

Proposed Carl Moyer Program Guidelines for Calculating Emission Reductions for Voluntary Accelerated Retirement of High Emitting Vehicles

Note: For the August 31, 2006 workshop, only the proposed new sections of Carl Moyer Guidelines are presented. These would be incorporated into the existing parts Chapter XI of the 2005 Carl Moyer Program Guidelines to form the proposed, revised Carl Moyer Guidelines for Board consideration.

If the Board adopts ARB staff's proposed changes to the voluntary accelerated vehicle retirement (VAVR) regulation, two types of VAVR programs would be allowed under the regulation.

Under the first type of program which we refer to as the conventional VAVR program, any vehicle may be retired provided it meets the minimum eligibility requirements specified in the regulation and any additional requirement air districts may choose to impose. For vehicles retired in the conventional program, the Carl Moyer Program Guidelines include a look up table for emission reductions by model year. In this calculation approach, the retired vehicle's emissions are not directly measured, so it is assumed that the retired vehicle produces the average emissions of its model year in ARB's motor vehicle emission inventory, in accordance with the provisions of the VAVR regulation. In addition, because a replacement vehicle's emissions are not measured and the vehicle chosen as a replacement is not specified, it is assumed that the replacement vehicle produces the emissions of a "fleet average" vehicle. No changes to the calculation methodology conventional VAVR programs are being proposed.

Under the second type of program which we refer to as a high emitter VAVR program, the highest emitting vehicles in the fleet would be identified via remote sensing devices (RSD), high emitter databases, or other methods, and the owners of these vehicles would be contacted and offered an opportunity to voluntarily retire their vehicles. The proposed changes to the VAVR regulation specify the framework for running a high emitter VAVR program. The emission reduction table used estimate benefits for conventional VAVR programs cannot not be used to estimate the reductions for this type of program because the table does not reflect the fact that only the highest emitting vehicles would be targeted for voluntary participation.

ARB staff is proposing the following criteria calculating the emission reductions from the for high emitter VAVR programs for inclusion in the Carl Moyer Program Guidelines.

I. Key Elements of Emission Reduction Calculation Methodology for Voluntary Retirement of Vehicles Identified as High Emitting

ARB staff proposes using the same fundamental approach as in the current regulation to estimate the reductions of retiring high emitting vehicles. The method is described in the 1998 VAVR regulation staff report (<http://www.arb.ca.gov/regact/scrap/isor.pdf>). However, the input variables would be different than in the conventional VAVR program, reflecting the fact that the retired vehicle has been identified as a high emitting vehicle and its emissions are measured. The proposed project criteria specify how to calculate

the emissions of the retired vehicle, the emissions of the replacement vehicle, and the credit life in order to calculate the emissions benefits of retiring vehicles identified as high emitters, where:

$$\text{Emission Reductions} = [\text{ER}_{\text{retired}} * \text{VMT}_{\text{retired}} - \text{ER}_{\text{replacement}} * \text{VMT}_{\text{replacement}}] * \text{Life}_{\text{retired}}$$

Where: $\text{ER}_{\text{retired}}$ = Emission rate of retired vehicle
 $\text{VMT}_{\text{retired}}$ = Vehicle miles traveled of retired vehicle
 $\text{ER}_{\text{replacement}}$ = Emission rate of replacement vehicle
 $\text{VMT}_{\text{replacement}}$ = Vehicle miles traveled of replacement vehicle
 $\text{Life}_{\text{retired}}$ = The remaining life of the retired vehicle

During the development of these guidelines, air district representatives encouraged ARB to provide flexibility for districts to develop specialized programs to address unique, local circumstances. District staff also voiced concern that if the program criteria are too prescriptive, districts may be overly limited in designing programs. ARB staff agrees that districts need flexibility in designing programs as long as they incorporate sufficient controls to ensure the emission reductions are real, quantifiable, enforceable, and surplus. Staff has attempted to build this flexibility into the guidelines. ARB staff also acknowledges that other stakeholders do not support the broad flexibility staff is proposing and believe more specific guidance is warranted to ensure successful program implementation.

