

## CALIFORNIA AIR RESOURCES BOARD

### **NOTICE OF PUBLIC MEETING TO REVIEW AND APPROVE REVISIONS TO THE CARL MOYER MEMORIAL AIR QUALITY STANDARDS ATTAINMENT PROGRAM GUIDELINES; INCENTIVES FOR LOWER EMISSION HEAVY-DUTY ENGINES**

The California Air Resources Board (Board or ARB) will conduct a public meeting at the time and place noted below to consider approving revisions to the Carl Moyer Program Guidelines.

DATE: November 16, 2000

TIME: 9:30 a.m.

PLACE: Air Resources Board  
Board Hearing Room, Lower Level  
2020 L Street  
Sacramento, CA

This item will be considered at a two-day meeting of the Board, which will commence at 9:30 a.m., November 16, 2000, and may continue at 8:30 a.m., November 17, 2000. This item may not be considered until November 17, 2000. Please consult the agenda for the meeting which will be available at least 10 days before November 16, 2000, to determine when this item will be considered.

This facility is accessible to persons with disabilities. If accommodation is needed, please contact ARB's Clerk of the Board at (916) 322-5594 by November 2, 2000, to ensure accommodation. Persons with hearing or speech impairments can contact us by using our Telephone Device for the Deaf (TDD) at (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento area.

#### **Background**

The purpose of the Carl Moyer Memorial Air Quality Standards Attainment Program is to obtain early emissions reductions of criteria air pollutants and help California meet its air quality obligations under the State Implementation Plan (SIP) required by the Federal Clean Air Act by funding state-of-the-art control programs. This program provides grants for the extra capital cost of lower-emission heavy-duty vehicles and equipment. In essence, the program buys critical near-term emission benefits that California needs to meet impending federal air quality deadlines.

The Air Resources Board approved the Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) Guidelines in February 1999. The program has been funded for two years, and is entering a third year funding cycle. Based on ARB and local air district staff experience with implementation of the Carl Moyer Program, the ARB

believes it is necessary to revise the Guidelines in order to improve the program's ability to achieve its goals. These proposed revisions will affect Carl Moyer Program projects funded in the third year (2000/01 fiscal year funds).

Assembly Bill 1571 (Brulte/Villaraigosa, Stats 1999, Ch. 923; HSC section 44275 et seq.), directs ARB staff to allow the public 45 days to comment on any proposed revisions to the program. AB 1571 also created the Carl Moyer Program Advisory Board (Advisory Board), which was responsible for developing a report with recommendations on continuing and improving the Carl Moyer Program. The ARB staff has developed these proposed revisions to the Guidelines taking into consideration changes required under AB 1571 and recommendations made by the Advisory Board. The staff's proposed revisions were made available to the public on July 27, 2000, opening the required 45-day public comment period. In August 2000, ARB staff conducted a series of public workshops to gather public comments.

The Carl Moyer Program is set up in a two-tier administrative system. The ARB has the responsibility to establish program guidelines, oversee the program, and report program benefits. Local air districts implement the program and provide a link with public and private participants. Hence, ARB staff must evaluate every participating district's program and progress and administer program funds, as well as review project applications. In addition, ARB has also supported the program by developing new certification and testing procedures and by researching new technologies and fuels for possible emission benefits. Participating districts implement the program, conduct outreach to project applicants, thoroughly review and select projects that meet guideline criteria, and report progress back to the ARB.

The original program guidelines were approved in February 1999. As a means to improve the program's effectiveness in achieving its goals, ARB staff is proposing to revise the program guidelines. If approved, projects funded in the third year must be selected according to the criteria listed in the proposed revisions.

### **STATUS OF THE CURRENT PROGRAM**

In its first year, the Carl Moyer Program was an overwhelming success. Staff estimated that projects funded in the first year of the program will reduce oxides of nitrogen (NOx) emissions by about 4 tons per day, and particulate matter (PM) emissions by about 100 pounds per day at a cost of \$3,000 per NOx ton. This cost-effectiveness is far below the program's initial threshold of \$12,000 per ton and below the cost of typical stationary emission reduction strategies. The demand for project funds exceeded three times the amount of funds available. ARB distributed \$24.5 million (1998/1999 fiscal year funds) in project funds to sixteen local air districts. Forty percent of those funds were used to fund alternative fuel on-road projects, 25 percent to fund marine vessel projects, 20 percent to fund agricultural pumps, 10 percent to fund forklifts, and the remaining 5 percent to fund other diesel repowers (mostly off-road equipment). In June 1999, Governor Davis and the Legislature approved a one-time appropriation of \$23

