



**GUIDANCE FOR  
EMISSION REDUCTION CREDIT GENERATION  
BY CLEAN FUEL FLEETS & VEHICLES**

**United States Environmental Protection Agency**

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**I. Foreword**

The Clean Air Act, as amended in 1990, mandates market-based approaches in certain Federal programs and encourages the use of such approaches at the Federal, State, and local levels, as well as by individual sources, to facilitate the attainment of the mandated milestones and goals of Title I of the Clean Air Act Amendments. In response to the Act, the Agency has proposed and issued rules and guidance that incorporate the use of market-based measures in Federal program areas such as acid rain reduction and clean fuel fleet vehicle purchases.

To facilitate the development of market-based programs that go beyond such Federal programs, the Agency is developing comprehensive rules and guidance for States and individual sources to follow in designing and adopting market-based programs in State Implementation Plans (SIP's). The pending Economic Incentive Program (EIP) Rules draw upon the general principles found in the 1986 Emission Trading Policy Statement (see 51 FR 43631 December 4, 1986) while providing a broad framework for the development and use of a wide variety of market-based control strategies. For States to take credit in their SIP's for emission reductions based upon such strategies, reductions must be quantifiable, enforceable, surplus to other Federal and State requirements, permanent within the timeframe specified by the program, and consistent with all other statutory and Federal regulatory requirements. The proposed EIP Rules are applicable to all types of sources including stationary and mobile sources and define general regulatory elements (e.g., program baseline, auditing procedures, enforcement requirements) that should be included in the design of market-based control strategies.

In addition to these broadly applicable general rules, the Agency is also developing a more narrowly focused document entitled "Guidance on the Generation of Mobile Source Emission Reduction Credits" specifically for the development of market-based programs involving the use of emission reduction credits generated by mobile sources. Such mobile source emission reduction credits (MERC's) can be generated from surplus emission reductions over and above Federal mobile source program requirements and can potentially be used to substitute for stationary emission reduction requirements. The general guidance on the generation of MERC's mentioned above addresses issues unique to emission reduction credits generated by mobile sources, including the calculation of emissions baselines for participating sources, the projection of future emissions levels, and the time-averaging of emission reduction credits that vary over time.



To exemplify how MERC's can be generated from a specific category of mobile sources, the following guidance addresses clean fuel vehicles and fleets, and illustrates how surplus purchases (i.e., beyond Federal program requirements) can be used to generate emission credits in a mobile-stationary source trading program. While market-based mobile source programs must be consistent with the Economic Incentive Program Rules and the Guidance on the Generation of Mobile Source Emission Reduction Credits, EPA does not intend to limit flexibility and innovation beyond the requirements found in these documents. The following guidance is intended to assist in the design of a Clean Fuel Vehicle and Fleet credit generation program, not to limit state initiative, creativity, or flexibility in developing a program which best meets the state's needs within the limits of good environmental policy.

## II. Introduction

Section 246 of the 1990 Clean Air Act Amendments (the Act) requires states which contain serious, severe, or extreme ozone nonattainment areas or areas with carbon monoxide design value greater than 16 ppm to revise their State Implementation Plans (SIPs) to establish a clean fuel fleet program. At present, the areas to be covered by the program include 22 nonattainment areas in 19 states (see attached table 1). The purchase requirements of the program, as prescribed in the Act, will begin in 1998 and will apply to those fleets which operate in a covered area and which contain any combination of 10 or more covered light-duty vehicles (LDV), light-duty trucks (LDT), or light- or medium-heavy-duty vehicles (HDVs). More states/areas could be added to the program in the future if they are found to be in any of the ozone noncompliance categories outlined above. According to the Act, the fleet programs must also include provisions to implement a purchase credit program for additional, early, and/or cleaner vehicle acquisitions. Affected states may independently choose to expand the program to additional fleets or to expand the programs statewide. States not covered by the program may opt-in to this program or develop similar programs voluntarily, as already has been done by several states. This is especially the case in those 70 areas which have some degree of ozone air quality problem and are covered under the fleet provisions of the recently enacted National Energy Policy Act but are not covered by the clean fuel fleet provisions of the Clean Air Act Amendments.