ARB staff is proposing to place the new calculation methodology in the Carl Moyer Program guidelines, not in the VAVR regulation, in order to have more flexibility to update it without needing to reopen the entire regulation. The Carl Moyer Program guidelines are updated every two years, providing a mechanism to routinely incorporate changes. Because there are no scrap programs specifically targeting the highest emitting vehicles, there are limited “real world” data upon which to base the update calculation methodology. The South Coast Air District is starting a remote sensing based program this year which would offer incentives for voluntary retirement or repair to only the highest emitting vehicles. Once data from this program and other programs become available, it may be necessary to update the calculation methodology to reflect what has been learned.

The major program criteria are broadly described below along with a discussion of some of the issues staff considered. The detailed criteria are listed in the next section, Proposed Project Criteria for Calculating Emission Reductions for Vehicles Identified as High Emitting.

A. Identifying High Emitting Vehicles for Voluntary Participation Vehicles for Voluntary Participation

The proposed changes to the VAVR regulation specify the framework for running a high emitter VAVR program, and programs would need to follow all provisions of the regulation. ARB staff proposes that remote sensing device (RSD) measurements, high

emitter profiles, or equivalent technologies/approaches be used as screening tools to identify possible high emitting vehicles for participation in VAVR programs. Emission reduction estimates would not be based on these measurements. Instead, the retired vehicle's emissions would be based on confirmatory Smog Check tests. At this time, ARB staff does not believe that a split second RSD measurement is quantitatively reflective of a vehicles emissions over a driving cycle.

To be eligible to receive extra emission reduction credit, an identified vehicle's confirmatory Smog Check test would need to exceed the pass/fail emission standard (cutpoint) for the for the model year and vehicle class. For the purposes of this program, a high emitting vehicle is defined as one that fails the Smog Check test. Vehicles whose emissions are below the pass/fail emission standard would not be considered an high emitting vehicles and would not be eligible for extra emission reductions. These vehicles could still be voluntarily retired and receive the emission reductions for conventional VAVR programs already established in the VAVR regulations. For vehicles that are not testable on the ASM testing equipment, a two speed idle (TSI) Smog Check may be substituted.

B. Calculating Baseline Exhaust Emissions of Retired Vehicle

This section addresses the baseline reactive organic gas exhaust (ROG_{exh}), oxides of nitrogen (NOx), and carbon monoxide (CO) emissions of the vehicle being retire. The particulate matter and evaporative (ROG_{evap}) emissions are addressed later.

Unlike the calculation methodology for conventional VAVR programs which assumes retired vehicles pass Smog Check, high emitting vehicles identified off-cycle would presumably fail their next Smog Check. Consequently, the emission rate of the retired vehicle would change over the credit life. It would be higher before the vehicle's next biennial Smog Check, but after the Smog Check, its emissions would be lower because it would have had to be repaired in order to stay on the road. To estimate the retired vehicle's emissions, the following parameters must be estimated:

- Emission rate until the next Smog Check
- Emission rate after the next Smog Check
- Length of time until next Smog Check
- VMT

1. Emission Rate Until Next Biennial Smog Check Date

Each vehicle identified as a potential high emitter would receive a confirmatory Smog Check test prior to being retired. ARB staff proposes that the emission rate until the date of the vehicle's next biennial Smog Check be equal to the measured Smog Check acceleration simulation mode (ASM) reading converted to a federal test procedure (FTP) based gram per mile emission rate using the conversion equations developed by Eastern Research Group and Sierra Research and used in ARB and

BAR's 2004 Evaluation of the California Enhanced Inspection and Maintenance (Smog Check) Program.

For vehicles exempt from Smog Check (pre-1976 model years), this emission rate would be used for the entire credit life because these vehicles would not have been required to pass a future Smog Check.

2. Emissions After Next Biennial Smog Check Date

After the date of the retired vehicle's next biennial Smog Check, its emissions would have been lower because had it not been retired. It would have presumably failed its Smog Check, and, thus, it would have had to be repaired in order to stay on the road resulting in post-repair emissions below the Smog Check emission standards. However, it is a challenge to estimate what its emissions would have been.

