting. In these meetings, staff provided an overview of the regulation, in addition to providing reporting and compliance planning assistance. In addition, staff has not waited to be invited to relevant events; staff researched the meeting and conference schedules for a number of relevant trade associations and called and offered to speak at and attend these meetings. In total, staff has spoken to 17 groups at industry trade association meetings and events. During this time, staff also attended nine conferences and workshops to give presentations regarding the regulation or to provide fact sheets or other information to interested stakeholders. Additionally, some of these events were held out-of-state; this enabled staff to more widely outreach to those individuals or companies who frequently bring equipment into California from surrounding states. A list of the organizations to which staff has made presentations with since approval of the regulation is included in Table 2 of Appendix D. Table 3 of Appendix D lists individual fleets and stakeholders with which staff has met, and Table 4 in Appendix D describes the conferences that off-road implementation staff has attended to talk about the regulation.

Staff has also done multiple mailings to individuals potentially affected by the regulation and notified them about upcoming training sessions and outreach opportunities. The industry groups and associations that received notification of this information included off-road equipment manufactures, off-road engine manufactures, California county board of supervisors, county public works departments, auction houses, theme parks, and general construction contractors.

In addition to traditional mailings, ARB has sent out multiple e-mail notifications through its Off-road list serve, which contains over 3,700 individual e-mail addresses. Staff is also currently working with the Department of Motor Vehicles (DMV) and the Contractors State License Board (CSLB) to get information about the off-road regulation inserted into the agency's respective registration and license renewal documents. Additionally, ARB staff expects to be able to reach approximately 15,000 contractors each month through CSLB renewal letters.

Staff is also producing a series of training videos to simply and clearly illustrate how to choose, install, and maintain VDECS. The goal for these videos is to help fleets gain the necessary understanding to more readily implement rules such as the off-road regulation that require installation of VDECS. These videos will include information such as:

- What are VDECS and how do they work;
- How to comply with regulatory VDECS requirements;
- Who to turn to for technical advice on VDECS;
- How to select a VDECS; and
- How to properly install and maintain VDECS.

Outreach efforts will continue in the future. ARB staff has designed a poster that will be placed in dealerships throughout the state where off-road equipment is sold, as well as in public works offices and other places where owners of affected vehicles may

frequent. Staff is also pursuing other avenues for getting the word out regarding the regulation, including the use of free public service announcements on radio stations.

B. Off-road Implementation Advisory Group

At the suggestion of several industry stakeholders, ARB formed an advisory group in March 2008 to assist staff with outreach and implementation. The group, called the off-road implementation advisory group (ORIAG), is an informal committee made up of approximately 50 members selected to represent a cross-section of fleets, engine manufacturers, retrofit manufacturers and installers, equipment dealers and manufacturers, trade groups, and others. Thus far, ORIAG has had three general meetings, in May, June, and September of 2008, all of which were webcast. ORIAG has also formed subcommittees on safety, DECS, fleets, outreach, and the Diesel Off-road On-line Reporting System (DOORS), as well as a guidance document review group.

Every general meeting has been attended by most of the ORIAG members. In addition, as the meetings are open to the public, many additional interested members of the public have attended and participated. Through the subcommittees and during general meetings, ORIAG members have provided excellent suggestions and feedback regarding, for example, the content of the training seminars, safe installation of retrofit devices, guidance documents (e.g., advisories and answers to frequently asked questions), and improving DOORS (the reporting system developed for the regulation). The feedback from ORIAG members has helped make ARB staff more aware of the needs and opinions of affected stakeholders and more able to effectively implement the regulation. Staff plans to continue to meet regularly with ORIAG in the future as implementation of the regulation progresses.

C. SOON Program Status

The Surplus Off-Road Opt-In for NOx (SOON) program was established by section 2449.3 of the regulation. It is intended to allow local air districts to fund projects for off-road diesel vehicles operating inside their district to achieve additional NOx emission reductions beyond those expected from the base regulation. Funding may come from any available funding source; however, staff expects that most of the SOON program funding will come from the Carl Moyer incentive program. The SOON program was implemented, in part, to assist the South Coast and San Joaquin Valley air districts in meeting federal air quality standards for ozone and fine particulate matter. In order for the SOON program to take effect, the participating district must develop administrative guidelines for the program and have those guidelines approved by ARB. Section 2449.3 allows the South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD) to make the SOON program mandatory for fleets beginning in 2009.

While any air district may opt into the SOON program, to date only the SCAQMD has officially elected to do so. The SJVAPCD is presently in the process of opting into the SOON program. Further details on the status of SOON in the SCAQMD and SJVAPCD are provided below.

1. South Coast Air Quality Management District

The SCAQMD submitted draft SOON guidelines to staff on March 20, 2008, and May 12, 2008. The SCAQMD's governing Board formally opted into SOON on May 2, 2008, and ARB approved the SCAQMD SOON guidelines on June 6, 2008. The SCAQMD released the first solicitation for SOON projects with a submittal deadline of November 7, 2008 (SCAQMD, 2008).

Based on the first round of solicitations, the SCAQMD has funded 125 off-road diesel vehicle repower projects from 21 private companies and one government agency at a cost of $16.6 million.[13] SCAQMD has committed to provide $30 million of Carl Moyer monies annually for the first four years of their SOON Program and will make another $13 million available with another round of solicitations after the November 7, 2008, deadline.

2. San Joaquin Valley Air Pollution Control District

The SJVAPCD submitted draft SOON guidelines for review and assessment to ARB staff on August 25, 2008, and September 19, 2008. However, staff's comments were not addressed in the most recent version of the proposed guidelines, and staff disapproved the proposed guidelines on October 15, 2008 (White, 2008). Staff is continuing to work with the staff of the SJVAPCD to develop guidelines that are consistent with the SOON program. The current SJVAPCD implementation plan calls for the investment of five million dollars from Carl Moyer monies annually to fund SOON projects (Gamez, 2008).

D. DOORS

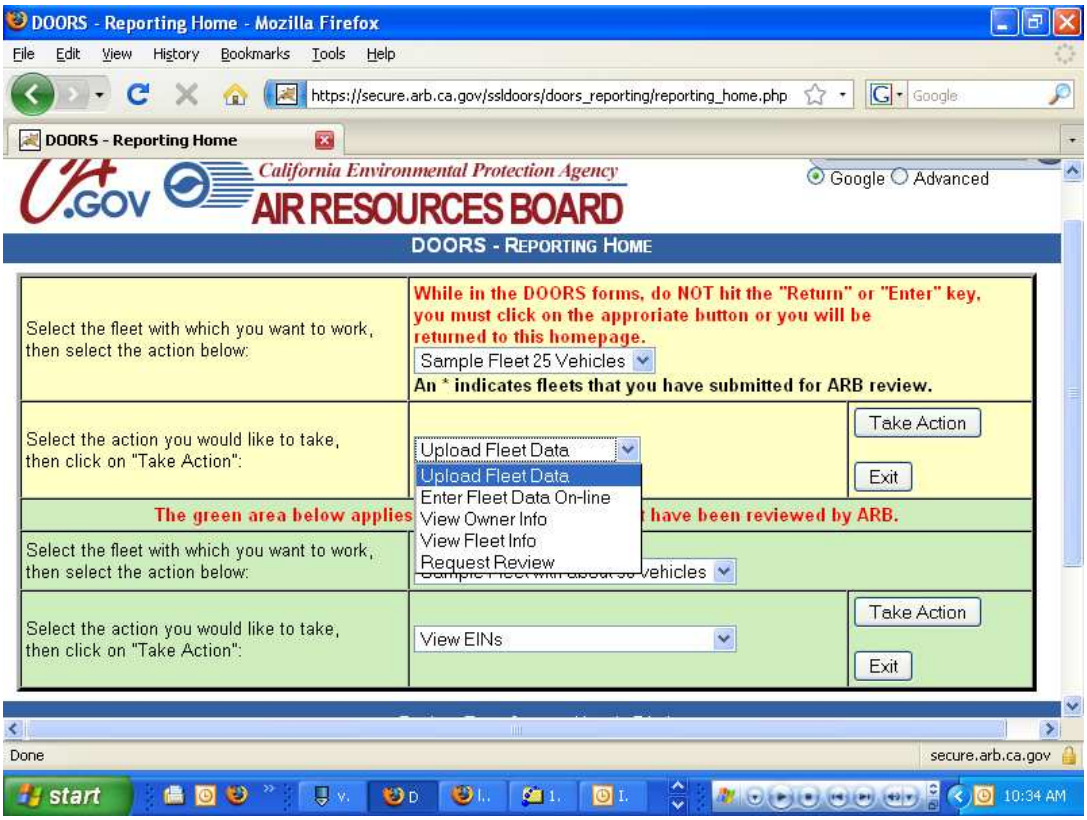
Staff has developed the DOORS system to enable fleet owners to report their fleet information to ARB as required by the regulation. DOORS is a web-based application using a database to store fleet data. Fleet owners, vehicle dealers, consultants and other members of the DOORS ORIAG subcommittee have provided input on the design and function of DOORS and are assisting in developing the compliance planning features and other enhancements as needed.

As shown in Figure 2, DOORS provides fleet owners a number of ways to provide their information to ARB, as well as providing many other features. As currently structured, DOORS allows fleet owners to:

- Enter their fleet information directly in on-line entry screens or by uploading information from a spreadsheet;
- View and edit their information; and
- Request ARB review of their information.

[13] Carl Moyer monies were used.

Figure 2: DOORS Screenshot



Staff has assisted fleets when they have had questions regarding DOORS reporting and has prepared an on-line user-guide (which is included in Appendix E) to assist fleet owners. Staff also provided comprehensive training on DOORS in the first round of statewide training sessions. Building on this, staff is offering half-hour one-on-one training sessions to assist interested fleets in using DOORS during the second round of training in November and December of 2008.

The deadlines for initial reporting are rapidly approaching – April 1, 2009, for large fleets, June 1, 2009, for medium fleets, and August 1, 2009, for small fleets. In total, staff expects that approximately 8,000 fleets with about 180,000 vehicles will be required to report their vehicles to DOORS. Staff has been strongly encouraging fleets to report early so that they will be able to become familiar with the process and be able to fully take advantage of the customer support being provided by staff. As of November 17, 2008, 64 fleets have reported information on over 7,100 vehicles. By reporting early, these fleets have provided themselves with extra time to label their vehicles with Equipment Identification Numbers (EINs) as required by the regulation and shown in Figure 3.

Figure 3: Vehicle Labeled with EIN

E. Enforcement Actions and Fines Issued

Two provisions in the regulation became enforceable when the regulation became effective on June 15, 2008: a five minute limit on unnecessary idling for off-road diesel vehicles, and the requirement that California-based sellers of off-road vehicles provide written disclosure to purchasers that the regulation may be applicable to the off-road diesel vehicles sold and operated in California.

Enforcement of the idling restrictions began in October, 2008, when ARB enforcement staff visited 15 construction sites in Southern California, and issued two citations for unnecessary idling and identified a dealer that had failed to include disclosure with off-road diesel vehicle sales. Based on the information provided by the dealer, enforcement staff identified 18 violations. Enforcement staff is continuing to perform inspections of construction sites and audit dealerships and auction houses, and are preparing to enforce the fleet reporting requirements beginning next spring.

F. Waiver Status

The federal Clean Air Act (CAA) section 209(e)(2) permits California to adopt emission standards and requirements related to emission control for in-use nonroad engines, so long as it obtains authorization from the Administrator of the U.S. EPA prior to the regulation becoming effective. As part of the authorization process, in Resolution 07-19, the Board made the requisite protectiveness finding required under CAA section 209(e)(2) that the adopted regulations will be, in the aggregate, at least as protective of public health and welfare as the applicable Federal standards, that California needs its nonroad emission standards to meet compelling and extraordinary conditions, and that

the standards and accompanying enforcement procedures approved therein are consistent with CAA section 209.

ARB submitted the request for authorization to U.S. EPA on August 12, 2008. On October 7, 2008, U.S. EPA published notice that it would consider California's request (U.S. EPA, 2008) at a public hearing on October 27, 2008. Staff attended the hearing in Washington D.C. and gave a presentation in support of its request. The comment period for U.S. EPA's consideration of the authorization request was originally scheduled to end November 28, 2008, but has now been extended until December 19, 2008 (U.S. EPA, 2008a; U.S.EPA, 2008b).

IV. PROPOSED MODIFICATIONS TO THE REGULATION FOR IN-USE OFF-ROAD DIESEL-FUELED FLEETS

This chapter discusses staff's proposed modifications to the regulation.

A. Regulatory Authority

ARB has authority under California law to adopt the proposed regulation modifications. California Health and Safety Code (HSC) sections 43000, 43000.5, 43013(b) and 43018 provide broad authority for ARB to adopt emission standards and other regulations to reduce emissions from new and in-use vehicular and other mobile sources. Under HSC sections 43013(b) and 43018, ARB is directly authorized to adopt emission standards for off-road vehicular sources, as expeditiously as possible, to meet state ambient air quality standards. ARB is further mandated by California law under HSC section 39667 to adopt Air Toxic Control Measures (ATCMs) for new and in-use vehicular sources, including off-road diesel vehicles, for identified TACs, such as diesel PM.