It has been proposed that emission credits generated by vehicles under a clean fuel fleet program would also be usable as emission reduction credits in an emission credit trading program



under the Economic Incentive Program<sup>1</sup>. These credits could then be generated, traded, and applied toward emission reduction requirements of another source under various state and federal programs.

The purpose of this document is to provide technical guidance to states that are interested in allowing credits generated in their clean fuel vehicle fleet program or a similar state-originated program to be used for emission credit trading. State-originated programs to grant these credits may be substantially different than the federal fleet program. EPA believes these trading programs should be designed not only to permit cross-source credit trading, but also to enhance an objective of the fleet program: encouraging the purchase of clean fuel vehicles that offer long-term environmental benefits.

This document is organized as follows. Section II briefly describes the clean fuel fleet credit program as described in the Act and in the regulations proposed by EPA<sup>2</sup>. Section III describes certain elements which EPA believes should be included in a program that allows fleet emission credits to be traded. Section IV proposes a method for calculating the emission credits. Section V addresses problems that may occur in such a trading program and proposes some solutions that states may consider to resolve those problems. Finally, section VI discusses the administration of the credit program.

### **III. The Clean Fuel Fleet Purchase Vehicle Credit Program**

The 1990 Clean Air Act Amendments contain specific requirements for the clean fuel fleet program ("fleet program") that affected states must adopt. Under the provisions of the Act, a specific portion of the new vehicles purchased by certain fleet owners will be required to meet clean fuel vehicle emission standards.

According to the Act, purchase credits can be generated through purchase of: (1) more clean fuel vehicles than required to fulfill the purchase requirements under the program, (2) clean fuel vehicles that meet more stringent emission standards than required (Ultra Low Emission Vehicle (ULEV) or Zero Emission Vehicle (ZEV) standards), (3) clean fuel vehicles in exempted categories (i.e., heavy heavy-duty vehicles (>26000 lbs GVWR), rental vehicles, emergency vehicles, law enforcement vehicles, or nonroad vehicles), or (4) clean fuel vehicles purchased before the effective date of the fleet program. EPA has proposed that each state can decide the

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<sup>1</sup> See Notice of Proposed Rulemaking, Economic Incentive Program Rules, 40 CFR Part 51, due to be published in the Federal Register by November 15, 1992.

<sup>2</sup> See Notice of Proposed Rulemaking, 56 FR 50196 (October 3, 1991).





size, type, and location of fleets eligible to generate purchase credits under the fleet program. At a minimum, however, all fleet operators subject to the compliance requirements of the fleet program are eligible to generate fleet purchase credits.

Under the fleet program, these purchase credits can be used in two ways. First, they may be used by the fleet owner who generated them to demonstrate compliance with the fleet program purchase requirements in a subsequent year. Second, they may be traded or sold for use by another fleet owner to demonstrate compliance with the fleet purchase requirements, as long as the trade occurs within the same nonattainment area. Purchase credits generated under the fleet program can be held for use at a later time without depreciation. However, purchase credits generated under the program can be traded only for purchases of vehicles in the same class (heavy-duty or light-duty). Also, credits are to be adjusted to reflect the level of emission reduction achieved by the vehicle so that the credit earned in purchasing an extra-clean vehicle (a ULEV or a ZEV) reflects its extra emission reduction benefit as compared to a clean fuel vehicle.

The fleet program also includes a new federal program to provide special incentives in the form of expanded Transportation Control Measure (TCM) exemptions for the purchase of Inherently Low Emission Vehicles (ILEVs) also known as Clean Air Vehicles (CAVs). ILEVs are clean fuel vehicles (must meet LEV requirements and the ULEV NOx standard) which also have very low evaporative emissions relative to their conventional fuel counterparts even when the control system is disabled. These vehicles can be purchased as part of the fleet program for either compliance or credit purposes, with the owner gaining the additional incentives (e.g., HOV lane exemptions) for the vehicles involved<sup>3</sup>.

While the above criteria are useful for creating a vehicle purchase credit program under the auspices of the fleet program, they are insufficient for defining a broader emission reduction credit program, where the focus is on the mass of emission reductions rather than the number of vehicles purchased. The fleet purchase credit program needs to be converted into a fleet emission reduction credit program. This is discussed below.

