California Environmental Protection Agency
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

AIRBORNE TOXIC CONTROL MEASURE TO LIMIT SCHOOL BUS IDLING AND IDLING AT SCHOOLS

Stationary Source Division
Project Assessment Branch

October 2002

State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

Public Hearing to Consider

ADOPTION OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE TO LIMIT SCHOOL BUS IDLING AND IDLING AT SCHOOLS

To be considered by the Air Resources Board on December 12, 2002, at:

California Environmental Protection Agency
Headquarters Building
1001 "I" Street
Central Valley Auditorium
Sacramento, California

Stationary Source Division:
Peter D. Venturini, Chief
Robert D. Barham, Assistant Chief
Project Assessment Branch:
Michael J. Tollstrup, Chief
Regulatory Assistance Section:
Beverly Werner, Manager

State of California
AIR RESOURCES BOARD

PROPOSED AIRBORNE TOXIC CONTROL MEASURE TO LIMIT SCHOOL BUS IDLING AND IDLING AT SCHOOLS

Primary Author

Barbara Cook, Stationary Source Division

Contributing Air Resources Board Staff

Alberto Ayala
Archana Agrawal
Julie Billington
Cherie Cotter
Pingkuan Di
Krista Fregoso
Scott Fruin
John Gruszecki
Paul Jacobs
Stephanie Kato
Earl Landberg
Connie Leong
Reza Mahdavi, Ph.D.
Elizabeth Miller
Robert Rogen
Michael Sutherland
Jay Zincke

Legal Counsel

Aron Livingston, Office of Legal Affairs

ACKNOWLEDGEMENTS

We would like to acknowledge the assistance of the following individuals, agencies, and organizations for their participation:

John Clements, Kings Canyon Unified School District
Dan Eisentrager, All West Coachlines, Inc./California Bus Association
Mike Ellis and Mario Esbri, California Highway Patrol
Bob Austin and John Green, California Department of Education
Paul Halaschak, Laidlaw Education Services
Tom Miller, Tahoe Truckee Unified School District
Antonio Rodriguez, Los Angeles Unified School District
Dano Rybar, California Association of School Transportation Officials
Claudia Sherrill, Elk Grove Unified School District
Cindy Wong, Parent-Teachers Association Health Commission

Staff Report: Initial Statement of Reasons for Proposed Rulemaking
Airborne Toxic Control Measure to Limit School Bus Idling and Idling at Schools

TABLE OF CONTENTS

Appendices

List of Tables

List of Figures

State of California
AIR RESOURCES BOARD

Staff Report: Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure to Limit School Bus Idling and Idling at Schools

Executive Summary

I. INTRODUCTION

This executive summary presents the Air Resources Board (ARB or Board) staff's Proposed Airborne Toxic Control Measure to Limit School Bus Idling and Idling at Schools (Proposed ATCM). Exhaust from California's more than 26,000 school buses and numerous other buses and heavy-duty vehicles that operate at or near schools is a source of unhealthful air pollutants, including diesel exhaust particulate matter (diesel PM) and other toxic air contaminants (TACs). Children are not the only persons exposed to exhaust from buses and other vehicles; however, they are disproportionately exposed to the highest levels of air pollutants associated with school transportation buses and vehicles at an especially vulnerable period of their lives. By restricting bus and vehicle idling to only when absolutely necessary, the Proposed ATCM would reduce children's exposure to exhaust emissions from school transportation buses and vehicles and from transit buses and heavy-duty vehicles that operate at or near schools.

II. BACKGROUND

1. Why is staff proposing an ATCM to limit school transportation bus and vehicle idling and transit bus and heavy-duty vehicle idling at or near schools?

Staff are proposing this ATCM because it is a simple pollution prevention measure that can be easily implemented to significantly reduce children's, parents', teachers', and near-by residents' exposure to diesel PM and the associated potential cancer risk and other adverse health effects.

The ARB identifies and controls TACs under the authority of the California Toxic Air Contaminant Identification and Control Program established under California law by Assembly Bill 1807 (AB 1807) and set forth in the California Health and Safety Code (HSC) sections 39650 through 39675. The Program involves a two-step process to address the potential health effects from TACs. The first step is the risk assessment (or identification) phase. In August 1998, following a 10-year scientific assessment process, the ARB identified diesel PM as a TAC. This marked the completion of the identification phase of the process to address the potential for adverse health effects associated with diesel PM emissions.

As part of the second step of the Program, the risk management (or control) phase, the Health and Safety Code requires the ARB to prepare a report on the need and appropriate degree of regulation of a substance identified as a TAC. Health and Safety Code section 39667 requires the Board to adopt ATCMs to achieve the maximum possible reduction in public exposure to TACs from vehicular sources. Regulations developed pursuant to this section must be based upon the utilization of best available control technologies or more effective control methods, unless the Board determines, based upon an assessment of risk, that an alternative level of emissions reduction is adequate or necessary to prevent endangerment of public health.

The ARB's October 2000 "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles" contained a comprehensive regulatory needs assessment and plan addressing known sources of diesel PM. In the Risk Reduction Plan, the ARB indicated that idling restrictions could be used to "limit the amount of time heavy duty vehicle engines are allowed to operate while not performing useful work, e.g., moving the vehicle or operating essential equipment."

In accordance with the AB 1807 risk management process, once the Risk Reduction Plan was adopted by the Board, staff began development of specific control measures to reduce diesel PM and other potentially harmful pollutant emissions. In October 2001, the Office of Environmental Health Hazard Assessment (OEHHA) published the "Prioritization of Toxic Air Contaminants Under the Children's Environmental Health Protection Act." The OEHHA's health effects assessments for TACs are provided to ARB for use in risk management activity. In its October 2001 report, the OEHHA identified diesel PM and several other TACs associated with motor vehicle exhaust as top priority TACs affecting children's health. This OEHHA report confirmed the ARB's resolve to consider school bus idling limits a priority for the agency.

In the spring and summer of 2002, staff conducted surveys to determine the status of anti-idling measures in California and other states; consulted with the California Department of Education (CDE), California Highway Patrol (CHP), and several school districts; and held a Public Consultation Meeting and two Public Workshops. As a result of public comment, the necessity and feasibility became clear for reducing unnecessary idling of all heavy-duty buses and vehicles involved in school transportation and of transit buses and other heavy-duty vehicles operating at or near schools. With this in mind, the staff developed the Proposed ATCM as one step in a larger strategy to reduce exposure to diesel PM and other TACs and air pollutants. The Proposed ATCM would particularly benefit: 1) children riding school transportation buses and vehicles; 2) school transportation bus and vehicle drivers; 3) children, parents, teachers, and others who frequent school yards and buildings; and 4) neighborhoods surrounding schools. The Proposed ATCM is also expected to reduce the cost of operating affected buses and vehicles by reducing the fuel use and engine wear associated with unnecessary idling.

2. What Laws Currently Regulate Idling in California and Other States?

Health and Safety Code section 42403.5 (Bus Idling, Civil) specifies civil penalties for the owner of any idling diesel-powered bus that violates Health and Safety Code section 41700 (No Person Shall Discharge Pollutants) to cause injury, detriment, nuisance, etc. However, exemption is made for persons that can establish "by affirmative defense that the extent of harm caused does not exceed the benefit accrued to bus passengers as a result of idling the engine." With respect to school buses, Health and Safety Code section 42403.5 fails to address approximately 14 percent of the California school bus fleet that is not diesel powered. In addition, potentially due to the broad exemption it includes, staff is unaware of any routine enforcement of this statute.

In addition to Health and Safety Code section 42403.5, title 13, California Code of Regulations section 1226 and Vehicle Code section 22515 effectively limit school bus and other motor vehicle idling under special circumstances. When children are aboard and a school bus driver leaves the driver's compartment, title 13, California Code of Regulations section 1226 requires the driver to park the bus, turn off the engine, and remove the ignition keys. Vehicle Code section 22515 essentially requires the driver of any unattended vehicle on a highway to do the same thing.

Aside from California, staff identified 17 states with statewide, county, or municipal anti-idling regulations or ordinances. Approximately half of these state and local measures apply to all motor vehicles while the other half apply solely to diesel-fueled vehicles or urban buses. More than two-thirds of these measures restrict idling to five minutes or less. Seven states have a limit of exactly five minutes. There is no federal motor vehicle anti-idling regulation; however, the United States Environmental Protection Agency (U.S. EPA) recommends that motor vehicle engines be turned off when a vehicle is not in motion.

A review of California air quality management and air pollution control district rulebooks showed no specific anti-idling regulations, and a staff survey of 882 school district transportation officials revealed no other local anti-idling ordinances. The survey of school district transportation officials did reveal that 12 of the 667 school districts that responded have written district policies limiting school bus idling and that many of the school districts with no written policies verbally advise school bus drivers to avoid excessive idling. Staff also surveyed the 13 largest school bus contractors in California and two responded with written policies limiting school bus idling.

III. PUBLIC OUTREACH

An open public process is an essential part of the adoption of any air quality regulation, including this Proposed ATCM. Staff made extensive efforts to ensure that the public was aware of, and had an opportunity to participate in, the rulemaking process. The staff's public outreach program involved interaction with:

- Government Agencies (CDE, CHP, school district transportation directors, Public Transit Agencies, California Air Pollution Control and Air Quality Management Districts, U.S. EPA, U.S. Postal Service);
- Industry (private schools school bus contractors, heavy-duty vehicle fleets operating at or near schools;
- Organizations [Association of State and Territorial Health Officials (ASTHO) California Air Pollution Control Officers Association (CAPCOA), California Association for Coordinated Transportation, California Association of School Transportation Officials (CASTO), California Bus Association, California Food Service Association, California Parent-Teacher Association, California Transit Association, Environmental Council of the States (ECOS), Environmental Groups, Environmental Justice Groups, Children's Health, and Community Activist Groups]; and
- other interested parties.

1. What actions did staff take to consult with interested parties?

Staff contacted approximately 17,000 affected parties (including individuals and organizations) by one or more of the following means: telephone, electronic mail, or regular mail.

In addition, staff developed and frequently updated (with list serve notification) a web page (http://www.arb.ca.gov/toxics/sbidling/sbidling.htm) describing the Proposed ATCM, its status, and contact information; arranged and held personal meetings and conference calls; submitted articles to organization newsletters; made presentations and discussed the Proposed ATCM at meetings of affected organizations, and held one Public Consultation Meeting and two Public Workshops. Approximately 17,000 individuals and organizations were notified about the Public Consultation Meeting and the Public Workshops.

Major Outreach Activities Included:

- a telephone survey of 50 state air quality regulators;
- a telephone survey of 882 school district transportation directors and 13 school bus contractors;
- a visit to a combination middle school-high school to observe school bus loading;
- articles to the CASTO and CAPCOA newsletters;
- presentations at meetings of the following organizations: CAPCOA Engineering Managers, CAPCOA Mobile Source and Fuels Committee, California Parent-Teachers Association Health Commission, Sacramento Consortium-Katz Safe School Bus Clean Fuel Efficiency Demonstration Program (a consortium of northern California school districts and others), Los Angeles Unified School District, CASTO Manager's Forum, ECOS-ASTHO,
- a Public Consultation Meeting;
- Public Workshops in Diamond Bar and Sacramento; and
- a conference call with representatives of the California Transit Association.

2. How does this Proposed ATCM relate to ARB's goals on Environmental Justice?

The Proposed ATCM is consistent with the ARB's Environmental Justice policy to reduce health risks from TACs in all communities, including low-income and minority communities. By limiting school bus and other bus and heavy-duty vehicle idling to only when necessary, the Proposed ATCM would provide air quality benefits by reducing exposure to diesel PM and other TACs and air pollutants in areas at and near schools. Additional idling limits on school buses and other buses and heavy-duty vehicles whose primary purpose is the transport of school children would provide air quality benefits at other locations as well (e.g., near bus garage and maintenance facilities, bus stops, and school activity destinations). The reduction in exposure in low-income, minority, and other communities would depend upon the number and current extent of unnecessary idling of affected buses and vehicles.

The goal of this ATCM is to reduce children's, parents', teachers', and nearby residents' exposure to diesel PM and other vehicular emissions. ARB staff believes limiting idling is an efficient, cost-effective measure to significantly reduce exposure at or near schools.

IV. EMISSIONS AND POTENTIAL HEALTH IMPACTS

1. What are the typical vehicular sources of diesel PM and other TAC emissions at schools?

All but electric-powered motor vehicles are sources of TAC emissions. Diesel-fueled buses and vehicles emit diesel PM, a complex mixture of gaseous vapors, fine particles, and numerous associated TACs. Gasoline-fueled and alternative-fueled (i.e., except electric) buses and vehicles also emit TACs. The following are vehicular sources of diesel PM or other TACs at schools: school buses, school pupil activity buses, youth buses, general public paratransit vehicles transporting school-age children to or from public or private school or school activities, transit buses, and other heavy-duty vehicles that operate at or near schools. Other heavy-duty vehicles operating at or near schools include delivery, maintenance, and construction vehicles (e.g., food and other supply trucks, garbage trucks, mail trucks, etc.). In addition, passenger vehicle exhaust is also a source of TACs at schools.

2. What are the estimated emissions from idling school transportation buses and vehicles in California?

There is very little information about when, where, and how much school transportation fleet buses and vehicles idle and no specific information about unnecessary idling. Staff analysis shows that annual PM10 (particulate matter 10 micrometers in diameter and smaller), including diesel PM, emissions are expected to increase as idling time increases. For example, assuming 2, 10, and 20 minutes of idling time per day per bus or vehicle, staff estimated Statewide 2002 school

transportation fleet PM10 emissions at approximately 0.25, 1.4, and 2.9 tons per year, respectively. While the Proposed ATCM provides some modest emission benefits that would reduce region-wide exposure to unhealthful exhaust emissions, the main purpose of the measure is to reduce localized exposure to diesel PM and other TACs in the vicinity of schools.

3. What are the potential adverse health impacts from exposure to diesel PM and other TAC emissions from school transportation buses and vehicles, transit buses, and other heavy-duty vehicles operating at or near schools?

The potential adverse health impacts from exposure to diesel PM and other TAC emissions from heavy duty buses and vehicles transporting school children or operating at or near schools include: eye and respiratory irritation, enhanced respiratory allergic reactions, asthma exacerbation, carcinogenicity, immunotoxicity, teratogenicity, and hematotoxicity.

ARB staff estimated the potential cancer risk associated with diesel PM exposure based upon modeled idling school bus emissions that could occur at a school near a designated loading/unloading zone. Overall, we estimate that the potential cancer risk for students exposed to emissions from idling diesel-fueled school buses will generally be less than 1 potential cancer case per million. The estimated potential cancer risk for teachers will generally be less than five potential cancer cases per million and, for nearby residents, the estimated potential cancer risk will be less than 10 potential cancer cases per million. These risk values assume exposure durations of nine years for children (student), 40 years for teachers, and 70 years for nearby residents. These risk values also assume that an individual would remain within 20 to 40 meters of the idling school bus zone for up to 20 minutes per day for 180 days per year. The estimated risk level would be reduced proportionately if the actual exposure duration decreased from the assumed exposure duration of 9, 40, and 70 years or if the student, teacher or resident were further away from the loading zone.

V. SUMMARY OF THE PROPOSED ATCM

1. What types of vehicle does the Proposed ATCM apply to?

With the exception of zero emission buses or vehicles, the Proposed ATCM would apply to: school buses, school pupil activity buses, youth buses, general public paratransit vehicles transporting school-age children to or from public or private school or school activities, transit buses, and other heavy-duty vehicles that operate at or near schools. Appendix E: Glossary of Terms of this Staff Report contains a description for the proposed definition for each of these types of vehicle. Examples of heavy-duty vehicles (other than buses) that operate at or near schools include food and supply delivery trucks, garbage trucks, and construction/maintenance vehicles.

The Proposed ATCM would not apply to passenger vehicles weighing 6,000 pounds or less or designed to carry 10 or fewer persons including the driver.

However, ARB would provide materials for public outreach on the Proposed ATCM.

2. What does the Proposed ATCM require?

The Proposed ATCM would require a driver of a school bus or other bus or heavy-duty vehicle to manually turn off the bus or vehicle engine upon arriving at a school and restart it no more than 30 seconds before departing. A driver of a bus or vehicle whose primary purpose is the transport of children (i.e., a school bus, school pupil activity bus, youth bus, or general public paratransit vehicle) would be subject to the same requirement when operating within 100 feet of a school and would be prohibited from idling more than five minutes at locations beyond schools, such as parking or maintenance facilities, school bus stops, or school activity destinations. A driver of a transit bus or other heavy-duty vehicle, whose primary purpose is not the transport of children, would be prohibited from idling beyond five minutes within 100 feet of a school. Again, a transit bus or other heavy-duty vehicle would also be prohibited from idling on school grounds for no more than 30 seconds before departure. In addition, the Proposed ATCM would require a motor carrier of an affected bus or vehicle to ensure that drivers are informed of the idling requirements, track complaints and enforcement actions regarding the requirements, and keep records of these driver education and tracking activities.

3. What exemptions are allowed?

The Proposed ATCM would exempt idling that is necessary for health, safety, or operational concerns. Specific exemptions are provided for idling: in the midst of traffic; to ascertain safe operating conditions of a bus or vehicle; for test, service, repair, or diagnostic purposes; for turbo-charged diesel engine cool down; to accomplish work, other than transportation, for which a vehicle was designed (e.g., controlling cargo temperature or operating a lift, drill, etc.); to operate equipment needed by persons with disabilities and heaters or air conditioners for children with exceptional needs; to operate defrosters or other equipment to prevent a safety or health emergency; and to recharge a hybrid electric bus or vehicle.

4. What does staff consider unnecessary idling?

Examples of unnecessary idling (as long as a bus or vehicle is safely parked outside of traffic) are idling:

- Due to the unfounded fear that a diesel engine will not restart if it is shut off;
- To "warm-up" a diesel engine for more than five minutes before operation;
- While simply waiting for passengers, or, for the scheduled time of departure;
- During passenger loading or unloading; or
- To avoid running down the battery while unnecessarily operating equipment (e.g., a heater or air conditioner).

