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## California's New Limits on Emissions from Diesel Construction Equipment – Details on How the Rules Work

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Over the objections of the construction industry, the California Air Resources Board (ARB) has adopted new rules that will require the phased overhaul of almost all off-road diesel vehicle fleets used in California. The new ARB regulation is the latest in a series of initiatives intended to reduce nitrogen oxide (NOx) and particulate matter (PM) emissions in California. According to ARB, off-road diesel vehicles are responsible for 24 percent of statewide diesel mobile source PM emissions and 19 percent of statewide diesel mobile source NOx emissions.

The regulation, adopted on July 26, 2007, is projected to affect about 180,000 vehicles in a wide range of industries. Construction equipment comprises roughly half of the affected equipment. The other half is used in a variety of industries, ranging from mining (11%) to utilities (7%) to retail trade, airlines and ski resorts (1% each). Examples of affected equipment include backhoes, bulldozers, loaders, trenchers, scrapers, forklifts, snow cats, baggage tugs, cargo loaders, belt loaders and aircraft tractors. Much of the affected equipment is 10 years old or less.

The regulation contains different requirements for fleets of differing size, with the strictest provisions applying to the largest fleets. Fleet size is determined by the sum of horsepower for all affected vehicles within the fleet and the type of owner. Low-use vehicles (those that operate less than 100 hours per year) are not included in the determination of fleet size.

The regulations establish a "fleet average emission rate target" for PM and NOx for all off-road diesel vehicles operating in the state, regardless of whether they are California-based or not. The emission rate targets decline over time - become more stringent - until the final fleet average emission rate target is reached in 2020 for large and medium fleets and in 2025 for small fleets. For example, the PM emission target for a 100 to 174 horsepower diesel vehicle will be 0.33 g/bhp-hour (grams per British horsepower hour of use) in 2010, declining over time to a floor of 0.06 g/bhp-hour in 2020.

The regulations take an "either/or" approach to compliance: Each year, the regulation requires each fleet to either meet the fleet average emission rate targets for PM or apply the highest level verified diesel emission control system (VDECS) to 20 percent of its horsepower. Large and medium fleets also must meet the fleet average emission rate targets for NOx or turn over a certain percentage of their horsepower by re-powering with a cleaner

engine, retiring a vehicle, replacing a vehicle with a new or used one, or designating a dirty vehicle as a low-use vehicle.

After the first fleet average compliance dates (2010 for large fleets, 2013 for medium fleets and 2015 for small fleets), fleets may not add vehicles that exceed the fleet targets for engines in the same horsepower group - i.e., they cannot add vehicles that make the fleet "dirtier." The regulation also limits unnecessary idling to 5 minutes and restricts any fleet from adding Tier 0 vehicles after March 1, 2009. The largest fleets must report the composition of their fleets by May 1, 2009, and medium and small fleets have one and three additional months to report, respectively.

### **Large-Sized Fleets**

A large fleet is any privately-owned or municipal fleet with a total horsepower greater than 5,000, and any state or federal government fleet.

Large fleets will be subject to the PM and NOx requirements beginning in 2010. This means that large fleets that do not meet the PM and NOx fleet average targets would need to accelerate turnover of engines to 8 percent of their horsepower per year and install exhaust retrofits on 20 percent of their horsepower per year, beginning in 2009. If by 2015 the fleet still cannot meet the NOx fleet average target, the fleet must increase its turnover of engines to 10 percent of horsepower per year.

### **Medium-Sized Fleets**

A medium fleet is any privately-owned fleet with a total horsepower equal to or less than 5,000 that does not meet the definition of a small fleet (see below) and any municipal fleet with total horsepower of between 2,501 and 5,000.

Medium fleets must meet the PM and NOx requirements beginning in 2013. This means that medium fleets that do not meet the PM and NOx fleet average targets would need to accelerate turnover of engines to 8 percent of their horsepower per year and install exhaust retrofits on 20 percent of their horsepower per year beginning in 2012. If by 2015 the fleet still cannot meet the NOx fleet average target, the fleet must increase its turnover of engines to 10 percent of horsepower per year.

### **Small-Sized Fleets**

A small fleet is any fleet owned by a municipality or a "small business" (that term is defined in California Government Code §11342.610 as an independently owned and operated business with gross receipts below certain levels) with total horsepower less than or equal to 2,500. A fleet owned by a municipality in a low-population county is considered a small fleet regardless of total horsepower.