#### **IV. Credit Generation Program Elements**

In general, credits for trading will be generated in ways similar to those specified in the fleet credit program. However, several additional elements are necessary in order to permit calculating credit values for the transfers, to ensure consistency

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<sup>3</sup> These additional incentives are discussed in the NPRM "Clean Fuel Fleet Credit Programs, Transportation Control Measure Exemptions, and Related Provisions" (56 FR 50196, October 3, 1991) and include, among other things, expanded transportation control measure exemptions for ILEVs.



with the general guidelines of the fleet program, and to ensure that the credit reflects true emission reductions. Suggested elements for a program that would convert clean fuel vehicle credits to tradeable emission reduction credits are described below. It will be up to the states to develop a proposal to integrate these general elements into a specific trading program.

**Element 1. Credit-generating vehicles must be in addition to those required to be purchased by statute or must be certified to cleaner standards.**

This element is necessary to ensure that credits are surplus: they reflect additional emission savings through the purchase of more clean fuel vehicles or cleaner vehicles than are otherwise required.

**Element 2. Clean fuel vehicles may operate on alternative clean fuels or on petroleum-based clean fuels such as reformulated fuels.**

Since the focus of this program is on expanding the use of clean fuel vehicles to generate emission reduction credits, it is not necessary to require that the affected vehicles run on any particular clean fuel. It is only necessary that the vehicles meet the clean fuel vehicle emission standards. At the same time, it should be noted that vehicles which run on clean alternative fuels (e.g., electricity, gaseous fuels, and neat alcohol) will potentially generate more emission credits than those that run on reformulated fuels, since they tend to be inherently lower emitting.

**Element 3. Vehicles need not be dedicated fuel vehicles to generate exhaust emission credits. However, only dedicated fuel vehicles such as ILEVs may generate credits based on vapor emission reductions.**

In a broad sense, EPA is not averse to including dual-fuel, flexible-fuel, or hybrid electric vehicles in a program to generate credits using exhaust emission reductions. However, including these vehicles complicates the calculation of tradeable credits. This is because it is necessary to verify how many miles the vehicle operated meeting the clean fuel vehicle standards as opposed to conventional standards. Special adjustments may be needed for hybrid vehicles as well as for vehicles meeting different clean fuel vehicle standards on different fuels.

Therefore, any program that includes dual-fuel, flexible-fuel, or hybrid electric vehicles must include a provision to ensure that vehicle miles traveled on the different fuels or using an auxiliary power plant can be calculated reliably. This will ensure that the calculation of the credit accurately reflects the actual reduction in emissions from operation on each fuel or in each mode. One way to improve accurate reporting is by equipping these vehicles with "fuel keys," which act to track, by computer, the fuel type dispensed to each vehicle. Such a system can be expanded to permit



coding of appropriate mileage records, to enable accurate calculation of vehicle miles traveled on each fuel. Chronometers may also be useful in assessing the operation of auxiliary power plants. This, and other methods, are currently being explored by some fleet owners. Fuel receipts may also be needed as well. Systems which do not rely on human factors are preferable.

Exhaust emission credits will only be issued for vehicles meeting at least the clean fuel vehicle emission standards of sections 243 and 245 of the 1990 Clean Air Act Amendments. Vehicles beating the conventional standards but not meeting clean fuel standards cannot receive credits. In the case of dual-fuel, flexible fuel, or hybrid electric vehicles, credits can be generated only for the portion of operation when the vehicle meets the clean fuel standards. Clean fuel vehicles meeting different sets of clean fuel standards on different fuels or in different modes will receive credits in proportion to their use. Conventional flexible-fuel vehicles (vehicles that operate on two conventional fuels but do not ever meet the clean fuel vehicle emission standards) will not be allowed to participate in this program.

The generation of emission reduction credits based on a reduction in vapor emissions must be limited to dedicated fuel vehicles such as ILEVs. For dual-fuel and hybrid electric vehicles vapor emissions may occur whether the vehicle is operating on conventional or clean fuels. In fact, these vehicles could potentially have even higher vapor emissions than their conventional-fueled counterparts if the vapor canister is not purged when the clean fuel is being used.