5. When would other laws take precedence over Proposed ATCM provisions?

The Proposed ATCM contains a provision that describes its relationship to other laws. The allowance of certain exempt periods within the Proposed ATCM does not legally permit idling beyond other applicable limits. Still, Proposed ATCM provisions that allow up to five minutes of idling under specific conditions could conceptually conflict with other requirements that effectively prohibit idling when: 1) a school bus driver leaves the driver's compartment (13 CCR§1226); 2) any driver leaves a vehicle unattended on a highway (VC§22515). The Proposed ATCM would clearly preclude an affected bus or vehicle driver from using provisions in the Proposed ATCM to justify violation of specified safety requirements that continue to apply. In addition, the Proposed ATCM would allow local regulations or ordinances to supercede it, provided such requirements were as stringent as, or more stringent than, any comparable requirement in the Proposed ATCM.

6. What alternatives to the Proposed ATCM did staff consider?

Staff considered the following alternatives to the Proposed ATCM: limiting applicability to school buses, limiting applicability to diesel buses and vehicles, and requiring new or add-on control devices. As staff learned from public comments, limiting applicability to school buses would leave school children exposed to diesel PM and other TACs and air pollutant emissions from the unnecessary idling of other types of school transportation and from transit buses and heavy-duty vehicles (other than buses) that operate at or near schools. Commenters urged staff to expand the scope of the ATCM beyond school buses.

Limiting applicability to diesel-fueled buses and vehicles would leave children exposed to TAC emissions from the unnecessary idling of gasoline- and alternative-fueled buses and vehicles and would complicate both the complaint registration process and enforcement.

Requiring new or add-on emission control devices would impose significant costs for school districts and others. Moreover, certain control devices are not feasible or are feasible for only a small segment of the school transportation fleet. For example, an automatic engine shut-off device is not feasible for practical and safety reasons and, as of this writing, the retrofit emission control technology verified for funding is limited to particulate filters requiring the use of low sulfur diesel fuel for school buses with 1994 and later model year engines. Retrofit emission control technology is continuing to be assessed as part of the retrofit program.

Staff notes that the Board has already approved regulatory amendments to align California with the federal government's more stringent new heavy-duty vehicle (including school bus) oxides of nitrogen (NOx) and PM emission standards effective in 2007.

VI. IMPACTS OF THE PROPOSED ATCM – HEALTH, ECONOMIC, ENVIRONMENTAL

1. How would the Proposed ATCM reduce public health risk?

The elimination of unnecessary idling of buses and other heavy-duty vehicles is expected to reduce diesel PM and other TAC emissions and, therefore, children and public exposure. Reduced exposure is expected to result in reduced risk of cancer and other adverse health effects associated with diesel PM and other TACs in bus and other heavy-duty vehicle exhaust.

2. What is the total cost of the Proposed ATCM?

Staff expects the total cost of the Proposed ATCM to be minimal for both the school transportation industry and the State agencies implementing the regulation. For these two entities, the total costs as a result of the Proposed ATCM are estimated at $92,000. The $92,000 estimate includes $52,000 in costs for the school transportation industry (i.e., $30,800 for school districts, $19,000 for school bus contractors, and $2,100 for private schools or approximately $2 per driver per year). However, the cost-related requirements for the school transportation industry primarily involve training and clerical responsibilities that are expected to be incorporated into existing CDE-CHP training, testing, and recordkeeping programs. The $92,000 estimate also includes approximately $40,000 in costs for State agencies (i.e., $14,000 to develop, revise, and reproduce educational, training, and testing materials and $25,000 to amend title 13 to authorize the CHP to provide enforcement assistance to ARB). These implementing costs are expected to be absorbed within existing State agency budgets and staffing.

Due to lack of information about the number of transit bus or heavy-duty vehicle (other than bus) drivers that operate at or near schools, staff is unable to include costs for transit agencies or heavy-duty vehicle fleet operators in the total cost estimate. However, staff estimate the training and recordkeeping costs at $2 per affected driver per year based upon the expectations that ARB would provide educational materials and that transit agencies and heavy-duty vehicle fleet operators already have basic information dissemination and record procedures for personnel.

Compliance costs are expected to be offset by fuel and maintenance cost savings as a result of reduced idling. For gasoline- and diesel-fueled school buses, staff assumed 2 to 20 minutes of idling per day would be avoided to estimate potential fuel cost savings from $2.70 to $27.00 per bus per year or $68,000 to $680,000 per year for the Statewide school bus fleet. The number of heavy-duty vehicles (other than buses) operating at schools is not known; however staff assumed heavy-duty vehicles (e.g., food and supply delivery trucks, garbage trucks, construction/maintenance vehicles) make 10 to 15 trips per school per week and idle 2 to 4 minutes per trip to estimate fuel cost savings from 1 to 3 cents per trip or from $70,000 to $210,000 per year Statewide. An acceptable method of calculating maintenance cost savings has yet to be developed. Staff estimate that most affected engines may experience three to five

additional warm restarts per day due to the Proposed ATCM; however, maintenance costs generated by these additional warm starts are determined to be negligible.

3. What are the expected economic impacts of the Proposed ATCM on affected parties?

No significant economic impacts are expected from the Proposed ATCM. Compliance costs are expected to be modest and offset by cost savings on fuel and maintenance as a result of eliminating unnecessary idling. Therefore, staff does not expect a noticeable change in employment, business creation, elimination or expansion; or business competitiveness in California. No significant economic impacts are expected for school districts or for federal, State, or local public agencies.

4. What are the expected environmental benefits of the Proposed ATCM?

The Proposed ATCM is expected to benefit the environment because the elimination of unnecessary idling would reduce PM10 emissions that contaminate air, water, soil, and vegetation. In addition, the Proposed ATCM is expected to reduce overall hydrocarbon, carbon monoxide, and oxides of nitrogen emissions from affected buses and vehicles.

5. Are there any significant adverse environmental impacts associated with the Proposed ATCM?

The staff have concluded that no significant adverse environmental impacts should occur from the adoption of, and compliance with, the Proposed ATCM.

VII. NEXT STEPS

If adopted, the ARB Enforcement Division would have the primary responsibility for enforcing the Proposed ATCM with assistance from the CDE and CHP. Air quality management and air pollution control districts and local peace officers could also play a role. To implement and enforce the ATCM, the following steps are expected to be taken:

- CHP would revise title 13, California Code of Regulations to provide additional authority to enforce the Proposed ATCM and to assist the ARB Enforcement Division.
- ARB would assist CDE and CHP to update school bus driver training manuals and certification tests to reflect the requirements of the Proposed ATCM.
- ARB would develop educational materials for distribution to motor carriers and drivers of all affected buses and vehicles, school districts, and the general public.
- The ARB Enforcement Division would use its existing 1-800-END-SMOG telephone complaint line to receive complaints of non-compliance with the Proposed ATCM.
- The ARB Enforcement Division would respond to complaints of non-compliance, with assistance from the CHP, local peace officers, and air pollution control or air quality management district personnel, if necessary.

- A procedure for dealing with alleged non-compliance and violations of the Proposed ATCM is expected to evolve once the Proposed ATCM is adopted and non-compliance complaints are received.

VIII. RECOMMENDATION

Staff recommend that the Board adopt the proposed regulation contained in Appendix A of this Staff Report. The Proposed ATCM would simply require an affected bus or vehicle driver to turn off his or her parked bus or vehicle engine unless idling is necessary for specified health, safety, or operational concerns. The Proposed ATCM would also require affected bus or vehicle motor carriers to ensure that drivers are informed of the idling requirements; track complaints and enforcement actions; and keep records of these driver education and tracking activities. The Proposed ATCM would reduce children's and the general public's exposure to diesel PM and other TACs from heavy duty: (1) buses and vehicles whose purpose is the transport of school children to and from school and other activities; and 2) transit buses and vehicles other than buses that operate at or near schools. Additional localized environmental benefits include reduced particulate matter and other air pollutant emissions; soiling; and noise. Additional affected fleet operator benefits include fuel conservation and consequent fuel cost and engine maintenance savings.

State of California
AIR RESOURCES BOARD

Staff Report: Initial Statement of Reasons for the Proposed Airborne Toxic Control Measure to Limit School Bus Idling and Idling at Schools

Technical Support Document

I. INTRODUCTION

A. OVERVIEW

The California Air Resources Board's (ARB's or Board's) primary mission is to protect public health and the environment by regulating air pollutant emissions. An effective means of achieving this mission is to reduce as much as possible the air pollutant exposure of especially sensitive persons, such as children. Motor vehicle exhaust, including exhaust from school buses and other buses and heavy-duty vehicles operating at or near schools, is a source of unhealthful air pollutants including: gaseous- and particulate-phase toxic air contaminants (TACs), particulate matter, carbon monoxide, hydrocarbons, and oxides of nitrogen. Diesel-fueled buses and vehicles emit diesel exhaust particulate matter (diesel PM), a TAC that has particular adverse health implications for children. Children are not the only persons exposed to exhaust from buses and other vehicles; however, they are disproportionately exposed to the highest levels of air pollutants associated with school buses and vehicles at an especially vulnerable period of their lives. (EHHI, 2002; OEHHA, 2001) Staff are proposing an Airborne Toxic Control Measure (ATCM) to Limit School Bus Idling and Idling at Schools because excessive idling unnecessarily exposes children and others to numerous TACs and other air pollutants that cause adverse health effects.

This Staff Report for the Proposed ATCM includes:

- Background regulatory information (Chapter I);
- A summary of public outreach (Chapter II);
- Emissions, exposure, health effects, and risk assessment (Chapter III);
- A summary and discussion of the Proposed ATCM, including alternative requirements considered (Chapter IV);
- Economic impact, environmental impact, and environmental justice efforts (Chapter V);
- References (Chapter VI); and
- The proposed text of the measure and other supplementary information (Appendices).

B. PURPOSE AND REGULATORY AUTHORITY

Purpose

The Proposed ATCM is designed to reduce children's and the general public's exposure to diesel PM and other TACs and air pollutants from heavy-duty: 1) buses and vehicles whose purpose is the transport of children at or below 12th-grade level to and from school and other activities; and 2) transit buses and vehicles other than buses that operate at or near schools. The Proposed ATCM would require that a driver of a school bus or other heavy-duty bus or vehicle manually turn off the bus or vehicle engine upon arriving at a school and restart it no more than 30 seconds before departure. A driver of a bus or vehicle whose primary purpose is the transport of children (i.e., a school bus, school pupil activity bus, youth bus, or general public paratransit vehicle) would be subject to the same requirement when operating within 100 feet of a school and would be prohibited from idling beyond five minutes at any location more than 100 feet from a school. A driver of a transit bus or other heavy-duty vehicle, whose primary purpose is not the transport of children, would be prohibited from idling beyond five minutes within 100 feet, of a school. In addition, the Proposed ATCM would require owners, operators, or those that direct the operation of affected buses or vehicles to: ensure that drivers are informed of the idling requirements, track complaints and enforcement actions regarding the requirements, and keep records of these driver education and tracking activities. The Proposed ATCM would exempt specific situations where health, safety, or operational concerns must take precedence. Chapter IV of this Staff Report contains a discussion, and Appendix A contains the full text, of the Proposed ATCM.

The Proposed ATCM is expected to reduce exposure to toxic and other air pollutants, particularly for: 1) children riding school buses and other vehicles used in school transportation; 2) drivers of school bus and other vehicles used in school transportation; 3) children, parents, teachers, and other persons who frequent school yards and buildings; and 4) neighborhoods surrounding schools. The Proposed ATCM is also expected to reduce the operating costs of school buses and other affected vehicles by reducing the fuel use and engine wear associated with unnecessary idling.

Regulatory Authority

Several sections of the California Health and Safety Code (HSC) provide the ARB with authority to adopt the Proposed ATCM. Health and Safety Code sections 39600 (General Powers) and 39601 (Standards, Definitions, Rules, and Measures) confer to the ARB, the general authority and obligation to adopt rules and measures necessary to execute the Board's powers and duties imposed by State law. An additional section of the Health and Safety Code provides broad authority for adopting measures to reduce TAC and other air pollutant emissions from motor vehicles. Health and Safety Code section 39667 primarily authorizes the revision of new motor vehicle emission standards for the purpose of reducing toxic air contaminants; however, it also authorizes requirements for best available control technology, or a more effective control method, on motor vehicles that are not new.

More specifically, California's Air Toxics Program, established under California law by AB 1807 (Stats. 1983, Ch. 1047) and set forth in Health and Safety Code sections 39650 through 39675, mandates the identification and control of air toxics in California. The identification phase of the Air Toxics Program requires the ARB, with participation of other state agencies, such as the Office of Environmental Health Hazard Assessment (OEHHA), to evaluate the health impacts of, and exposure to, substances and to identify those substances that pose the greatest health threat as TACs. The ARB's evaluation is made available to the public and is formally reviewed by the Scientific Review Panel (SRP) established under Health and Safety Code section 39670. Following the ARB's evaluation and the SRP's review, the Board may formally identify a TAC at a public hearing. Following the identification of a substance as a TAC, Health and Safety Code section 39665 requires the ARB, with the participation of the air pollution control and air quality management districts, and in consultation with affected sources and interested parties, to prepare a report on the need and appropriate degree of regulation for that substance.

In August 1998, the Board identified diesel PM as a TAC and in October 2000, the ARB published a "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles." In the Risk Reduction Plan, the ARB indicated that idling restrictions could be used to "limit the amount of time heavy duty vehicle engines are allowed to operate while not performing useful work, e.g., moving the vehicle or operating essential equipment." In October 2001, the OEHHA, published a "Prioritization of Toxic Air Contaminants Under the Children's Environmental Health Protection Act." Table I-1 lists several, but by no means all, TACs associated with diesel-, gasoline-, and alternative-fueled school bus and other bus and heavy-duty vehicle exhaust and indicates that four of the listed TACs are among the top five affecting children. Diesel PM is of particular interest since it is a complex mixture of gases, vapors, and fine particles that contains all of the other TACs listed in Table I-1 and dozens of others as well. The Board has determined that there was not sufficient scientific evidence available to support "safe" threshold exposure levels for the TACs listed in Table I-1. (ARB, 2000b; OEHHA, 2001). Exposure to these TACs and to other air pollutants as a result of unnecessary idling would be reduced if the Proposed ATCM was adopted by the Board.

TABLE I- 1

TOXIC AIR CONTAMINANTS ASSOCIATED WITH HEAVY-DUTY BUS AND VEHICLE EXHAUST

TAC	ARB Identification	Top Priority Children's TAC
Acetaldehyde	1993	No
Acrolein	1993	Yes
Benzene	1985	No
Benzo[a]pyrene	1994	Yes
1,3-Butadiene	1992	No
Diesel Exhaust Particulate Matter	1998	Yes
Chlorinated Dioxins and Dibenzofurans	1986	Yes
Formaldehyde	1992	No

(ARB, 1984; ARB, 1986; ARB, 1992a; ARB, 1992b; ARB, 1993a; ARB, 1993b; ARB, 1994; ARB, 1998a; OEHHA, 2001)

C. REGULATORY STATUS

This section provides a regulatory context for the Proposed ATCM by briefly discussing significant existing federal, state, and local air quality regulations and programs that apply to school buses and other affected buses and vehicles. It is not intended to address all of the air quality or other regulations that could possibly affect these buses and vehicles.

Federal and California Emission and Fuel Standards

Federal motor vehicle emission standards are set forth in 40 Code of Federal Regulations (CFR) Part 86, and most California emission standards are set forth in title 13 California Code of Regulations (CCR) sections 1956.1-1956.8. The standards vary depending upon the vehicle's engine type, model year, and gross vehicle weight rating. School buses are subject to the same hydrocarbon (THC), carbon monoxide (CO), oxides of nitrogen (NOx), and particulate matter (PM) emission standards as heavy-duty trucks of similar engine types, model years, and sizes. For recent model years, federal and California emission standards and test procedures for similar motor vehicles, including school buses, are identical or differ only slightly. However, federal and California emission standards have not always been consistent and are continually being ratcheted downward. For example, the federal government plans to require more stringent new heavy-duty vehicle NOx and PM emission standards in 2007. Additionally, the Board has approved regulatory amendments to align California emission standards with the 2007 federal requirements.

Health and Safety Code section 43108 (School Bus; Certification) ensures that sufficient school buses are available to transport school children by allowing the ARB to certify a school bus or school bus engine to a less stringent federal standard. In order to obtain such certification, the manufacturer is required to demonstrate that every effort has been made to redesign the school bus to accommodate an engine that complies with California emission standards. Currently, many manufacturers produce compliant engines and a Health and Safety Code section 43108 demonstration would be unnecessary.

Urban buses, such as transit buses, are designed and used to transport people of all ages while school buses are designed and used exclusively to transport children. Historically, urban buses have been regulated separate from other heavy-duty diesel engines and vehicles, including school buses. Current emission standards for urban buses are set forth in title 13 California Code of Regulations section 1956.1 and are more stringent than those for other heavy-duty vehicles. (U.S. EPA, 1997) As previously mentioned, more stringent emission standards are scheduled for other heavy-duty vehicles, including school buses.

Federal and California fuel standards specifically apply to manufacturers and distributors rather than to motor vehicles or their operators. Nevertheless, these standards directly affect the fuel used in motor vehicles, including school buses. Fuel standards for aromatic content, Reid Vapor Pressure, and other fuel components and parameters play a critical role in meeting emission standards. Federal commercial fuel standards are set forth in 40 CFR Part 80 and California fuel standards are set forth in title 13 California Code of Regulations sections 2250-2273 (gasoline), sections 2281 and 2282 (diesel), and section 2292 (methanol, ethanol, compressed natural gas, and liquid propane gas). Both California and the United States Environmental Protection Agency (U.S. EPA) plan to allow only very low sulfur levels (15 ppm) in diesel fuel beginning in 2006. Fuel suppliers for California must meet both federal and California fuel standards.

California Regulations Other than Emission Standards

In addition to state emission standards, school buses and other motor vehicles are subject to several other air quality-related statutes and regulations in the State Health and Safety Code, Vehicle Code (VC), and California Code of Regulations. ARB and California Highway Patrol (CHP) authority overlap for several of these statutes and regulations. As a result, the two agencies have developed cooperative and complementary implementation and enforcement strategies. The ARB primarily develops, implements, and enforces air quality-related motor vehicle regulations with assistance from the CHP. The ARB may either cite violators and impose penalties under civil codes, investigate and refer violations for criminal penalties, or both. The CHP may cite violators under criminal codes and, with respect to certain motor vehicle regulations, may be more likely than ARB staff to encounter and address violations.