Immediately after its next Smog Check date, the retired vehicle's emissions would likely have been somewhat below the Smog Check pass/fail cutpoints because repairs on failing vehicles generally reduce emissions below the cutpoint (that is, vehicles are usually not repaired just to the cutpoint). However, after being repaired, its emissions would have started to increase again as its emission controls continued their normal deterioration. In some cases, repaired vehicles deteriorate at such a rate that they fail their proceeding biennial Smog Check while other repaired vehicles pass the next Smog Check.

ARB staff proposes that the retired vehicle's emissions after the date of its next biennial Smog Check be assumed to be equal to the Smog Check pass/fail emission cutpoint pollutant concentrations for the vehicle class and model year, converted to an FTP based gram per mile emission rate. This may overestimate its emissions immediately after its next Smog Check date but attempts to factor in deterioration over its remaining life. This would only apply to the pollutants for which the vehicle failed its Smog Check test administered at time of retirement.

Staff also recognizes that some vehicles may fail the Smog Check test for only one pollutant (i.e., they may have NO_x levels exceeding the cutpoint, but ROG_{exh} levels below the cutpoint, or vice versa). If a vehicle's emissions at time of retirement were below the Smog Check pass/fail cutpoint for one pollutant, its emissions for that pollutant would be equal to its measured emissions at the time of retirement because the Smog Check program would not have forced any change in emissions of the passing pollutant.

3. Length of time until next Smog Check

Because vehicles are, on average, one year away from their next biennial Smog Check, ARB staff proposes to assume all vehicles are one year away from their next Smog Check for simplicity. This may overestimate the time for some vehicles and underestimated it for others, but should be correct on average.

4. VMT of Retired Vehicle

ARB staff proposes using the average VMT of the model year vehicle retired, as is the case in the current regulation. Staff considered the alternative of estimating an individual vehicle's VMT based on the difference in odometer reading between its last two Smog Checks. This approach was suggested when the VAVR regulation was last updated in 2002. At that time, ARB staff concluded that the Smog Check odometer data were not sufficiently reliable because a portion of these data are inaccurate (for example, odometer readings that are less than the odometer reading at a previous Smog Check).

C. Calculating Exhaust Emissions for the Replacement Vehicle

For conventional VAVR programs, the regulation does not require that owners document how they replace the vehicles they retire. ARB staff does not plan to change this. However, some air districts and other stakeholders have expressed interest in allowing programs which provide additional incentives for owners who document that they have purchased a vehicle certified to ARB's low emission vehicle (LEV) or cleaner emission standard. ARB staff proposes allowing this option in the emission reduction calculation guidance.

For programs where there is no requirement for how the retired vehicle is replaced, ARB staff proposes that the replacement vehicle's emissions equal the fleet average emission rate as is the case in the calculation methodology for conventional VAVR programs.

For programs which provide extra incentives if a LEV-certified or cleaner replacement vehicle is purchased, ARB staff proposes that the emission rate of the replacement vehicle equal the average emission rate of a LEV-certified vehicle of the model year purchased as a replacement, calculated using ARB's motor vehicle emission model. To qualify, the owner would need to document that the replacement vehicle is certified to a LEV or cleaner emission standard as defined in the ARB's LEV regulations.

ARB staff proposes that the VMT of replacement vehicle would be equivalent to the VMT of the retired vehicle as is the case in the calculation methodology for conventional VAVR programs.

D. Credit Life

ARB staff proposes that the life of the retired vehicle remain 3 years, consistent with the existing regulation. Surveys conducted since the regulation was adopted in 1998 support the three year credit life. These surveys conducted in the Bay Area and South Coast indicate that owners estimated their vehicles would have lasted on average 3-3.5 years if they had not been retired. The South Coast data is from the 1999 time frame. However, Bay Area survey data are available from as recently as 2004-2005. At

this time, ARB staff does not have any data that would indicate the remaining life should be changed.

E. Evaporative Emissions

ARB staff proposes that, as a default, evaporative emission reductions be calculated using the methodology for conventional VAVR programs. RSD does not measure evaporative emissions, and high emitter profiles do not predict likelihood of evaporative Smog Check failures. Vehicles identified as high emitters for exhaust emissions do not necessarily have high evaporative emissions as well. Consequently, the extra emission reduction credits for retiring high emitting vehicles would apply only to exhaust emissions.