Small fleets are only subject to the PM requirements beginning in 2015. Small fleets that do not meet the PM fleet average targets would need to install exhaust retrofits on 20 percent of their horsepower per year beginning in 2014 or accelerate turnover of the fleet until the PM fleet average target is met. Small fleets are not subject to the NOx fleet average requirements or the turnover requirements.

### **Exemptions**

The new regulation carves out certain categories of diesel vehicles, including locomotives, commercial marine vessels, recreational vehicles (including personal vehicles), and equipment at ports or intermodal railyards. Most significantly, the regulation broadly excludes diesel equipment and vehicles used in agricultural operations.

The regulations provide some exemptions to the turnover (for NOx) and retrofit (for PM) requirements. First, vehicles in small fleets and owned by municipalities in counties with low populations are not subject to the NOx fleet average or turnover requirements.

In addition, fleets which operate exclusively in areas that have attained the National Ambient Air Quality Standard (NAAQS) for ozone and PM<sub>2.5</sub> and do not contribute to downwind violations also would be excluded from the NOx requirements. Currently, only fleets located and doing work exclusively in the following counties would qualify: Alpine, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Monterey, Plumas, San Benito, San Luis Obispo, Santa Cruz, Shasta, Sierra, Siskiyou, Trinity, Tehama and Yuba. Fleets in these counties still need to meet the PM fleet average or PM exhaust retrofit requirements.

The following vehicles generally are exempt from the turnover requirements:

- Vehicles less than 10 years old.
- Specialty vehicles if certain criteria are met.
- Engines equipped with the best available PM exhaust retrofit, installed within the last six years.
- Engines meeting the Tier 4 or interim Tier 4 standards.

The following vehicles are generally exempt from the PM exhaust retrofit requirements:

- Engines in vehicles less than 5 years old.
- Engines for which there is no retrofit available or for which the retrofit cannot be safely installed.
- New engines that come with a diesel particulate filter (DPF).
- Engines already retrofitted with the best available PM exhaust retrofit that achieved at least 50 percent
- PM reduction at the time of installation.
- Engines retrofitted with an experimental diesel emission control strategy approved by ARB.

Finally, low-use vehicles (vehicles used less than 100 hours per year, either in the past year or on average over the last three years) need comply only with labeling, reporting and recordkeeping requirements. They do not need to be included when calculating fleet average targets, nor do they need to be retrofitted or turned over.

## **Early Action**

**The regulation offers some incentives to fleets that take steps to reduce NOx or PM emissions before the mandatory start date. Fleets that have phased out the dirtiest engines (Tier 0) would not be required to do any mandatory turnover of Tier 1 or newer vehicles until 2013. Level 2 or 3 retrofits installed before March 1, 2009, may be counted double toward later requirements for mandatory annual retrofit requirements. Re-powers, i.e., engine replacements, to Tier 1 or better installed before March 1, 2009, may be counted toward later mandatory turnover requirements. Fleets that turn over their Tier 0 vehicles at a rate greater than 8 percent per year of their total horsepower between March 1, 2006, and March 1, 2009, may apply to ARB's Executive Officer for credit towards later mandatory turnover requirements.**

**The regulation also gives credit for use of electric vehicles, including double credit incentives in the first few years for the replacement of diesel vehicles with electric ones.**

## **Enforcement**

**In enforcing the off-road diesel vehicle regulation, ARB intends to rely on the annual reporting and the equipment identification number (EIN). Fleet owners are required to report information about each vehicle, its engine data, its model year and actions taken to comply with the regulation, such as any re-powering or retrofitting. For vehicles claimed as low-use, owners must report the hour-meter readings.**

**Large fleets will have to make an initial report by April 1, 2009, medium fleets by June 1, 2009, and small fleets by August 1, 2009. The report must be certified by a responsible official. Large fleets must report annually each year from 2010 to 2021. Medium fleets must report annually from 2012 to 2021. Small fleets must report annually from 2014 to 2021. Any fleet that fails to meet the fleet average target rate by 2021 must continue to report annually until it does so. In addition, small and medium fleets that add, remove or change (e.g., retrofit or re-power) any vehicles within the fleet before 2012 and 2014, respectively, must report the changes to ARB by the annual reporting date.**

**Self-reporting will, therefore, be the primary tool for ARB to determine if fleets have met the fleet average targets or complied with the BACT requirements. If the fleet is in compliance with the regulations, ARB will issue a Certificate of Reported Compliance for the year.**