Table I-2 lists several important state air quality-related provisions and regulations that apply to motor vehicles, including school buses. It is not intended to identify all possible air quality-related State provisions and regulations that may apply. Because the Proposed ATCM and Health and Safety Code section 42403.5 (Bus Idling, Civil) may both be considered anti-idling measures, Health and Safety Code section 42403.5 is discussed separately in the following section (i.e., California and Other State and Local Anti-idling Regulations) of this Staff Report.

TABLE I- 2

CALIFORNIA AIR QUALITY REQUIREMENTS OTHER THAN EMISSION STANDARDS THAT APPLY TO HEAVY-DUTY BUSES AND VEHICLES

Citation(s)	Applicability	Provision/Regulation
HSC §41700, VC §27153	Any source, including any motor vehicle Any motor vehicle	Nuisance, including excessive smoke Excessive exhaust products
HSC §41701 VC §27153.5	Any source 1971 and later motor vehicles Pre-1971 motor vehicles	Ringelmann 2 or 40 percent opacity Ringelmann 1 or 20 percent opacity Ringelmann 2 or 40 percent opacity
HSC §44011(a)(1)	Diesel-powered vehicles	Exemption from Smog-Check Program
HSC §44011.6 13 CCR, §2180-2194	Heavy duty diesel vehicles	Heavy-Duty Vehicle Inspection Program - roadside visible emissions (opacity) test by CHP Periodic Smoke Inspection Program - fleet vehicle visible emissions (opacity) test by fleet owners/operators

California and Other State and Local Anti-idling Measures

Health and Safety Code section 42403.5 (Bus Idling, Civil) specifies civil penalties for the owner of any idling diesel-powered bus that violates Health and Safety Code section 41700 (No Person Shall Discharge Pollutants) to cause injury, detriment, nuisance, etc. However, exemption is made for persons that can establish "by

affirmative defense that the extent of harm caused does not exceed the benefit accrued to bus passengers as a result of idling the engine." With respect to school buses, Health and Safety Code section 42403.5 fails to address approximately 13 percent of the California school bus fleet that is not diesel powered. In addition, potentially due to the broad exemption it includes, staff is unaware of any routine enforcement of this statute. Moreover, Health and Safety Code section 44011.6(l) limits the imposition of civil penalties for a first time citation of a school bus under the Heavy-Duty Vehicle Inspection Program.

In addition to Health and Safety Code section 42403.5, title 13 California Code of Regulations section 1226 and Vehicle Code section 22515 effectively limit school bus and other motor vehicle idling under special circumstances. When children are aboard and a school bus driver leaves the driver's compartment, title 13 California Code of Regulations section 1226 requires the driver to park the bus, turn off the engine, and remove the ignition keys. Vehicle Code section 22515 essentially requires the driver of any unattended vehicle on a highway to do the same thing.

Aside from California, staff identified 17 states with statewide, county, or municipal anti-idling regulations or ordinances. Approximately half of these state and local measures apply to all motor vehicles while the other half apply solely to diesel-fueled vehicles or urban buses. More than two-thirds of these measures restrict idling to five minutes or less. Six states have a limit of exactly five minutes. Typical idling restriction exemptions cited in the anti-idling measures include: emergency vehicle idling, idling while in traffic, idling during service or repair, idling to power auxiliary equipment (e.g., air conditioning), and idling when outside temperatures are below freezing. Appendix B of this Staff Report provides a summary of state and local anti-idling measures. There is no federal motor vehicle anti-idling regulation; however, the U.S. EPA recommends that motor vehicle engines be turned off when a vehicle is not in motion. (U.S. EPA, 2002a)

A review of California air quality management and air pollution control district rulebooks showed no specific anti-idling regulations, and a staff survey of 882 school district transportation officials revealed no other local anti-idling ordinances. The survey of school district transportation officials did reveal that 12 of the 667 school districts that responded have written district policies limiting school bus idling and that many of the school districts with no written policies verbally advise school bus drivers to avoid excessive idling. Staff also surveyed the eight largest school bus contractors in California and two responded with written policies limiting school bus idling.

Voluntary Bus Replacement and Retrofit Programs

Federal, State, and local programs have been developed to encourage or require (dependent upon available funding) school districts to obtain less-polluting, safer school buses. These programs include:

- U.S. EPA's Voluntary Diesel Retro Fit Program;

- ARB's Lower-Emission School Bus Program;
- California Energy Commission's (CEC's) Safe School Bus Clean Fuel Efficiency Demonstration Program; and
- South Coast Air Quality Management District's (SCAQMD's) Rule 1195 (Clean On-road School Buses).

(ARB, 2001a; SCAQMD, 2001; U.S. EPA, 2002b)

The ARB's Lower-Emission School Bus Program (Program) is the primary source of funding for the replacement and retrofit of school buses in California. Approved by the Board in December 2000, the Program is designed to reduce school children's exposure to both cancer-causing and smog-forming pollution from school buses. The Program, co-administered by the ARB and CEC, provides grants to upgrade California's aging and high-polluting school bus fleet through two program components: 1) a new bus purchase program to replace the oldest school buses, with an emphasis on replacing pre-1977 model year buses; and 2) a retrofit program to equip in-use diesel school buses with emission control technologies verified by the ARB to reduce particulate matter emissions. Grantees are required to provide matching funds. Since the Program's inception in December 2000, a total of 66 million dollars has been dedicated to purchasing new alternative fuel and lower-emitting diesel school buses (49.5 million dollars allocated) and retrofitting in-use diesel school buses (16.5 million dollars allocated).

The CEC, in conjunction with the local air quality management and air pollution control districts, implements the new school bus purchase component of the Program. The ARB, as the primary administrator of the Program, is generally responsible for monitoring and oversight. The ARB also implements the diesel retrofit component of the Program in conjunction with participating air districts. As of this writing, the retrofit emission control technologies verified for funding are particulate filters requiring the use of low-sulfur diesel fuel for school buses with applicable 1994 and later model year engines.

ARB estimates that about 450 new alternative fuel and lower-emitting diesel school buses will be purchased by the close of 2002. In addition, the ARB estimates that about 2,500 diesel school buses will be retrofitted by late 2003. Further replacement and retrofit of school buses depends upon future state budget allocations. For the 2002-2003 fiscal year, the ARB will receive $25 million under Proposition 40 to fund projects that affect air quality in State and local parks and recreational areas. Assembly Bill 425 (Stats. 2002, Ch. 379) requires that 20 percent of the Proposition 40 funds be used for the purchase of clean, safe school buses. (ARB, 2001a; Fregoso, 2002)

School bus replacement and retro-fit programs, alone, can not be expected to adequately address school bus TAC and other air pollutant emissions considering the number of older school buses and the current prospects for funding such programs. Generally, older school buses emit more TACs and other air pollutants than more current models. More than one-third of California's approximately 26,000 school buses are twenty years old or older. Approximately 7,000 of California's diesel-fueled school

buses were manufactured before 1987 and are subject to less stringent emission standards than those for later model school buses. (ARB, 2002b)

D. REASONS FOR PROPOSED ATCM

The Proposed ATCM would simply and effectively eliminate unnecessary school bus and other bus and heavy-duty vehicle idling emissions before they occur and, most importantly, would reduce exposure to TACs and other air pollutants beyond those reductions achieved by existing measures and programs. In addition to health and environmental benefits, the Proposed ATCM is anticipated to provide fuel and maintenance cost savings for motor carriers of affected buses and other vehicles.

Need

The Proposed ATCM would apply to all school buses and buses and other heavy-duty vehicles that operate at or near schools and is needed to complement existing regulations for the reasons listed below.

- California's anti-idling provision (HSC§42403.5) for diesel-powered buses and the Heavy-Duty Vehicle Inspection Program and Periodic Smoke Inspection Program:
  - Do not apply to gasoline- or alternative-fueled buses or vehicles;
  - Limit civil penalties for school-district-owned school bus idling; and
  - Do not specifically address children's peak exposure on idling school buses and other buses and vehicles involved in school transport.
- California title 13 California Code of Regulations section 1226 and Vehicle Code section 22515 preclude idling only when a school bus driver leaves the driver's compartment or a school bus or other bus or vehicle driver leaves the bus or vehicle unattended on a highway.
- Approximately 7,000 of California's diesel-fueled school buses were manufactured before 1987 and are subject to less stringent than current federal and California emission standards.
- No air district regulations, no local ordinances, and few written school district and school bus contractor polices address school bus idling.
- Voluntary school bus replacement and retrofit programs:
  - Provide a limited amount of funding for specified purposes;
  - Are not always feasible due to terrain, fuel availability, inability to retrofit;
  - Usually require matching funds; and
  - Are subject to future government budget allocations.

Benefits

The Proposed ATCM would benefit children, the general public, the environment, and motor carriers of affected buses and vehicles because the elimination of unnecessary idling would:

- Reduce children's peak exposure to diesel PM emissions which are associated with acute respiratory distress and, possibly, asthma attacks;
- Reduce children's and public's exposure to diesel PM and other air pollutants associated with cancer and other adverse health affects;
- Reduce emissions of particulate matter associated with the contamination of air, water, soil, and vegetation;
- Reduce noise and soiling, improve visibility; and
- Reduce bus and vehicle operating costs related to fuel use and engine wear.

Effectiveness

The Proposed ATCM would be reasonable and effective because it:

- Simply requires manually shutting off a bus or vehicle engine when idling is not necessary - no redesign or add-on mechanical devices are required.
- Recognizes situations where idling is necessary for safety or operational purposes.
- Can be effectively implemented and enforced through:
  - ARB development and distribution of educational materials to inform parents and teachers as well as the regulated community, including: school districts, transit agencies, private schools, school bus contractors, and owners or operators of heavy-duty vehicles (other than buses) operating at or near schools;
  - Pre-existing California Department of Education (CDE) training program and CHP certification program for school bus drivers; and
  - Enforcement by ARB Enforcement Division, the CHP, local peace officers or air districts.
- Is consistent with California and other state and local anti-idling measures and with local school district and school bus contractor polices.

II. PUBLIC OUTREACH

An open public process is an essential part of adopting any air quality regulation, including the Proposed ATCM to Limit School Bus Idling and Idling at Schools. State law requires an open regulatory process to ensure that all affected parties have adequate opportunity to provide pertinent information and comments. The following government agencies, industry groups, and organizations were identified as those that could be affected by, or may have particular interest in, the Proposed ATCM:

Government Agencies:	California Department of Education California Highway Patrol Public School Districts (Transportation Directors) Transit Agencies - California Transit Association California Air Pollution Control and Air Quality Management Districts U.S. Environmental Protection Agency U.S. Postal Service
Industry/Organizations:	Private Schools School Bus Contractors Heavy-duty Vehicle Fleets (operating at or near schools) Environmental Groups Environmental Justice, Children's Health, and Community Activist Groups California Association of School Transportation Officials California Association for Coordinated Transportation California Bus Association California Food Service Association California Parent-Teacher Association

ARB staff conducted public outreach to ensure that affected and interested parties were aware of, and had the opportunity to participate in, the development and review of the Proposed ATCM. These public outreach efforts are described below and summarized in Table II-1.

The public was initially made aware of the ARB's intention to address school bus and other heavy-duty bus and vehicle idling emissions by the publication of the "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles" in October 2000. The Risk Reduction Plan included a risk characterization scenario for idling school buses and general recommendations for reducing diesel PM from mobile sources. The Plan recommended motor vehicle idling

measures to enhance and maintain emission reductions achieved through new engine emission standards and retrofits. The OEHHA's release of "Prioritization of Toxic Air Contaminants Under the Children's Environmental Health Protection Act" in October 2001, underscored the potential need for a Proposed ATCM to limit idling of school buses and other heavy-duty buses and vehicles that operate at or near schools. Idling exhaust from all but zero emission heavy-duty buses and vehicles contains priority TACs, such as diesel PM, and other TACs and air pollutants harmful to children. (ARB, 2000b; OEHHA, 2001)

During development of the Proposed ATCM, staff identified a need to reach a large number of potential stakeholders. To address this need, staff established a School Bus Idling web page (http://www.arb.ca.gov/toxics/sbidling/sbidling.html) and list serve and submitted articles to newsletters for the California Association of School Transportation Officials (CASTO) and the California Air Pollution Control Officers Association (CAPCOA). Staff also presented information about the Proposed ATCM at meetings of the: CAPCOA Engineering Managers, CAPCOA Mobile Source and Fuels Committee, California Parent-Teachers Association Health Commission, Sacramento Consortium-Katz Safe School Bus Clean Fuel Efficiency Demonstration Program (the consortium consists of representatives from several northern California school districts and other organizations), Los Angeles Unified School District, CASTO Manager's Forum, and Environmental Council of the States and Association of State and Territorial Health Officials. In addition, numerous personal consultations and small-group conference calls were held with affected government agencies, industry, and others. In particular, ARB consulted extensively with the CDE and CHP throughout the development of the Proposed ATCM.

The ARB staff also conducted telephone surveys of state air quality regulators, school district transportation officials, and school bus contractors. The purpose of the surveys was to determine the extent to which idling has already been regulated and to request copies of existing idling statutes, regulations, ordinances, and policies. Information from the surveys confirmed the need for the Proposed ATCM and provided example regulations and policies to consider during its development. The results of the surveys were discussed earlier in Chapter I of this Staff Report. Appendix B provides a summary of state and local anti-idling measures. Chapter III of this Staff Report contains a discussion of staff observations of school bus loading at a northern California combination middle school and high school.

Notices for the Public Consultation Meeting held on July 23, 2002, and for two Public Workshops held on September 10 and 12, 2002, were sent to approximately 16,200 of the aforementioned stakeholders and to approximately 800 environmental justice, children's health, community, and environmental activists or organizations.

Approximately 40 persons attended the July 23, 2002 Public Consultation Meeting, including representatives of school districts, school bus contractors, California Parent-Teacher Association, environmental groups, State agencies (i.e., CHP, CDE, and CEC), and the U.S. EPA. During the meeting, staff presented and responded to

questions and comments about an initial idea to regulate school bus idling. As a result of comments at this meeting and two subsequent meetings with school district transportation officials, staff expanded the applicability of the Proposed ATCM to include all heavy-duty buses and vehicles that operate at or near schools. Once this decision was made, staff personally contacted California Transit Association, several large regional transit agencies, the U.S. Postal Service, and school food suppliers and others that use heavy-duty vehicles. Representatives from these organizations were placed on the School Bus Idling list serve or on a revised mailing list and a meeting was held with representatives of the California Transit Association in September 2002.

On August 30, 2002 and after, a draft ATCM could be accessed and downloaded from the School Bus Idling web page. Copies of the draft ATCM were also available by fax and electronic or regular mail and at the Public Workshops held on September 10, 2002 (SCAQMD Offices, Diamond Bar) and on September 12, 2002 (CalEPA Building, Sacramento). Approximately 30 persons attended each of the Workshops, including representatives of: California Transit Association, California Bus Association, Los Angeles Light and Power, Natural Resources Defense Council, school districts, private schools, school bus contractors, environmental groups, and State agencies. Workshop comments focused on clarification, implementation, and enforcement of the draft ATCM. Participants were encouraged to provide further comments by telephone, fax, electronic mail, or regular mail. They were also encouraged to contact Beverly Werner, Manager, Regulatory Assistance Section, to arrange a personal meeting or conference call with staff.

TABLE II- 1

SUMMARY OF PUBLIC OUTREACH HIGHLIGHTS

Highlight	Date	Affected and/or Interested Parties Involved
ARB Report: "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles"	October 2000	General Public
OEHHA Report: "Prioritization of Toxic Air Contaminants Under the Children's Environmental Health Protection Act"	October 2001	General Public
Telephone Survey	May-June 2002	Air Quality Regulators in 50 States
Telephone Survey	May 2002	882 School District Transportation Directors 13 School Bus Contractors
Middle-High School Site Visit	May 7, 2002	Elk Grove Unified School District
Article Prepared for and Published by CASTO Newsletter	May 22, 2002	Approximately 4,300 persons, including school bus driving instructors, school bus drivers, school transportation officials, and representatives of manufacturing and servicing firms
School Bus Idling Web Page and List Serve	May 2002 and ongoing	Web page accessible to general public; list serve reaches more than 5,000 individuals and organizations
CAPCOA Engineering Managers Meeting	June 4, 2002	Approximately 25 Air District Representatives
Article Prepared for and Published by CAPCOA Newsletter	June 14, 2002	125 CAPCOA Newsletter Subscribers
Presentation at Parent-Teachers Association Health Commission, Burlingame	July 11, 2002	Presentation to 30 directors; handouts for 120 attending Commission meeting
Public Consultation Meeting, Sacramento	July 23, 2002	Approximately 40 representatives of school districts, school bus contractors, California Parent-Teachers Association, environmental groups, State agencies, U.S. EPA
Presentation for Sacramento Consortium-Katz Safe School Bus Clean Fuel Efficiency Demonstration Program, Sacramento	July 24, 2002	Approximately 20 persons representing several northern California school districts, CHP, and a local air district
Presentation for Los Angeles Unified School District, Los Angeles	July 30, 2002	Approximately 20 Los Angeles Unified School District personnel involved in school transportation, school bus contractor

Highlight	Date	Affected and/or Interested Parties Involved
Public Workshops, Diamond Bar Sacramento	 Sept. 10, 2002 Sept. 12, 2002	 Approximately 30 persons Approximately 30 persons Including: school districts, private schools, school bus contractors, bus associations, transit organization, environmental groups, local government utility, State agencies
CAPCOA Mobile Source and Fuels Committee, Sacramento	September 12, 2002	Approximately 10 Air District Representatives
California Transit Association Conference Call	September 20, 2002	5 high level transit organization officials
Environmental Council of the States and Association of State and Territorial Health Officials	October 16, 2002	Representatives from state environmental and health agencies
CASTO Manager's Forum, Orange County	October 17, 2002	Approximately 100 to 150 School Transportation Officials

III. EMISSIONS, EXPOSURE, HEALTH EFFECTS, AND HEALTH RISK ASSESSMENT

A. EMISSIONS

California School Buses

"School Bus" Definition

For the purposes of the Proposed ATCM to Limit School Bus Idling and Idling at Schools and this Staff Report, the term "school bus" is based upon the definition in Vehicle Code section 545, i.e., a vehicle used to transport children at or below the 12th-grade level to or from public or private school or school activities, excluding any: passenger vehicle designed for and carrying 10 or fewer persons, school pupil activity bus, youth bus, or general public paratransit vehicle. The complete description of the proposed "school bus" definition is included in Appendix E: Glossary of Terms of this Staff Report. The CHP conducts a safety inspection for each California school bus at least once every 13 months. Based upon CHP safety inspection records, there are approximately 26,000 school buses of various sizes, fuel types, and ages in California. These buses transport nearly one million children to school and school activities each year. (Esbri, 2002; School Bus Fleet, 2002)