However, ARB staff acknowledges that the South Coast Air Quality Management District is planning to conduct evaporative emission testing of vehicles identified as exhaust high emitters via RSD to determine whether these vehicles are high evaporative emitters as well. ARB staff is proposing to allow the option of conducting evaporative emission testing of vehicles prior to retirement and providing extra evaporative emission reduction credits for retiring vehicles identified as high evaporative emitters.

One challenge associated with testing vehicles' fuel evaporative systems is that the test equipment is still under development. BAR is in the process of developing regulations to add a low pressure fuel evaporative test to the Smog Check program, but at this time, no equipment has been certified by BAR. However, several manufacturers' equipment are undergoing certification. Staff proposes that only equipment that has been submitted for certification be used in VAVR programs that test for evaporative emissions. In the future, once equipment has been fully certified by BAR, ARB staff would propose requiring that only certified equipment be used. If these vehicles fail the low pressure evaporative, they would be eligible for extra evaporative emission reduction credits if retired.

Calculating the emission reductions associated with retiring vehicles identified as evaporative high emitters presents a challenge because the low pressure evaporative testing equipment does not directly measure a mass-based emission rate. Consequently, the emission benefits associated with retiring vehicles with high evaporative emissions cannot be measured directly. Staff is proposing to base the emission reductions on pilot studies by the ARB and others that quantified in the laboratory the benefits of repairing vehicles which failed the low pressure evaporative test. (See *Environmental Impacts of Implementing A Low Pressure Evaporative Test in the California Smog Check Program*, released November 29, 2005, http://www.arb.ca.gov/msprog/smogcheck/evap_report.pdf.)

The total evaporative emission benefits from retiring vehicles identified a evaporative high emitters would be equal to the average reductions of evaporative repairs (which represents the benefit of returning these vehicles' emissions to the level of an average

vehicle of its model year) plus the evaporative reductions calculated using the methodology for conventional VAVR programs (which represents the benefits for replacing an older average vehicle with a fleet average vehicle).

F. Particulate Matter Emissions

ARB staff is not proposing extra particulate matter (PM) emission reduction credits for high emitters at this time because RSD or high emitter profiles have not been conclusively demonstrated as tools to identify PM high emitters. ARB staff does understand that work is underway to develop PM measurement capabilities for RSD equipment, and in the future, RSD may be a viable tool to identify PM high emitters. Vehicles identified as having high ROG or NO_x exhaust emissions do not necessarily produce high PM emissions as well. A further challenge in quantifying PM emissions from motor vehicles is that the Smog Check ASM test does not measure PM. There is not an established method to measure PM emissions from vehicles in a road side setting.

ARB staff proposes that PM emission reductions be calculated using the methodology for conventional VAVR programs, reflecting the fact that there is a PM reduction associated with retiring an older vehicle and replacing it with a newer one.

ARB staff acknowledges that the South Coast Air Quality Management District plans to evaluate methods for identifying PM high emitters and quantifying PM emission reductions. ARB is also funding research into measuring PM emissions in light duty vehicles. ARB staff supports assigning extra PM emission reductions for the retirement of PM high emitters once a viable, technologically supportable method of quantifying PM benefits is demonstrated. However, because of the uncertainties in measuring PM, districts should not rely on the extra emission reductions from retiring PM high emitters to show that the program is cost-effective at this time.

If a PM component is included in a high emitter VAVR program, the VAVR program plan must specify the procedure/analytical approach that would be used to measure PM. The plan must also outline how the district intends to evaluate and validate that its proposed method of measure PM emissions in the field correlates with scientifically accepted methods of measuring PM emissions in the laboratory.

G. Modifications to Calculation Methodology

Some stakeholders have voiced the concern that a “one size fits all” approach may not work for the calculation methodology. ARB staff is proposing a calculation methodology that would work in most cases. However, if a district implements a narrowly focused program, the variables specified in ARB’s guidance may not be appropriate to reflect the district’s program. An example would be if a district plans to only offer voluntary retirement to the high emitting vehicles that are furthest away from their next biennial Smog Check, the proposed approach of assuming a vehicle is one year away from its next Smog Check would not be appropriate.