**Element 4. Vehicles can be new or converted.**

The clean fuel vehicle fleet program allows converted vehicles to be counted as vehicle purchases for purposes of compliance. Converted vehicles will also be permitted in this credit generation program. Conversions must be certified in accordance with the provisions of the fleet program and meet the appropriate emission standards. The conversion may be to a dual or dedicated clean fuel vehicle configuration. However, as noted above, credits are only available when the vehicle is operating on a fuel or in a mode which permits it to meet the clean fuel vehicle emission standards.

**Element 5. Vehicles must pass an annual I/M test in areas that require testing and where I/M tests are available.**

This element is needed to ensure that the vehicle is running correctly in use. Vehicles for which the owner sought a waiver from repair may not generate credits. In areas that do not require I/M testing, EPA will not require that vehicles in the program be tested annually. Instead, EPA and the states will rely on results obtained from national I/M tests to determine if the vehicles in the credit program are actually running correctly. In this case, if there is evidence from national vehicle testing that a particular vehicle model is not meeting requirements for the LEV



program standards of interest, it is consistent with other EPA enforcement programs to assume that similar vehicles in areas that do not have I/M testing are also not meeting the standards, and to require those vehicles to be serviced accordingly. Alternatively, credit discounting may be an option to account for uncertainty or to address problems identified.

**Element 6. Credits will be calculated yearly, preferably on a calendar year basis.**

Ideally, the credit generation programs should coincide on a time period basis. However, fleet purchase credits are generated on a model year basis while in most cases fleet emission reduction credits would be used on a calendar year basis. Given the methods used to calculate the fleet credits discussed below and the fact that compliance determinations for other programs are annual, EPA believes that credits generated by vehicles in the fleet emission reduction program should be calculated annually, preferably on a calendar year basis. Therefore, for the purpose of calculating credits for this program, vehicle miles traveled will be measured from January 1 through December 31 of each year, and credits will be generated for that period. Other annual periods would probably be acceptable depending on state preference.

**Element 7. Vehicles used in the fleet credit program cannot be used in the fleet emission reduction credit program, and vice versa.**

This element is necessary because, as noted above, the credits generated in the fleet purchase program are one-time, per-vehicle credits that are used to offset annual purchase requirements, while the credits generated in the emission reduction program for trading are used to offset tons of emissions generated by other sources. In the fleet program, vehicles are counted only once, to fulfill one annual purchase requirement, and credits generated are traded against other annual vehicle purchase requirements. In the emission credit program, however, reductions in vehicle emissions due to the use of a clean fuel vehicle are in addition to those generated by vehicles acquired to meet the purchase requirements. Therefore, it is necessary to segregate these vehicles for credit accounting purposes to ensure that double-counting does not occur.

At the same time, in the case where a credit is being generated by the purchase of a cleaner vehicle, the actual purchase of the clean vehicle will be counted as satisfying the purchase requirement under the fleet program, while the added emission benefits from the cleaner characteristics of the vehicle (ULEV, ZEV) could generate a credit. However, as noted above, the reduction in emissions due to the cleaner nature of the vehicle can generate credits in only one of the programs: **either** the fleet purchase program or the fleet emission reduction program. Due to administrative difficulties, it is probably not advisable to split these "cleaner" credits between programs. An individual ULEV or





ZEV could be used to generate either purchase credits or emission reduction credits but not both.

**Element 8. Credits are to be calculated on a per pollutant basis.**

The program described in this document focuses on reductions in emissions of pollutants for which clean fuel vehicle standards apply: non-methane organic gas (NMOG), carbon monoxide (CO), and oxides of nitrogen (NOx). No credits will be given for formaldehyde (HCHO) or particulate matter (PM). In the case of formaldehyde, there is no standard for this substance for conventional vehicles, so there is no rate to use in the formula for calculating the credit described below. EPA believes that using average formaldehyde emission levels as a base is inappropriate since this substance is not regulated for most vehicle/fuel groups and relatively more credits would be allocated than if it were currently regulated. In the case of PM, the emission rate for most conventional vehicles (gasoline) is so close to zero now, that allowing credits for clean fuel vehicles using the diesel cycle PM standard would amount to a large "give away" of PM credits.

NMOG credit values derived from the clean fuel vehicle exhaust emission standards are not directly interchangeable with other hydrocarbon values needed for trading to other sources. NMOG credits must be converted to NMHC or THC, as appropriate for each vehicle/fuel.