The distribution of school buses in California tracks population, that is, more school buses operate in the highly-populated metropolitan areas than in less populous rural areas. About 10,770 school buses are located in northern and central California, and about 15,360 are located in southern California. School districts, school bus contractors, and private schools own about 60, 36, and 4 percent of California school buses, respectively. School bus contractors are private companies that contract with school districts to provide school bus service. (Esbri, 2002)

School Bus Sizes

The size of California school buses range from 6,000 to more than 33,000 pounds manufacturer's gross vehicle weight rating. The manufacturer's gross vehicle weight rating is the maximum weight for which a vehicle is designed. Using number of passengers and gross vehicle weight rating as size criteria, the CHP designates school buses as Type 1 or 2. A Type 1 bus is designed for carrying more than 16 passengers while a Type 2 bus is designed for carrying not more than 16 passengers, or, if manufactured on or after April 1, 1977, has manufacturer's gross vehicle weight rating of 10,000 pounds or less and is designed for carrying not more than 20 passengers. Generally, a Type 1 school bus would be equipped with a larger engine and emit more TACs and air pollutants than a Type 2 school bus. However, a new Type 1 may actually emit less than an old Type 2 school bus. CHP safety inspection records indicate that approximately 75 percent of California school buses are Type 1 and 25 percent are Type 2. (Esbri, 2002)

School Bus Fuel Use

According to CHP safety inspection records, approximately 87 percent of California school buses are diesel-fueled, nine percent are gasoline-fueled, three percent are CNG-fueled, and one percent are multi-fueled or fueled by: liquefied natural gas, liquefied petroleum gas, methanol, or electric battery. (Esbri, 2002)

School Bus Fleet Age

When compared with other on-road motor vehicles (i.e., automobiles, trucks, and urban buses), California's school bus fleet is, on average, comprised of older vehicles. For example, approximately 60 percent of school buses, but only 48 percent of automobiles, in California are more than 10 years old. School bus contractor-owned school buses tend to be newer than the average school bus fleet because they are driven more miles per year and are replaced more frequently than school district-owned school buses. Age is an important consideration because older vehicles generally emit larger amounts of TACs and other air pollutants. In particular, school buses model year 1987 or earlier (i.e., more than one-third of California's school bus fleet) are subject to less stringent emission standards than those manufactured after that date. (Valley Research, 1994; ARB 2001a; ARB, 2002b; Landberg, 2002)

The Statewide school bus turnover rate is likely to remain lower than that of other on-road motor vehicles because school districts, which own 60 percent of the fleet, do not have sufficient funds to purchase new school buses on a regular basis. As of this writing, new school buses are estimated to cost between $86,000 and $117,000. Retrofitting diesel school buses with ARB-certified particulate filters is estimated to cost $6,500 to $7,500 per school bus. As of this writing, the retrofit emission control technology verified for funding is limited to filters requiring the use of low sulfur diesel fuel for school buses with applicable 1994 and later model year engines. The ARB's Lower-Emission School Bus Program previously described in Chapter I is expected to allow the purchase of about 450 new alternative fuel and lower-emitting school buses by the end of 2002 and the retrofit of about 2,500 in-use diesel school buses by the end of 2003. For the 2002-2003 fiscal year, the ARB will receive $25 million under Proposition 40 to fund projects that affect air quality in State and local parks and recreational areas. Assembly Bill 425 (Stats. 2002, Ch.379) requires that 20 percent of the Proposition 40 funds be used for the purchase of clean, safe school buses. (Fregoso, 2002; Landberg, 2002) However, even if current State funding problems are resolved, continued school bus replacement and retrofit under this program depend upon future State budget allocations. Such programs, alone, will not achieve the maximum possible reduction in Statewide children's exposure to school bus TAC and other air pollutant emissions.

School Bus Activity Pattern

Although California's school bus fleet is quite diverse with respect to size, fuel use, and age, the general bus-to-bus activity pattern is consistent. Generally, a morning school

bus route begins at a parking or maintenance facility and proceeds with brief stops to load children at bus stops. The morning route terminates with the unloading of children at a school. In the afternoon, the route is reversed. In addition, a school bus may stop to load or unload children at transfer points during both morning and afternoon routes and some buses may simply serve as shuttles between the school and one or more transfer points. The time a child-rider spends aboard a school bus per day may range from 20 to 120 or more minutes depending upon where the child lives in relation to the school and his or her other activities.

The ARB Planning and Technical Support Division estimates that most school buses are driven an average of about 40 miles per day. (ARB, 2002b) A 1994 study of on-road motor vehicle activity indicates that about 98 percent of school bus vehicle miles are driven on weekdays with peak driving periods occurring in the morning before schools open and in the afternoon after schools close. The study also indicates that about 70 percent of school bus miles traveled are for the purpose of transporting children to and from school. About 20 percent are "deadhead" miles traveled for the purpose of returning school buses to a parking and/or maintenance facility and about 10 percent are miles traveled transporting children to and from school activities such as field trips, sporting events, etc. Staff note that individual schools may provide space for parking school buses when not in use and thus reduce or eliminate "deadhead" miles. (Valley Research, 1994)

School Transportation Other Than School Buses

In addition to school buses, there are several other types of heavy-duty buses and vehicles whose primary purpose is the transport of children to and from school, school-related, or other activities, including school pupil activity buses, youth buses, and general public paratransit vehicles (i.e., those transporting children). The complete descriptions of the proposed definitions for these buses and vehicles are in Appendix E: Glossary of Terms of this Staff Report .

A school pupil activity bus is used to transport children to and from school activities such as class field trips, museum visits, or school sporting events. Schools may charter buses from private companies or use their own or another school district's school buses for such activities. Similarly, schools may hire bus drivers certified for school buses from private companies or use their own or another school district's school bus driver by special agreement. The frequency of such trips varies a great deal from school to school and, for the same school, from year to year. Some schools do not have sufficient funds to sponsor such trips while others may sponsor as many as 15 or more school-related trips per year. A youth bus is used to transport children from school to a non-school activity such as "Kids Day at the Fair." Similar to school pupil activity buses, a variety of motor carrier-operator relationships are possible and trip frequency is highly variable. Typically, a school pupil activity bus or youth bus would be expected to begin and end its trip at a school and spend two or more hours at the activity site.

A general public paratransit vehicle transporting children to and from school or a school activity is owned and operated by a public transit system, but it is not considered a "transit bus" (see discussion of transit buses below). Usually, a general public paratransit vehicle would have the same activity pattern as a school bus or a school pupil activity bus depending on the nature of the trip. These vehicles frequently transport children with exceptional needs (e.g., children susceptible to seizures and other health emergencies). To prevent such emergencies, it is necessary for a vehicle transporting one or more children with exceptional needs to maintain moderate interior temperatures at all times.

Transit Buses and Heavy-duty Vehicles Other Than Buses Operating At Or Near Schools

Many transit buses and heavy-duty vehicles other than buses (e.g., delivery, construction, and maintenance vehicles) operate at or near schools. A transit bus is owned or operated by a publicly owned or operated transit system, or operated under contract with a publicly owned or operated transit system. Its purpose is to provide regularly scheduled transportation to the general public for which a fare is charged.

The Valley Research Corporation under contract to the ARB gathered and analyzed transit bus fleet and activity data. According to their study, transit buses are fewer in number, but travel more miles and make more service stops, than school buses. Also, in contrast to school buses, transit buses routinely operate on weekends as well as weekdays; however, on weekends, they typically follow an abbreviated schedule. The study was not designed for and contained no specific data about transit bus operation at or near schools. However, according to the California Department of Education, transit buses do not operate on school grounds as a matter of routine. Generally, transit bus operation at or near a school is limited to brief, regularly scheduled stops to load and unload passengers at a bus stop adjoining the school. (Valley Research, 1994; Green, 2002)

A variety of heavy-duty vehicles other than buses may operate at or near schools, including: food and supply delivery trucks, garbage trucks, and various vehicles that perform construction or maintenance work. The frequency of heavy-duty vehicle trips to schools may range from occasional to several times per week depending upon the work the vehicle performs and the needs of the school or school neighborhood. (Miller, 2002; Sherrill, 2002)

Idling

For the purposes of the Proposed ATCM and this Staff Report, the term "idling" means the engine is running while the bus or vehicle is stationary. Very little detailed information is available about when, where, and how much school buses or other motor vehicles idle. Engine manufacturers and fleet operators recommend that drivers avoid unnecessary idling because such idling:

- Wastes fuel (i.e., 0.5 or more gallons of fuel are burned per hour of diesel engine idling;
- Increases preventive maintenance due to the need for more frequent oil and filter service; and
- Causes engine wear due to carbon build-up. (Truck Maintenance Council, 1995; Caterpillar, 2001)

A list and discussion of circumstances when school buses and other buses and vehicles must idle for safety or operational purposes is included in Chapter IV, Section B, Discussion - Exemptions, of this Staff Report. The idling requirements of Subsection (c) of the Proposed ATCM would not apply in those exempt circumstances where idling is considered necessary.

Subsection (c) requirements of the Proposed ATCM would apply to unnecessary idling when a bus or vehicle is safely parked outside of traffic, for example, idling:

- Due to the unfounded fear that a diesel engine will not restart if it is shut off;
- To "warm-up" a diesel engine for more than five minutes before operation (Caterpillar, 2001);
- While simply waiting for passengers, or, for the scheduled time of departure;
- During passenger loading or unloading; or
- To avoid running down the battery while unnecessarily operating equipment (e.g., a heater or air conditioner).

In addition, concerns about “starter wear” as a result of shutting off and restarting an engine several times per day are unfounded. Considering typical driving activity patterns of school transportation buses and vehicles, staff anticipate three to five additional engine restarts per day would be necessary as a result of the Proposed ATCM. Even 10 times that number of additional restarts is not expected to significantly affect starter wear. (Hintz, 2002; Steinbrenner, 2002)

Idling of School Buses and Other Buses and Vehicles Used in School Transportation

In 1993, some information about school bus idling was collected during a chase-car study conducted by the Valley Research Corporation under contract to the ARB. In this study, chase cars were equipped with data loggers to record speed and distance. The chase cars followed seven different South Coast Air Basin (SoCAB) school buses during randomly chosen portions of each bus's route for 30-minute periods. A total of 70 trips were made. The study was not designed to address school bus idling and provided no specific data about idling during initial engine warm-up and safety and equipment inspection at the parking or maintenance facility, loading or unloading of children at schools, or the wait for children to end a school day or school activity. Nevertheless, the study did provide some data about idling at bus stops and in-traffic. The study indicated that school bus trips in SoCAB urban areas include, on average, eight minutes of idling for each 30 minutes of travel while those in SoCAB rural areas include, on average, five minutes of idling for each 30 minutes of travel. More time may be spent idling in urban than in rural areas due to increased stoplights and traffic congestion. (Valley Research, 1994)

In some school districts, school bus idling time has already been minimized. For example in May 2002, staff observed the arrival, loading, and departure of 19 school buses at a combination middle school-high school in northern California. Staff observed school buses arriving up to 30 minutes before classes were dismissed. However, at this school, very little idling was observed because early school bus drivers turned off their engines upon arrival and restarted them only one to three minutes before departure. Also, when children were able to board immediately upon school bus arrival, idling and boarding were coincidental and lasted no more than two to three minutes. At this school, idling times would have ranged from about two to 33 minutes if all school buses had idled from the time of arrival until departure.

No specific studies have been conducted regarding the idling of school pupil activity buses, youth buses, or general public paratransit buses. However, general public paratransit vehicles are expected to idle more in order to maintain moderate interior temperatures for children with exceptional needs. As previously mentioned, such idling is necessary in order to prevent the risk of health emergencies.

Idling of Transit Buses and Heavy-duty Vehicles Other Than Buses That Operate At or Near Schools

According to the previously mentioned study conducted by Valley Research Corporation, both transit and school buses spend roughly 30 percent of total trip time in idling; however, transit buses make more service stops and engage in more idling events than school buses. (Valley Research, 1994) A transit bus likely idles no more than five minutes during most passenger loading and unloading operations at a bus stop near a school unless such stop is the beginning of the bus route, a transfer point, or a break point for the driver. For reasons of liability and fuel savings, heavy-duty vehicles other than buses likely idle very little at or near schools except when running an engine is necessary to operate auxiliary equipment such as refrigeration units, lifts, drills, mixers, etc.

School Transportation Emissions

Introduction

The ARB Planning and Technical Support Division used EMFAC 2001 Version 2.09 to provide exhaust emission factors for the Statewide 2002 school transportation fleet consisting of more than 29,000 diesel- and gasoline-fueled school buses and other buses and vehicles currently registered for school use by the California Department of Motor Vehicles (DMV). The exhaust emission factors for the fleet were assumed to be the same as those of diesel- or gasoline-fueled vehicles with gross vehicle weight rating between 14,001 and 33,000 pounds because: 1) there is a lack of specific test data on school transportation buses and vehicles; and 2) school transportation buses and vehicles generally use the same engines as trucks and other buses and vehicles of comparable size and fuel use.

In addition, the Planning and Technical Support Division provided exhaust emission factors on CNG-fueled school buses based upon emissions testing on a chassis dynamometer of a single CNG transit bus. The ARB Research Division-sponsored emissions testing was conducted in conjunction with a study to compare the running exhaust emissions of a CNG transit bus and a diesel transit bus before and after installation of a particulate trap. The single CNG bus tested and the approximately 815 CNG school buses in the school transportation fleet are about the same age and were assumed to have similar emissions. However, transit buses and school buses are subject to different emissions standards and may differ in one or more components of their emissions profiles. Due to lack of data, exhaust emission factors were not estimated for alternative-fueled buses and vehicles other than CNG. (ARB, 2002b; Esbri, 2002)

Idling Emissions

Idling exhaust emissions occur when the engine is running but the bus or vehicle is stationary. Table III-1 shows the estimated PM10 idling exhaust emission rates for diesel-fueled and compressed natural gas-fueled school transportation buses and vehicles. Staff notes that PM10 idling exhaust emission rates for gasoline-fueled buses and vehicles are small and for all practical purposes are considered to be negligible when compared to the total fleet emissions. (U.S. EPA, 1998) In addition, Table III-1 shows estimated idling exhaust emission rates for THC, CO, and NOx for the aforementioned diesel and CNG buses and vehicles, and for gasoline-fueled bus and vehicles.

TABLE III- 1

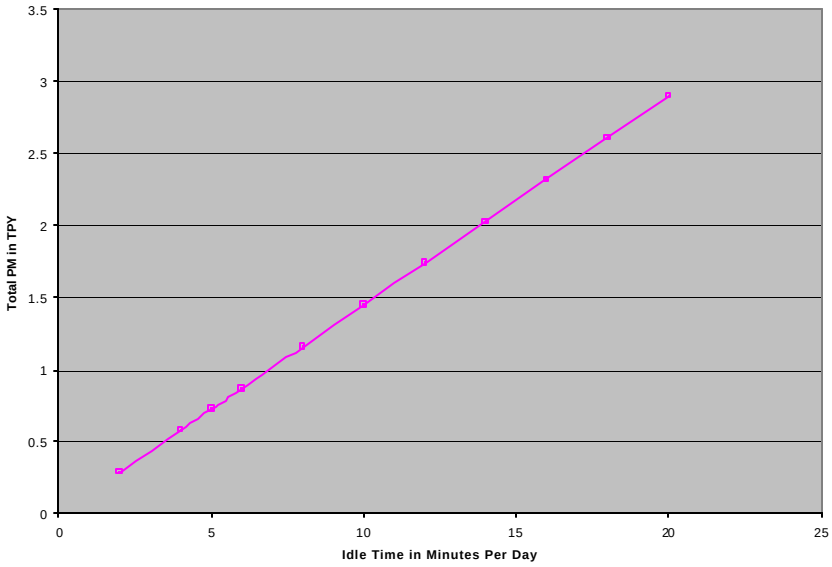
ESTIMATED STATEWIDE 2002 SCHOOL TRANSPORTATION FLEET IDLE EXHAUST EMISSION RATES (Grams Per Minute)

	Idle exhaust			
Fuel	**THC**	**CO**	**NOx**	**PM10**
Gasoline	0.45	2.58	0.03	0.0001
Diesel	0.06	0.44	1.35	0.03
CNG	0.92	0.43	0.03	0.0046

As discussed earlier, for the purpose of fuel savings, as well as children's and driver's health, a trend toward limiting unnecessary idling may already be underway. However, there is very little information about how much school transportation buses and vehicles idle and no specific information about unnecessary idling. Staff selected a range of 2 to 20 minutes of idling time per day per fleet vehicle for the purpose of illustrating estimated Statewide 2002 school transportation fleet PM10 emissions as a function of time idled in Figure III-1. Figure III-1 shows how total annual PM10 emissions are expected to increase as idling time increases. The annual PM10 estimates for Figure III-1 are based upon 81 percent of school transportation fleet vehicles operating 180 days per year and 19 per cent operating 250 days per year (Green, 2002).

FIGURE III- 1

ESTIMATED ANNUAL STATEWIDE 2002 SCHOOL TRANSPORTATION FLEET PM10 EMISSIONS AS A FUNCTION OF IDLE TIME



Conclusions Regarding Idling Limits

Based upon a limited body of test data, modeling runs, and extrapolated data, the elimination of unnecessary idling is expected to decrease PM10 emissions from diesel- and CNG-fueled buses and vehicles. The change in PM10 emissions for gasoline-fueled buses and vehicles is expected to be small. With respect to other criteria pollutants, overall, school transportation fleet emissions of THC, CO, and NOx are also expected to decrease as a result of the Proposed ATCM. Staff analyses show that limiting idling of the school transportation fleet and other buses and heavy-duty vehicles that operate at or near schools would reduce PM10 emissions and, as a result, reduce exposure to diesel PM and PM2.5 emissions. Therefore, staff believe that the Proposed ATCM would be an efficient and cost-effective means of meeting the ARB's goal to significantly reduce children's parents', teachers', and nearby residents' exposure to diesel PM at or near schools.

Non-idling Emissions

For the purpose of providing perspective on the amount of school transportation fleet emissions relative to total Statewide mobile source emissions, staff analyzed non-idling emissions from gasoline- and diesel-fueled buses and vehicles.