Under federal and California law, ARB is the primary agency in California responsible for making certain that all regions of the State attain and maintain NAAQS. To achieve this, California must adopt all feasible measures to obtain the necessary emission reductions, including measures from mobile sources. The federal CAA preempts states, including California, from adopting requirements for new off-road engines less than 175 horsepower used in farm or construction equipment. However, California may adopt emission standards for in-use off-road engines (federal CAA section 209(e)(2)). Because the proposed regulation addresses in-use rather than new off-road engines, it is permitted by the federal Clean Air Act. For example, turnover of a vehicle is not required until a vehicle is older than 10 years. California must obtain authorization from the Administrator of the U.S. EPA before the in-use emission standards of this proposed regulation become enforceable. Since the proposed regulation is not within the scope of any existing U.S. EPA authorizations, California must obtain a new authorization from U.S. EPA prior to the regulation becoming effective (ARB, 2007a).

B. Public Process

Staff is planning to hold a public workshop on December 19, 2008, in Sacramento, California, to solicit public input on the proposed modifications to the regulation. However, since the regulation was adopted, staff has met and spoken with numerous affected fleets and industry representatives who have expressed significant concerns regarding the limited availability of off-road VDECS, and the need for extending the early credit provision.

In addition to the individual meetings, at the September 26, 2008 ORIAG meeting, staff solicited input from the ORIAG on the possibility of extending the early credit deadline. Staff has considered all comments and recommendations received from various stakeholders, and has crafted the proposed amendments to the regulation to help address the specific concerns that were expressed.

C. Need for Modifications

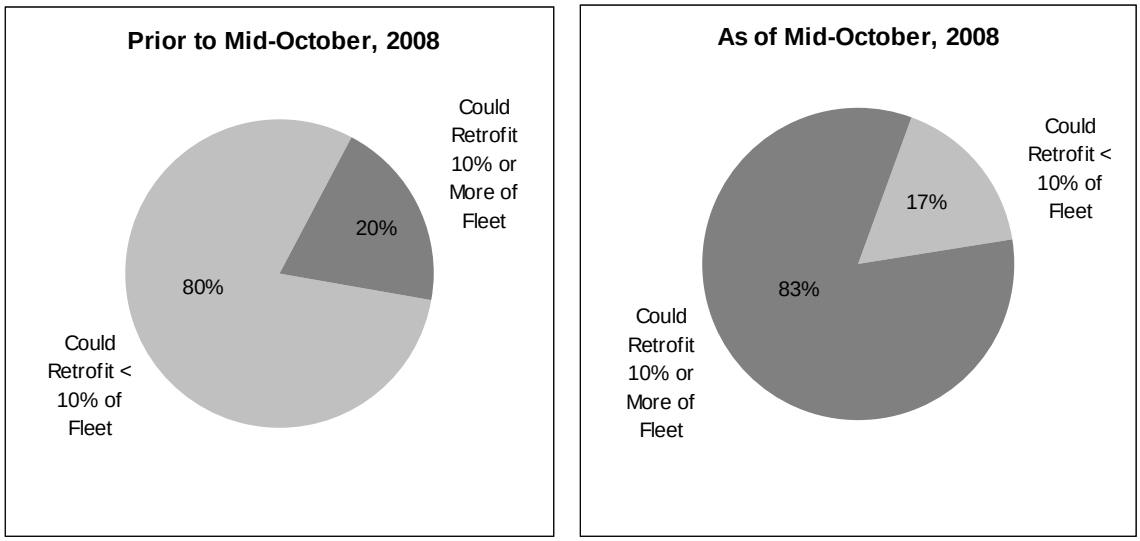
The early credit provision in the regulation currently provides double credit for VDECS installed by March 1, 2009. When a highest level VDECS is installed on an engine before March 1, 2009, that fleet will get double credit, meaning that the fleet will receive carryover retrofit credit equal to double the horsepower of the engine on which the highest level VDECS is installed[14]. If there are manufacturing or installer delays that prevent a VDECS from being installed until after March 1, 2009, a fleet will still get double credit as long as the VDECS was ordered by November 1, 2008.

Although the availability of off-road VDECS is increasing, as discussed in Chapter II, VDECS have become available at a slower pace than staff initially anticipated and have not allowed fleets to take full advantage of this early credit provision. When the regulation was initially adopted, staff anticipated there would be many additional off-road exhaust retrofits verified well before the early credit deadline of March 1, 2009 (ARB, 2007a). In proposing the regulation to the Board, staff noted that the early credit provisions for both PM and NOx would be important in making the regulation affordable for some fleets (ARB, 2007e; ARB, 2008a). Early double PM credit was intended to give fleets the opportunity to spread out their annual compliance costs in the early years of the regulation over several years and to reduce otherwise potentially high initial compliance costs (ARB, 2007e; ARB, 2008a). If the double early credit deadline for PM VDECS is not extended, the forecasted economic benefits of the provision would not be as great.

As shown in Figure 4 below, prior to mid-October, 2008, staff estimates that only 20 percent of fleets affected by the regulation could retrofit 10 percent or more of their vehicle horsepower with available passive verified DECS. Thus, most fleets with a need or strong preference for passive systems could not take full advantage of the early credit provisions. Even if they had wanted to purchase retrofits for all of the vehicles in their fleet that could utilize retrofits, they would have been unable to accumulate even one year's worth of retrofit credit in time to meet the November 1, 2008, date for guaranteed double credit.

[14] Consider, for example, a large fleet with total horsepower of 10,000 hp that applies highest level VDECS to 1,000 hp of its engines before March 1, 2009. Such a fleet can bank 2,000 hp (1,000 hp times 2) in carryover retrofit credit. Then, on March 1, 2010, if the fleet does not meet the 2010 fleet average target for PM, it may choose not to meet the BACT requirements to retrofit 20 percent of 10,000 hp (i.e., 2,000 hp). Instead, the fleet may use its 2,000 hp of banked carryover retrofit credit and postpone any required retrofitting to the following year.

Figure 4: Breadth of Passive Level 3 Verifications by Fleet Hp 2008[15]



However, as can also be seen in Figure 4, now that several more verified systems have recently become available, staff estimates that 83 percent of fleets affected by the regulation can currently retrofit more than 10 percent of their vehicle horsepower with passive VDECS. Thus, many more fleets can now take full advantage of double credit.

Since the regulation was adopted, based on feedback and comments from affected fleets and other stakeholders, staff has also identified a number of other provisions of the regulation that require clarification or simplification. Specifically, staff is proposing to clarify the duration of the Tier 1 vehicle turnover exemption, the recordkeeping requirements for the disclosure of the regulation's applicability, and the reporting requirements for VDECS. Staff is also proposing to simplify a minor provision in the changing of fleet size requirements. These clarifications are necessary for successful implementation of the regulation.

D. Proposed Modifications

Staff is proposing the following modifications to the regulation:

- Extend the double credit for early PM retrofits deadline by 10 months from March 1, 2009 to January 1, 2010;
- Modify the changing fleet size requirements to not penalize fleets that change from small fleets to larger fleets, and then subsequently become a small fleet again;
- Clarify that all sellers, and not just dealers, of off-road vehicles must maintain records of the disclosure of regulation applicability;
- Clarify that the provision for delay of Tier 1 turnover exempts Tier 1 vehicles from turnover only until the March 1, 2012, compliance deadline; and

[15] The pie chart on the left shows the estimated percent of fleets that could have retrofit 10 percent of more of their fleet hp with VDECS verified before mid-October 2008. The pie chart on the right shows the percent of fleets that could do so with VDECS verified as of mid-October 2008.

- Clarify the reporting requirements for VDECS.

In addition to the aforementioned modifications, two minor changes to the off-road regulation were proposed as part of the regulatory package for Proposed Regulation for In-Use On-Road Diesel Vehicles: (1) the clarification to the low-use provisions, and (2) the addition of all two engine cranes to the off-road regulation. These changes are scheduled to be considered by the Board at the December 11, 2008, Board hearing. For more information regarding these proposed changes, please see Chapter V. of the Staff Report for the Proposed Regulation for In-Use On-Road Diesel Vehicles (ARB, 2008c).

A more detailed discussion of the modifications staff is proposing is provided below.

1. Change early double credit deadline

This change would extend the deadline for earning double PM BACT credit in section 2449.2(a)(2)(A)2.a.i. from March 1, 2009, to January 1, 2010. The change would also mean that VDECS ordered by September 1, 2009, would receive double credit even if manufacturer or installer delays cause installation of the VDECS to be delayed beyond January 1, 2010. Additionally, this change would allow fleets more time to accumulate early PM credit and take greater advantage of recently verified DECS. Utilizing early PM credit would provide fleets with more time to more effectively spread out the initially compliance costs of the regulation. Also, adding 10 months to the early double PM credit deadline would allow more time for additional off-road verifications to be completed.

2. Requirements for fleet size changes

Staff proposes to remove the provision in section 2449(d)(4)(A) that requires a small fleet that becomes a medium or large fleet, and then subsequently reverts to a small fleet, to keep meeting the medium or large fleet requirements for two years after its reduced total maximum horsepower once again reclassifies it as a small fleet. This provision was initially developed to prevent fleets from taking advantage of a potential loophole under the regulation by deliberately growing and shrinking a fleet's size and being subject only to the small fleet requirements. However, after further review of this requirement, staff has determined that the possible complexity of this provision in practice, especially in situations where a fleet's size changes frequently over time, far outweighs the potential for fleets to abuse the changing fleet size provisions.

3. Recordkeeping requirements for disclosure of applicability

The record retention requirements in section 2449(h)(8) currently provide that only dealers must maintain records of the disclosure of the regulation applicability required by section 2449(j). In contrast, section 2449(j) requires any person selling a vehicle with an engine subject to the regulation to include a disclosure that the vehicle sold might be subject to the regulation. The intent of section 2449(h)(8) was to parallel section 2449(j) and require the records of the disclosure to be retained by anyone required to issue a disclosure of regulation applicability. As such, staff proposes that

the language in 2449(h)(8) be changed to clarify that all sellers, not just dealers, must maintain the records of the disclosure of regulation applicability.

4. Tier 1 delay

Section 2449.1(a)(2)(A)5. states that all vehicles with a Tier 1 or higher engine are exempt from the turnover requirement until March 1, 2013, provided that all Tier 0 vehicles in the fleet owner's fleet that do not qualify for exemption under section 2449.1(a)(2)(A)4. have been turned over. The intent of this provision is to exempt Tier 1 vehicles from the turnover requirements of the regulation until the fleet must meet their March 1, 2013, compliance deadline; that is a fleet may have to begin turning over their Tier 1 vehicles after March 1, 2012, to meet the fleet's March 1, 2013, compliance requirements. Staff is proposing to clarify this language by stating that all vehicles with a Tier 1 or higher engine are exempt from the turnover requirement until March 1, 2012 (instead of March 1, 2013), provided that all Tier 0 vehicles in the fleet owner's fleet that do not qualify for exemption under section 2449.1(a)(2)(A)4. have been turned over.

5. VDECS reporting

The reporting requirements in section 2449(g)(1)(D) specify the information regarding VDECS that must be reported to ARB. Section 2449(g)(1)(D)2. requires reporting of the VDECS model. After further review of this requirement during development of the DOORS system, staff has determined that reporting of just the VDECS model does not provide specific enough information to determine if the device was verified for a particular engine at the time of installation. Instead, it was determined that reporting of the VDECS family name is necessary for this purpose. It was also determined that reporting of the VDECS serial number is also important so that ARB enforcement will be able to track a particular device should there be questions regarding the proper functioning of the device. Reporting of the VDECS serial number data in DOORS would also facilitate transferring of information to a buyer should a vehicle with a VDECS be sold. Therefore, staff is proposing to remove the requirement to report the VDECS model and replace it with a requirement to report the VDECS family name and serial number. The DOORS system has been built to request the VDECS family name and serial number, so this change in the regulation will not require any rework for fleets that have reported early.

E. Staff Recommendation

Staff recommends that the Board adopt the proposed amendments to title 13, CCR, sections 2449 through 2449.3, as set forth in Appendix A.

V. ECONOMIC IMPACTS

This chapter describes the potential economic impacts of staff's proposal, and specifically the provision to extend the deadline for fleets to accrue early double PM credit for the installation of VDECS from March 1, 2009, to January 1, 2010. Staff's other proposed modifications are clarifications to the regulation, and will not affect the compliance costs for the regulation.

A. Legal Requirements

Sections 11346.3 and 11346.5 of the Government Code require state agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment shall include a consideration of the impact of the proposed regulation on California jobs, business expansion, elimination, or creation, and the ability of California businesses to compete.

State agencies are also required to estimate the cost or savings to any state or local agency and school districts in accordance with instruction adopted by the Department of Finance. This estimate is to include any nondiscretionary costs or savings to local agencies and the costs or savings in federal funding to the state.