Under staff's proposal, districts would have the option of proposing modifications to the calculation methodology, where necessary, to reflect unique elements of their program. Any proposed modifications would need to be included in the district's program plan. The onus would be on the district to document that the proposed modifications are technically sound and justified. The district would need to receive approval by ARB to use an alternative methodology.

H. Calculating Cost-effectiveness

The Carl Moyer Program guidelines require that all projects meet a cost-effectiveness limit of \$14,300 per weighted ton of ROG, NOx, and PM reduced. In calculating cost-effectiveness, a district must include all State funds expended to retire high emitting vehicles. For the Carl Moyer Program, ARB considers program costs to be those directly related to repowering, replacing, or retrofitting an engine. All other costs are considered administrative. Administrative funds are not included in the program cost-effectiveness calculations, but must be accounted for relative to the administrative limits associated with each funding source.

For high emitting vehicle VAVR programs, ARB staff is proposing that the costs directly related to identifying potential high emitting vehicles be considered program-related. It would not be possible to operate a targeted program for high emitting vehicles without first identifying these vehicles. ARB staff is proposing to further define program-related costs to include the actual costs of remote sensing measurements and the costs of the Smog Check tests required to confirm the emissions of candidate vehicles. However, ARB staff considers funds spent on outreach, contacting potential participants, data analysis, and development of data analysis tools such as databases to be administrative costs. This distinction between program-related and administrative costs applies to VRV programs as well. For VRV programs, the cost of diagnosing vehicles for repair would also be considered program-related.

Evaluating the cost-effectiveness presents unique challenges not seen in other Carl Moyer Program source categories. For all other categories, potential grant recipients submit applications in advance. During the application period, each project is evaluated to ensure that it meets the Carl Moyer Guidelines' project criteria and cost-effectiveness limits. Those projects that are identified as cost-effective may then be eligible to receive funding. For VAVR programs, a different dynamic exists.

The nature of a VAVR program does not allow an opportunity to fully assess the cost-effectiveness during an application period. Costs are incurred up front to identify high emitting vehicles for possible voluntary retirement. However, the benefits cannot be fully estimated in advance because they ultimately depend on the voluntary participation rate and the mix of vehicles retired. With these variables, the cost-effectiveness can only be calculated after the fact, unlike other Carl Moyer Program source categories. This issue is also discussed in the cost-effectiveness section of the VRV program guidance.

II. Proposed Project Criteria for Calculating Emission Reductions for Vehicles Identified as High Emitting

The emission reductions for VAVR are calculated using the following formula:

$$\text{Emission Reductions} = [\text{ER}_{\text{retired}} * \text{VMT}_{\text{retired}} - \text{ER}_{\text{replacement}} * \text{VMT}_{\text{replacement}}] * \text{Life}_{\text{retired}}$$

Where:

- $\text{ER}_{\text{retired}}$ = Emission rate of retired vehicle
- $\text{VMT}_{\text{retired}}$ = Vehicle miles traveled of retired vehicle
- $\text{ER}_{\text{replacement}}$ = Emission rate of replacement vehicle
- $\text{VMT}_{\text{replacement}}$ = Vehicle miles traveled of replacement vehicle
- $\text{Life}_{\text{retired}}$ = The remaining life of the retired vehicle

The following sections specify the criteria for calculating the emission benefits.