Non-idling emissions include emissions from diurnal, resting loss, hot soak, and running loss processes as well as idling and starting emissions. These processes are defined in

Appendix E: Glossary of Terms and are described in more detail in Chapter 5 of the EMFAC 2000 Technical Support Documentation which may be accessed at http://www.arb.ca.gov/msei/doctabletest/doctable_test.html. (ARB, 2000a) Table III-3 shows estimated daily and annual average THC, NOx, CO, and PM10 emissions (excluding idling). (ARB, 2002b)

TABLE III- 2

ESTIMATED STATEWIDE 2002 SCHOOL TRANSPORTATION FLEET EMISSIONS EXCLUDING IDLING

Fuel	Number of Buses and Vehicles	THC		CO		NOx		PM10	
		TPD	TPY	TPD	TPY	TPD	TPY	TPD	TPY
Diesel	23,234	1.12	216	6.39	1,236	30.84	5,961	0.54	105
Gasoline	6,635	1.75	338	26.17	5,058	1.33	257	--	--
Total	29,869	2.87	554	32.56	6,294	32.17	6,218	--	--

The estimated 105 tons per year (TPY) diesel PM non-idling emissions from the school transportation fleet constitute less than two-tenths of one percent of the 687,200 TPY diesel PM emissions estimated from all diesel on-road mobile sources in the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (ARB, 2000b).

B. HEALTH EFFECTS AND EXPOSURE

Adverse Health Effects

Motor vehicle exhaust, including that from buses and other heavy-duty vehicles operating at or near schools, exposes children and others to numerous TACs and other air pollutants. Table III-4 briefly lists the adverse health effects associated with the most significant of these motor vehicle exhaust pollutants and identifies those that are priority TACs for children. Priority TACs for children are TACs designated by the OEHHA to be among the top five that may cause infants and children to be especially susceptible to illness. The OEHHA considered the following criteria as part of the prioritization process: 1) disproportionately high exposure for infants and children; 2) special susceptibility of infants and children; 3) effects of simultaneous exposures to compounds with the same mechanism of action; and 4) interactions of air pollutants. (OEHHA, 2001)

TABLE III- 3

ADVERSE HEALTH EFFECTS OF TOXIC AIR CONTAMINANTS (TACS) AND CRITERIA POLLUTANTS ASSOCIATED WITH MOTOR VEHICLE EXHAUST

TAC	Adverse Health Effects
Acetaldehyde	Respiratory irritant, possible asthma exacerbation, probable carcinogen. (ARB, 1993a; OEHHA, 2001)
Acrolein (Children's Priority TAC)	Eye and respiratory tract irritant, asthma exacerbation, possible carcinogen. (OEHHA, 1999; OEHHA, 2001)
Benzene	Hematotoxic, carcinogen. (OEHHA, 2001)
Benzo[a]pyrene (Children's Priority TAC)	Teratogenic, immunotoxic, probable carcinogen. (OEHHA, 2001)
1,3-Butadiene	Teratogenic, probable carcinogen. (ARB 1992b; OEHHA, 2001)
Diesel Exhaust Particulate Matter (Children's Priority TAC)	Enhances respiratory allergic reactions, possible asthma exacerbation, immunotoxic, teratogenic, probable carcinogen. (OEHHA, 2001)
Chlorinated Dioxins and Dibenzofurans (Children's Priority TAC)	Immunotoxic, teratogenic, developmental neurotoxic, probable carcinogen. (OEHHA, 2001)
Formaldehyde	Eye and respiratory tract irritant, asthma exacerbation, decreased pulmonary function, probable carcinogen. (OEHHA,1999; OEHHA, 2001)
Criteria Pollutant	**Adverse Health Effects**
Carbon Monoxide	Headache, irritability, impaired judgement and memory, breathlessness, aggravation of angina and other cardiovascular diseases, developmental toxicity (OEHHA, 1999).
Ozone	Eye and respiratory irritant, asthma exacerbation, bronchitis, lung damage. (ARB, 1991)
Oxides of Nitrogen	Respiratory irritant, immunosuppressant, asthma exacerbation. (ARB,1991)
Particulate Matter	Respiratory irritant, high levels associated with increased incidence of: cardiovascular and lung failure in elderly, asthma in children. (ARB, 1991; SCAQMD, 2000)

Differences in Children and Adult Exposure to Air Pollutants

For many years, scientific studies focused on the air pollutant exposure and resultant adverse health effects for adults. More recently, the scientific community has recognized that children's exposure to harmful substances in the air differs from that of adults and could make them more susceptible to illness. A primary difference is that children inhale more air per unit of body weight than adults. Children's higher activity levels further increase their respiration rates, which, in turn, increase the amount of air and air pollutants children inhale relative to adults. Moreover, much of children's increased activity occurs outdoors where the levels of many air pollutants are highest.

In addition, children are exposed to more air pollutants than adults via indirect routes, such as food, water, and soil contamination by consuming more food and water per unit of body weight. Even very young infants are indirectly exposed to air pollutants through the ingestion of human breast milk. Also, as a result of playing in or near air pollutant-contaminated soil, children typically experience more indirect exposure from soil than do adults.

Children are physiologically more susceptible than adults to harm from air pollutant exposure because their pulmonary, immune, and detoxification systems are less mature than those of adults. The majority of pulmonary system growth and development occurs after birth and may not be complete until early adolescence. Pulmonary development includes cell proliferation, cell differentiation, and bronchiole branching. The relatively small diameters and surface area of children's bronchioles, as well as the immature cells constituting the respiratory tract and lungs, make deposition of particles more likely to cause harm. Recent primate studies indicate that air pollutant and allergen exposure in childhood can permanently effect pulmonary development and compromise a person's ability to handle additional exposures as an adult. Neonates and infants are particularly vulnerable to air pollutants because their defense mechanisms (e.g., cellular immunity, mucosal cells, detoxifying enzyme levels) do not respond or function as well as those of adults. Such defense mechanisms are essential to ridding the body of, and repairing the damage done, by harmful substances. (EHHI, 2002) (OEHHA, 2001) (Plopper, 2002)

Exposure

Although staff is concerned about children's exposure to TAC and other air pollutant emissions from all buses and vehicles operating at or near schools, diesel PM emissions from buses and vehicles involved in school transport are of utmost concern and will be the focus of this discussion on exposure for the following reasons: 1) school transport buses and vehicles primarily serve children; 2) 87 percent of school buses are diesel-fueled; 3) diesel PM is a complex mixture of gases, vapors, and particles that contains several priority TACs for children; 4) diesel PM contains several TACs that are emitted from gasoline- and alternative- fueled motor vehicles as well; 5) diesel PM is responsible for most of the cancer risk associated with school bus exhaust; and 6) studies indicate that exposure to diesel PM is associated with acute respiratory problems in children.

For the year 2000, estimated outdoor and indoor statewide annual population-weighted average diesel PM concentrations are 1.8 and 1.2 micrograms per cubic meter, respectively. However, school bus drivers (approximately 26,000 in California) and children who ride school buses each year (approximately one million in California) are likely to be exposed to higher than average outdoor and indoor diesel PM concentrations. Other persons that may be exposed to higher than average concentrations of diesel PM due to school transport bus or vehicle emissions are: children on school grounds and in school classrooms, teachers and other school employees, and persons living in neighborhoods near schools or school bus yards. (ARB, 2000b; School Bus Fleet, 2002)

Several studies have established that in-vehicle air pollutant concentrations can be higher than concentrations measured at near-by ambient monitors. Generally, these studies have shown that the greatest influence on in-vehicle concentrations is likely to be the exhaust of near-by vehicles, particularly during stop-and-go traffic conditions. Other factors affecting in-vehicle concentrations include weather conditions, time of day, and the size, age, and degree of ventilation of the vehicle.

There are a few studies of diesel PM concentrations inside diesel-fueled school buses. These studies are difficult to compare because each involves a very limited number of school buses and a unique test protocol. Samples were collected at various locations in and outside test school buses under a variety of conditions and were analyzed for one or a combination of diesel PM surrogates such as PM2.5, PM10, or carbon black (i.e., diesel soot). Generally, these studies appeared to reinforce conclusions drawn from earlier studies of other types of motor vehicles. For example, recent studies conducted by the Natural Resources Defense Council (NRDC) and Environment and Human Health, Inc. (EHHI) and a pilot study conducted by the ARB indicated that diesel PM inside school buses can be several times higher than ambient levels under certain conditions. The EHHI study and ARB's pilot study associated peak concentrations of diesel PM with idling school buses in queue to load or unload students, at stop lights, or in the midst of slow-moving traffic. These studies indicated that limited air exchange rates associated with idling, particularly in the presence of other idling or slow-moving diesel-fueled vehicles, can result in increased diesel PM inside test school buses. All three studies indicated higher concentrations of diesel PM inside school buses or other vehicles when they directly followed or were near diesel-fueled vehicles in traffic.

The testing protocols for the three studies did not provide sufficient data to indicate the amount of emissions contributed by a test school bus to diesel PM concentrations inside the bus. Indeed, such contribution could be expected to vary depending upon a school bus's design, mode of operation, age, maintenance, passenger compartment integrity, and the presence or absence of an exhaust leak.

Personal exposure data from the EHHI study indicated higher than ambient diesel PM concentrations immediately outside school buses in loading and unloading areas. However, the period of exposure is expected to be brief because children do not usually remain in such areas for long. The health risk assessment discussion that follows addresses the important issue of length of exposure. (ARB, 1998b; ARB, 2002a; EEHI, 2002; NRDC, 2001)

C. HEALTH RISK ASSESSMENT

This section examines the potential cancer health risks associated with exposure to particulate matter emissions from idling diesel-fueled school buses and exposure to toxic emissions from idling gasoline- or natural gas-fueled buses. Additional details on the methodology used to estimate the health risks are presented in Appendix C of this report.

Risk assessment is a complex process which requires the analysis of many variables to simulate real-world situations. There are three key types of variables that can impact the results of a health risk assessment for idling school buses – the magnitude of diesel PM emissions, the meteorological conditions, and the length of time someone is exposed to the emissions from school buses. Diesel PM emissions are a function of the age of the school bus, how many buses are idling at one time, and the duration of the idling. Older buses tend to have greater emissions than newer buses and the longer a bus idles the greater the emissions. Meteorological conditions can have a large impact on the resultant ambient concentration of diesel PM with higher concentrations found along the predominant wind direction and under calm wind conditions. How close a person is to the emissions plume and how long he or she breathes the emissions (exposure duration) are key factors in determining potential risk with longer exposures times typically resulting in higher risk.

Because risk estimates for idling school buses are dependent on numerous factors and because these factors vary from location to location, ARB staff developed a generic risk assessment for idling school buses. We assumed that buses would emit at the statewide school bus fleet weighted average emission factor for the 1965 through 2002 model years; that 1, 5, or 10 buses would be idling at any one time; and that the idle duration would range from 1 to 10 minutes twice per day. Meteorological data from West Los Angeles was selected to provide meteorological conditions with lower wind speeds and more persistent wind directions, which will result in less pollutant dispersion and higher estimated risk. Additionally, meteorological data for Sacramento was also used. Meteorological data from these two areas encompasses the range of meteorological conditions expected in California. The U.S. EPA's ISCST3 air dispersion model was used to estimate the annual average diesel PM concentration at 20, 40, and 60 meters from the bus loading/unloading location.

The estimated annual average diesel PM concentrations were then adjusted to take into consideration how long a person might breathe these emissions. Consistent with the current risk assessment methodology recommended by the Office of Environmental Health Hazard Assessment and used by ARB in evaluating potential cancer risk from diesel PM emission sources, we assumed that students would be exposed to modeled diesel PM concentrations for 180 days/year for 9 years, teachers for 180 days/year for 40 years, and nearby residents for 180 days/year for 70 years. These exposure durations represent an "upper-bound" of the possible exposure duration. The potential cancer risk was estimated by multiplying the modeled annual average concentrations of

diesel PM, adjusted for the duration of exposure, by the unit risk factor for diesel PM (300 excess cancers per million people/microgram/cubic meter of diesel PM).

Overall, we estimate that the potential cancer risk for students exposed to emissions from idling diesel-fueled school buses will generally be less than 1 potential cancer case per million. The estimated potential cancer risk for teachers will generally be less than 5 potential cancer cases per million and, for nearby residents, the estimated potential cancer risk will be less than 10 potential cancer cases per million. As mentioned previously, these risk values assume exposure durations of 9 years for children (student), 40 years for teachers, and 70 years for nearby residents. These risk values also assume that an individual would remain within 20 to 40 meters of the idling school bus zone for up to 20 minutes per day for 180 days per year. The estimated risk level would be reduced proportionately if the actual exposure duration decreased from the assumed exposure duration of 9, 40, and 70 years or if the student, teacher or resident were further away from the loading zone.

The estimated risk levels presented here are based on a number of assumptions. The potential cancer risk for actual situations may be less than or greater than those presented here. For example, an increase in the number of buses or the duration of idling would increase the potential risk levels. A decrease in the exposure duration or an increase in the distance from the loading/unloading location would decrease potential risk levels. The estimated risk levels would also decrease over time as newer, lower-emitting diesel-fueled school buses replace older buses. Therefore, the results presented are not directly applicable to any particular school. Rather, this information is intended to provide an indication as to the potential relative levels of risk that may be observed from idling school buses and to act as an example when performing a site-specific risk assessment for idling diesel school buses.

No OEHHA-approved unit risk factors for PM emissions from gasoline- and CNG-fueled engines are currently available. As such, comparative risk analyses cannot be provided for PM emissions from gasoline and CNG-fueled school buses at this time. However, staff did evaluate the risk associated with selected toxic emissions from idling gasoline-fueled buses (benzene, 1,3-butadiene, and formaldehyde) and CNG-fueled school buses (formaldehyde and acetaldehyde). Using the same modeling input parameters used for the diesel-fueled school buses, these analyses showed the potential cancer risk associated with gasoline- and CNG-fueled idling school buses is approximately a factor of 10 less than that associated with diesel-fueled school buses.

IV. SUMMARY AND DISCUSSION OF THE PROPOSED AIRBORNE TOXIC CONTROL MEASURE TO LIMIT SCHOOL BUS IDLING AND IDLING AT SCHOOLS

A. SUMMARY

The Proposed ATCM to Limit School Bus Idling and Idling at Schools is designed to reduce children's and the general public's exposure to diesel PM and other toxic air contaminants and air pollutants from heavy-duty: 1) buses and vehicles whose purpose is the transport of children at or below 12th-grade level to and from school and other activities; and 2) transit buses and vehicles other than buses that operate at or near schools.

The requirements of the Proposed ATCM would affect both the public and private transportation industry. The public agencies that could be affected are school districts and transit agencies. The private businesses that could be affected are private schools, school or other bus contractors, and heavy-duty vehicle fleets. These agencies and businesses would be affected to the extent they own, operate, or direct the operation of the following: school buses, school pupil activity buses, youth buses, general public paratransit vehicles transporting children, transit buses operating at or near schools, and other heavy-duty vehicles (e.g., delivery, construction, or maintenance vehicles) operating at or near schools.

The Proposed ATCM would require that a driver of a school bus or other bus or heavy-duty vehicle manually turn off the bus or vehicle engine upon arriving at a school and restart it no more than 30 seconds before departure. A driver of a bus or vehicle whose primary purpose is the transport of children (i.e., a school bus, school pupil activity bus, youth bus, or general public paratransit vehicle) would be subject to the same requirement when operating within 100 feet of a school and would be prohibited from idling beyond five minutes at any location more than 100 feet from a school. A driver of a transit bus or other heavy-duty vehicle, whose primary purpose is not the transport of children, would be prohibited from idling beyond five minutes within 100 feet, of a school. Again, a transit bus or other heavy-duty vehicle would also be prohibited from idling on school grounds for more than 30 seconds before departure. In addition, the Proposed ATCM would require a motor carrier of an affected bus or vehicle to: ensure that drivers are informed of the idling requirements, track complaints and enforcement actions regarding the requirements, and keep records of these driver education and tracking activities.

The Proposed ATCM would exempt specific idling situations where health, safety, or operational concerns take precedence. For example, exemptions are provided for idling: in the midst of traffic; to ascertain safe operating conditions of a bus or vehicle; for test, service, repair, or diagnostic purposes; for turbo-charged diesel engine cool down; to accomplish work, other than transportation, for which a vehicle was designed

(e.g., controlling cargo temperature or operating a lift, drill, etc.); to operate equipment needed by persons with disabilities and heaters or air conditioners for children with exceptional needs; to operate defrosters or other equipment to prevent a safety or health emergency; and to recharge a hybrid electric bus or vehicle. In addition, the Proposed ATCM contains a provision that describes its relationship other laws. To avoid potential conflict with those laws, the Proposed ATCM clearly states that it does not allow idling in excess of other applicable limits, or in excess of more stringent limits. The basis and the full text of the Proposed ATCM may be found in Chapter I, Section B and Appendix A, respectively.

B. DISCUSSION

Purpose

As specified in Subsection (a) of the Proposed ATCM, the regulation is intended to protect children and others by reducing exposure to emissions of diesel PM, acetaldehyde, benzene, benzo[a]pyrene, 1,3-butadiene, chlorinated dioxins and dibenzofurans, formaldehyde, and other toxic air contaminants in school bus and other bus and heavy duty vehicle exhaust. Reduced exposure, particularly children's exposure to diesel PM, is expected to result from limiting excessive school transportation bus and vehicle idling at all locations and of other bus and heavy-duty vehicle idling at or near schools. As an additional benefit, compliance with the Proposed ATCM is expected to reduce the bus and other heavy-duty vehicle emissions of other TACs and air pollutants associated with adverse health effects in children and others.

Applicability

As specified in Subsection (b) of the Proposed ATCM, the regulation would apply to school buses, school pupil activity buses, youth buses, general public paratransit vehicles when transporting children at or below the 12th-grade level to or from public or private school or school activities, transit buses, and other heavy-duty vehicles (e.g., food and supply delivery trucks, garbage trucks, and construction-maintenance vehicles). Bus and vehicle definitions in Subsection (h) of the Proposed ATCM clarify that the requirements in the Proposed ATCM would not apply to any bus or vehicle certified to zero-emission standards. Also, Subsection (b) of the Proposed ATCM specifies that the requirements of the regulation do not apply for certain periods covered by the circumstances described in Subsection (d). Subsection (d) of the Proposed ATCM is explained below in the Exemptions section of this discussion.