B. Methodology

To examine the potential economic impacts of the proposed regulation modifications, staff evaluated the impact of the proposed changes on individual fleets, as well as on the total statewide cost of the regulation.

1. Individual fleet analysis

To estimate the compliance costs for fleets under the proposed modifications, staff reevaluated a previous analysis of an actual rental company fleet that shared its fleet information with staff during the development of the original rulemaking. Staff used average costs for repowers, vehicle replacements, and retrofits as outlined in that Staff Report and the TSD (ARB, 2007a; ARB 2007b). The results of this analysis are provided in Section C below.

2. Statewide cost analysis

To estimate the average statewide costs of the proposed modifications, staff used the ARB Off-Road Compliance Model (the model) previously used to estimate the statewide costs of the regulation. This model is described in detail in Chapter XI and Appendix H of the TSD (ARB, 2007b). As a bounding exercise, staff used the model to calculate the statewide costs of a scenario in which all large fleets took advantage of the proposed extended early PM VDECS credit. The results were then compared to the costs of a scenario where no early PM VDECS credit was utilized. The results of this analysis are provided in Section C below.

C. Economic Impacts of Proposed Modifications

1. Individual fleet analysis results

In the Final Statement of Reasons (FSOR) prepared for the initial adoption of the regulation, and the 2007 Board Hearing presentation, staff stated that the installation of early PM VDECS and the receipt of credits would help fleets spread out early compliance costs (ARB, 2007e; ARB, 2008a). However, because there were fewer VDECS available than staff anticipated at that time, fleets have not been able to fully utilize this credit, making the regulation less affordable for many fleets.

For example, for the rental fleet modeled, staff found that they could reduce their PM compliance requirements significantly in the beginning years of the regulation by taking early actions, and receiving early double PM credit (ARB, 2007e). In modeling the fleet's costs, staff assumed that one advantageous compliance path that the fleet could take would be to repower seven percent of its horsepower with engines meeting the Tier 1 standard and have these vehicles retrofitted with VDECS prior to March 1, 2009. Following this compliance path with early retrofits would enable this fleet to build up early retrofit credits and be able to limit the number of retrofits it would be required to do in subsequent years. If the fleet did not do early retrofits, it would otherwise have to retrofit 20 percent of its horsepower in each of the first three years after compliance becomes mandatory (2010-2012). On the other hand, taking advantage of the early credit provisions the fleet would have been able to reduce its compliance costs by over $110,000, or by about seven percent, in the year when the maximum compliance costs occurred[16], when compared to the scenario where it did not utilize the early credit provisions. Additionally, this fleet was able to reduce its 2010 compliance costs by approximately $1,400,000, or 80 percent, by utilizing the early credit provisions.

If the deadline for double early credit is not extended and this fleet cannot utilize the early credit provisions as initially envisioned by staff, it could experience up to seven percent higher maximum annual compliance costs as well as significantly higher compliance costs in 2010, and could find the regulation less affordable than staff estimated in the Staff Report and TSD (ARB, 2007a, ARB, 2007b). Staff believes that many fleets are in a situation similar to that faced by the modeled fleet. Although these fleets would have liked to utilize the early credit provisions to spread out their compliance costs and lower their maximum annual compliance costs, they have been unable to do so because of a lack of verified devices. Overall, the proposal to extend early credit for PM VDECS would allow compliance to be more affordable for such fleets, and would not increase individual fleet costs above the costs estimated in the initial 2007 TSD (ARB, 2007b).

2. Statewide cost analysis

The statewide cost analysis indicates that the proposed modification should help fleets spread out the initial costs of the regulation, without increasing the total cost of the

[16] For most fleets that do not utilize early credit, the maximum compliance costs will occur in 2010. However, if early credits are utilized, the maximum compliance costs will occur later during a fleet's compliance period.

regulation, or the costs in any given year. Staff anticipates that the proposed change would lower compliance costs in 2010, the year maximum annual regulation costs are expected to occur (ARB, 2007a).

The results of staff's analysis are as follows:

- If all large fleets (those fleets with a March 1, 2010, compliance date) utilized the early credit provisions and installed retrofits in time to get double PM credit, the statewide costs in 2010 would be approximately 40 percent less than if no fleets performed early retrofitting; and
- The total cost of the regulation over the period 2009 to 2030 would be approximately the same in both scenarios (all large fleets doing early retrofitting versus none doing early retrofitting).

D. Impacts on California Economy

The proposed modification to extend early double PM credit will not impose additional impacts of the regulation on the economy, nor is it expected to adversely impact employment. The modification is intended to allow fleets to spread out their compliance costs, which is expected to make the regulation more affordable. If in turn, that leads fewer fleets to reduce employment as a result of the regulation, the modification could benefit total California employment.

E. Potential Impacts on Small Businesses

The proposed modification to extend early double credit will not impose any additional costs on small businesses. Instead, it will provide a benefit to them by providing fleets additional time to install early VDECS, and thereby accumulate PM credit that will enable them to spread out their compliance costs in later years. While staff believes most small businesses are small or medium fleets, which have a first compliance date in 2015 or 2013, respectively, a few small businesses meet the regulation's definition of large fleet, which have their first compliance date in 2010. The proposed modification will benefit large fleets, and in particular small businesses that are large fleets, the most because their initial compliance date means their need for early PM credit is more urgent.

F. Potential Impacts on Public Agencies

The proposed modification to extend early double PM credit will not impose any additional costs on public agencies. Instead, it will provide a benefit to them by enabling fleets additional time to install VDECS early, and thereby accumulate PM credit that will enable them to spread out their compliance costs in later years.

The proposed modification will benefit the State, Federal, and larger municipal fleets whose first compliance date is March 1, 2010, more than local municipalities that are small or medium fleets, because their earlier first compliance dates mean their need for early PM credit is potentially more urgent.

VI. ENVIRONMENTAL IMPACTS

This chapter describes the potential environmental impacts of extending early double credit for PM VDECS to January 1, 2010. The other proposed modifications are clarifications only, and will not decrease the estimated emissions benefits of the regulation. Therefore, they were not included as part of the analysis.

A. Legal Requirements

The legal requirements applicable to the environmental impact analysis are the same as those presented in the original off-road TSD (ARB, 2007b). Please see Chapter IX.A. of the off-road TSD for a description of these requirements.

The results of the environmental impact analysis for the proposed regulation modifications are discussed in the sections below. Alternatives to the proposed changes to the regulation are discussed in Chapter VII of this report.

B. Air Quality Impacts of Proposed Modifications

The proposed amendments will have no effect on the anticipated emission reductions of NOx, because the provisions of the regulation that will provide NOx reductions (through engine and vehicle turnover) are not proposed to be amended. Any potential change in the emission benefits of the regulation will be limited to PM. Because it is not possible to know exactly how many or which fleets will choose to take advantage of the proposed extension of the early credit provisions, it is impossible to estimate precisely the change in anticipated PM reductions. However, staff expects there to be little to no overall adverse impact on air quality. To the extent that the proposed change could cause some increased emissions, overriding considerations exist for ARB to adopt the proposed changes.

If the proposed amendments cause significant numbers of fleets to perform PM VDECS installations earlier than they otherwise would have, the proposed amendments may have a positive effect (i.e., result in reduced health impact from PM emissions) because extending the early credit deadline so that it is usable by more fleets should encourage fleets of all sizes to retrofit earlier than they otherwise would, thereby achieving immediate reductions in diesel PM. The earlier diesel PM is reduced, the more health benefits are achieved.

On the other hand, the change could also have a negative effect (slightly increase emissions) because if many large fleets take advantage of the double PM credit provisions, this could reduce the total number of retrofits that would otherwise be completed by March 1, 2010.

This possible increase in emissions is tempered by the fact that activity and total vehicle horsepower, and therefore emissions, from off-road vehicles have likely been reduced to some extent due to the current economic slowdown. To date, staff has analyzed California off-road (non-taxable) diesel fuel consumption data for 2007 and 2008 from

the California Board of Equalization (BOE). As shown in Figure 5, overall off-road diesel fuel consumption in California has dropped in 2008[17] from 2006 and 2007 consumption levels (BOE, 2008). While off-road diesel fuel consumption can provide a useful surrogate for off-road vehicle activity when combined with other data, this data alone does not provide a complete perspective, as it also includes diesel fuel consumption from other off-road uses such as rail, stationary, marine, and agricultural (which are not subject to the regulation).

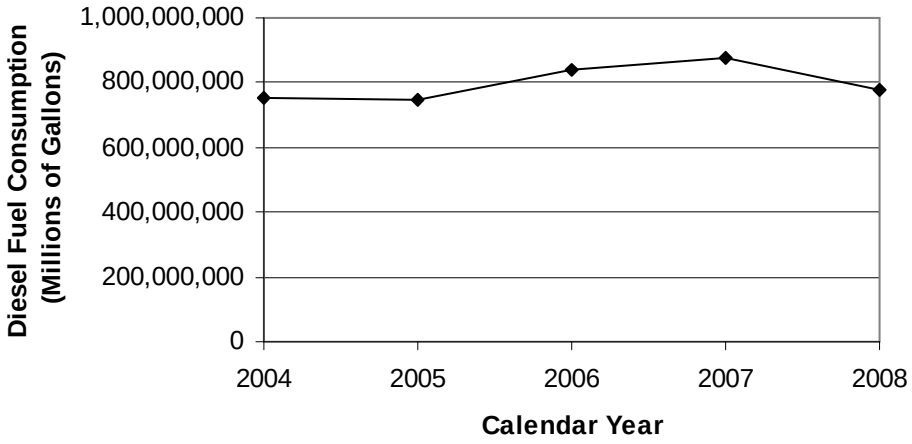


Figure 5: California Off-Road Diesel Vehicle Fuel Consumption

While this data shows a decrease in overall diesel fuel consumption from all off-road sources, and is likely reflective of general trends from all users of off-road diesel fuel, the specific changes in fuel use by fleets affected by the regulation (for example, the construction industry) cannot be derived from this data.

C. Future Evaluation of Current Economic Conditions on Emissions

It is well understood that the United States economy is currently in an economic downturn (Regalia, 2008; La Monica, 2008). In response to this, staff has been investigating the effect of this downturn on the industries affected by the regulation, and in particular the effect of this on emissions from off-road vehicles subject to the regulation. As part of this analysis, staff is evaluating available data on vehicle activity, as well as attempting to evaluate whether fleets may have changed their turnover practices due to the poor economy or their inability to obtain financing to comply with the regulation or take early compliance actions. Staff will present its findings at the January 2009, Board meeting.

D. Other Environmental Impacts

Staff does not believe there will be any additional environmental impacts from the proposed modifications to the regulation.

[17] The 2008 fuel consumption total is an estimate based on the extrapolation of off-road fuel consumption data for the first three quarters of 2008.

VII. ALTERNATIVES CONSIDERED

This chapter discusses the alternatives to the proposed 10-month extension of the early double credit that staff considered and why they were rejected in favor of the proposal. Because the proposed modifications to the other minor provisions are clarifications, staff did not perform an alternatives analysis for them.

A. Extend Early Credit Deadline, but for Less Time

First, staff considered a shorter extension of the early PM VDECS credit. Staff, however, determined that providing a shorter extension (only a couple of months) to the early credit deadline would not adequately address the need of fleets for additional time to purchase and install newly verified DECS. The longer the early credit deadline can be extended, the more time fleets will have to locate the resources they need (such as access to credit) to buy retrofits. Finally, many construction vehicles covered by the regulation are used heavily in the summer months, and not as much during the rainy winter months. The optimal period for fleets to datalog their vehicles is over the summer, with orders for retrofits placed before the fall. Therefore, staff believes the proposal to extend the double credit deadline to January 1, 2010 and the double credit guarantee date to September 1, 2009, is preferable to other alternatives that would extend the deadlines by only a few months.

B. Extend Early Credit Deadline by a Full Year

Staff considered extending the early double credit for VDECS by a full year to March 1, 2010, but did not propose that option for two reasons. First, extending the deadline by a full year could result in a loss in emissions benefits. If the deadline were extended to March 1, 2010, this would effectively be the same as cutting the PM BACT retrofit requirement for that year down from 20 percent to 10 percent[18]. If the requirement for PM BACT were changed to 10 percent per year for the 2010 compliance date only, the number of VDECS installed would effectively be cut in half.[19] Second, extending the deadline a full year could disrupt the business plans of retrofit manufacturers that have invested significantly so that they may provide VDECS to fleets. If these manufacturers fail or pull out of the California market because of a delay, that could jeopardize the regulation's future PM benefits. For these reasons, staff did not propose extending the early credit deadline beyond January 1, 2010.

C. Give More or Less than Double Credit before March 1, 2010

Staff also considered providing more than double PM credit for VDECS installed before March 1, 2009, or to give between single and double credit for VDECS installations completed between March 1, 2009, and March 1, 2010 (for example, to give one and a

[18] If all large fleets received double credit for early PM VDECS, they could potentially fulfill the PM BACT requirements in 2010 by only retrofitting half of the vehicles they would otherwise have; essentially cutting the retrofitting requirements from 20 percent to 10 percent.