**In addition, each vehicle must have its EIN displayed prominently on the side of the vehicle. The new regulations give any ARB employee with proper credentials the right to enter any facility where off-road vehicles are located or off-road vehicle records are kept to conduct an inspection. Operation of a vehicle that is subject to the regulation but not labeled with an EIN is considered noncompliant with the regulation, and ARB inspectors will be instructed to look for the EINs during inspections or other visits to work sites.**

## **Cost Impact of the Regulations**

**ARB has acknowledged that the regulation imposes a significant cost on the affected fleets. The total cost of the regulation is expected to be between \$3 billion and \$3.4 billion (in 2006 dollars), spread over the years 2009 to 2030, with the majority of costs occurring between 2010 and 2021.**

For a typical fleet, ARB estimates that the total costs over the life of the regulation will be between \$104 to \$117 per horsepower for affected vehicles, at an annualized pace of \$8 to \$9 dollars per horsepower. Just over half the cost of the regulation stems from the costs for exhaust retrofits. Some comments submitted by construction companies suggested that the real cost to fleet owners will be double what ARB has estimated.

The state's Carl Moyer program provides grants to businesses for emission reductions that go beyond the requirements of air quality regulations and occur at least three years earlier than the effective date of the air quality regulation. The grants are distributed through local air quality districts. Because compliance is required by 2010, large fleets will not be able to utilize the Carl Moyer program to defray the costs of compliance. However, because their initial compliance dates do not begin until 2015, small fleets will be able to pursue the incentive funds provided by the Carl Moyer program to install retrofits or re-powers early. Small fleets also are eligible for changes that achieve NOx reductions as the NOx fleet average emission rate target does not apply to them.

Small fleet owners should be mindful that as the PM fleet average emission rate target declines over time, they might fall out of compliance and be forced to update or turnover their equipment more than once.

The regulation also decreases the value of older vehicles, as companies will not be able to resell Tier 0 vehicles within the state after March 1, 2009. Demand for Tier 1 vehicles likely will decline within the state even before compliance is required. ARB calculates the decrease in value to these vehicles as \$10 per horsepower, which ARB contends is an approximation for the cost of shipping a Tier 0 or Tier 1 vehicle for sale outside the state. If and when other states adopt the same or similar regulations, however, resale will likely become considerably more difficult, further diminishing the equity held by fleet owners.

### **Implications**

The biggest fear is that this regulation will greatly hamper construction in the state through a combination of decreased demand, as those companies that can pass the cost of compliance along to consumers do so; rising prices; and fewer fleets, as companies that cannot pass the cost of compliance along to consumers fold.

The main criticism of the regulation is that ARB assumed in its cost-benefit analysis that construction companies would be able to absorb a 10 percent reduction in profits to accommodate the regulation. In an analysis of the economic impact of the regulation on seven actual fleets, ARB determined that only one fleet did not need to raise revenue to keep the reduction of profits to less than 10 percent. The remaining fleets had to increase revenue up to 4 percent (with "most fleets right in the middle") to bring the impact of compliance to less than a 10 percent reduction in profits. ARB calculates that by passing the cost along to consumers, the cost of construction overall will be raised 0.3 percent.

As noted above, some construction companies have commented that the real cost of compliance with the regulations will be double what ARB estimates. Others reported preliminary statements from their banks and lending institutions that they would not fund retrofits or re-powering. Still others expressed concern during the comment period that the regulations could not be adequately enforced, and compliant fleets would effectively be penalized during the bidding process. Undoubtedly, the largest impact will be on those small businesses with large fleets and thin margins. Many

comments predict that this regulation will drive out all but the largest corporate fleets that have the ability to absorb successive, large outlays of capital without going out of business.

It will take years to determine whether the economic burden of the regulation outweighs the public benefit in NOx and PM emission reductions. In the meantime, fleet owners need to begin preparing to comply with the new regulation.

The new regulation can be found in the California Code of Regulations at 13 CCR §2449. Authority for the regulations may be found in Health and Safety Code §§39667, 43000, 43000.5, 43013 (b) and 43018. [Click here](#) for access to those statutes and regulations. ARB must obtain authorization from the U.S. Environmental Protection Agency before the in-use emission standards becomes enforceable. EPA has yet to indicate whether such authorization will be granted although businesses should expect authorization.

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