The reason for limiting the idling of school buses, school pupil activity buses, youth buses, and general public paratransit vehicles is that children are the primary users of, and are disproportionately exposed to diesel PM and other harmful air pollutant emissions from, such transportation. Children are also exposed at schools or activity sites where these buses and vehicles congregate before and during loading and unloading. To a lesser degree, children are also exposed to diesel PM and other air

pollutant emissions from transit buses and other heavy-duty vehicles that operate at or near schools.

Although reducing children's exposure to diesel PM is the primary goal of the Proposed ATCM, applicability has not been limited to diesel-fueled buses and vehicles because gasoline- and alternative-fueled buses and vehicles also emit TACs that have no identified threshold levels below which exposure can be considered completely safe. Also, idling limits on affected gasoline- and alternative-fueled, as well as diesel-fueled, buses and vehicles are expected to result in additional reductions of non-TAC air pollutants. Moreover, public complaint and enforcement are expected to be encouraged and facilitated by eliminating the need to determine bus or vehicle fuel use when a violation occurs.

Idling Control Measure - Requirements

Subsections (c)(1)(A-B) and (c)(2)(A)

As specified in Subsection (c) of the Proposed ATCM, the regulation's idling requirements represent an operational control and pollution prevention approach to the regulation of affected buses and vehicles. The Proposed ATCM is an operational control measure because a driver is simply required to change his or her operation by manually turning an affected bus or other heavy-duty vehicle engine off under certain circumstances. There are no requirements for new or add-on control devices of any kind. Because the Proposed ATCM is an operational control measure, it is also considered a prescriptive measure pursuant to Government Code section 11346.2. For this regulation, a prescriptive rather than a performance-based approach was preferable due to cost and feasibility issues associated with new or add-on control devices. Section C of this Chapter discusses control technology options in more detail.

The Proposed ATCM is a pollution prevention measure because turning off a bus or other heavy-duty vehicle engine and restarting no more than 30 seconds before departing from a school [see Subsection (c)(1)(A-B) and Subsection (c)(2)(A) of the Proposed ATCM] would prevent diesel PM and other emissions before they occur. These provisions would effectively constitute a "no idling" requirement at schools for affected buses and vehicles. In addition, school transportation buses and vehicles (i.e., school buses, school pupil activity buses, youth buses and general public paratransit vehicles) would have the same "no idling" pollution prevention requirement within 100 feet of a school. The Proposed ATCM also contains provisions to allow necessary idling for safety or operational purposes, address practical operational considerations, and encourage compliance with idling requirements. The circumstances when idling would be necessary for safety or operational purposes have been specified in Subsection (d) of the Proposed ATCM and explained in detail in the Exemptions section of this discussion. The provisions addressing practical considerations and compliance are discussed below.

Subsections (c)(1)(B) and (c)(2)(B)

To address practical operation of buses and vehicles as well as children's health considerations, the regulation would limit idling to no more than five consecutive minutes, or a period or periods aggregating no more than five minutes in any one hour, at locations outside of school property. For example, Subsection (c)(1)(B) of the Proposed ATCM would limit idling of school transportation buses or vehicles at any single location more than 100 feet from a school to no more than five minutes. The provisions in Subsection (c)(2)(B) would limit idling of transit buses and other heavy-duty vehicles within 100 feet of a school to no more than five minutes. These provisions would enable most school transportation and transit bus drivers to stay on schedule by avoiding the need to turn off their engines at bus stops. Staff has observed that loading and unloading a school or transit bus usually takes three minutes or less. The Proposed ATCM would provide five minutes of acceptable idling at a bus stop because a slightly longer loading or unloading period may be required for some passengers. In addition, diesel engine manufacturers recommend five minutes of idling to allow lubricating oil and other engine parts to reach operating temperature under cold start conditions and three to five minutes of idling to cool down a turbo-charged diesel engine that has been operating at high revolutions per minute (RPM), high loads, or both. Cold starts generally occur at a parking or maintenance facility after the bus or vehicle engine has been shut-down for several hours. Cool downs are necessary before shutting down a turbo-charged bus or vehicle to maximize shaft and bearing life. Furthermore, staff note that both the 30 seconds of idling allowed by Subsections (c)(1)(A-B) and (c)(2)(A) and the five minutes of idling allowed by Subsections (c)(1)(B) and (c)(2)(B) are consistent with anti-idling regulations in other states.

In this proposal, buses and vehicles involved in school transportation have more stringent requirements than transit buses and other heavy-duty vehicles because the primary purpose of school transportation is to transport children, i.e., children are aboard and are likely to be exposed to exhaust emissions, particularly at loading and unloading areas where school transportation buses and vehicles tend to congregate. Conversely, children are not always aboard transit buses and are unlikely to be transported by other heavy-duty vehicles. Also, transit buses and other heavy-duty vehicles are not as likely to congregate nor idle unnecessarily for any length of time at or near a school. Therefore, Subsection (c)(1)(a) and (b) of the Proposed ATCM essentially require school transportation buses and vehicles not to idle within 100 feet of a school and to idle no more than five minutes at locations more than 100 feet from a school. Subsection (c)(2)(B) requires transit buses and other heavy-duty vehicles to idle no more than five minutes within 100 feet of a school and has no requirement limiting idling more than 100 feet from a school. Staff chose 100 feet for idling requirements because public comments indicated that most people could estimate a distance of 100 feet. Also, a 100 foot zone surrounding a school would add an additional “buffer” area to the distance between emission source and receptor (i.e., 20 meters or 65 feet) assumed in many health risk assessment scenarios and consistent with the CAPCOA Risk Assessment Guidelines. (CAPCOA, 1993)

The provisions in Subsection (c)(1)(B)(ii) and Subsection (c)(2)(B)(ii) that prohibit idling for "a period or periods aggregating more than five minutes in any one hour" would prevent a driver from circumventing the Proposed ATCM by idling the engine for several less-than-five-minute intervals that could total more than five minutes during the course of a single hour. However, when a school bus is assigned to shuttle children back and forth from school to the same transfer point multiple times during a single hour, a five minute-period of idling should be allowed at the transfer point per shuttle trip, provided such transfer point is not at or within 100 feet of a school.

Subsections (c)(3) and (c)(4)

To encourage driver compliance with the idling requirements, staff included responsibilities for motor carriers in Subsections (c) (3) and (4) of the Proposed ATCM. Since it is impractical to expect motor carriers to be present at each instance of idling, staff does not intend that motor carriers actively police their drivers regarding compliance with the Proposed ATCM. However, staff believe it is practical for a motor carrier to take reasonable steps to ensure that drivers are aware of, and comply with, the Proposed ATCM and to keep records verifying that those steps have been taken. Therefore, the Proposed ATCM would require motor carriers of affected vehicles to ensure that drivers are informed of the idling requirements, track complaints and enforcement actions regarding the requirements and take remedial action as necessary, and keep records of these driver education and tracking activities. Remedial action should be taken on all complaints and enforcement actions. At minimum, the motor carrier should discuss each complaint or enforcement action with the driver who generated the complaint or enforcement action and keep a record of the discussion and any other action taken.

Exemptions

The Proposed ATCM is intended to eliminate excessive idling and would not apply for periods or periods during which idling is necessary for safety or operational reasons. The circumstances when applicable buses or vehicles would be exempt are specified in Subsection (d) of the Proposed ATCM and are explained below:

In Traffic Subsection (d)(1) would exempt a bus or vehicle that is idling while stopped at a traffic signal or other device or while forced to remain motionless due to traffic conditions. A driver of a bus or vehicle should not be required to turn off the bus or vehicle engine while “in traffic” because the resultant loss of maneuverability would prevent the driver from taking evasive action to avoid an unsafe traffic condition. Staff would consider a bus or vehicle to be "in traffic" at any time other than when it is parked safely outside of traffic. For example, staff would consider a school bus stopped at a railroad crossing to be "in traffic" and exempt from the Proposed ATCM's idling requirements as a result of Subsection (d)(1). Subsection (d)(1) also acknowledges that the directions of a peace officer must pre-empt all other requirements.

Safety or Equipment Inspection Subsection (d)(2) would exempt a bus or vehicle that is idling for the purposes of ascertaining that it is in safe operating condition. Such exemption is not intended to apply to those parts of a bus or vehicle safety or equipment inspection that can be conducted with the engine off. For example, a visual inspection of equipment or an inspection that requires only that the ignition key be turned on without activation of the engine could and should be conducted before the engine is activated. Staff acknowledge that problems may arise at any time and a safety or equipment inspection may be needed at times other than the daily safety inspection.

Testing, Servicing, Repairing, or Diagnostics Subsection (d)(3) would exempt a bus or vehicle that is idling when idling is necessary to conduct an emission test, service, repair, or diagnostic operation. The staff intend that such exemption would be solely for those period or periods during which a technician, mechanic, or other maintenance person is engaged in one of the aforementioned activities.

Turbo-charged Diesel Engine Cool Down Subsection (d)(4) would exempt a turbo-charged diesel bus or vehicle that is idling at low revolutions per minute (RPM) in order to reduce and stabilize internal engine temperature before shut down and to maximize turbo-charger and bearing life. Such period of exemption would be limited to no more than that recommended by the manufacturer and would apply only to a bus or vehicle with a turbo-charged diesel engine that has been operating at high RPM or high load. A turbo-charged diesel engine requires a three to five-minute cool down depending upon engine model and operation.

Work for Which a Vehicle is Designed Subsection (d)(5) would exempt a vehicle that is idling in order to accomplish the work for which it is designed. The exemption would not apply to the "work" of transporting passengers, nor to the operation of heaters or air conditioners for interior vehicle comfort. The staff intend that such exemption would apply solely when heavy-duty delivery or maintenance vehicles are engaged in a task or tasks that rely upon the engine as a power source for successful completion of the task or tasks, e.g., the operation of refrigeration unit, lift, crane, pump, drill, hoist, mixer, etc.

Equipment Use for Disabled Passengers or Children with Exceptional Needs
Subsection (d)(6)(A) would exempt a bus or vehicle that is idling in order to operate a lift or other piece of equipment needed to assist a person with disabilities.
Subsection (d)(6)(B) would exempt bus or vehicle idling for the purpose of maintaining moderate interior bus or vehicle temperatures for children with exceptional needs whose pre-disclosed health conditions (e.g., subject to seizures) make them sensitive to temperature variation.

Defroster, Other Safety Equipment, Heater, Air Conditioner Operation Subsection (d)(7) would exempt bus or vehicle idling that is necessary to operate defrosters, heaters, air conditioners, or other equipment in order to prevent a safety or health emergency. The staff intend such exemption to allow idling only so long as it is necessary to prevent a safety or health emergency for the passengers or driver. For example, idling for defroster operation is allowed only so long as necessary to attain a clear visual field at

the time of bus or vehicle departure. Similarly, idling is allowed until brake pressure reaches a safe level for brake operation. This exemption would also apply in catastrophic circumstances, or the threat thereof (e.g., a natural disaster, civil disorder, and similar emergencies). However, idling in order to use equipment solely for the comfort of passengers or driver is not exempt from the requirements of Subsection (c) of the Proposed ATCM. Idling for the purpose of heating or cooling a bus or vehicle was discussed extensively during meetings with stakeholders and the public. No consensus was reached regarding the ambient or in-side vehicle temperatures that should trigger the use of a heater or air conditioner and no practical means of enforcing a provision based upon temperature was determined. Staff understand that running a heater while idling is not an effective way to heat a school bus and that an affected school bus can quickly reach comfortable interior temperatures for passengers (other than children with exceptional needs) once the engine is turned on and the bus is underway. (Miller, 2002)

Hybrid Electric Bus or Vehicle Recharge Subsection (d)(8) would exempt idling that is necessary to recharge a hybrid electric vehicle or bus. The staff intend such exemption to apply solely to idling necessary to restore the energy supply so the hybrid electric bus or vehicle can continue operation on electric power. Staff believe that emission reductions and fuel savings from electrical operation rather than fuel combustion-based operation would more than compensate for any emissions generated during recharge.

Relationship to Other Law

Subsection (e) of the Proposed ATCM recognizes a relationship to other laws, regulations, or ordinances. The allowance of certain exempt periods within the Proposed ATCM does not legally permit idling beyond other applicable limits. Still, Proposed ATCM provisions that allow up to five minutes of idling under specific conditions could conceptually conflict with other requirements that effectively prohibit idling when: 1) a school bus driver leaves the driver's compartment (13 CCR§1226); 2) any driver leaves a vehicle unattended on a highway (VC§22515). Under the circumstances specified, Subsection (e) would more clearly preclude an affected bus or vehicle driver from using provisions in the Proposed ATCM to justify violation of safety requirements that continue to apply. In addition, Subsection (e) would allow local regulations or ordinances to supercede the Proposed ATCM, provided such requirements were as stringent as, or more stringent than, any comparable requirement in the Proposed ATCM.

Penalties

As described in Section D of this Chapter, the ARB expects a high degree of compliance with the Proposed ATCM. Nevertheless, penalties are needed for instances of non-compliance. Subsection (f) of the Proposed ATCM would provide for a civil penalty of no less than 100 dollars per violation. In addition, Subsection (f) would provide for criminal penalties in cases of violation. Such civil and criminal penalties could be imposed for:

- A driver or motor carrier of a school bus, school pupil activity bus, youth bus, or general public paratransit vehicle that violates Subsection (c)(1) or (c)(3) of the Proposed ATCM, respectively; or
- A driver or motor carrier of a transit bus or other heavy-duty vehicle that violates Subsection (c)(2) or (c)(4) of the Proposed ATCM, respectively.

Staff believe motor carrier liability and self-interest from related fuel savings will motivate motor carriers to encourage driver compliance with the idling requirements of the Proposed ATCM. For example, motor carriers could effectively encourage driver compliance by making compliance a condition of employment. In addition, violations cited under the Vehicle Code put points on a driver's record that would be recorded in a pull notice report that will display additional violations for that driver (VC§1808.1).

Enforcement

Enforcement provisions are specified in Subsection (g) of the Proposed ATCM. Primary enforcement is expected to be carried out by the ARB Enforcement Division with assistance, if necessary, from the CHP, local peace officers, and air pollution control or air quality management district personnel. Section D of this Chapter provides more information on the implementation and enforcement of the Proposed ATCM.

Definitions

The basis for each definition in Subsection (h) of the Proposed ATCM is specified below:

Term Defined	Basis
"Children With Exceptional Needs"	Education Code (EC)§56026
"Driver"	VC§305
"Emergency"	1) Random House College Dictionary, 1975; 2) consistent with California air quality management and air pollution control district definitions of "emergency;" and 3) addresses persons (e.g., special needs children) with pre-disclosed conditions that require immediate medical action under certain circumstances
"General Public Paratransit Vehicle"	VC§336 ("…that is transporting school pupils …" is intended to exclude vehicles not used for children)
"Gross Vehicle Weight Rating"	VC§350

"Heavy-Duty Vehicle"	13 CCR§1900(b)(6)
"Hybrid Electric Bus or Vehicle"	ARB Mobile Source Control Division working definition (Negrete, 2002)
"Idling"	definitions found in other state anti-idling regulations (see Appendix B)
"Motor Carrier"	13 CCR§1201(q).
"Official Traffic Control Device"	VC§440
"Official Traffic Control Signal"	VC§445
"School"	HSC§42301.9 and Education Code§17609(e)
"School Bus"	VC§545
"School Pupil Activity Bus"	VC§546
"Transit Bus"	VC§642
"Youth Bus"	VC§680
"Zero Emission School Bus, Transit Bus, School Pupil Activity Bus, Youth Bus, General Public Paratransit Vehicle, or Other Heavy-Duty Vehicle"	13 CCR§1962(a)

C. ALTERNATIVE REQUIREMENTS CONSIDERED

Staff considered the following alternative requirements to those in the Proposed ATCM: limit ATCM applicability to school buses, limit ATCM applicability to diesel buses and vehicles, and require new or add-on control devices.

Limit Applicability to School Buses

Staff initially focused attention on proposing idling limits for school buses only because children are disproportionately exposed to school bus exhaust as a result of riding school buses and attending classes and playing at schools where school buses tend to congregate before and during loading and unloading. Staff considered such exposure of primary importance because children are more vulnerable than adults to the harmful TACs and other air pollutants in school bus and other motor vehicle exhaust. However,

at a July 23, 2002 Public Consultation Meeting and subsequent meetings with northern California and the Los Angeles Unified School districts, school transportation officials, the California Parent Teacher Association, and the public, concern was expressed about other sources of motor vehicle exhaust at schools.

After consulting with the CHP and CDE, staff concluded that applicability to the Proposed ATCM should be expanded to include: school pupil activity buses, youth buses, general public paratransit vehicles, transit buses, and other heavy-duty vehicles operating at or near schools. Staff recognize the difficulty involved in enforcing idling limits against parents transporting children to and from school. Therefore, staff do not propose that passenger vehicle idling at or near schools be regulated at this time. However, ARB would provide materials for public outreach on the Proposed ATCM.

Limit Applicability to Diesel Buses and Vehicles

Staff considered limiting applicability to diesel-fueled buses and vehicles since the greatest cancer risk as well as other non-cancer adverse health effects appear to be associated with exposure to diesel PM. However, as previously mentioned in the Applicability section of Section B of this Chapter, the Proposed ATCM, applicability has not been limited to diesel-fueled buses and vehicles because affected gasoline- and alternative-fueled buses and vehicles also emit TACs that have no identified threshold levels below which exposure can be considered completely safe. Also, idling limits on affected gasoline- and alternative-fueled, as well as diesel-fueled, buses and vehicles are expected to result in additional reductions of non-TAC air pollutants. Moreover, public complaint and enforcement are expected to be encouraged and facilitated by eliminating the need to determine bus or vehicle fuel use when a violation occurs.

New or Add-on Control Device Requirement

To reduce affected bus and vehicle emissions, staff considered automatic engine shut-off devices to curtail idling and particulate traps to reduce diesel PM emissions. The CHP considers automatic shut-off devices unsafe because they could limit a driver's ability to quickly avoid hazards if such a device were triggered while a bus or vehicle is stopped at a traffic signal or in the midst of traffic. Thus, for this particular regulation, which is intended only to limit idling while a bus or vehicle is parked and not "in traffic," an automatic shut-off device is impractical and could present a safety issue. Particulate traps would have limited applicability because they are used only for diesel-fueled buses or vehicles and, as of this writing, the retrofit control technology verified for funding is limited to traps that require the use of low sulfur diesel fuel for school buses with 1994 and later model year engines. In addition, both of these control devices would have required significant expenditures (i.e., for the device and for its installation) on the part of public and private schools, school bus contractors, local transit agencies, heavy-duty vehicle fleet operators, and the government agencies that must monitor that such devices are installed and maintained. Clearly, requiring manual engine shut-off is the safest, most cost-effective, means of controlling unnecessary idling in affected buses and vehicles provided good compliance can be achieved.