[19] This emission benefit loss could be mitigated somewhat, but not completely, by the decreased off-road vehicle activity due to the current economic downturn.

half credit). Staff believes such an approach would add significant additional recordkeeping and compliance complexity to the regulation, while providing no additional relief to fleets relative to staff's proposal.

D. No Change

Staff also considered making no changes to the regulation. However, as discussed in this report, staff believes it is necessary to provide fleets with additional time to purchase and install VDECS to receive early PM BACT credit. As such, making no change to this provision would not address this issue.

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APPENDIX A: PROPOSED REGULATION ORDER FOR IN-USE OFF-ROAD DIESEL-FUELED FLEETS

Note: Proposed modifications are shown in <u>underline</u> to indicate additions and ~~strikeout~~ to indicate deletions, compared to the preexisting regulatory language. The symbol "***" indicates that regulatory language not being amended is not shown.**

Amend sections 2449, 2449.1, and 2449.2, title 13, California Code of Regulation to read as follows.

~~§~~ 2449 General Requirements for In-Use Off-Road Diesel-Fueled Fleets

*****

(d) Performance Requirements -

*****

(4) Changing Fleet Size –

(A) Small fleets that become medium or large fleets must meet the medium or large fleet requirements, respectively, on the reporting date two years subsequent to the year they became a medium or large fleet. ~~If such fleets become small again, they must keep meeting the medium or large fleet requirements for two years after becoming a small fleet.~~

(B) Large fleets that become medium fleets may meet either the medium or large fleet requirements on the next reporting date. Large fleets that become small fleets may meet either the small or large fleet requirements on the next reporting date.

(C) Medium fleets that become small fleets may meet either the small or medium fleet requirements on the next reporting date. Medium fleets that become large fleets must meet the large fleet requirements on the reporting date two years subsequent to the year they became a large fleet.

*****

(g) Reporting **–**

Reporting is required for each and every fleet. Large and medium fleets may report separately for different divisions or subsidiaries of a given company or agency. Fleet owners may submit reporting information using forms (paper or electronic) approved by the Executive Officer.

(1) Initial reporting – All fleet owners must submit the information in section 2449(g)(1)(A) through (G) to ARB by their initial reporting date. In the initial reporting, fleet owners must report information regarding each vehicle subject to this regulation that was in their fleet on March 1, 2009. Systems or non-diesel

fueled vehicles that are used in place of a vehicle that would be subject to this regulation must also be reported. The initial reporting date for large fleets is April 1, 2009. The initial reporting date for medium fleets is June 1, 2009. The initial reporting date for small fleets is August 1, 2009. Reports must include the following information:

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(D) Verified Diesel Emission Control Strategies - For each VDECS that is installed on an engine listed per section 2449(g)(1)(C) report the following information.

1. VDECS Manufacturer;
2. VDECS ~~Model~~Family;
3. Verification level;
4. Verified percent NOx reduction (if any);
5. Date installed;
6. VDECS Serial Number.

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(h) Record keeping –

Fleet owners must maintain copies of the information reported under section 2449(g), as well as the records described in section 2449(h) below, and provide them to an agent or employee of the ARB within five business days upon request. Records must be kept at a location within the State of California.

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(8) Record Retention – Each fleet owner shall maintain the records for each vehicle subject to the regulation until it is retired and for the overall fleet as long as the owner has a fleet or March 1, 2030, whichever is earlier. If vehicle ownership is transferred, the seller shall convey the vehicle records including vehicle data per section 2449(g)(1)(B), engine data per section 2449(g)(1)(C), and VDECS data per section 2449(g)(1)(D) to the buyer. If fleet ownership is transferred, the seller shall convey the fleet records including fleet data per sections 2449(g)(1)(A) through (G) to the buyer. ~~Dealers~~ Any person selling a vehicle with an engine subject to this regulation in California must maintain records of the disclosure of regulation applicability required by Section 2449(j) for three years after the sale.

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Note: Authority cited: Sections 39002, 39515, 39516, 39600, 39601, 39602, 39650, 39656, 39658, 39659, 39665, 39667, 39674, 39675, 40000, 41511, 42400, 42400.1, 42400.2, 42400.3.5, 42402, 42402.1, 42402.2, 42402.4, 42403, 43000, 43000.5, 43013, 43016, and 43018, Health and Safety Code. Reference: Sections 39002, 39515, 39516, 39600, 39601, 39602, 39650, 39656, 39657, 39658, 39659, 39665, 39667, 39674, 39675, 40000, 41511, 42400, 42400.1, 42400.2, 42402.2, 43000, 43000.5, 43013, 43016, and 43018, Health and Safety Code.

§ 2449.1 NOx Performance Requirements

(a) Performance Requirements

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(2) BACT Requirements

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(A) <u>Turnover Requirements for Fleets Not Meeting NOx Target Rate</u> – A fleet may meet the turnover requirements by retiring a vehicle, designating a vehicle as a low-use vehicle, repowering a vehicle, rebuilding the engine to a more stringent emissions configuration, or applying a VDECS verified to achieve NOx reductions. If repowering a vehicle or rebuilding the engine to a more stringent emissions configuration, the new engine must be Tier 2 or higher and must be a higher tier than the engine replaced or rebuilt. The method for counting VDECS verified to achieve NOx reductions is specified in section 2449.1(a)(2)(A)8.

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5. Delay Tier 1 turnover - All vehicles with a Tier 1 or higher engine are exempt from the turnover requirement until <u>the compliance year ending</u> March 1, 2013 <u>(i.e., the first turnover of Tier 1 or higher engines would be required between March 2, 2012 and March 1, 2013)</u>, provided that all Tier 0 vehicles in the fleet owner's fleet that do not qualify for an exemption under section 2449.1(a)(2)(A)4. have been turned over.

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Note: Authority cited: Sections 39002, 39515, 39516, 39600, 39601, 39602, 43000, 43000.5, 43013, 43016, and 43018, Health and Safety Code. Reference: Sections 39002, 39515, 39516, 39600, 39601, 39602, 39650, 39656, 39657, 39658, 39659, 39665, 39667, 43000, 43000.5, 43013, 43016, and 43018, Health and Safety Code.

§ **2449.2 PM Performance Requirements**

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(a) Performance Requirements

*****

(2) BACT Requirements

*****

(A) PM Retrofit Requirements for Fleets Not Meeting Diesel PM Target Rate

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2. Carryover PM retrofit credit –

a. Beginning - All fleets other than those meeting the criteria in (i) or (ii) below for vehicles remaining in their fleets begin with zero carryover retrofit credit on March 1, 2009.

i. Double Credit for Early PM Retrofits – Fleets that have installed the highest level VDECS on their vehicles before <u>January 1, 2010</u> ~~March 1, 2009~~ begin with a carryover retrofit credit equal to: 2

multiplied by total maximum power of engines on which highest level VDECS was installed before January 1, 2010 ~~March 1, 2009~~, unless the contract for funding the VDECS stipulates single credit for installation of the VDECS.

ii. Single Credit for Other PM Retrofits Before Initial Compliance Date – Medium fleets that install highest level VDECS on their vehicles between January 1, 2010 ~~March 1, 2009~~ and February 29, 2012 accumulate carryover retrofit credit equal to total maximum power of engines on which highest level VDECS was installed. Small fleets that install highest level VDECS on their vehicles between January 1, 2010 ~~March 1, 2009~~ and February 28, 2014 accumulate carryover retrofit credit equal to total maximum power of engines on which highest level VDECS was installed.

b. Accumulating carryover PM retrofit credit – Beginning March 1, 2011 ~~2010~~ for large fleets, March 1, 2013 for medium fleets, and March 1, 2015 for small fleets, a fleet accumulates carryover retrofit credit each year it retrofits more than 20 percent of its maximum power. The amount accumulated is the percent of maximum power retrofit in excess of 20 percent in the past 12 months prior to March 1. A large fleet also accumulates carryover retrofit credit on March 1, 2010 if the sum of the double retrofit credit earned from March 1, 2009 to January 1, 2010 plus the single retrofit credit earned from January 1, 2010 to March 1, 2010 exceeds 20 percent of its maximum horsepower. The amount accumulated is the sum of double credit retrofit credit earned from March 1, 2009 to January 1, 2010 plus the single credit earned from January 1, 2010 to March 1, 2010 in excess of 20 percent of fleet's maximum horsepower in the past 12 months.

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Note: Authority cited: Sections 39002, 39515, 39516, 39600, 39601, 39602, 39650, 39656, 39658, 39659, 39665, 39667, 39674, 39675, 40000, 41511, 42400, 42400.1, 42400.2, 42400.3.5, 42402, 42402.1, 42402.2, 42402.4, 42403, 43000, 43000.5, 43013, 43016, and 43018, Health and Safety Code. Reference: Sections 39002, 39515, 39516, 39600, 39601, 39602, 39650, 39656, 39657, 39658, 39659, 39665, 39667, 39674, 39675, 40000, 41511, 42400, 42400.1, 42400.2, 42402.2, 43000, 43000.5, 43013, 43016, and 43018, Health and Safety Code.

APPENDIX B: ASSUMPTIONS FOR STATEWIDE FLEET RETROFITTING ANALYSIS

This appendix provides the assumptions and methodologies used to estimate Verified Diesel Emission Control System (VDECS) applicability.

ARB estimated the in-use off-road diesel vehicle population that could have VDECS installed for three specific cases; (1) the percentage of vehicles that could have any of the current verified devices installed, (2) the percentage of vehicles that could have passively regenerated VDECS installed today, and (3) the percentage of vehicles that could have had passively regenerated VDECS installed more than two weeks prior to the deadline for guaranteed double retrofit credit as of mid-October 2008.

To develop this estimate, staff used the following information:

- The verification letters (also referred to as Executive Orders) for each off-road VDECS. The Executive Orders specify the horsepower, model year, emissions levels, and whether the device can be used with engines equipped with exhaust gas recirculation (EGR).
- Letters from VDECS manufacturers exempting certain vehicle types or models from retrofitting under the Carl Moyer program (Bruenke, 2007a; Bruenke, 2007b; Bruenke, 2008a; Bruenke, 2008b; Bruenke, 2008c; Bruenke, 2008d; Luksik, 2008). Staff's analysis assumes that such exempted vehicle types or models cannot be retrofit.

Staff based the estimate of VDECS applicability on horsepower (hp), particulate matter (PM) emissions limit, and engine model years. Staff chose these parameters because these are the most important factors limiting verifications and because this data is available in the ARB emissions inventory model (the OFFROAD model). Each VDECS has a number of other requirements which would prevent it from being applied to a particular engine/vehicle combination, including but not limited to:

- specific exemptions or inclusions by engine family name,
- use of fuel additives,
- poor engine conditions with excessive emissions,
- insufficient exhaust pressure for the device,
- no appropriate or safe means of installing the device on the vehicle infrastructure,
- exclusion due to the use tracks instead of rubber tires,
- lack of available electrical power for actively regenerated VDECS, and
- inadequate exhaust temperature for passive VDECS.

These factors would need to be considered for each engine not initially ruled out based on hp, PM emissions, and model year. The factors listed above are not included in the ARB emissions inventory model (the OFFROAD model), nor does staff have access to other vehicle or engine population data that would allow the factors above to be factored into an overall estimate of VDECS applicability. An estimation on the effect of these factors on the breadth of VDECS applicability is unlikely to be accurate without an in-

depth inspection, including data logging, of a sizeable portion of California's inventory of off-road equipment. Therefore, it is important to note that the estimations of VDECS applicability below refer only to the engines which are not initially ruled out by the age, PM emissions, and size of the engine. The estimates should be considered upper bounds on the fraction of vehicle horsepower to which retrofits could be applied.

Passive and Active Retrofits

To determine the percentage of vehicles which could have any currently verified or conditionally verified device installed, staff reviewed the breadth of the VDECS verifications for all verified devices. Staff concluded that the HUSS Umwelttechnik GmbHFS-MK Series Diesel Particulate Filter (Huss DPF), which is a level 3 actively regenerated device, is the device with the widest applicability. In fact, the Huss device is verified for virtually any engine, regardless of age, horsepower or emission levels, with the exception of engines using exhaust gas recirculation and vehicles exempted specifically from retrofitting under the Carl Moyer program. The engines specifically exempted from the Huss verification can in most cases be retrofit by an alternative device, hence the only engines which can be entirely ruled out from receiving any of the currently verified retrofit devices are those using exhaust gas recirculation.

Based on staff's analysis, the only manufacturer with a substantive market share of the applicable engines in California using exhaust gas recirculation in all or most of their equipment in any given year was Volvo, in 2006 and later model year engines. Although other manufacturers have used exhaust gas recirculation, they did not do so in quantities which would justify removing all of their engine lines from the engines which could be retrofit.

The market share of Volvo in off-road construction application was determined by industry reports from the Yengst Associates (Yengst, 2005). The model years for Volvo engines using EGR were accounted for based on the estimated useful life of the equipment types using Volvo engines (ARB, 2007b).