A. Identifying High Emitting Vehicles for Voluntary Participation

- Only vehicles identified as potential high emitting through a technology/approach such as RSD or an high emitter profile database approved by the ARB and operated in accordance with the VAVR regulations found in Title 13 California Code of Regulations, Division 3, Chapter 13, Article 1, section 2601 et seq. are potentially eligible to receive extra emission reduction credits for VAVR.
- Prior to being retired, a vehicle must receive a Smog Check ASM test to establish its baseline emissions. To be eligible to receive extra emission reduction credit, a vehicle's ASM test must exceed the pass/fail emission standard for the model year and vehicle class as defined in Title 16, Division 33, Chapter 1, Article 5.5, Section 3340.42 of the California Code of Regulations. (A table listing the emission standards can be found on BAR's web site at: http://www.smogcheck.ca.gov/ftp/pdfdocs/asm_ph43.pdf.)
 - Vehicles not testable under the ASM test (e.g., 4-wheel or all wheel drive vehicles) may be given a two speed idle (TSI) Smog Check test to determine eligibility.
 - If the vehicle's emissions are below the pass/fail emission standards, the vehicle is not considered an high emitting vehicle is not be eligible for extra emission reduction credits. These vehicles could still be voluntarily retired and receive the default emission reductions, established in the existing VAVR regulations and Carl Moyer Program Guidelines.
 - The Smog Check test must be conducted by a BAR-licensed technician and must be conducted in accordance with BAR regulations and procedures.

- Vehicles must also meet all eligibility requirements specified in the VAVR regulation and the Carl Moyer Program Guidelines to participate.

B. Calculating Baseline Exhaust Emissions for Vehicle Being Retired

- Between the time the vehicle is retired and its next biennial Smog Check date, the baseline ROG_{ex}, NOx, and CO emission rates are equal to the pollutant concentrations measured in the ASM test converted to a federal test procedure (FTP) based gram per mile emission rate using the conversion equations used in the ARB and BAR's *2004 Evaluation of the California Enhanced Inspection and Maintenance (Smog Check) Program*. The conversion equations are listed in Table X-1.
 - For vehicles exempt from Smog Check (pre-1976 model years), the emissions measured at time of retirement are the baseline emissions for the entire credit life.
- After the retired vehicles next biennial Smog Check date, the baseline ROG_{ex}, NOx, and CO emission rates are equal to the lesser of the two following values:
 - the Smog Check pass/fail emission cutpoint pollutant concentrations for the model year and vehicle class converted to an FTP based gram per mile emission rate using the conversion equations in Table X-1.
 - the pollutant concentration measured in the ASM test at the time of retirement, converted to an FTP based gram per mile emission rate using the conversion equations used in Table X-1.
- The time until the next Smog Check is assumed to be one year, on average.
- The VMT are assumed to be the average VMT of the vehicle's model year based on the ARB's motor vehicle emission model. The average VMT for each model year is listed in table X-2.

C. Calculating Exhaust Emissions for the Replacement Vehicle

- If the vehicle owner is not required to document how the retired vehicle is replaced, the replacement vehicle emissions are assumed to equal fleet average emission rate calculated using ARB's motor vehicle emission model. For calendar year 2007, the emission rates are:

ROG Exhaust g/mile	ROG Evap Running Loss g/mile	ROG Evap Hot Soak g/trip	ROG Evap Diurnal+Resting g/day/vehicle	CO Exhaust g/mile	NOx Exhaust g/mile	PM10 Exhaust g/mile

Note: Emission rates to be filled in. Rates will be calculated using ARB's new, draft emission model which is scheduled to be finalized by November 2006.

- If a VAVR program is set up to provide extra incentives for the purchase of LEV-certified or cleaner replacement vehicle and if the owner documents that the replacement vehicle is certified to a LEV or cleaner emission standard as defined in the ARB's LEV regulations (Title 13, Division 3, Chapter 1, Article 1, Sections 1960.1 and 1961 of the California Code of Regulations), the replacement vehicle emissions are assumed to equal the average emission rate of a LEV-certified vehicle for the model year purchased as a replacement, based on ARB's motor vehicle emission model. For calendar year 2007, the emission rates are:

LEV Model Year	ROG Exhaust g/mile	ROG Evap Running Loss g/mile	ROG Evap Hot Soak g/trip	ROG Evap Diurnal+Resting g/day/vehicle	CO Exhaust g/mile	NOx Exhaust g/mile	PM10 Exhaust g/mile
1997							
1998							
1999							
2000							
2001							
2002							
2003							

Note: Emission rates to be filled in. Rates will be calculated using ARB's new, draft emission model which is scheduled to be finalized by November 2006.