Subsection D of this Chapter discusses compliance in connection with the implementation and enforcement measures that are planned for the Proposed ATCM.

D. IMPLEMENTATION AND ENFORCEMENT

If the Proposed ATCM is adopted by the Board, the ARB would have the primary responsibility for implementation and enforcement. The ARB anticipates that the CHP and CDE would provide valuable assistance in this effort, and air districts and local peace officers could also play a role.

Long-established CHP and CDE training and certification programs are expected to result in a high rate of compliance on the part of drivers of school buses, school pupil activity buses, youth buses, and general public paratransit vehicles. These drivers are already legally required to undergo training by CDE and certification by CHP upon employment. In addition, they are required to take at least 10 hours of in-service training per year. ARB plans to work with the CDE and CHP to revise training materials and tests to reflect the Proposed ATCM, once finalized. ARB also plans to develop educational materials for distribution to motor carriers and drivers of all affected buses and vehicles. These materials would include a summary of requirements and penalties for non-compliance. Furthermore, staff would develop and provide educational materials for school districts and the general public as part of public outreach for the Proposed ATCM. These materials would include a summary of requirements and provide specific contact information for registering a complaint. Schools could be asked to distribute such materials to parents through their children and to the surrounding neighborhood as necessary.

As previously mentioned, primary enforcement of the Proposed ATCM is expected to be carried out by the ARB Enforcement Division with assistance, if necessary, from the CHP, local peace officers, and air pollution control or air quality management district personnel. The CHP and local peace officers could enforce the Proposed ATCM as either a Vehicle Code section 27153 violation (Excessive Exhaust Products) or, once CHP amends its title 13 regulations to cross reference ARB's regulations, as a CHP vehicular safety or operational regulation [VC§34506(c-g) (Misdemeanor) or VC§34506.3 (Infraction)] violation. The CHP plans to revise title 13, California Code of Regulations to clearly indicate the agency's authority by specifically referencing the Proposed ATCM in title 13, California Code of Regulations, Division 2, Chapter 6.5 (Motor Carrier Safety). The CHP's ability to directly impose criminal penalties under the Vehicle Code is expected to complement and support the ARB Enforcement Division's ability to impose civil penalties or refer for criminal prosecution cases of non-compliance. The Health and Safety Code does not specifically require air districts to adopt and enforce ATCMs that apply solely to vehicular TAC sources. Nevertheless, Subsection (g) of the Proposed ATCM and local nuisance rules would confirm an air district's independent authority to enforce the Proposed ATCM, as either a bus idling violation (HSC§42403.5), or, arguably, as a violation subject to air district enforcement under Health and Safety Code section 42403.

A more detailed procedure for processing violations of the Proposed ATCM is expected to continue evolving once the Proposed ATCM is adopted and non-compliance complaints are received. Initially, the ARB Enforcement Division is expected to be alerted to a possible violation via its toll-free telephone complaint line [i.e., 1(800)-END-SMOG]. This complaint line already exists to register complaints about smoking vehicles and could also be used to register complaints about Proposed ATCM non-compliance. Enforcement Division staff would immediately notice the motor carrier (i.e., registered owner of the bus or vehicle) that a driver may have violated the Proposed ATCM. Such warning notice would include the vehicle license plate number or other identifying features of the bus, vehicle, or driver, and a description of the alleged violation, including the date and approximate time it occurred. The notification letter would also include the sanctions that could be imposed upon a driver or motor carrier pursuant to the Proposed ATCM. As previously mentioned, motor carriers would, at minimum, be expected to discuss the alleged violation with the driver and to keep a record of the discussion and any other action taken.

The Enforcement Division is expected to use a database to track, by motor carrier and individual driver, as applicable, warning notices that have been sent. The Enforcement Division would use enforcement discretion to decide when to send an inspector to observe a fleet or fleet driver. If an inspector observes a violation, he or she may issue a field citation or a report of violation to the driver. In addition, a separate field citation or report of violation may be issued to the motor carrier if requirements for motor carriers have been violated. Both a field citation and a report of violation may be considered a notice of violation. It is likely that the ARB would consider nearly all violations of the Proposed ATCM amenable to resolution through the administrative hearing process being developed pursuant to SB 527 (Stats. 2001, Ch. 769), in which case the violator would have the option of requesting an administrative hearing to have his or her violation adjudicated. The ARB may also refer a violation to the CHP. Also, the CHP, local peace officers, or air district could assist the ARB in its enforcement activities as necessary.

Violations cited or noticed by the Proposed ATCM would be subject to penalties pursuant to title 13, California Code of Regulations, section 2480(f)(1-4). Section 2480(f)(1-4) would provide for a minimum civil penalty assessment of $100 per violation of subsection (c)(1), (2), (3), or (4) of section 2480. This minimum assessment would be levied under Health and Safety Code section 39674, which provides for civil penalties of up to $10,000 per day. The ARB would likely only seek amounts higher than $100 from recalcitrant drivers or motor carriers. For example, a motor carrier or driver receiving a second notice of violation within one year of a previous notice would likely be assessed a higher penalty. Other factors affecting the amount of the assessment are provided in Health and Safety Code section 42403(b), which states:

"(b) In determining the amount assessed, the court, or in reaching any settlement, the district, shall take into consideration all relevant circumstances, including, but not limited to, the following:

(1) The extent of harm caused by the violation.

(2) The nature and persistence of the violation.

(3) The length of time over which the violation occurs.
(4) The frequency of past violations.
(5) The record of maintenance.
(6) The unproven or innovative nature of the control equipment.
(7) Any action taken by the defendant, including the nature, extent, and time of response of the cleanup and construction undertaken, to mitigate the violation.
(8) The financial burden to the defendant."

Though staff is not proposing a formal penalty schedule in the Proposed ATCM, ARB enforcement staff may consult the Heavy-Duty Diesel Smoke and Inspection Program for guidance on penalties (HSC§44011.6; 13 CCR§2180-2188). Additionally, criminal penalties may be assessed to the maximum extent provided by law. Health and Safety Code section 39675 provides authority for the ARB, through the California Attorney General or local District or City Attorney, to file criminal complaints in California Superior Courts against violators of these regulations. The tracking database discussed above would assist the Enforcement Division and cooperating enforcement authorities, in evaluating appropriate penalty types and levels.

As stated above, it is likely that an ARB notice of violation under civil codes could be appealed to an administrative law judge through the administrative hearing process currently being developed in accordance with SB 527. An air district notice of violation would follow air district penalty proceedings, also potentially including resolution through administrative civil penalty proceedings. Mutual settlement of violation is an option both before and after a violation has been appealed. A CHP or a local peace officer notice of violation under criminal codes could be appealed through the appropriate court (e.g., a traffic court) system for the jurisdiction in which the violation occurred.

V. ECONOMIC IMPACT, ENVIRONMENTAL IMPACT, AND ENVIRONMENTAL JUSTICE

A. ECONOMIC IMPACT

Summary of Economic Impact

The Proposed ATCM to Limit School Bus Idling and Idling at Schools is not expected to have a significant economic impact on affected businesses nor on affected federal, State or local agencies. Fuel and vehicle maintenance cost savings resulting from the Proposed ATCM's elimination of excessive idling are generally expected to compensate owners of affected vehicles that are required to comply with the Proposed ATCM. Furthermore, though unquantifiable, the health benefits and health care cost savings for California's children and other citizens are expected to justify the regulatory cost of program implementation by State agencies.

Compliance costs primarily involve driver training and recordkeeping and are estimated to be a maximum of $2 per affected driver per year. Motor carriers potentially affected by these requirements would be: school bus contractors, private schools, heavy-duty vehicle (other than bus) carriers in both the private and public sector, school districts and transit agencies. The actual cost to most affected motor carriers may be considerably less than $2 per driver per year because training and recordkeeping requirements are likely to be integrated into existing procedures. Well-established CDE-CHP training, testing, and recordkeeping programs are already required for school bus and vehicle drivers employed by school bus contractors, private schools, and school districts. In addition, heavy-duty vehicle carriers and local public transit agencies are expected to have existing procedures for information dissemination and personnel records. ARB plans to work with CDE and CHP to update training and testing to reflect the Proposed ATCM’s requirements and to provide educational materials and guidance to all affected motor carriers, school districts, and others.

Section A of this Chapter provides a detailed cost analysis of the effect of the Proposed ATCM on affected parties. The assumptions and methodology used to estimate cost impacts are detailed in Appendix D of this Staff Report.
Based on the staff's analysis, compliance costs are expected to be offset by fuel and maintenance cost savings. Statewide school bus fleet fuel cost savings are estimated at $68,000 to $680,000 per year. Statewide fuel cost savings for heavy-duty vehicle fleets (other than school buses) are estimated at $70,000 to $210,000 per year. Even if fuel and maintenance cost savings were excluded from consideration, staff would not expect the Proposed ATCM to have a significant effect on the creation, elimination or expansion of jobs and businesses and no significant effect on California business competitiveness.

State agencies' costs of implementing the Proposed ATCM are expected to be absorbed within existing budgets. The affected State agencies would be: ARB, CDE, CHP, and DMV. For these agencies, the cost associated with developing, revising, and

reproducing educational and testing materials for affected drivers, motor carriers, and others is estimated at $14,000. The cost to revise title 13 California Code of Regulations to reference and, thereby enhance enforcement of, the Proposed ATCM is expected to be about $25,000. No additional staff are expected to be required for any of these activities.

Legal Requirements Applicable to the Economic Impact Analysis

Government Code section 11346.3 requires the ARB and other State agencies to assess the potential for adverse economic impacts on California businesses and individuals when proposing to adopt or amend any administrative regulation, including a regulation such as the Proposed ATCM. The assessment must include the impact of the proposed regulation upon California: jobs; business expansion, elimination, or creation; and businesses' ability to compete with those of other states.

Health and Safety Code section 57005 further requires the ARB to perform an economic impact analysis of submitted alternatives to a proposed regulation before the adoption of any major regulation. A "major regulation" is defined as a regulation that would potentially cost California businesses more than ten million dollars in any single year. Because the Proposed ATCM is not expected to cost California businesses more than ten million dollars in any single year, no economic impact analysis of alternatives is necessary.

In addition, Government Code section 11357 and instructions adopted by the Department of Finance (DOF) require the ARB and other State agencies to estimate a proposed regulation's associated cost or savings to any local, State, or Federal agency. The agency proposing a regulation is also required to determine whether, as a result of the regulation, any cost to local agencies or school districts is reimbursable by the State. Pursuant to Government Code section 17566, any cost to school districts, transit agencies, or other local public agencies as a result of the Proposed ATCM would not be reimbursable because private sector transportation businesses would be subject to the same requirements and costs.

Potential Affected Businesses, Cost, and Cost Savings

Private businesses that would be affected by the Proposed ATCM are: school bus contractors; private schools that provide transportation for pupils; and businesses that operate heavy duty-vehicles (other than buses) at or within 100 feet of a school.

<u>School Bus Contractors and Private Schools</u>

In California, 34 school bus contractors own and operate about 36 percent of school buses. Under contract to school districts, they provide daily school pupil transport to and from schools. School bus contractors also provide school pupil activity buses for special school events and activities such as sporting events and field trips. About 200 private and independent schools own and operate about four percent of school buses.

Cost The Proposed ATCM would not require any new or additional equipment but would require affected motor carriers, to: ensure that drivers are informed about idling restrictions upon employment and annually thereafter; track complaints and enforcement actions regarding excessive idling and take remedial action as necessary; and keep records of yearly reminder and tracking activities. All drivers of school buses, school pupil activity buses, youth buses, or general public paratransit vehicles are already required to undergo training and certification by the CDE and CHP upon employment. They are also required to have at least 10 hours of in-service training per year. Staff expect that recordkeeping requirements imposed by the Proposed ATCM can be integrated into existing procedures. Therefore, staff estimates that school bus contractors and private schools may incur a maximum cost of $2 per driver per year for training, tracking, and recordkeeping expenses. Statewide annual maximum cost to school bus contractors (who own about 9,101 diesel- or gasoline-fueled school buses and are assumed to employ an equivalent number of drivers) is estimated at $18,200. The Statewide annual maximum cost to private schools (who own about 999 diesel- or gasoline-fueled school buses and are assumed to employ an equivalent number of drivers) is estimated at $2,000.

Cost Saving Staff expect that the compliance costs associated with the Proposed ATCM would be fully recovered by fuel cost savings as the result of eliminating excessive idling (i.e., idling that burns fuel without performing useful work). On a statewide level, staff estimate that school bus contractors would save $24,500 to $245,000 per year and private schools would save $2,700 to $27,000 per year on the cost of fuel.
(Oregon DOE, 1996; CenterViews, 2000; School Bus Fleet, 2000; Argonne National Laboratory, 2001; U.S. DOE, 2001; Esbri, 2002; Green, 2002)

Other Heavy-Duty Fleet Operators

Cost Various private sector businesses could potentially operate heavy-duty vehicles (other than buses) at or within 100 feet of a school. Examples of such vehicles include: vehicles delivering food or other supplies to a school and vehicles involved in construction or maintenance of grounds or buildings at or near a school. The heavy-duty vehicle fleet operators' cost for the drivers' yearly reminder should be minimal because the ARB plans to provide educational materials about the Proposed ATCM at no charge. Thus, driver's yearly reminder and associated recordkeeping expenses for the private sector motor carriers of heavy-duty vehicles (other than buses) are estimated to be a maximum of $2 per affected driver per year. Because the number of private sector heavy-duty vehicle drivers involved in trips to or near schools per year is not known and is likely to vary, staff are unable to estimate Statewide annual cost to heavy-duty vehicle motor carriers.

Cost Saving Based on information that heavy-duty vehicles other than buses make about 10 to 15 trips per school per week and the assumption that half of those trips are

made by private heavy-duty vehicles, staff estimate that affected businesses would save $35,000 to $105,000 per year on the cost of fuel.
(Oregon DOE, 1996; CDE, 2002; CenterViews, 2000; School Bus Fleet, 2000; Argonne National Laboratory, 2001; U.S. DOE, 2001; Miller, 2002; Sherrill, 2002)

Wear and Maintenance

Staff also expect the elimination of excessive idling to reduce bus and vehicle engine wear and provide maintenance cost savings to all private sector motor carriers. However, an acceptable method for estimating maintenance cost savings has yet to be developed due to the numerous variables involved, including: engine design, vehicle miles traveled, and frequency of preventive maintenance such as oil changes. Additional engine starts as a result of the Proposed ATCM are expected to have a negligible effect on starter wear. Thus, staff expect no additional costs to the private sector transportation industry due to starter wear. (Truck Maintenance Council, 1995; Hintz, 2002; Steinbrenner, 2002)

Potential Effect on Business Competitiveness and the Creation, Elimination and Expansion of Jobs and Businesses

The Proposed ATCM would have no significant effect on California business competitiveness and the creation, elimination and expansion of jobs and businesses. The Proposed ATCM would not place California's school bus contractors, private schools, or other industries operating heavy-duty vehicles at or within 100 feet of a school at a competitive disadvantage because the affected buses and vehicles are operated by local businesses and are not in direct competition with their counterparts in other states. The cost of compliance is expected to be small because the Proposed ATCM requires the simple procedural change of turning off a bus or other heavy-duty vehicle engine and because training, tracking, and recordkeeping impacts would be so minimal, even a small business could absorb them. The regulation's requirements would affect such a small part of business operations that they are not likely to draw new businesses into California, nor would the few minutes per year spent on compliance affect a decision to stay or expand in California. Staff expect no effect on employment in California because the Proposed ATCM's training, tracking, and recordkeeping requirements for motor carriers are expected to be met with existing personnel.

Potential Affected Local Public Agencies, Cost, and Cost Savings

The local public agencies that would be affected by the Proposed ATCM are school districts, transit agencies, and other public agencies that operate heavy-duty vehicles (other than buses) at or within 100 feet of a school. Examples of other heavy-duty vehicles operated by local public agencies are: garbage trucks and city or county maintenance vehicles.

School Districts

Cost In California, local school districts operate 60 percent of the school buses involved in school pupil transportation. As mentioned in the previous cost sections, all school bus drivers are required to participate in training and certification. Moreover, school districts that provide bus service are required by regulation to keep records on each school bus driver. Therefore, staff expect that the training, tracking, and recordkeeping requirements imposed by the Proposed ATCM can be integrated into existing procedures at no additional expense to school districts. Although not required by the Proposed ATCM, a school district (or a public or private school) could choose to inform motorists, by signage or some other means, about the regulation's idling requirements at or near schools. The cost of such voluntary activity is expected to be borne by the school district (or public or private school); however, the ARB may provide assistance or guidance in designing signs or other promotional materials.

Cost Saving Statewide, staff estimate fuel cost savings of $41,400 to $414,000 per year for the 15,396 diesel- and gasoline-fueled buses operated by school districts. (Oregon DOE, 1996; CenterViews, 2000; School Bus Fleet, 2000; Argonne National Laboratory, 2001; U.S. DOE, 2001; Esbri, 2002; Green, 2002)

Transit Agencies

Cost Staff understand that local public transit buses rarely stop on school grounds and that an undetermined number of transit agencies use bus stops within 100 feet of a school. Therefore, staff can provide only a per driver estimate of costs for transit agencies. Staff estimate compliance costs for transit agencies at a maximum of $2 per affected driver per year.

Cost Saving Transit buses would probably not have to significantly reduce their idling as a result of the Proposed ATCM because they do not stop at schools and are unlikely to spend more than five minutes at any bus stop within 100 feet of a school. Therefore, staff do not anticipate any reliably measurable fuel cost savings for local public transit agencies.

Local Public Agencies That Operate Heavy-Duty Vehicles (Other Than Buses)

Cost The drivers' yearly reminder and associated recordkeeping expenses for local public agencies that operate heavy-duty vehicles (other than buses) at or near a school are estimated to be a maximum of $2 per affected driver per year. Because the number of public sector heavy-duty vehicle drivers involved in trips to or near schools per year is not known and is likely to vary, staff are unable to estimate Statewide annual costs.

