THE CARL MOYER PROGRAM GUIDELINES PROPOSED REVISIONS 2005

WORKSHOP

August 19
Sacramento

On-Road Controls Branch
Mobile Source Control Division

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
Air Resources Board

Webcast Communication Information

- Please send questions and comments to:
  - Email address: OnAir@arb.ca.gov

Today's Agenda

- Carl Moyer Program Background
- Agricultural Sources
- Agricultural Assistance Program
- Voluntary Accelerated Vehicle Retirement
- Open Discussion

Carl Moyer Program
Background

- Provides grants to offset the incremental cost of lower emitting technologies
- Early introduction of low-emission technologies
- Carl Moyer Program's objective
  - Improve air quality
  - Supplement, not replace, regulations

Carl Moyer Program
Core Principles

- A state and local partnership
  - ARB sets guidelines
  - Local districts receive applications, make grants, and monitor projects
- Emission reductions must be real, quantifiable, surplus, and enforceable
- Environmental justice funding requirement

Carl Moyer Program
Eligible Emission Reductions

- Emission reductions must be real, quantifiable, surplus, and enforceable
  - Certified engines and/or verified retrofit kits
  - Cannot be used in alternative compliance strategies (e.g., ABT)
  - Cannot be used to comply with other regulations (e.g., fleet rules)
  - Cannot be used to comply with legally binding agreements (e.g., MOUs)

Carl Moyer Program Changes

- Increased and continued funding
  - Adjustment to Smog Check and tire fees through 2015
  - Local districts may increase motor vehicle registration surcharge by $2
- Program expansion
  - Add PM and ROG
  - Add light-duty vehicles
  - Add agricultural sources (HSC 39011.5)
  - Add fleet modernization program

Cost-Effectiveness

Proposed Formula

- Cost-Effectiveness ($/ton) =

$$\frac{\text{Annualized Cost}}{NOx + ROG + (WF * PM_c)}$$

Where:

NOx	=	Annual NOx emissions (tpd)
ROG	=	Annual ROG emissions (tpd)
PM_c	=	Combustion PM (tpd)
WF	=	weighting factor

- WF may be based on many factors
- Range of weighting factor for PM_c: 10 - 30
- Non-combustion PM not included
  - Guidelines criteria not available for non-combustion PM projects

Schedule

- Workshops on Carl Moyer Guideline Revisions
  - November/December 2004
  - April/May 2005
  - August 2005
- Release Proposed Project Criteria -- August 2005
- Release Proposed Guidelines -- Oct 2005
- Board Hearing -- Nov 2005

Carl Moyer Program

Agricultural Sources

Project Criteria

Agricultural Sources
Background

- Previous funding for self-propelled equipment, irrigation pump engines/motors
- AB 923 expanded agricultural projects eligible for funding:
  - Confined animal facilities
  - Internal combustion engines (not self-propelled)
  - Title V sources
  - Sources subject to district regulation

Agricultural Sources

Project Criteria

- General Requirements
  - Early or extra emission reductions
  - Cost-effectiveness of $14,300/weighted ton
  - Project life of at least 3 years

See project criteria handout for a complete list of proposed criteria

Agricultural Sources

Project Criteria- Stationary/Portable Engines

- Engines greater than 25 hp
- Repowers of diesel engines
  - Electric
  - New certified diesel or SI engine
  - New SI engine with emissions below district requirements
- Repowers of spark-ignited (SI) engines
  - Electric
  - New certified SI engine
  - New SI engine with emissions below district requirements

See project criteria handout for a complete list of proposed criteria

Agricultural Sources

Project Criteria- Stationary/Portable Engines

- Uncertified SI engine projects
  - Subject to ARB staff approval
  - Must include closed-loop fuel system and three-way catalyst
  - Source testing every 2 years
  - Quarterly (with exceptions) NOx and HC emission readings using portable analyzer
  - Costs associated with testing and monitoring not eligible for funding

See project criteria handout for a complete list of proposed criteria

Agricultural Sources

Electric Motor Projects

- Districts must give priority to projects that replace stationary agricultural engines with electric motors
- Electric motor projects may use a 10 year project life
- Necessary equipment associated with motor is eligible for funding