Staff estimate that exhaust gas recirculation engines comprise 0.4 percent of the off-road diesel inventory, and are the only category that can be absolutely excluded when considering any of the available retrofits. ARB staff acknowledges that many other vehicles and engines are not suited to be retrofit, however as stated above, most the additional exemptions would need to be identified on a case by case basis.

Passively Regenerated Retrofits

To determine the percentage of vehicles which could have one of the passively regenerated VDECS installed, staff considered the Caterpillar DPF, DCL MINE-X Sootfilter, and the ECS Purifilter verifications on November 1, 2008 (ARB, 2008d; Cross, 2008a; Cross, 2008b). The restrictions on engine applicability are listed in Table 1 below.

Table 1: Passively Regenerated Retrofit Requirements

	Caterpillar DPF	DCL MINE-X Sootfilter	ECS Purifilter
Horsepower Range	175 - 600 hp	175 - 300 hp	50 - 750 hp
PM Emissions Limit	0.2 g/bhp-hr	0.15 g/bhp-hr	0.2 g/bhp-hr
Engine Model Years	1996 - 2008	1996 - 2008	1996 - 2008

The PM emissions limits are applied to the engine's certification level , not the certification standard. Although the standards did not require engines to meet a limit of 0.2 g/bhp-hr for PM until 2001 at the earliest, many engines tested at or below 0.2 g/bhp-hr as early as 1996 (ARB, 2008e), and could have one of the passive devices list above installed. Although many engines test above these standards, no specific model year of 1996 or later, or horsepower category, can be excluded, as each category has at least a few engines which meet the standard.

Comparing the applicability requirements, staff filtered the off-road inventory (ARB, 2006) for all vehicles between 50 and 750 horsepower, for Tier 1 or newer engine models. Engines using exhaust gas recirculation were also discounted, using the method described previously for active and passive retrofits.

Staff estimate that 41 percent of the off-road diesel horsepower covered by the regulation could not have a passive device installed currently due to restriction on hp, model year and emissions. As stated previously, of the remaining 59 percent of California's horsepower, staff expect that the factors such as engine condition, installation issues, and duty cycle would further reduce the amount of vehicles that could be retrofit with a passive device, however the engine would need to be evaluated on an individual basis.

Passively Regenerated Retrofits Available Mid-October 2008 for Double Retrofit Credit

Staff also wanted to determine the percentage of vehicles that could have had a passively regenerated retrofit installed at least two weeks prior to the deadline to guarantee double retrofit credit, November 1, 2008. This entailed removing the ECS Purifilter which was verified on October 20, 2008 and the extension of the Caterpillar DPF, which had the verification expanded on October 24, 2008. Table 2 below shows the applicability requirements for the Caterpillar DPF and DCL MINE-X Sootfilter prior to the expansion of verification (Cross, 2008a; Cross, 2008c).

Table 2: Limited Caterpillar DPF and DCL Sootfilter Requirements

	Caterpillar DPF	DCL MINE-X Sootfilter
Horsepower Range	175 - 300 hp	175 - 300 hp
PM Emissions Limit	0.2 g/bhp-hr	0.15 g/bhp-hr
Engine Model Years	1996 - 2008	1996 - 2008

Additionally, both retrofits were only verified for rubber-tired applications. Although many vehicle categories are comprised of both rubber tired and track vehicles, only the crawler tractor category can be assumed to be comprised solely of track vehicles and can be completely ruled out.

Comparing the applicability requirements, staff filtered the off-road inventory (ARB, 2006) for all vehicles between 175 and 300 horsepower, for Tier 1 or newer engines, and excluded crawler tractors. Engines that used exhaust gas recirculation were also discounted, using the method described above for active and passive retrofits.

Staff estimate that 89 percent of the off-road diesel horsepower covered by the regulation could not be retrofit with one of the passively regenerated devices installed prior to mid-October, 2008, based on horsepower, model year, and emissions. As with the previous analysis, the remaining 11 percent would need to be evaluated on individual basis.

HUSS Exemptions by Vehicle Model

The effect of HUSS exemptions (Bruenke, 2007a; Bruenke, 2007b; Bruenke, 2008a; Bruenke, 2008b; Bruenke, 2008c; Bruenke, 2008d; Luksik, 2008) on the statewide fleet was estimated using information from the Machinery Trader auction site (www.machinerytrader.com). The market share of applicable engine models was estimated by comparing the number of specific vehicle models for sale against the total number of vehicles for sale in that vehicle category (for example, Cat 769 off-road trucks were 3.5 percent of the total off-road trucks for sale on Machinery Trader on November 24, 2008. These market share estimates were applied to the total vehicle type populations in ARB's off-road inventory (ARB, 2007) to estimate the number of vehicles and horsepower currently used in California that would fall under the HUSS exemptions. The total horsepower of exempted vehicles was compared against the total statewide horsepower (ARB, 2006) to determine the percent of statewide horsepower affected by the HUSS exemptions.

References

All references for this appendix can be found in Chapter VIII.

APPENDIX C: SHOWCASE AND SEP

Table 1: Showcase Retrofits Installed as of November 2008

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
1995	275	0	Rubber Tired Loader	CAT - EUG/DPF	Passive
2003	255	2	Crawler Tractor	DCL MINE-X	Passive
1997	400	1	Scraper	DCL MINE-X	Passive
1997	559	1	Scraper	DCL MINE-X	Passive
1997	400	1	Scraper	DCL MINE-X	Passive
1997	559	1	Scraper	DCL MINE-X	Passive
2004	95	2	Tractor/Loader/Backhoe	JM-CRT	Passive
1994	168	0	Excavator	Sud Chemie ENVICAT	Passive
1999	222	1	Excavator	Sud Chemie ENVICAT	Passive

Table 2: Showcase Retrofits Planned for Installation

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
2006	405	3	Crawler Tractor	CDT Permit-FBC	Passive FBC
1997	67	0	Tractor/Loader/Backhoe	Dinex DiNox	Passive+NOx Control
2002	73	1	Tractor/Loader/Backhoe	Dinex-Dipex	Passive
1992	134	0	Rubber Tired Loader	Dinex DiNox	Passive+NOx Control
2001	62	1	Rubber Tired Loader	Dinex-Dipex	Passive
1992	375	0	Rubber Tired Loader	Mann Hummel FBC	Passive FBC
2001	107	1	Rough Terrain Forklift	Nett Tech - Active SCR	Active+NOx Control
2001	109	1	Rough Terrain Forklift	Nett Tech - Active SCR	Active+NOx Control
2002	123	1	Rough Terrain Forklift	Nett Tech - Active SCR	Active+NOx Control
1998	312	1	Excavator	Nett Tech - Passive SCR	Passive+NOx Control
1990	270	0	Wheel Loader	Nett Tech - Active SCR	Active+NOx Control
2000	178	1	Excavator	Nett Tech - Active SCR	Active+NOx Control
2000	222	1	Excavator	Nett Tech - Passive SCR	Passive+NOx Control

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
1991	375	0	Excavator	Extengine ADECII	Active+NOx Control
1991	250	0	Excavator	Recat-ESW DC-100	Active+FBC
1984	350	0	Excavator	Sud Chemie ENVICAT	Passive
2002	692	1	Excavator	Sud Chemie ENVICAT	Passive
1986	552	0	Rubber Tired Dozer	Extengine ADECII	Active+NOx Control
1997	400	1	Scraper, Rear	Extengine ADECII	Active+NOx Control
1986	400	0	Scraper, Rear	Extengine ADECII	Active+NOx Control
1997	552	1	Scraper, Front	Extengine ADECII	Active+NOx Control
1986	596	0	Scraper, Front	Extengine ADECII	Active+NOx Control
1997	275	1	Motor Grader	Nett Tech-Passive SCR	Passive+NOx Control
1996	177	1	Crawler Tractor	CDT FBC-DPF	Passive+FBC
1998	75	1	Off-Highway Tractors	CDT FBC-DPF	Passive+FBC
1998	75	1	Off-Highway Tractors	CDT FBC-DPF	Passive+FBC
2006	120	2	Off-Highway Tractors	CDT FBC-DPF	Passive+FBC
1997	120	1	Off-Highway Tractors	CDT FBC-DPF	Passive+FBC
1996	177	1	Crawler Tractor	CDT Permit-FBC	Passive+FBC
1997	95	0	Off-Highway Tractors	CDT Permit-FBC	Passive+FBC
1993	136	0	Rubber Tired Loader	CDT Permit-FBC	Passive+FBC
1996	170	0	Rubber Tired Loader	CDT Permit-FBC	Passive+FBC
2006	91	2	Tractor/Loader/Backhoes	CDT Permit-FBC	Passive+FBC
1998	75	1	Off-Highway Tractors	CDT Platinum Plus Purifilter Filter	Passive+FBC
1998	75	1	Off-Highway Tractors	CDT Platinum	Passive+FBC

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
				Plus Purifilter Filter	
1999	109	1	Off-Highway Tractors	CDT Platinum Plus Purifilter Filter	Passive+FBC
1996	145	0	Rubber Tired Loader	CDT Platinum Plus Purifilter Filter	Passive+FBC
1993	120	0	Off-Highway Tractors	DCL Mine-X	Passive
1995	120	0	Off-Highway Tractors	DCL Mine-X	Passive
1993	136	0	Rubber Tired Loader	DCL Mine-X	Passive
1992	136	0	Rubber Tired Loader	DCL Mine-X	Passive
1995	190	0	Rubber Tired Loader	DCL Mine-X	Passive
2006	75	2	Tractor/Loader/Backhoe	DCL Mine-X	Passive
2006	75	2	Tractor/Loader/Backhoe	DCL Mine-X	Passive
1992	170	0	Rubber Tired Loader	Dinex-Dipex	Passive
2001	108	1	Off-Highway Tractors	Donaldson Passive DPF	Passive
2001	110	1	Off-Highway Tractors	Donaldson Passive DPF	Passive
2004	129	2	Rubber Tired Loader	Donaldson Passive DPF	Passive
2004	170	2	Rubber Tired Loader	Donaldson Passive DPF	Passive
1995	120	0	Paver	ECS Assisted Purifilter	Active+Electric
1993	81	0	Rubber Tired Loader	ECS Assisted Purifilter	Active+Electric
1993	136	0	Rubber Tired Loader	ECS Assisted Purifilter	Active+Electric
1992	136	0	Rubber Tired Loader	ECS Assisted Purifilter	Active+Electric
1993	75	0	Tractor/Loader/Backhoe	ECS Assisted Purifilter	Active+Electric
1999	89	1	Off-Highway Tractors	ECS Purifilter	Passive
1999	89	1	Off-Highway Tractors	ECS Purifilter	Passive
1995	120	0	Off-Highway Tractors	ECS Purifilter	Passive
1995	120	0	Off-Highway Tractors	ECS Purifilter	Passive
1992	136	0	Rubber Tired Loader	ECS Purifilter	Passive
2004	173	2	Rubber Tired Loader	ECS Purifilter	Passive
2003	205	2	Rubber Tired Loader	ECS Purifilter	Passive
1993	75	0	Tractor/Loader/Backhoe	ECS Purifilter	Passive
1995	105	0	Crawler Tractor	Huss FS-MD	Active
2002	75	1	Off-Highway Tractors	Huss FS-MD	Active

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
1995	76	0	Other Mobile Off-Road Vehicle	Huss FS-MD	Active
1992	136	0	Rubber Tired Loader	Huss FS-MD	Active
1993	190	0	Rubber Tired Loader	Mann-Hummel FBC	Passive+FBC
2006	75	2	Off-Highway Tractors	Mann-Hummel SMF-AR	Active+FBC+ Electric
1998	83	1	Off-Highway Tractors	Mann-Hummel SMF-AR	Active+FBC+ Electric
1999	95	1	Off-Highway Tractors	Mann-Hummel SMF-AR	Active+FBC+ Electric
2001	75	1	Tractor/Loader/Backhoe	Mann-Hummel SMF-AR	Active+FBC+ Electric
1993	120	0	Off-Highway Tractors	Mann-Hummel SMF-AR	Active+FBC+ Electric
1998	75	1	Off-Highway Tractors	Nett Tech-Active SCR	Active+NOx Control
2000	105	1	Off-Highway Tractors	Nett Tech-Active SCR	Active+NOx Control
1996	150	0	Rubber Tired Loader	Nett Tech-Active SCR	Active+NOx Control
2004	194	2	Rubber Tired Loader	Nett Tech-Active SCR	Active+NOx Control
2004	194	2	Rubber Tired Loader	Nett Tech-Active SCR	Active+NOx Control
1997	120	1	Off-Highway Tractors	Nett Tech-Passive SCR	Passive+NOx Control
1996	150	0	Rubber Tired Loader	Nett Tech-Passive SCR	Passive+NOx Control
1999	109	1	Off-Highway Tractors	Rypos HDPF/C	Active+Electric
2003	116	2	Off-Highway Tractors	Rypos HDPF/C	Active+Electric
1999	89	1	Off-Highway Tractors	Sud Chemie ENVICAT	Passive
1999	89	1	Off-Highway Tractors	Sud Chemie ENVICAT	Passive
1992	136	0	Rubber Tired Loader	Sud Chemie ENVICAT	Passive
2004	128	2	Rubber Tired Loader	Sud Chemie ENVICAT	Passive
1993	136	0	Rubber Tired Loader	Sud Chemie ENVICAT	Passive
1996	170	0	Wheel Loader	ECS Assisted	Active+Electric