Cost Saving Based on the assumption that approximately half of the estimated 10 to 15 heavy-duty vehicle (other than bus) trips to schools are made by public agencies, staff estimate that these agencies would save $35,000 to $105,000 per year on the cost

of fuel. (Oregon DOE, 1996; CDE, 2002; CenterViews, 2000; School Bus Fleet, 2000; Argonne National Laboratory, 2001; U.S. DOE, 2001; Miller, 2002; Sherrill, 2002)

Wear and Maintenance

Staff expect maintenance cost savings for school districts and local public agencies, but not for local public transit agencies. As previously mentioned, an acceptable method of calculating maintenance cost savings has yet to be developed. Additional engine starts as a result of the Proposed ATCM are expected to have a negligible effect on starter wear. Thus, staff expect no additional costs to the public sector transportation industry due to starter wear. (Truck Maintenance Council, 1995; Hintz, 2002; Steinbrenner, 2002)

Potential Affected State Agencies, Cost, Cost Savings

State agencies that would be involved in implementing the Proposed ATCM are: ARB, CDE, CHP, and DMV. Generally, implementation costs are expected to be absorbed within existing State agency budgets and additional staff should not be required. Each affected agency's implementation activities, and the estimated cost of the activity, are specified below.

ARB: The ARB's Enforcement Division would be responsible for the primary enforcement of the Proposed ATCM. Enforcement activities such as following up on complaints, notifying motor carriers and drivers, and citation issuance are expected to be performed by existing staff. If enforcement workload increases substantially beyond expectations, staff believe that additional workload could be handled by no more than one person year (PY) at $100,000 per PY. The ARB is also expected to develop, reproduce, and distribute educational materials to approximately 20,000 businesses, organizations, and persons affected by the Proposed ATCM. The printing and distribution of such materials is expected to cost approximately $12,500. This cost is expected to be absorbed within existing budgets and additional staff should not be required.

CDE: The CDE is expected to make minor adjustments to the school bus driver's training curriculum and materials in order to address the requirements of the Proposed ATCM. The cost of this activity is estimated to be negligible. (Green, 2002)

CHP: The CHP is expected to revise title 13 of the California Code of Regulations to reference the Proposed ATCM for the purpose of further specifying CHP's authority to enforce the Proposed ATCM and to assist ARB Enforcement Division personnel. The estimated $25,000 cost of this revision is expected to be absorbed within existing budgets and additional staff should not be required. The CHP is also expected to develop new questions for the school bus driver certification test at an estimated cost of $600. (Esbri, 2002)

DMV: The DMV is expected to revise and reproduce school bus driver certification tests to address the Proposed ATCM at an estimated cost of $1,150. (Boudreu, 2002)

Estimating health benefits resulting from a regulation is problematic because of disagreement over assigning a standardized monetary value to extending life or to avoiding cancer or asthma. However, the potential health benefits associated with the Proposed ATCM, particularly those for California children, more than justify the relatively modest implementation costs estimated for affected State agencies.

Potential Affected Federal Agencies, Cost, and Cost Savings

The only federal vehicles that routinely operate at or near schools belong to the U.S. Postal Service. Most U.S. Postal Service mail delivery vehicles are not heavy duty and would not be subject to the Proposed ATCM. Moreover, the U.S. Postal Service already has a "no idling" policy for all of its vehicles regardless of size. (Bellino, 2002) Therefore, staff estimate no cost and no cost savings for the federal government as a result of the Proposed ATCM.

B. ENVIRONMENTAL IMPACT

This section describes the potential impacts that the Proposed ATCM may have on the environment. The Proposed ATCM is intended to protect the health of children and others by reducing exposure to school bus idling exhaust containing potentially harmful emissions of diesel PM and other TACs and air pollutants. An additional consideration is the impact that the Proposed ATCM may have on the environment. Based upon available information, the ARB staff has determined that no significant adverse environmental impacts should occur as a result of adopting the Proposed ATCM.

Legal Requirements Applicable to the Environmental Impact Analysis

The California Environmental Quality Act (CEQA) and ARB policy require an analysis to determine the potential environmental impacts of proposed regulations. Since the ARB's program involving the adoption of regulations has been certified by the Secretary of Resources pursuant to Public Resources Code section 21080.5, CEQA environmental analysis requirements may be included in the Initial Statement of Reasons for this rulemaking in lieu of preparing an environmental impact report or negative declaration. In addition, staff will respond, in the Final Statement of Reasons for the ATCM, to all significant environmental issues raised by the public during the public review period or at the Board public hearing.

Public Resources Code section 21159 requires that the environmental impact analysis conducted by ARB include the following:

- An analysis of reasonably foreseeable environmental impacts of the methods of compliance;
- An analysis of reasonably foreseeable feasible mitigation measures; and

- An analysis of reasonably foreseeable alternative means of compliance with the ATCM.

Regarding mitigation measures, CEQA requires an agency to identify and adopt feasible mitigation measures that would minimize any significant adverse environmental impacts described in the environmental analysis.

Analysis of Reasonably Foreseeable Environmental Impacts of the Methods of Compliance

Compliance with the Proposed ATCM is expected to directly impact air quality alone. Therefore, the only reasonably foreseeable impact on other environmental media (i.e., water, soil, or vegetation) would be as a consequence of the air quality impact. The Proposed ATCM would require a driver to turn off an affected bus or vehicle engine when parked as a means of reducing idling emissions. However, in order to resume travel, the engine would need to be restarted and, as a result, warm start emissions are expected to occur.

Based upon a limited body of test data, modeling runs, and extrapolated data, the elimination of unnecessary idling is expected to decrease PM10 emissions from diesel- and CNG-fueled buses and vehicles. The change in PM10 emissions for gasoline-fueled buses and vehicles is expected to be small. With respect to other criteria pollutants, overall, school transportation fleet emissions of THC, CO, and NOx are also expected to decrease as a result of the Proposed ATCM. Staff analyses show that limiting idling of the school transportation fleet and other buses and heavy-duty vehicles that operate at or near schools would reduce PM10 emissions and, as a result, reduce exposure to diesel PM and PM2.5 emissions. Therefore, staff believe that the Proposed ATCM would be an efficient and cost-effective means of meeting the ARB's goal to significantly reduce children's parents', teachers', and nearby residents' exposure to diesel PM at or near schools.

Reasonably Foreseeable Mitigation Measures

ARB staff has concluded that no significant adverse environmental impacts should occur from adoption of, and compliance with, the Proposed ATCM. Therefore, no mitigation measures would be necessary.

Reasonably Foreseeable Alternative Means of Compliance with the ATCM

Alternatives to the Proposed ATCM are discussed in Chapter IV, Section C, of this Staff Report. ARB staff has concluded that the Proposed ATCM provides the most effective and least burdensome approach to reducing children's and the general public's exposure to TACs and other air pollutants as a result of excessive school bus and other heavy-duty vehicle idling.

C. ENVIRONMENTAL JUSTICE

The ARB is committed to integrating environmental justice in all of its activities. On December 13, 2001, the Board approved "Policies and Actions for Environmental Justice," which formally established a framework for incorporating Environmental Justice into the ARB's programs, consistent with the directives of State law. Environmental Justice is defined as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. These policies apply to all communities in California, but recognize that environmental justice issues have been raised more in the context of low-income and minority communities.

The Environmental Justice Policies are intended to promote the fair treatment of all Californians and cover the full spectrum of ARB activities. Underlying these Policies is a recognition that the agency needs to engage community members in a meaningful way as it carries out its activities. People should have the best possible information about the air they breathe and what is being done to reduce unhealthful air pollution in their communities. The ARB recognizes its obligation to work closely with all communities, environmental and public health organizations, industry, business owners, other agencies, and all other interested parties to successfully implement these Policies. (ARB, 2001b)

Chapter II of this Staff Report generally describes the efforts made to apprise the public about the development of the Proposed ATCM. During the development process, ARB staff proactively searched for opportunities to present information about the Proposed ATCM at places and times convenient to stakeholders. For example, several presentations were made at regularly-scheduled meetings of organizations whose members were identified as affected or interested parties. These presentations reached more than 200 persons.

The Public Consultation Meeting (Sacramento, July 23, 2002) and Public Workshops (SCAQMD, Diamond Bar, September 10, 2002 and Sacramento, September 12, 2002) were held in the mid to late afternoon to maximize the attendance of school bus drivers and other school personnel. Also, to maximize public participation, notices of the Public Consultation Meeting and two Public Workshops were sent to approximately 16,200 affected individuals or organizations and to approximately 800 environmental justice, children's health, community, and environmental activists. An overview of the Proposed ATCM and all meeting documents and information were, and continue to be, displayed on the School Bus Idling web page. The web page includes a link for subscribing to the School Bus Idling List Serve.

The Proposed ATCM is consistent with the environmental justice policy to reduce health risks from TACs in all communities, including low-income and minority communities. By limiting school bus and other heavy-duty bus and vehicle idling to only when absolutely necessary, the Proposed ATCM would provide air quality benefits by reducing

diesel PM and other TACs and air pollutants in neighborhoods at and near schools. Additional idling limits on buses and other heavy-duty vehicles whose primary purpose is the transport of school children would provide air quality benefits at other locations as well (e.g., near bus garage and maintenance facilities, bus stops, and school and other activity destinations). The amount of emissions reduction in low-income, minority, and other communities would depend upon the number and current extent of unnecessary idling of affected buses and vehicles.

VI. REFERENCES

ARB, 1984. California Air Resources Board and Department of Health Services. Report to the Scientific Review Panel on Benzene. Overview. Sacramento: ARB and OEHHA, 27 November 1984.

ARB, 1986. California Air Resources Board and Department of Health Services. Public Hearing to Consider the Adoption of a Regulatory Amendment Identifying Chlorinated Dioxins and Dibenzofurans as Toxic Air Contaminants. Sacramento: ARB and DHS, 6 June 1986.

ARB, 1991. California Air Resources Board. Public Information Office. Facts About Air Pollution and Health. Sacramento: ARB, 1991.

ARB, 1992a. California Air Resources Board and Office of Environmental Health Hazard Assessment. Final Report on the Identification of Formaldehyde as a Toxic Air Contaminant. Part A Exposure Assessment. Sacramento: ARB and OEHHA, July 1992.

ARB, 1992b. California Air Resources Board and Office of Environmental Health Hazard Assessment. Proposed Identification of 1,3-Butadiene as a Toxic Air Contaminant. Staff Report/Executive Summary. Sacramento: ARB and OEHHA, May 1992.

ARB, 1993a. California Air Resources Board and Office of Environmental Health Hazard Assessment. Acetaldehyde as a TAC. Executive Summary. Sacramento: ARB and OEHHA, November 1993.

ARB, 1993b. California Air Resources Board. Identification of Federal Hazardous Air Pollutants as Toxic Air Contaminants. Staff Report. Sacramento: ARB, June 1993.

ARB, 1994. California Air Resources Board and Office of Environmental Health Hazard Assessment. Benzo[a]pyrene as a Toxic Air Contaminant. Executive Summary. Sacramento: ARB and OEHHA, July 1994.

ARB, 1998a. California Air Resources Board and Office of Environmental Health Hazard Assessment. Proposed Identification of Diesel Exhaust as Toxic Air Contaminant. Staff Report. Sacramento: ARB and OEHHA, June 1998.

ARB, 1998b. California Air Resources Board. Measuring Concentrations of Selected Air Pollutants Inside California Vehicles, Final Report, Contract No. 95-339. Sacramento: ARB, December 1998.

ARB, 2000a. California Air Resources Board. Public Meeting to Consider Approval of Revisions to the State's Motor Vehicle Emissions Inventory. EMFAC 2000 Technical Support Document. Sacramento: ARB, May 2000.

ARB, 2000b. California Air Resources Board. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. Sacramento: ARB, October 2000.

ARB, 2001a. California Air Resources Board. Lower-Emission School Bus Program. Sacramento: ARB, April 2001.

ARB, 2001b. California Air Resources Board. Policies and Actions for Environmental Justice. Sacramento: ARB, 13 December 2001.

ARB, 2002a. California Air Resources Board. Characterizing the Range of Children's Pollutant Exposure During School Bus Commutes, Pilot Study Report, No. 00-322. Sacramento: ARB, 19 April 2002.

ARB, 2002b. California Air Resources Board Planning and Technical Support Division, School Bus Emissions Inventory, May-September 2002.

Argonne National Laboratory, 2001. Stodolsky, Frank, Linda Gaines, and Anant Vyas. Technology Options to Reduce Truck Idling. Presentation. Argonne National Laboratory Transportation Technology R&D Center, 15 March 2001.

Bellino, 2002. Personal Communication, Joe Bellino, U.S. Postal Service, to Stephanie Kato, ARB, Stationary Source Division, September 2002.

Boudreu, 2002. Personal Communication (Telephone Conversation), Marty Boudreu, Department of Motor Vehicles, to Mike Sutherland, ARB, Stationary Source Division, July-August 2002.

CAPCOA, 1993. California Air Pollution Control Officers Association. Air Toxics "Hot Spots" Program: Revised 1992 Risk Assessment Guidelines, October 1993.

Caterpillar, 2001. Operation and Maintenance Manual: C-10, C-12, 3406E, C-15, and C-16 Truck Engines. Media Number SEBU7186-04, 9 October 2001.

CDE, 2002. Public and Private Schools Directory Information. Item 9746. CD-ROM. California Department of Education Press, 2002.

CenterViews, 2000. "CenterViews," The Planning Center, Costa Mesa, California, May 2000.

EHHI, 2002. Wargo, John, Ph.D. Children's Exposure to Diesel Exhaust on School Buses. North Haven: Environment and Human Health, Inc., February 2002.

Esbri, 2002. Personal Communications, Mario Esbri, CHP, to Barbara Cook, ARB Stationary Source Division, June-July 2002.

Fregoso, 2002. Personal Communication, Krista Fregoso, ARB Mobile Source Control Division, to Barbara Cook, ARB Stationary Source Division, 1 July 2002.

Green, 2002. Personal Communications (Including Telephone Conversations), John Green, California Department of Education, to Barbara Cook, ARB Stationary Source Division, June-July 2002.

Hintz, 2002. Personal Communication (Telephone Conversation), Curt Hintz, Caterpillar Dealership, to John Gruszecki, ARB Stationary Source Division, 17 September 2002.

Landberg, 2002. Personal Communication (Telephone Conversation), Earl Landberg, ARB Mobile Source Control Division, to Barbara Cook, ARB Stationary Source Division,10 May 2002.

Miller, 2002. Personal Communication, Tom Miller, Tahoe-Truckee Unified School District, to Barbara Cook, ARB Stationary Source Division, August 2002.

Negrete, 2002. Personal Communication, Lucina Negrete, ARB Mobile Source Control Division, to Barbara Cook, ARB Stationary Source Division, 27 June 2002.

NRDC, 2001. Solomon, Gina M., et al. No Breathing in the Aisles: Diesel Exhaust Inside School Buses. Los Angeles: Natural Resources Defense Counsel/Coalition for Clean Air, January 2001.

OEHHA, 1999. California Office of Environmental Health Hazard Assessment. Determination of Acute Reference Exposure Levels for Airborne Toxicants. Sacramento: OEHHA, March 1999.

OEHHA, 2001. California. Office of Environmental Health Hazard Assessment. Prioritization of Toxic Air Contaminants Under the Children's Environmental Health Protection Act. Sacramento: OEHHA, October 2001.

Oregon DOE, 1996. "Oregon Clean Cities at Work: An Alternative Fuels Case Study," Oregon Department of Energy, September 1996.

Plopper, 2002. Plopper, Charles G. "Deleterious Effects of Air Pollution and Allergens on Lung Development in Infants." Children's Environmental Health – Developing a Risk Assessment Framework, OEHHA Program, 31 May 2002.

SCAQMD, 2000. Kleinman, Michael T. “The Health Effects of Air Pollution on Children." South Coast Air Quality Management District Student’s Health, Fall 2000, Updated 19 September 2000 <http://www.aqmd.gov/forstudents/kleinman_article.htm>.

SCAQMD, 2001. South Coast Air Quality Management District. Proposed Rule 1195, Clean On-Road School Buses, Staff Report. Diamond Bar: SCAQMD, April 2001.

School Bus Fleet, 2000. Hirano, Steve, ed. “How to Keep High Fuel Prices from Throttling Your Budget.” Archives. Schoolbusfleet.com, September 2000 <http://www.schoolbusfleet.com/archive2.cfm?rank=234>.

School Bus Fleet, 2002. “Statistics, School Bus Transportation: 1999-2000 School Year.” State-by-State Transportation Statistics. Schoolbusfleet.com. 1999-2000 School Year. April 2002 <http://www.schoolbusfleet.com/SBFFB02p29-31.pdf>.

Sherrill, 2002. Personal Communication, Claudia Sherrill, Elk Grove Unified School District, to Barbara Cook, ARB Stationary Source Division, August-September 2002.

Steinbrenner, 2002. Personal Communication (Telephone Conversation), Bob Steinbrenner, California Department of Transportation, to John Gruszecki, ARB Stationary Source Division, 17 September 2002.

Truck Maintenance Council, 1995. Analysis of Costs from Idling and Parasitic Devices for Heavy Duty Trucks. Truck Maintenance Council Recommended Practice 1108. Alexandria: American Trucking Association, March 1995.

U.S. DOE, 2001. Office of Heavy Vehicle Technologies. “Don’t Idle Your Profits Away!” Poster. U.S. Department of Energy Office of Heavy Vehicle Technologies, 1 April 2001 <http://www.trucks.doe.gov/pdfs/V/13.pdf>.

U.S. EPA, 1997. Environmental Protection Agency. Emission Standards Reference Guide for Heavy-Duty and Nonroad Engines. EPA420-F-97-014. Washington, D.C.: US EPA, September 1997.

U.S. EPA, 1998. Environmental Protection Agency. Office of Mobile Sources. Emission Facts: Idling Vehicle Emissions. EPA420-F-98-014. Washington, D.C.: US EPA, April 1998.

U.S. EPA, 2002a. "Region 1: New England - Diesel Exhaust." U.S. EPA, Updated 24 May 2002 <http://www.epa.gov/ne/eco/diesel>.

U.S. EPA, 2002b. "Voluntary Diesel Retrofit Program - Overview" U.S. EPA Voluntary Diesel Retrofit Program, Updated 28 June 2002 <http://www.epa.gov/otaq/retrofit/overview.htm>.

Valley Research, 1994. Volume I - Bus Population and Activity Pattern, On-Road Motor Vehicle Activity Data. Northridge: Valley Research Corporation, September 1994.