See project criteria handout for a complete list of proposed criteria

Agricultural Sources

Electric Motor Projects

- Some utilities offering special rate and credit for line extension for electric ag pumps
  - Limited time offer
- Propose to extend project life for current Moyer-funded IC engines that opt for limited time electric rate
- Propose to reduce engine rebuild cost for non-Moyer-funded IC engines that opt for limited time electric rate
- Districts may use match funds for additional line extension costs

See project criteria handout for a complete list of proposed criteria

Agricultural Sources

Project Criteria- Non-Engine Projects

- No criteria proposed at this time
- Continue to monitor potential control technologies:
  - Real, quantifiable, enforceable emission benefits
  - Availability of testing methods for quantifying emission benefits
  - Availability of baseline emission factors
- Propose to allow EO approval of project criteria

See project criteria handout for a complete list of proposed criteria

Agricultural Sources

Criteria

Discussion

Email address: OnAir@arb.ca.gov

Agricultural Sources

Sample Calculation – Irrigation Pump Engine Repower

Existing engine information:

- 1991 Caterpillar 3116, diesel
- Emission rate (g/bhp-hr): 7.6 NOx, 0.67 ROG, 0.27 PM,
- Activity: 2,000 hr/yr
- Engine horsepower: 155 hp
- Load factor: 0.65

Reduced-emission engine information:

- 2005 GE 5K445FT328, electric
- Emission rate (g/bhp-hr): 0.0 NOx, 0.0 ROG, 0.0 PM
- Activity: 2,000 hp
- Engine horsepower: 100 hp (75 kW)
- Load factor: 0.65

Draft – Do not cite or quote – numbers may change

Agricultural Sources

Sample Calculation – Irrigation Pump Engine Repower

Emissions Calculation – Baseline

- NOx = (7.6 g/bhp-hr*2,000 hr/yr *155 hp*0.65)/907,200 g/ton = 1.69 ton/yr
- ROG = (0.67 g/bhp-hr*2,000 hr/yr *155 hp*0.65)/907,200 g/ton = 0.15 ton/yr
- PM = (0.27 g/bhp-hr*2,000 hr/yr *155 hp*0.65)/907,200 g/ton = 0.06 ton/yr

Emissions Calculation – Reduced Emissions

- NOx = (0.0 g/bhp-hr*2,000 hr/yr*100 hp*0.65)/907,200 g/ton = 0 ton/yr
- PM = (0.0 g/bhp-hr*2,000 hr/yr*100 hp*0.65)/907,200 g/ton = 0 ton/yr
- ROG = (0.0 g/bhp-hr*2,000 hr/y *100 hp*0.65)/907,200 g/ton = 0 ton/yr

Draft – Do not cite or quote – numbers may change

Agricultural Sources

Sample Calculation – Irrigation Pump Engine Repower

- NOx Reductions = 1.69 ton/yr – 0 ton/yr = 1.69 ton/yr
- ROG Reductions = 0.15 ton/yr – 0 ton/yr = 0.15 ton/yr
- PM Reductions = 0.06 ton/yr – 0 ton/yr = 0.06 ton/yr

Draft – Do not cite or quote – numbers may change

Agricultural Sources

Sample Calculation – Irrigation Pump Engine Repower

- Project Life = 7 years → CRF = 0.167
- Incremental cost =

  $26,700 - $7,000/2 = $23,200
- Annualized cost =

  $23,200 * 0.167 = $3,874/yr
- Project cost-effectiveness =

  ($3,874/yr)/[1.69 ton NOx/yr +

  0.15 ton ROG/yr + 10*0.06 ton PM/yr]

  = **$1,588/weighted surplus ton**

Draft – Do not cite or quote – numbers may change

Agricultural Sources

Sample Calculation

Discussion

Email address: OnAir@arb.ca.gov

Agricultural Assistance Program

Agricultural Assistance Program
Background

- Funded by $2 motor vehicle fee collected by some districts
- Projects from “previously unregulated” agricultural sources of air pollution
  - Minimum of 3 years from adoption of rule or until compliance date, whichever comes first
  - Reductions do not need to be surplus

Agricultural Assistance Program

Background (cont.)