million to fund the Carl Moyer Program through a second year (\$19 million to the ARB for engine projects and \$4 million to the California Energy Commission (CEC) for infrastructure and advanced technology projects). Most districts have already started selecting and funding projects with second year funds. During the second year, the Advisory Board, with the assistance of ARB, CEC, and the local air districts, recommended in a report released March 31, 2000, to the Governor and the Legislature to continue the Carl Moyer Program through 2010, at an increased level of funding. Subsequently, the Governor and the Legislature approved a one-time budget appropriation of \$50 million (\$45 million to ARB and \$5 million to CEC) to fund the Carl Moyer Program through a third year (fiscal year 2000/2001).

## **PROPOSED REVISIONS**

In order to ensure that funding criteria are consistent statewide, even though districts have different implementation schedules, it is necessary to move toward an annual revision schedule. Hence, ARB staff is proposing a number of revisions to the Carl Moyer Program Guidelines that will affect projects funded during this third year of the program.

Some of the major proposed revisions include placing a cap on districts' matching funds for the future program, adding a new chapter to quantify the PM emission reduction benefits of the program, adding provisions to allow funding for incremental fuel cost, and adjusting the cost-emission requirement to reflect inflation and cost of living levels. In addition, existing chapters are being revised to add provisions for dual-fuel engines operated in low-speed, stop-and-go chassis cycle, large off-road and agricultural irrigation pump projects, diesel to diesel repower and retrofit projects, and update default emission factors. There are also some minor modifications to correct discrepancies in the Guidelines such as omissions and typographical errors. The following sections provide a brief description of the major proposed revisions.

**District Matching Funds Ratio.** The Advisory Board recommended that districts' matching fund requirement be capped, recognizing the challenge in meeting the matching requirement for an annual program funding level above \$25 million. The Governor and the Legislature responded by enacting Senate Bill 1300 (Sher; Stats 2000, Ch. 729) authorizing the ARB to adjust the ratio of matching funds required from a district. Staff proposes to modify districts matching fund requirement according to the Advisory Board's recommendations.

**PM Emission Reduction Requirements and Goals.** The Carl Moyer Program was designed to help California produce the NO<sub>x</sub> emission reductions from heavy-duty vehicles required in the 1994 SIP. Although the initial focus of the program was on NO<sub>x</sub> reductions, the Advisory Board, ARB, and local air districts recognize that diesel PM is a serious public health concern and PM reductions are necessary throughout California. In its report, the Advisory Board suggested to the Governor and the Legislature that the Carl Moyer Program should encourage further PM reductions. The

Advisory Board suggested a Carl Moyer Program goal to reduce PM emissions by 25 percent statewide, except for areas that are non-attainment for the federal PM standard. Those areas designated as serious non-attainment for the federal PM standard are required to reduce PM emissions by 25 percent on a program basis (not a project-by-project basis). Currently, the San Joaquin Valley Air Pollution Control District and the South Coast Air Quality Management District (SCAQMD) are the only two districts affected by this proposed requirement.

ARB staff proposes to incorporate the Advisory Board's recommendations addressing PM reductions into the Carl Moyer Program Guidelines. ARB staff proposes that PM emissions be calculated similar to NOx emission reductions. Emission factors are used to calculate reductions from the program and are based on the ARB emission inventory models -- EMFAC 2000 and OFFROAD. A new chapter lists default PM emission factors for each project category, and provides examples for calculating project and program PM reductions.

**Incremental Fuel Cost.** The Carl Moyer Program is designed to pay the incremental capital cost of vehicles and equipment that are cleaner than required. Funding of incremental fuel costs is not currently allowed under the program. Cleaner alternative fuels and alternative diesel fuels (e.g., diesel-water emulsions) are available that can reduce NOx and PM emissions. ARB staff proposes to allow districts the option to fund incremental fuel costs, provided those funds come from district funds. Projects would be approved by ARB on a case-by-case basis and funds would count as district matching funds.

**Cost-Effectiveness Requirement.** The program's cost-effectiveness limit of \$12,000 per ton of NOx reduced was approved in the first year of the program, three years ago. Section 44283 of the Health and Safety Code authorizes the Board to adjust the cost-effectiveness limit to reflect the current inflation and cost of living adjustments. Hence, ARB staff proposes to adjust the cost effectiveness limit to account for cost of living increases that occurred over the past three years.

