

Appendix I

School Bus Regulatory Requirement

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The reduction of diesel exhaust emissions is imperative to reducing all Californians exposure to cancer-causing and smog-forming compounds. School age children are an especially vulnerable segment of our population to the affects of air pollution. Reducing children's exposure to the harmful affects of diesel exhaust can be achieved through the implementation of the proposed regulation.

A. School Bus Regulatory Requirements

Diesel-fueled school buses as defined in the California Vehicle Code section 545 with a GVWR above 14,000 pounds will need to install a Verified PM retrofit device meeting the requirements of the regulation. Unlike all the other vehicle sectors subject to the proposed NOx and PM requirements of the proposed regulation, school buses are only required to meet the proposed PM requirements and are subject to several special provisions and timetables specifically designed for this sector. School buses manufactured prior to April 1, 1977, before minimum federal safety standards, will be required to be removed from service by January 1, 2012. Proposition 1B, approved by California voters in 2006, will provide \$200 million, through the Lower-Emission School Bus Program, to replace all remaining eligible pre-1977 model year school buses, replace approximately 1000 model year 1977 to 1986 school buses and install diesel particulate filters on about 3500 buses. All buses replaced or retrofitted through the Lower-Emission School Bus Program will be in compliance with the proposed regulation. All remaining diesel-fueled school buses must meet one of the following three proposed compliance options:

- The Best Available Control Technology (BACT) Compliance Schedule
- The BACT Percentage Limits Compliance option
- Fleet Average Compliance Option

School buses would be considered in compliance with the proposed regulation when they have installed the highest level VDECS available for the school buses engine, either a Level-2 or Level-3 (50 percent or 85 percent reduction in PM, respectively) by the designated compliance date under the option selected. Depending on the compliance option chosen and the VDECS that is installed, a school bus fleet may be subject to proposed reporting requirements.

If it is not technologically feasible for the school bus engine to be retrofitted with a Level-2 or Level-3 VDECS, then compliance may be delayed until January 1, 2018. Before the beginning of 2018 the unretrofitable school bus engine needs to be replaced with an engine that is in compliance with the proposed regulation or the school bus needs to be replaced.

B. The BACT Compliance Schedule Option

It is anticipated most school bus fleets would use the BACT compliance option. School bus fleet operators would be required to retrofit specific model year school bus engines with the highest level VDECS meeting the requirements of the proposed regulation by specified dates as described in Table 1 below. School buses that can not be retrofitted with a Level-2 or higher VDECS will be allowed to delay compliance with the proposed regulation until January 1, 2018. However, operators will be required to report the status of that school bus engine to the ARB annually through 2017.

Table 1: Best Available Control Technology Compliance Schedule for Schoolbus Fleets

Compliance Deadline (as of January)	Engine Model-Years
2011	2000 and newer
2012	1994 – 1999
2013	1987 – 1993
2014	Pre-1987

C. The BACT Percentage Limits Compliance Option

School bus fleet operators that choose the BACT Percentage Limits compliance option will be required to retrofit a percentage of the school bus fleet with the highest level VDECS meeting the requirements of the proposed regulation by specified dates as described in Table 2 below. School buses that can not be retrofitted with a Level-2 or higher VDECS will be allowed to delay compliance with the proposed regulation until January 1, 2018. If the school bus fleet operator chooses the BACT Percentage Limits compliance option than all school buses in the fleet will need to be reported annually to the ARB.

The percentage limits compliance option would work well for school bus fleets that either have a large number of newer school buses or school bus fleets that have taken advantage of available incentive funding to retrofit a large portion of their school bus fleet. School bus fleets that already have significant retrofit penetration into their fleet could potentially be in compliance with the proposed regulation for the first year or two.

Table 2: Percent of Total School Bus Fleet That Must Comply with PM BACT Standard

Compliance Deadline (as of January 1)	Percent of Total Fleet Complying with PM BACT
2011	25%
2012	50%
2013	75%
2014	100%

D. Fleet Averaging Compliance Option

School bus fleet operators that choose the fleet averaging compliance option will calculate the average emission level of their school bus fleet and compare that value with the fleet PM targets as indicated in the proposed regulation. The average emission level for the school bus fleet will need to be at or below the Fleet PM Targets provided in Section 2025 (h) of the proposed regulation to be considered in compliance. School bus fleets will reduce the emissions from their fleet by retrofitting school bus engines with the highest level VDECS and replacing older school buses with new buses meeting the 2007 diesel PM emission standard of 0.1 g PM/bhp-hr. School buses that can not be retrofitted with a Level-2 or higher VDECS will be allowed to delay compliance with the proposed regulation until January 1, 2018, however, these buses need to be included in the school bus fleet average calculation. School bus fleets that use alternative-fueled school buses will be allowed to use the credit for alternative-fueled vehicles. The credit for alternative-fueled vehicles can only be used with the Fleet Averaging Option.

The fleet average compliance option is well suited for school bus fleets that are largely comprised of alternative-fueled vehicles with a small number of relatively newer diesel fueled school buses or school bus fleets that are largely comprised of new diesel-fueled school buses meeting the 0.01 g PM/bhp-hr emission level.