- Statutory guidance: projects must follow Carl Moyer Program guidelines
  - Incremental cost
  - Use Carl Moyer Program project criteria
  - No infrastructure costs
- Cost-effectiveness based on total (not surplus) reductions:

$$\frac{\text{Annualized Cost (\$/year)}}{\text{Emission Reductions if no Regulatory Req. Existed (tons/yr)}}$$

Agricultural Assistance Program

Project Criteria- Stationary/Portable Engines

- Engines greater than 25 hp
- Repowers of diesel engines
  - Electric
  - New certified diesel or SI engine
  - New SI engine with emissions meeting or below district requirements
- Repowers of SI engines
  - Electric
  - New certified SI engine
  - New SI engine with emissions meeting or below district requirements

See project criteria handout for a complete list of proposed criteria

Agricultural Assistance Program

Project Criteria- Stationary/Portable Engines

- Uncertified SI engine projects
  - Subject to ARB staff approval
  - Must include closed-loop fuel system and three-way catalyst
  - Source testing every 2 years
  - Quarterly (with exceptions) NOx and HC emission readings using portable analyzer
  - Costs associated with testing and monitoring not eligible for funding

See project criteria handout for a complete list of proposed criteria

Agricultural Assistance Program

Electric Motor Projects

- Some utilities offering special rate and credit for line extension for electric ag pumps
  - Limited time offer
- Propose to extend project life for current Moyer-funded IC engines that opt for limited time electric rate
- Propose to reduce engine rebuild cost for non-Moyer-funded IC engines that opt for limited time electric rate
- Districts may use match funds for additional line extensions costs

See project criteria handout for a complete list of proposed criteria

Agricultural Assistance Program

Project Criteria- Non-Engine Projects

- No criteria proposed at this time
- Continue to monitor potential control technologies:
  - Real, quantifiable, enforceable emission benefits
  - Availability of testing methods for quantifying emission benefits
  - Availability of baseline emission factors
- Propose to allow EO approval of project criteria

See project criteria handout for a complete list of proposed criteria

Agricultural Assistance Program

Criteria

Discussion

Email address: OnAir@arb.ca.gov

Agricultural Assistance Program

Sample CETR Calculation

District Rule: Compliance by January 1, 2007

Existing engine information:

- 1977 John Deere JD6466A
- Emission rate (g/bhp-hr): 11.2 NOx, 0.94 ROG, 0.40 PM
- Activity: 3,000 hr/yr
- Engine horsepower: 182 hp
- Load factor: 0.65

Reduced-emission engine information:

- 2005 John Deere 6068HF275-225
- Emission rate: 4.2 NOx, 0.12 ROG, 0.09 PM
- Activity: 3,000 hr/yr
- Engine horsepower: 184 hp
- Load factor: 0.65

Draft – Do not cite or quote – numbers may change

Agricultural Assistance Program

Sample CETR Calculation

Emissions Calculation – Baseline

- NOx = (11.2 g/bhp-hr*3,000 hr/yr *182 hp * 0.65)/907,200 g/ton = 4.38 ton/yr
- ROG = (0.94 g/bhp-hr*3,000 hr/yr*182 hp * 0.65)/907,200 g/ton = 0.37 ton/yr
- PM = (0.40 g/bhp-hr*3,000 hr/yr*182 hp * 0.65)/907,200 g/ton = 0.16 ton/yr

Emissions Calculation – Reduced Emissions

- NOx = (4.2 g/bhp-hr*3,000 hr/yr*184 hp * 0.65)/907,200 g/ton = 1.66 ton/yr
- ROG = (0.12 g/bhp-hr*3,000 hr/yr*184 hp * 0.65)/907,200 g/ton = 0.05 ton/yr
- PM = (0.09 g/bhp-hr*3,000 hr/yr*184 hp * 0.65)/907,200 g/ton = 0.04 ton/yr