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
				Purifilter	
1993	220	0	Rubber Tired Loader	DCL Mine-X	Passive
2006	211	3	Rubber Tired Loader	CAT - DPF	Passive
2000	114	1	Rubber Tired Loader	Nett Tech-Active SCR	Active+NOx Control
2004	170	2	Rubber Tired Loader	CDT FBC-DPF	Passive+FBC
2005	260	2	Rubber Tired Loader	CDT Permit-FBC	Passive+FBC
2001	145	1	Tractor Wheel Loader	DCL MINE-X	Passive
2004	170	2	Rubber Tired Loader	Donaldson Passive DPF	Passive
2006	160	2	Tractor Wheel Loader	Extengine ADECII	Active+NOx Control
2004	90	2	Tractor Wheel Loader	Huss FS-MD	Active
2005	98	2	Tractor	Recat - ESW DC-100	Active+FBC
2002	188	1	Excavator	CDT Permit-FBC	Passive+FBC
2001	315	2	Rubber Tired Loader	Dinex DiNox	Passive+NOx Control
1998	240	1	Excavator	Donaldson Active DPF	Active+Electric
1999	235	1	Rubber Tired Loader	Donaldson Active DPF	Active+Electric
2003	66	1	Rough Terrain Forklift	ECS Purifilter	Passive
1994	200	0	Rubber Tired Loader	Extengine ADECII	Active+NOx Control
1994	200	0	Rubber Tired Loader	Extengine ADECII	Active+NOx Control
1994	128	0	Excavator	Extengine ADECII	Active+NOx Control
1997	54	0	Excavator	Huss FS-MD	Active
1994	168	0	Excavator	Mann-Hummel GMBH CRT	Passive
2003	66	1	Rough Terrain Forklift	Mann-Hummel SMF-AR	Active+FBC+ Electric
2003	247	2	Excavator	Nett Tech-Passive SCR	Passive+NOx Control
1992	256	0	Rubber Tired Loader	Nett Tech-Passive SCR	Passive+NOx Control
1994	200	0	Rubber Tired Loader	Sud Chemie ENVICAT	Passive
2006	418	3	Scraper, Rear	CAT - DPF	Passive

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
2006	577	3	Scraper, Front	CAT - DPF	Passive
1996	285	1	Motor Grader	CDT Permit-FBC	Passive+FBC
2006	418	3	Scraper, Rear	CDT Permit-FBC	Passive+FBC
2006	577	3	Scraper, Front	CDT Permit-FBC	Passive+FBC
2006	418	3	Scraper, Rear	CDT Platinum Plus Purifilter Filter	Passive+FBC
2006	577	3	Scraper, Front	CDT Platinum Plus Purifilter Filter	Passive+FBC
2007	405	3	Crawler Tractor	DCL MINE-X	Passive
1998	514	1	Excavator	Recat-ESW DC-100	Active+FBC
2007	405	3	Crawler Tractor	Sud Chemie ENVICAT	Passive
2007	405	3	Crawler Tractor	Sud Chemie ENVICAT	Passive
2006	405	3	Crawler Tractor	Sud Chemie ENVICAT	Passive
1989	375	0	Rubber Tired Loader	Rypos HDPF/C	Active+Electric
1995	400	0	Rubber Tired Loader	Sud Chemie ENVICAT	Passive
1996	400	0	Rubber Tired Loader	Sud Chemie ENVICAT	Passive
1997	290	1	Excavator	CAT-DPF	Passive
1990	310	0	Rubber Tired Dozer	CAT-EUG/DPF	Passive+NOx Control
2002	128	1	Excavator	CDT Permit-FBC	Passive+FBC
1998	305	1	Crawler Tractor	DCL Mine-X	Passive
1997	168	1	Excavator	ECS Assisted Purifilter	Active+Electric
1995	365	0	Scraper	ECS Assisted Purifilter	Active+Electric
1997	358	1	Off-Highway Truck	ECS Purifilter	Passive
1997	305	1	Crawler Tractor	Nett Tech-Active SCR	Active+NOx Control
1997	165	1	Grader	Recat-ESW DC-100	Active+FBC
2004	185	2	Grader	CAT - DPF	Passive

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
2005	185	2	Grader	CAT - DPF	Passive
2001	201	1	Rubber Tired Loader	Donaldson DPF-SCR	Passive+NOx Control
1998	165	1	Grader	ECS Assisted Purifilter	Active+Electric
2001	102	1	Tractor/Loader/Backhoe	ECS Assisted Purifilter	Active+Electric
1999	106	1	Rough Terrain Forklift	ECS Purifilter	Passive
2006	111	2	Tractor/Loader/Backhoe	Huss FS-MD	Active
1995	170	0	Rubber Tired Loader	Mann-Hummel FBC	Passive+FBC
2007	440	3	Scraper	Donaldson Passive DPF	Passive
2006	404	3	Excavator	Dinex DiNox	Passive+NOx Control
2006	120	2	Mobile Jumbo Screen Plant	Dinex DiNox	Passive+NOx Control
2007	385	3	Retek Startrack Mobile Recycling Plant (Impact)	Extengine ADECII	Active+NOx Control
2006	343	3	Rubber Tired Loader	Extengine ADECII	Active+NOx Control
2007	440	3	Retek Startrack Mobile Recycling Plant (Cone)	Nett Tech-Passive SCR	Passive+NOx Control
1996	310	1	Crawler Tractor	ECS Assisted Purifilter	Active+Electric
1997	62	0	Tractor/Loader/Backhoe	ECS Assisted Purifilter	Active+Electric
1994	220	0	Rubber Tired Loader	Extengine ADECII	Active+NOx Control
1999	175	1	Rubber Tired Loader	Extengine ADECII	Active+NOx Control
1981	255	0	Rubber Tired Dozer	Huss FS-MD	Active
1997	215	1	Grader	Huss FS-MD	Active
1989	450	0	Rubber Tired Dozer	Huss FS-MD	Active
1994	175	0	Scraper	Huss FS-MD	Active
2003	73	1	Tractor/Loader/Backhoe	Huss FS-MD	Active
1982	255	0	Rubber Tired Dozer	Mann-Hummel GMBH CRT	Passive
1979	330	0	Scraper	Mann-Hummel GMBH CRT	Passive
2004	115	2	Crawler Tractor	Nett Tech-Active SCR	Active+NOx Control
1995	335	0	Crawler Tractor	Nett Tech-Active SCR	Active+NOx Control

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
2002	110	1	Rubber Tired Loader	Nett Tech-Passive SCR	Passive+NOx Control
2004	230	2	Rubber Tired Loader	Nett Tech-Passive SCR	Passive+NOx Control
1980	310	0	Rubber Tired Dozer	Recat-ESW DC-100	Active+FBC
1984	330	0	Scraper	Recat-ESW DC-101	Active+FBC
2003	150	2	Crawler Tractor	Sud Chemie ENVICAT	Passive
1993	275	0	Rubber Tire Loader	CAT-EUG/DPF	Passive+NOx Control
2004	247	2	Excavator	Mann-Hummel FBC	Passive+FBC
2002	116	1	Rough Terrain Forklift	Nett Tech-Active SCR	Active+NOx Control
2005	371	2	Excavator	CAT-DPF	Passive
2006	469	3	Articulated Truck	CAT-DPF	Passive
2005	433	2	Excavator	CAT-DPF	Passive
1990	525	0	Crawler Tractor	Extengine ADECII	Active+NOx Control
1984	315	0	Rubber Tired Dozer	Extengine ADECII	Active+NOx Control
1988	550	0	Waterpull	Extengine ADECII	Active+NOx Control
2006	187	3	Rubber Tire Loader	CAT - DPF	Passive
1985	45	0	Off-Highway Tractors	Dinex-Dipex	Passive
2004	75	2	Tractor/Loader/Backhoe	Donaldson Passive DPF	Passive
1985	45	0	Off-Highway Tractors	ECS Purifilter	Passive
1985	188	0	Scraper	ECS Purifilter	Passive
2006	73	2	Rubber Tire Loader	ECS Purifilter	Passive
2003	17	1	Tractor/Loader/Backhoes	Huss FS-MD	Active
2006	24	2	Tractor/Loader/Backhoe	Huss FS-MD	Active
1987	45	0	Off-Highway Tractors	Huss FS-MD	Active
2000	62	1	Rubber Tire Loader	Huss FS-MD	Active
2006	95	2	Tractor/Loader/Backhoe	Huss FS-MD	Active
1985	188	0	Scraper	Mann-Hummel FBC	Passive+FBC
1975	125	0	Off-Highway Tractors	Mann-Hummel SMF-AR	Active+FBC+ Electric
1987	153	0	Off-Highway Tractors	Sud Chemie ENVICAT	Passive

Year	HP	Tier	Vehicle Type	Installed Device	Type of Device
1993	134	0	Rubber Tire Loader	Sud Chemie ENVICAT	Passive
1996	166	0	Rubber Tire Loader	Sud Chemie ENVICAT	Passive
1996	166	0	Rubber Tire Loader	Sud Chemie ENVICAT	Passive

Table 3: Private and Public Fleets in Showcase

Private Fleet	Public Fleet
Community Recycling & Resource Recovery Inc.	CALTRANS Division of Equipment (Invited)
Albert W. Davies, Inc.	City of Burbank Public Works Department
Recycled Materials Company of CA	City of Los Angeles, General Services Department
Dan Copp Crushing	County Sanitation Districts of L.A. County
ECCO Equipment Corp.	City of Culver City Transportation Department
Griffith Company	
PEED Equipment Company	
Altfillisch Contractors, Inc.	
Reed Thomas Company, Inc.	
Shimmick Construction Co.	
Skanska USA Civil West California District Inc.	
Tiger 4 Equipment Leasing	
Sukut Equipment Inc	

Table 4: List of Manufacturers Participating in Showcase

Participating Manufacturers	
Aaqius	Huss
Caterpillar	Johnson Matthey
CDT	Mann-Hummel
DCL	Nett Tech
Dinex	Purem
Donaldson	Recat-ESW/ETI
ECS	Rypos
Extengine	Sud Chemie

Figure 1: Example of Data Logging Results (Vehicle # W93518, City of Los Angeles)

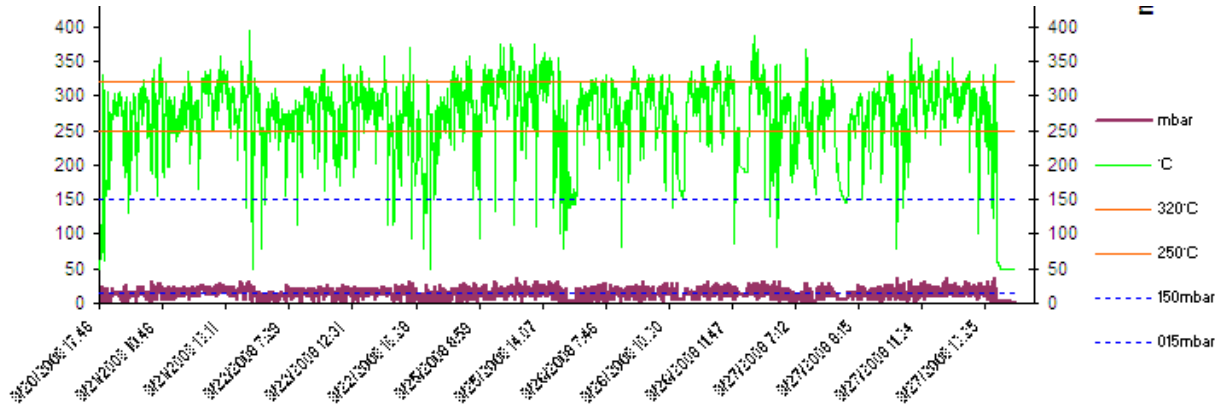
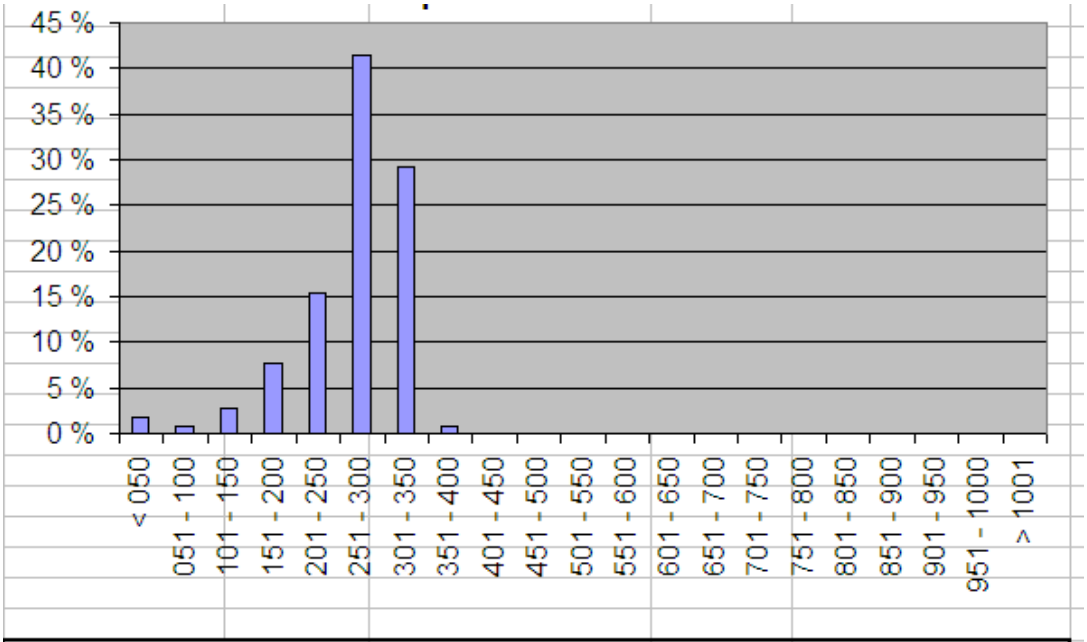