**Dual-Fuel Engines In Transit Bus and Neighborhood Refuse Collection Vehicles.** Dual-fuel engines are available that are certified to reduce NOx to sixty-two percent of the required NOx standards. One set of in-use test data shows that while these engines deliver full emission benefits in many applications, the emission benefits are less for engines operated on a low-speed, stop-and-go chassis cycle (the Central Business District cycle). One indication of this is the percentage of alternative fuel consumed. This fuel substitution rate has been high (approximately 80 percent) during certification, but may be significantly lower in stop-and-go applications. ARB staff has been working closely with a dual-fuel engine manufacturer to collect additional information and more accurately determine the emission benefits in neighborhood refuse collection. Staff proposes that prior to any dual-fuel project being funded for a stop-and-go application, the manufacturer must provide the Executive Officer with sufficient in-use documentation to demonstrate that the fuel substitution rate is

appropriate to yield the certified benefits.

**Update Emission Factors.** ARB staff is proposing new NOx emission factors to reflect the recently adopted EMFAC 2000 emission model, which accounts for the settlement agreement between ARB and the diesel engine manufacturers (regarding excess NOx emissions from the use of alternative injection timing strategies). ARB staff is proposing emission factors for heavy-duty on-road vehicles that are based on the model year and gross vehicle weight rating (GVWR). ARB staff is also proposing new emission factors for off-road engines that reflect the new off-road model (OFFROAD), which incorporates the most recent regulations adopted by both the U.S. Environmental Protection Agency and the ARB for off-road diesel engines.

**NOx Emission Reduction Requirement.** The current guidelines establish a 25 - 30 percent emission reduction requirement for any retrofit or repower projects funded under the program. This requirement, along with the new proposed emissions factors, would prevent funding for significant emission reductions from diesel-to-diesel repower and retrofit projects. Section 44282 of the Health and Safety Code authorizes the Board to revise the minimum NOx emission reduction requirement for retrofit and repower equipment, when necessary in order for the program to achieve its air quality goals. ARB staff proposes to decrease the NOx emission reduction requirement to 15 percent.

**Repower Funding Caps.** Based on implementation experience during the first two years of the program, ARB staff believes that the funding caps for repower projects may prohibit large off-road and agricultural irrigation pump engine projects from being funded. Emission reductions from the replacement of these engines are significant and can benefit the program in meeting its air quality goals. In order to encourage the participation of large off-road and agricultural irrigation pump engine projects, ARB staff proposes to remove the funding cap for repower projects.

**Emission Calculations to Account for Activity Level Increase/Decrease.** In general, the emission reduction benefit of a project can be calculated based on the annual fuel consumed, annual miles traveled, or annual hours operated and should reflect the individual characteristics, such as horsepower, brake specific fuel consumption, and load, etc., of both the replacement and current engine. If the annual fuel consumption is used, an energy consumption factor should be calculated (based on the brake specific fuel consumption of each engine) and the activity level should be based on actual annual fuel receipts. ARB staff proposes that when the annual mileage or hours of operation is the basis for determining the emission reductions, the activity level be based on the vehicle odometer or hour meter. The details for calculating emissions are presented in each chapter, for each project category.

**Diesel Hybrids.** One of the new heavy-duty technologies being demonstrated is that of hybrid electric engine systems. Manufacturers of this technology are currently focusing on the transit bus market, but this technology could also provide emission

reductions in other applications. Recent test data indicate that diesel hybrid transit buses with a particulate filter and low sulfur diesel fuel can achieve PM emission levels comparable to a natural gas transit bus without a particulate filter. However, that testing shows current diesel hybrid technology does not produce the NOx reduction benefits of natural gas engines. With further optimization diesel hybrid technology has the potential to significantly reduce both NOx and PM. ARB staff is working to develop a certification procedure for heavy-duty hybrids. Until that occurs, however, it is unlikely that reduced emission levels of diesel hybrid vehicles can be easily validated. Currently, diesel hybrids are not funded in transit applications. Staff proposes to allow them in the program on a case-by-case basis until the certification procedure is resolved.

**Auxiliary Power Units for Reducing Idling Emissions from Heavy-Duty Vehicles.** It is common practice for truck operators to idle their truck engines for an extended length of time when the vehicles are parked. This keeps the engines and fuel warm, and provides heating and cooling for the truck cabs. This practice increases the amount of fuel used and emissions. An auxiliary power unit could be installed on a truck to significantly reduce the amount of idling time the truck would normally be subject to. This would result in fuel savings and emission reduction benefits. However, relatively high initial costs of the auxiliary power units have prevented this and similar technologies from being more widely utilized. Hence, ARB staff is proposing to include a new project category into the Carl Moyer Program. Staff proposes to allow Carl Moyer Program funds to pay for installation costs of auxiliary power units, up to \$1,500 per unit installed. Staff's proposal includes criteria for funding these projects to ensure real emission benefits would be realized in a most cost-effective manner.