Draft – Do not cite or quote – numbers may change

Agricultural Assistance Program

Sample CETR Calculation

- NOx Reductions = 4.38 ton/yr – 1.66 ton/yr = 2.72 ton/yr
- ROG Reductions = 0.37 ton/yr – 0.05 ton/yr = 0.32 ton/yr
- PM Reductions = 0.16 ton/yr – 0.04 ton/yr = 0.12 ton/yr

Draft – Do not cite or quote – numbers may change

Agricultural Assistance Program

Sample CETR Calculation

- Project Life = 7 years → CRF = 0.167
- Incremental cost =

  $20,320 - $3,500 = $16,820
- Annualized cost =

  $16,820 * 0.167 = $2,809/yr
- Project cost-effectiveness =

  ($2,809/yr)/[2.72 ton NOx/yr +

  0.32 ton ROG/yr + 10*0.12 ton PM/yr]

  = **$663/weighted ton**

Draft – Do not cite or quote – numbers may change

Agricultural Assistance Program

CETR

Sample Calculation Discussion

Email address: OnAir@arb.ca.gov

Carl Moyer Program

Light-Duty Vehicles

Project Criteria

Light-Duty Vehicles
Outline

- Background
- Voluntary accelerated vehicle retirement regulations / proposed Moyer criteria
- South Coast remote sensing project
- Sample cost-effectiveness calculations

Light-Duty Vehicles
Background

- AB923 brings light-duty vehicle projects into Carl Moyer Program
- Examples of light-duty projects
  - Voluntary accelerated vehicle retirement (VAVR or car scrapping)
  - Voluntary vehicle repair
- Remote sensing (RSD) technology to identify high emitters for voluntary retirement/repair

Light-Duty Vehicles

Why Light-Duty Vehicles?

- Major contributor to ozone and PM pollution
  - 580 tpd ROG and 575 tpd NOx in 2005
  - 21% of all anthropogenic ozone precursors
- Pre-1990 models
  - 57% of ROG/41% of NOx from light-duty vehicles
  - 19% of population/13% of vehicle miles traveled

Light-Duty Vehicles

Steps for Adding Light-Duty Projects

2005

- Allow projects that meet existing VAVR regulations
- Allow a limited South Coast remote sensing/retirement/repair program

2006

- Revise VAVR regulation and Moyer guidelines to fully integrate remote sensing
- Guidelines for vehicle repair projects

Light-Duty Vehicles

Introduction to VAVR

- Retire older, more polluting vehicles earlier than their expected lifetime
- Participation is strictly voluntary
- Administered by districts, overseen by ARB
- VAVR regulations govern district programs
  - Title 13, California Code of Regulations, sections 2601 et seq.
- District programs complement BAR's vehicle retirement program

Light-Duty Vehicles
Basic VAVR Operations

- Vehicles must meet functionality, equipment eligibility, and registration requirements
- Vehicles are disposed of by crushing so vehicle and its parts are unusable
- Scrap operations privately run
  - Districts contract with enterprise operators who evaluate and dispose of qualified vehicles

Light-Duty Vehicles
Car Collector Concerns

- Enabling legislation requires VAVR programs to be sensitive to car collector concerns
- 10 day vehicle holding period to allow public opportunity to purchase
  - Entire vehicles or drive train parts may be sold, but no emission reductions claimed
  - Non-emission and non-drive train parts may be recovered from vehicles scrapped for credit

Light-Duty Vehicles

Moyer Criteria for VAVR Projects

- Projects must comply with all provisions of the VAVR regulation
- Districts must submit plan to ARB before starting VAVR projects using Moyer funds
- Districts must report annually to ARB as part of required Moyer report
- Projects must meet cost-effectiveness limit
  - $14,300 per weighted ton of ROG + NOx + PM

See project criteria handout for a complete list of proposed criteria

Light-Duty Vehicles

Vehicle Qualification Requirements

- Currently registered by the DMV for at least 24 months in the district
  - Stricter than in the VAVR regulation (120 days) but consistent with Health & Safety Code §44094
- Must operate under its own power
- Must pass functionality and eligibility inspections described in VAVR regulation