Figure 2: Example of Data Logging Results (Vehicle # W93518, City of Los Angeles)



Average Temperature	266	° C
Maximum Temperature	394	° C
Percentage > 250 °C	71.5	%
Longest duration >320 °C	0:03:40	hh:mm:ss
Frequency of 120 seconds above 320 °C	4	times

Table 5: SEP I Retrofits Installed

Year	HP	Tier	Vehicle Type	Installed Device	Passive/ Active/NOx Control
2000	315	1	Wheel Loader	Extengine ADECII	Active/ Nox
1999	230	1	Excavator	Rypos HDP	Active
2003	550	2	2-Engine	DCL Mine X	Passive
	400		Scraper		
1998	105	1	Wheel Loader	Nett Tech	Passive/ Nox
2007	125	3	John Deere	ECS Assisted	Active
2007	125	3	John Deere	ECS Assisted	Active
2000	185	1	Motorgrader	Recat- ESW DC	Active
2006	125	2	Tractor	Sud Chemie	Passive
2006	125	2	Tractor	Recat ESW	Active
2000	89	1	Wheel Loader	Mann Hummel	Active
1999	80	1	Wheel Loader	Mann Hummel	Active
1995	105	0	Wheel Loader	Huss FS-MD	Active
2007	125	3	John Deere Tractor	Sud Chemie	Passive
2007	125	3	John Deere Tractor	Sud Chemie	Passive

Table 6: SEP II Retrofits

Year	HP	Tier	Vehicle Type	Installed or Proposed Device	Passive/ Active/NOx Control
2000	86	1	Backhoe	Mann Hummel SMF-AR	Active
2007	150	3	Tractor	Huss FS-MC	Passive
2007	150	3	Tractor	ECS Purifilter	Passive
2005	224	2	Wheel Loader	CAT – DPF	Passive
2007	150	3	Tractor	Tehag	Passive
2002	180	0	Wheel Loader	Econix DPF-A	Active
2000	108	1	Wheel Loader	CDT Platinum Plus Purifilter (Proposed)	Passive
2004	95	2	Wheel Loader	CAT – DPF	Passive
2002	439	2	Excavator	CAT – DPF (Proposed)	Passive
2005	142	2	Fork Lift Truck	Nett Tech Active DPF (Proposed)	Active
1999	185	1	Side Handler 6 High	Extengine MaxTrap (Proposed)	Active/Nox

Table 7: SEP III Retrofits Proposed to be Installed

Year	HP	Tier	Vehicle Type	Proposed Device	Passive/ Active/NOx Control
2006	80	2	Broom	CDT	Passive
2004	119	2	Wheel Loader	CDT	Passive
1999	240	1	Excavator	CAT	Passive
2005	55	2	Tractor	ECS	Passive
2005	81	2	Mower	ECS	Passive
2004	82	2	Mower	Mann Hummel	Passive
2001	95	1	Backhoe	Mann Hummel	Active
2006	75	2	Tractor Loader	HUSS	Active
1998	75	1	Wheel Loader	Nett Tech	Active
1997		1	Motor Grader	Nett Tech	Active
1999	225	1	Motor Grader	DCL	Passive
2004	113	2	Mower	HUSS	Active

Table 8: Fleets in Participating in SEP

SEP	Fleet
SEP I	LA County Sanitation District
	LA County Dept of Beaches and Harbors
	City of Burbank Dept of Public Works
SEP II	City of Long Beach
	City of Los Angeles
	Fast Lane (private company)
SEP III	City of Benicia
	Alameda County
	Contra Costa County
	Solano County

Table 9: Manufacturers Participating in SEP

Participating Manufacturers	
Caterpillar	Mann-Hummel
CDT	Nett Tech
DCL	Recat
ECS	Rypos
Econix	Sud Chemie
Extengine	Tehag
HUSS	

Table 10: Number of Vehicles in Showcase and SEP by Vehicle Type and Horsepower

Vehicle Type	<175 HP	175<HP>500	>500 HP
Bore/Drill Rigs	0	0	0
Cranes	0	0	0
Crawler Tractor	3	12	1
Excavator	6	19	1
Graders	2	7	0
Off-Highway Tractor	35	1	0
Off-Highway Truck	1	2	0
Other Mobile Off-road	5	1	1
Paver	2	0	0
Roller	0	0	0
Rough Terrain Forklift	7	0	0
Rubber Tired Dozer	0	6	1
Rubber Tired Loader	31	25	0
Scraper	0	16	8
Skid Steer Loader	0	0	0
Tractor/Loader/Backhoe	42	5	0
Trencher	0	0	0

APPENDIX D: OUTREACH SUMMARY

Table 1: ARB Training Sessions

Date	Location	# of people in attendance
7/31/2008	San Luis Obispo, CA	92
8/5/2008	Bakersfield, CA	77
8/7/2008	Redding, CA	77
8/11/2008	Nevada City, CA	65
8/14/2008	Fresno, CA	81
8/19/2008	Riverside, CA	142
8/20/2008	San Diego, CA	123
8/27/2008	El Monte, CA	142
8/29/2008	Sacramento, CA	190
9/3/2008	San Jose, CA	83
9/9/2008	Ventura, CA	75
9/12/2008	Oakland, CA	126
11/19/08	South Lake Tahoe, CA	27

Table 2: Presentations to Groups

Date	Meeting/Group	City	# of people in attendance
10/16-17/2007	Clean Vehicle Expo	Ontario, CA	50
11/1/2007	San Luis Obispo County Builders Exchange	San Luis Obisbo, CA	50
11/7/2007	National Association of Demolition Contractors	Anaheim, CA	70
12/6/2007	CalCIMA (represents Construction Aggregate and Industrial Mineral producers statewide)	Sacramento, CA	50
12/13/2007	Municipal Employees Maintenance Association (MEMA)	Irvine, CA	20
2/21/2008	Presentation for Quinn Company customers	Santa Maria, CA	40

Date	Meeting/Group	City	# of people in attendance
5/22/2008	Solid Waste Association of North America (SWANA)	Seaside, CA	25
6/25/2008	The Air and Waste Management Association (AWMA) Annual Conference and Exhibition	Portland, OR	12
8/21/2008	Building Industry Association of Central California	Modesto, CA	20
8/27/2008	Maintenance Superintendents Association	Rohnert Park, CA	40
9/10/2008	TEC Equipment & AGC (American General Contractors) Event	Oakland, CA	40
10/3/2008	Tractoberfest	Newark, CA	150
10/13/2008	South Coast AQMD Clean Vehicle Expo	Ontario, CA	13
10/14/2008	CMCA (Concrete Modification Contractor's Assoc.)	Livermore, CA	15
10/21/2008	Industrial Environmental Association	San Diego, CA	75
10/23/2008	DGS fleet asset mgmt unit	Sacramento, CA	25
11/10/2008	CA Golf Course Superintendents Assoc	Cabazon, CA	150

Table 3: Meetings with Individual Fleets or Stakeholders

Date	Meeting/Group	City
11/27/2007	ARB Implementation Seminar/training for Sequoia equipment company (CASE dealer)	Fresno, CA
12/10/2007	Municipal Fleet of Yolo County	Woodland, CA
12/13/2007	Cattrac	Fontana, CA
1/4/2007	Iron Man	Corona, CA
1/7/2007	CASE Tractor Equipment Sales	Hayward, CA
3/26-28/2008	Quinn company	City of Industry, CA
3/27/2008	Stevens Creek Quarry, Inc.	Sacramento, CA
4/7/2008	Monterey Regional Waste Management District	Sacramento, CA
4/9/2008	CASE Tractor Equipment Sales	Hayward, CA
4/10/2008	Mountain Cascade Inc	Livermore, CA
4/16/2008	Tutor Saliba Corp.	Sacramento, CA
4/21/2008	C & C Construction	Sacramento, CA
5/6/2008	Pape Machinery (John Deere)	Sacramento, CA
5/14/2008	Neff Rentals	Sacramento, CA
5/21/2008	Nissan	Sacramento, CA
5/28/2008	Pape Materials Handling Group	Sacramento, CA
5/29/2008	Western Power and Equipment	Sacramento, CA
6/12/2008	CAT dealership	San Diego, CA
6/17/2008	Johnson-Lift/HYSTER dealership	City of Industry, CA
6/20/2008	NAACO Materials Handling Group (Yale division)	Sacramento, CA
6/20/2008	NAACO Materials Handling Group (HYSTER division	Sacramento, CA
7/8/2008	Sugar Bowl	Sacramento, CA
7/22/2008	Diamond D Engineering and Associates	Sacramento, CA
8/28/2008	Tahoe Truckee Sierra Disposal	Sacramento, CA
9/10/2008	Rush Enterprises	Fontana, CA

Date	Meeting/Group	City
10/10/2008	Western Stabilization	Sacramento, CA
10/27/2008	Appian Engineering	Milpitas, CA
11/5/2008	PAR Electrical Contractors	Sacramento, CA

Table 4: Attendance at Conferences and Workshops

Date	Meeting/Group	Location
10/16-17/2007	Clean Vehicle Expo	Ontario, CA
9/17/2008	Public Works Event - AGC	Emeryville, CA
9/25-26/2008	League of California Cities 2008 Annual Conference & Expo	Long Beach, CA
10/3/2008	Tractoberfest	Newark, CA
10/13/2008	South Coast AQMD Clean Vehicle Expo	Ontario CA
10/21-22/2008	Industrial Environmental Association	San Diego, CA
10/23/2008	DGS fleet asset mgmt unit	Sacramento, CA
10/29/2008	AGC Southern California Construction Technology Event	San Diego, CA
11/13-11/14/2008	Far West Equipment Dealers Association Annual Conference	Phoenix, AZ

APPENDIX E: DOORS ON-LINE USER-GUIDES

The Diesel Off-road On-line Reporting System (DOORS) is available for fleets which choose to report early. Staff have been assisting fleet representatives personally, and have also created a number of user guides and explanations of the reporting information required by the regulation. These guides are available from the reporting homepage (https://secure.arb.ca.gov/ssldoors/doors_reporting/reporting.php) and are listed below in Table 1.

Table 1: DOORS User Guides

General DOORS Guides
Reporting Using Online Screens
Reporting Using Excel Spreadsheets
How to Report with Missing Information
How to Report Duplicate Serial Numbers
Reporting Multiple Fleets or Subfleets
Importing Data to Excel Spreadsheets
Definitions and Explanations
Owner Information
Vehicle Information
Engine Information
VDECS Information

The “Reporting Using Online Screens” guide is presented on the following pages as an example of the method and format used in the DOORS guides.

Online Forms for Initial Reporting

Introduction

The Diesel Off-Road On-Line Reporting System (DOORS) is an online tool designed to help fleet owners report their off-road diesel vehicle inventories and actions taken to reduce vehicle emissions to the Air Resources Board (ARB), as required by the In-Use Off-Road Diesel Regulation.

Both the DOORS reporting tool and the DOORS User manual were created to help fleet owners comply with the regulation, but they are not a substitute for reading and comprehending the regulation. Many portions of the DOORS system will require fleet owners to understand terms and conditions defined in regulation, and to know which portions of the regulations apply to their vehicles, and where they are eligible for full or partial exemptions. It is strongly recommended that, prior to using the DOORS system, fleet owners determine how the regulation applies to their fleets.

The regulation, fact sheets, additional user guides, and compliance examples can be found at:

http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm

User Guide – Online Forms for Initial Reporting

This guide was created to assist fleet owners using Online Screens to report fleet information during the initial reporting period. The guide contains instructions on how to create an online account with ARB in DOORS, navigate to the online screens, enter the data, receive a review from ARB and receive Equipment Identification Numbers (EINs).