**Discount Factors for Marine Vessels.** There is a degree of uncertainty regarding the amount of offshore emissions that actually reach the mainland. Hence, staff is proposing local district emission inventory boundaries will determine the range of offshore emissions boundaries for the program. If a local district has not established an emission inventory boundary, ARB staff has set default value of 10 miles off shore.

**Agricultural Pump Electric Motors.** The current program is designed to provide funding for the increase in capital cost between two engines (i.e., diesel engine versus electric motor). Electric motors for agricultural pumps, however, cost less than diesel engines and therefore do not qualify for incentive funding.

The emission benefits associated with replacing engines with electric motors are significant. Hence, ARB evaluated two methods for providing the agricultural communities with incentives to convert to electric motors: funding to cover standby electric charges, or funding to install the power line and peripheral equipment necessary for an electric pump. The cost of the electric motor plus the installation cost to set up a power line and connect necessary peripheral equipment to the motor are comparable to the installed cost of a new off-road emission-certified diesel engine. ARB staff proposes to allow Carl Moyer Program project funds for the incremental cost

of connecting the power line to the grid plus peripheral equipment. ARB staff recommends line extension costs not be funded.

**Expanded Forklift Program.** For the first two years of the Carl Moyer Program, many electric forklift projects were funded through a successful demonstration project in the SCAQMD. Under this demonstration program, the SCAQMD staff determined it appropriate to set a cost-effectiveness criterion of \$3,000 per ton of NOx reduced for all forklift projects. ARB staff proposes to expand the forklift demonstration program statewide, including a maximum cost-effectiveness criterion of \$3,000 per ton of NOx reduced.

**October 2002 Repowers.** Under the current Carl Moyer Program replacing early 90s electronically controlled engines with similar engines manufactured in the late 90s (electronic-to-electronic repowers) was not allowed. Electronically controlled engines manufactured in the late 90s are equipped with advanced computer controls that have alternative strategies for fuel management. When these engines operate outside of the certified test procedure, the alternative strategies allow the engines to produce excess NOx emissions above the certified standard. This practice is commonly referred to as "off-cycle NOx emissions". A settlement agreement was reached between the engine manufacturers, ARB, and U.S. Environmental Protection Agency requiring that many of the engine manufacturers introduce new engines with significantly lower NOx emissions beginning in October 2002. Repowering older electronically controlled trucks with these October 2002 engines can significantly reduce emissions. Hence, ARB proposes to allow October 2002 repowers under the Carl Moyer Program.

### **AVAILABILITY OF DOCUMENTS AND AGENCY CONTACT PERSON**

A proposed revised version of Carl Moyer Program Guidelines will be presented by the ARB staff at the Board meeting. Copies of the proposed revisions may be obtained from the Board's Public Information Office, 2020 L Street, Sacramento, CA 95814, (916) 322-2990, prior to the scheduled meeting. This report will also be available electronically on ARB's website at <http://www.arb.ca.gov/msprog/moyer/moyer.htm>. Further inquiries regarding this matter should be directed to Lucina Negrete, Air Pollution Specialist, at (916) 327-2938.

### **SUBMITTAL OF PUBLIC COMMENTS**

The public may present comments relating to this matter orally or in writing to the Clerk of the Board in person, on the day of the meeting, and in writing or by e-mail before the meeting. To be considered by the Board, written submissions must be addressed to and received by the Clerk of the Board, P.O. Box 2815, Sacramento, California 95812, no later than 12:00 noon on November 15, 2000, or received by the Clerk of the Board at the meeting. To be considered by the Board, e-mail submissions must be addressed to the Clerk of the Board at [moyer00@listserv.arb.ca.gov](mailto:moyer00@listserv.arb.ca.gov), and received at the ARB no later than 12:00 noon, November 15, 2000.

The Board encourages members of the public to bring to the attention of staff in advance of the meeting any suggestions or comments. The Board requests, but does not require, that 30 copies of any written statement be filed at least ten days prior to the meeting date, so that ARB staff and Board Members have time to fully consider each comment.

CALIFORNIA AIR RESOURCES BOARD

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Michael P. Kenny  
Executive Officer

Date: October 20, 2000