Light-Duty Vehicles

Vehicle Requirements- Smog Check Status

- Emission reductions must be surplus to Smog Check
- Vehicles must:
  - Not have failed a Smog Check if retired within 61 to 90 days of next inspection
  - Have passed the Smog Check if retired within 60 days of next scheduled inspection
  - Not be operating under a repair cost waiver

Light-Duty Vehicles
Record Keeping and Audits

- Districts and enterprise operators must keep detailed records of all retired vehicles
- Records must be submitted to ARB as part of district's annual Moyer report
- ARB will conduct annual reviews of all district VAVR projects

Light-Duty Vehicles
Emission Reductions

- Emission reductions must be calculated using methodology from VAVR regulation

  Reductions = [$Emissions_{ret}$ – $Emissions_{rep}$] x [Life]

  Where:

  $Emissions_{ret}$ = average emission rate x average VMT of model year vehicle retired

  $Emissions_{rep}$ = average emission rate of light-duty fleet x VMT of retired vehicle

  Life = 3 years
- Emission factors and VMT from EMFAC
- Emission reduction table in guidance document

Light-Duty Vehicles

South Coast RSD/Retirement/Repair Project

- Guidelines would authorize South Coast to run RSD program to ID higher polluting vehicles for voluntary retirement or repair
  - Data will be used to update VAVR regulation / Moyer guidelines to integrate RSD
  - Methodology for crediting emission reductions from RSD programs to be established
- South Coast AQMD to submit a detailed project plan to ARB

Light-Duty Vehicles

RSD Issues

- Procedures to ensure proper RSD operation
- Emission reduction calculations
  - Converting RSD measurements to emission reductions
  - Ensuring benefits not double counted with Smog Check
- Proper use of Moyer/AB923 funds to pay for remote sensing

Light-Duty Vehicles

Criteria

Discussion

Email address: OnAir@arb.ca.gov

Light-Duty Vehicles
Sample Calculation

- A district pays a total of $750 to retire a 1980 model year light-duty vehicle in 2005
- Emission reductions over 3 year project life
- From Moyer Guideline Look-up Table:
  - ROG = 131 lb
  - NOx = 88 lb
  - PM = 0.9 lb

Draft – Do not cite or quote – numbers may change

Light-Duty Vehicles
Sample Calculation

- Annual Weighted Emission Reductions

  = (131 + 88 + 10 x 0.9)/ 3 yrs = 76 lb/yr
- Annualized Cost

  = $750 x 0.360 = $270/yr
- Cost-effectiveness

  = [$270/yr]/[76 lb/yr]x[2000 lb/ton]

  = **$7,105/weighted surplus ton**

Draft – Do not cite or quote – numbers may change

Light-Duty Vehicles

Sample Calculation

Discussion

Email address: OnAir@arb.ca.gov

Carl Moyer Program

Other Issues

Email address: OnAir@arb.ca.gov

Carl Moyer Program

- Please provide written comments by September 2, 2005
- For more information, visit the Carl Moyer Program web page
  - www.arb.ca.gov/msprog/moyer/moyer.htm

Contact Information

- **Jack Kitowski** - Chief, On-Road Controls Branch, (916) 445-6102, jkitowsk@arb.ca.gov
- **Lucina Negrete** - Manager Alternative Strategies Section, (916) 445-6138, lnegrete@arb.ca.gov
- **Edie Chang** - Manager Carl Moyer Off-Road Section, (916) 322-6924, echang@arb.ca.gov
- **Bob Nguyen** - Moyer Guidelines Lead, (916) 327-2939, rnguyen@arb.ca.gov
- **Elise Keddie –** Agricultural Sources and Ag Assistance Program,(916) 323-8974, ekeddie@arb.ca.gov
- **Andrew Panson** – Light-Duty Vehicles, (916) 323-2881, apanson@arb.ca.gov
- **Tom Roemer** – Light-Duty Vehicles, (916) 322-1520, troemer@arb.ca.gov
- **Kevin Nesbitt** - Zero-Emission Technologies, (916) 322-6922, knesbitt@arb.ca.gov