Steps to Report Fleet Data Using Online Forms

This guide provides detailed instructions on how to complete the following steps to report you fleet using our online forms:

A. Create a DOORS account with ARB
B. Determine applicable vehicles
C. Log in to DOORS, and open the online forms
D. Complete the owner information form
E. Enter the vehicle information
F. Enter the engine information, and if necessary, the VDECS information
G. Review the data, and make changes if necessary
H. Request a review from ARB and receive EINs

A. Create a DOORS Account with ARB

- Go to https://secure.arb.ca.gov/ssldoors/doors_reporting/reporting.php
- Request an account

If you do not have an account, you will be asked to create one, and the account information will be sent to an email address you supply within a few minutes. If you do not see the email, check your "Spam" or "Trash" folders to ensure the email was not blocked by your email server. If you do not receive your email within 15 minutes, re-apply for one on the DOORS homepage. If this does not work, contact ARB for assistance by emailing doors@arb.ca.gov.

B. Determine applicable vehicles

Prior to reporting vehicle information to ARB, fleet owners will need to determine which of their off-road diesel vehicles are covered by the regulation. Some vehicles will likely be fully subject to the regulation, however some vehicles will be exempt from all requirements except labeling and reporting, and some will be fully exempt from the regulation.

- Create a complete list of vehicles subject to the regulation, including those which are only required to be reported and labeled

Early Credit: If you wish to claim early credit, report each vehicle that was included in the fleet from March 1, 2006, to the present, including vehicles you have retired or sold. You will be able to designate which vehicles you have retired or replaced to receive credit in the on-line screens after future updates.

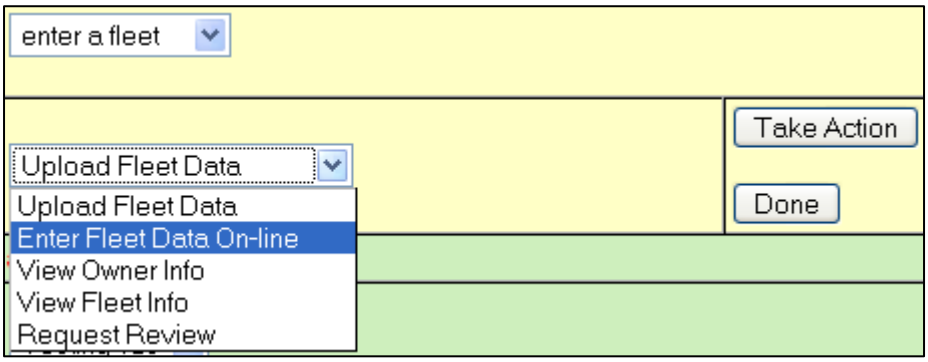
Non-diesel or electric: You will be able to report vehicles using alternative fuels or electric vehicles that have replaced diesel vehicles in your fleet in the on-line screens after updates, for now please include information on the diesel vehicle that was replaced.

C. Log in to DOORS, open the online forms

- Return to the DOORS login screen, and log in to the system using the login name and password emailed to you

Do not hit "Enter"; you must click on the Login button directly. If DOORS does not accept your password, copy the password from the email, and paste it into the DOORS login screen.

- Once you have logged in to DOORS, go the first dropdown, and select "enter a fleet". In the second dropdown, select "Enter Fleet Data On-Line" and then click on the [Take Action] button to the right.



D. Complete the owner Information form

- The first screen you will be taken to is the Owner Information screen. Complete this form, and then select [Enter Data].

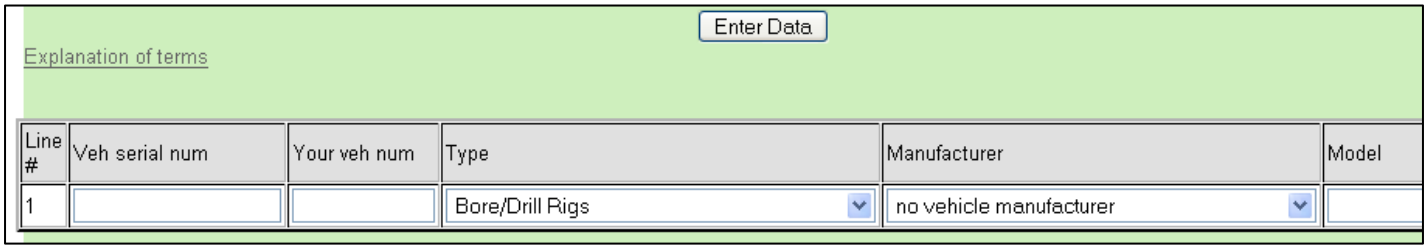
If you have questions about what information is requested, please refer to our explanation for each spreadsheet, available on the reporting page https://secure.arb.ca.gov/ssldoors/doors_reporting/reporting.php under the User Guide menus. For the Owner information, select "Owner Information Dictionary".

- If DOORS rejects any of your information, it will supply an error message and reason at the top of the screen. Attempt to fix the cause of the error, and resubmit the data.

E. Enter vehicle information

- Once your owner information has been successfully entered, select the option to [Add / Edit Vehicle] at the top or the bottom of the screen.

- This will take you to the screen where you may add, delete or edit vehicle information.



- Enter the vehicle information required, then select [Enter Data]

If you have questions about what information is requested, please refer to our explanation for each spreadsheet, available on the reporting page https://secure.arb.ca.gov/ssldoors/doors_reporting/reporting.php under the Explanation of Terms.

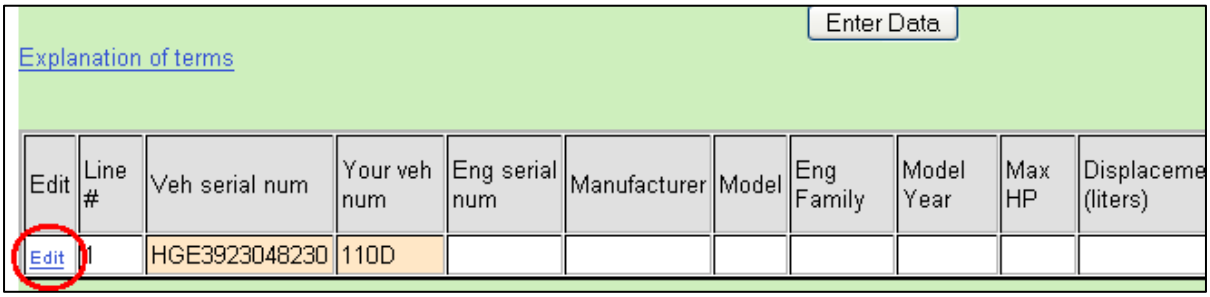
For missing or partial information, refer to the attachment on the last page of the guide.

- After the information on the previous vehicle is entered into a table, continue to use the form to add additional vehicles until your entire inventory is reported. For each successive vehicle, enter the vehicle information required, then select [Enter Data]

F. Enter engine information, and if necessary, VDECS information

- After entering information on all of the vehicles you wish to report, select the option to [Add / Edit Engine] at the top or the bottom of the screen.

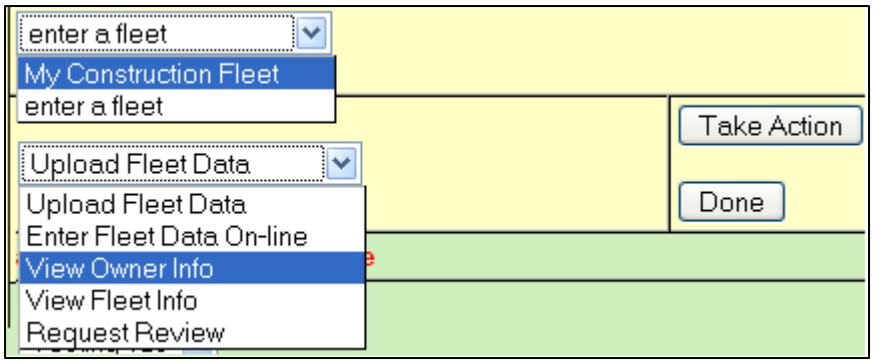
- For each vehicle you have entered, select "Edit" at the left side of the screen, and input the engine information. Then select [Enter Data]. You will only be able to add engine information to vehicles you have already added, and you will only be able to add VDECS information if you have already entered the engine information.



- Complete the same steps to enter VDECS information, if you have any VDECS installed on your vehicles.

G. Review the data, and make changes if necessary

Before continuing, it is recommended that you review the data you have entered. On the Reporting Home page (the first page in DOORS), the following options are available for fleets you have entered into the system:



- Select the fleet you have entered and wish to review

- Select "View Owner" and click on "Take Action". DOORS will display the fleet owner information you have uploaded. Ensure the data shown is correct, and then return to the Reporting Home page.

    - If it is not correct, return to the reporting homepage, select the fleet, and the choose "Enter Fleet Data On-line". You will be able to edit, delete, and add owner, vehicle, engine, and vdecs information.

- Select "View Fleet" and click on "Take Action". DOORS will display the vehicle, engine, and VDECS information you have uploaded. Ensure the data shown is correct, and then return to the Reporting Home page.

    - If it is not correct, return to the reporting homepage, select the fleet, and the choose "Enter Fleet Data On-line".

H. Request a review from ARB and receive EINs

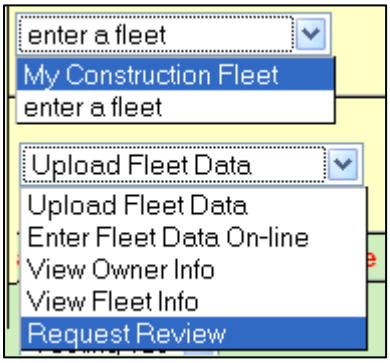
The information you have entered so far will be saved, and you can access it again and make changes at a later time before submitting it to ARB for review. After ARB reviews the information you will be able to edit and add to your vehicle inventory, and will receive your ARB-designated Equipment Identification Numbers, which must be displayed on your vehicles. The information will not be reviewed by ARB staff, or assigned EINs, until you choose to submit it to ARB for review. To access the fleet information you have entered at a later date, log back in to the DOORS system.

Where you previously selected "Enter a fleet", the fleet (or fleets) you have entered will now be available.
To edit a fleet, select it, and then choose "Upload Fleet Data" and the press the "Take Action" button. You may resubmit the appropriate **.prn** files and view your updated information.

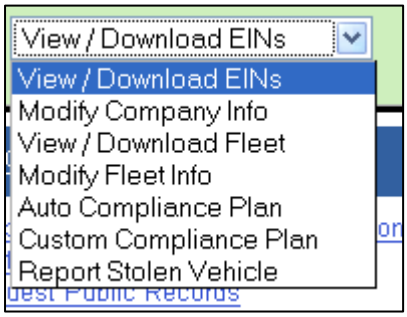
Once you are satisfied with the information and are prepared to send it to ARB for review and receive EIN assignments for your vehicles, return to the Reporting Home page in the DOORS system.

- Select the Fleet you wish to submit to ARB in the drop down menu

- Select "Request Review" from the drop down menu below, and click on "Take Action"



After the fleet information has been approved by ARB, the fleet will be available for further review and modification, using the following menu on the bottom of the Reporting Home page of the DOORS system after you log in. Not all features will be available when DOORS first comes online in July, 2008.



For more information on reporting with missing or partial information, or how to report multiple fleets or subfleets, refer to our guides, which are available from our reporting homepage at:

https://secure.arb.ca.gov/ssldoors/doors_reporting/reporting.php

If you require additional assistance or information, please email us at:

doors@arb.ca.gov

APPENDIX F: LIST OF ACRONYMS

ARB --- Air Resources Board

BACT --- Best Available Control Technology

BOE --- California Board of Equalization

CAA --- Clean Air Act

Cal/OSHA --- California Occupational Safety and Health Administration

CCR --- California Code of Regulations

CSLB --- Contractors State License Board

DECS --- Diesel Emission Control Strategies

DOCs --- Diesel Oxidation Catalysts

DOF --- Department of Finance

DOORS --- Diesel Off-Road On-Line Reporting System

DMV --- Department of Motor Vehicles

DPF --- Diesel Particulate Filter

EIN --- Equipment Identification Number

EGR --- Exhaust Gas Recirculation

G/BHP-HR --- Grams per Brake-Horsepower Hour

HP --- Horsepower

MSHA --- Mining Safety and Health Administration

MSRC --- Mobile Source Air Pollution Reduction Review Committee

NO_X --- Oxides of Nitrogen

ORIAG --- Off-Road Implementation Advisory Group

PM --- Particulate Matter

SCAQMD --- South Coast Air Quality Management District

SEP --- Supplemental Environmental Project

SJVAPCD --- San Joaquin Valley Air Pollution Control District

SOON --- Surplus Off-Road Opt-In for NOx

TSD --- Technical Support Document

U.S. EPA --- United States Environmental Protection Agency

VDECS --- Verified Diesel Emission Control System