- The VMT of replacement vehicle is equal to the VMT of the retired vehicle.

D. Project Life

- The project life for a vehicle retirement project is 3 years.

E. Evaporative Emission Reductions

- Evaporative emission reductions are calculated using the methodology for conventional VAVR programs if no evaporative testing is conducted on vehicles being retired. The reductions are based on the retired vehicle's model year and are found in Table X-___. *Note: Table will be included in proposal to be released October 20, 2006.*
- Districts may, at their option, conduct evaporative testing on vehicles identified as exhaust high emitting vehicles to determine whether they are evaporative high emitting vehicles as well.
 - Low pressure fuel evaporative testing must be conducted using models that have been submitted to BAR for certification.

- Evaporative testing must be conducted in accordance with the manufacturers standard operating procedures and the protocols for low pressure fuel evaporative testing developed by BAR.
- Only vehicles that fail the low pressure fuel evaporative test are eligible to receive extra emission reductions as a high evaporative emitter in addition to the default evaporative emission reductions for VAVR listed in Table X-__. *Note: Table will be included in proposal to be released October 20, 2006.*
- For vehicles identified as high evaporative emitters, the emission reductions for retirement are equal to the default evaporative emission reductions for VAVR listed in Table X-__ plus the average emission reductions for repairing evaporative system failures estimated by ARB staff in its evaluation of the low pressure evaporative test, The repair benefits, as summarized in *Environmental Impacts of Implementing A Low Pressure Evaporative Test in the California Smog Check Program*, released November 29, 2005 [http://www.arb.ca.gov/msprog/smogcheck/evap_report.pdf], are:

	Emission Reduction
Hot Soak (gram per vehicle per day)	3.28
Diurnal Loss (gram per vehicle per day)	2.07
Running Loss (gram per vehicle per day)	12.66
Total Evaporative Benefit (gram per vehicle per day)	18.0
Total Evaporative Benefit (pounds per vehicle per year)	14.5

F. Particulate Matter Emission Reductions

- PM exhaust emission reductions are calculated using the methodology for conventional VAVR programs. The reductions are based on the retired vehicle's model year and are found in Table X-__. *Note: Table will be included in proposal to be released October 20, 2006.*
- If a viable method to measure and correlate PM emissions from vehicles is demonstrated and validated, districts have the option measuring the PM emissions of vehicles identified as possible high emitters and quantify the extra emission reductions of retiring PM high emitting vehicles, subject to ARB approval.
- If a district intends to identify and quantify emission reductions from retiring PM high emitting vehicles, the district's VAVR program plan must specify the analytical approach that would be used to measure PM emissions.

G. Modifications to Calculation Methodology

- Air districts retain the option of proposing modifications to the calculation methodology, where necessary, to reflect unique elements of their program.

Districts must provide technical justifications to support any proposed modifications to the default methodology in their VAVR program plan. The district must receive written approval from ARB to use a modified methodology.

- If a district receives approval to use a modified calculation methodology, emission reductions from all vehicles retired must be calculated in accordance with that approved methodology.

H. Calculating Cost-effectiveness

- Cost-effectiveness must be calculated in accordance with the methodology described in Appendix C of *The Carl Moyer Program Guidelines – Approved Revision 2005*.
- The district must include the State funds expended on the program-related costs identify and retire high emitting vehicles in the cost-effectiveness calculations.
 - Program-related costs are the costs directly linked to conducting RSD measurements, Smog Check tests, diagnosing vehicles, and the costs to retire vehicles.
 - Broad programmatic costs (e.g. the cost of RSD) which cannot be attributed to retiring a specific vehicle should be distributed proportionally across each vehicle retired. If the district is running a VRV program in conjunction with the VAVR program, these costs should be distributed across each vehicle repaired or retired.
 - The program cost-effectiveness must be calculated for each year of program funding and reported in a district's annual and final report for that year of funding.
- State funds used to pay for the administrative costs of running VAVR programs are not included in the cost-effectiveness calculations, but must be accounted for relative to the administrative limits associated with each funding source. Administrative costs include funds spent on outreach, contacting potential participants, data analysis, and development of data analysis tools such as databases.