E. Special Provisions for School Buses

School buses are eligible for Low-Use Exemption if the school buses have a working odometer and travels less than 1000 miles per year, an hour meter will not be required to be installed. School buses that meet the requirements of the low-use exemption will be not be required to install a VDECS and can continue to be operated by the school bus fleet operator. Low-use school buses will not be required to be included in determining compliance with the regulation compliance options. School bus fleet operators that choose to use the low-use exemption are required to report that school bus to the ARB.

School buses that are registered as historic vehicles and meet the requirements of historic vehicles as defined in the proposed regulation are exempt from the requirements of the proposed regulation.

F. Available Incentive Funding for School Bus Fleet Operators

Public school districts and public school districts operating as part of a joint powers authority are eligible for school bus replacement and retrofit funding under the Lower-Emission School Bus Program. Private companies that contract with public school districts are eligible for retrofit funding under the Lower-Emission School Bus Program. Typically the local air district implements the Lower-Emission School Bus Program in their area. However, some smaller and medium sized air districts have chosen to have the ARB implement the Program in their air districts. School districts that are interested in the Lower-Emission School Bus Program should contact their local air district to determine who is implementing the Program in their area.

Assembly Bill 923 (AB 923, Stat 2004 Ch 707) is another possible source of funding for school bus replacement funding. This legislation has provided a mechanism for air district to increase the motor vehicle registration fee surcharge from four dollars to six dollars. The additional two dollar surcharge may be used by the air district for four different clean air categories, including school bus replacement projects pursuant to California's Lower-Emission School Bus Program. Not all air districts are allowed to collect the DMV registration fee and some air districts choose not to assess the fee. Public school districts should contact their local air districts to see if AB 923 funds are available for school bus replacement. The California Department of Education's Small School District School Bus Replacement Program provides funding for the replacement of older school bus for public school districts with an average daily attendance below 2,501 students, school districts should contact the California Department of Education for information on this program.

Private schools are not eligible for school bus replacement or retrofit funds from the Lower-Emission School Bus Program. A more in depth discussion on incentive funding for school bus replacement and retrofit funding can be found in Chapter XV of the staff report.

G. Existing School Bus Fleet

Currently there are about 24,000 school buses that transport children to and from school in California. Although alternative-fueled school buses have become very common in California over the last decade, the in-use school bus fleet operating in California is still primarily diesel-fueled. School buses tend to accrue fewer miles than other heavy-duty vehicles operating in California, which leads to vehicles having a long useful life. As such, school bus fleets tend to be comprised of buses that have been or will operate for 30 years or more.

The oldest school buses still in operation in school bus fleets are from the 1973 model year. With the financial assistance provided through California's Lower-Emission School Bus Program the remaining pre-1977 model year school buses will be replaced by February 2010, as well as about 40 percent of the remaining pre-1987 model year school buses by the middle of 2011.

In addition, approximately 10 percent of the school bus fleet still uses 2-stroke diesel engines, many of which have uncontrolled diesel PM emissions. These buses can not be retrofitted, therefore it is expected that these 2-stroke engine school buses will need to be replaced by the end of 2017 to comply with the proposed regulation.

Currently, approximately 20 percent of the in-use school bus fleet has already been retrofitted with a diesel particulate filter putting them in compliance with the proposed regulation. A further 10 percent of the school bus fleet has a diesel particulate filter installed by the engine manufacturer and are therefore in compliance with the proposed regulation, as well as all model year alternative-fueled school buses. Overall, at least one-third of the fleet meets the proposed requirements today.

H. Existing Technology Availability for School Buses

School buses were one of the first vehicle classes to be retrofitted with diesel particulate filters and as such some school bus fleet operators have become very experienced with VDECS. Not all diesel engines are suitable for VDCES retrofit. Some engines, like 2-stroke engines do not have a VDECS available meeting the requirements of the proposed regulation.

School bus fleets have been able to employ both active and passive style diesel particulate filters on school bus engines. Active style diesel particulate filters require an external heat source to oxidize the collected diesel PM while passive style filters use the heat from the engine with the help of a catalyzed filter washcoat to force the oxidization of the collected diesel PM while the school bus is in operation. Typically, newer buses employ less expensive passive style filters while older school bus engines require the use of active style filters.

Generally, school bus engines manufactured before 1987 can not be retrofitted with either a passive or active diesel particulate filter. School bus engines from model year 1987 to 1993 can typically be retrofitted with active filters with the exception of the 2-stroke engines. School bus engines from model year 1994 to 2002 are good candidates for retrofit with most of these engines being able to be retrofitted with the passive-style filter. School bus engines from model year 2003 to 2006 generally employ exhaust gas recirculation systems to reduce the levels of NOx in the exhaust. Currently there are not any PM filters verified for 2003 to 2006 model year engines, but it is anticipated that PM filters will be verified in the near future.

If an engine in a school bus is not retrofittable, the engine can potentially be replaced with an engine that can be retrofitted. Repowering a school bus with a newer engine may be feasible for some school bus fleet operators that wish to maintain their older school buses in operation.

Since 2001 all school buses funded under California's Lower-Emission School Bus Program had diesel particulate filters installed and are in compliance with the proposed regulation. Diesel engines manufactured for model year 2007 and newer have diesel particulate filters installed by the engine manufacturer and are considered in compliance with the proposed regulation.