**Element 9. Credits can be generated only by those vehicles allowed to generate credits in the fleet program as determined by the states.**

Although any clean fuel vehicle could feasibly generate exhaust emissions credits that could be traded, EPA recognizes the practical problems that would be associated with allowing any and all vehicle owners to participate in this program. Specifically, it would be difficult for states to enforce the program if credit generating vehicles are spread among too many vehicle owners. Therefore, as noted above, it will be up to the states to decide who is eligible to generate credits in the fleet emission reduction program, based on their decision for participation eligibility in the fleet program or perhaps additional criteria if the federal Clean Fuel Fleet Program does not apply in their state. However, as a minimum, fleets covered by the Clean Fuel Fleet Program under section 246 must be permitted to participate.

**Element 10. Vehicle owners may be limited to either TCM exemptions or tradeable credits for the same emission reductions.**

Under section 246 of the Clean Air Act, fleet owners can get both purchase credits and TCM exemptions for the same qualifying vehicle. However, if concerns exist about double incentives, vehicle owners could be limited to either TCM exemptions or



tradeable emission credits for the same qualifying emission reduction.

There are two situations where this could be applied. First, for fleets/vehicles covered by the state's section 246 fleet program, early and extra vehicles could get either purchase credits or tradeable emission credits. As was mentioned above, such vehicles would retain their eligibility for TCM exemptions if they are used for purchase credits under the fleet program. However, if such vehicles use their emission reductions for tradeable credits under this program the vehicle would be considered out of the fleet program and no longer eligible for TCM exemptions. Second, clean fuel vehicles in non-covered fleets to which the state may choose to provide some form of TCM exemptions or other incentives should not receive such exemptions/ incentives for emission reductions and then be able to trade away such emission reductions. Thus, these vehicles would be eligible for exemptions/incentives or tradeable emission credits but not both.

More specifically, additional (early, extra) clean fuel fleet vehicles cannot get temporal TCM exemptions and also trade away the qualifying exhaust emission reductions. Similarly, ILEVs cannot get expanded TCM exemptions and trade away the reduced vapor emissions.

However, a splitting of benefits is possible. Vehicles certified as ULEVs or ZEVs under 40 CFR Part 88 could trade away the extra exhaust emission reduction and still qualify as a clean fuel fleet vehicle (LEV) and get the temporal TCM exemptions. Similarly, an ILEV can trade away the vapor benefit and still qualify as a CFFV and retain the temporal TCM exemption. An extra ILEV could trade away its exhaust and vapor emission reductions and be eligible for no exemptions/ incentives.

## **V. Method of Calculation**

The method of calculation of credits outlined below is designed to ensure that emission reduction credits are determined with confidence. There are three cases: for purchases of 1) additional clean fuel vehicles, 2) cleaner vehicles, and 3) ILEV vehicles. In all cases, the credits accrue to the vehicle owner, who can then sell them directly to another source or to a broker, or retain them for internal use.

Credits will be calculated based on the number of miles traveled by each vehicle each year, adjusted by the degree to which the vehicle is cleaner than a conventional vehicle as prescribed below. States may calculate credits in one of two ways: projected or year-end. A state's choice of method will depend on the needs of its program. However, under either method, the state must have a method to verify that credits given reflect actual emissions savings.



The projection method of credit calculation ensures that credits are used during the same year they are generated. According to this method, credits are estimated and allocated at the beginning of the year they are generated, based on an estimate of how many miles the vehicle will travel that year. Then, at the end of the year, the states must follow up with a verification procedure based on actual vehicle miles traveled, to verify that estimated emission reductions are the same actual emission reductions. States using this method must provide a remedy to correct estimation errors

The year-end method of credit calculation can be used to avoid the extra paperwork associated with the verification procedure required by the first method. In the year-end method, states calculate and allocate credits at the end of the year, based on actual vehicle miles traveled. Under this method, emission credits are used during the year after they are generated.

Under either program, credits are to be calculated according to the following methods, in grams per year of each pollutant. For the two different methods of calculation, VMT represents either estimated or actual mileage, depending on which method is used and, if the first method is used, whether the calculation is the beginning of the year estimate or the year-end verification.

#### **Method 1. Purchases of Additional Vehicles.**

To calculate the credit generated by the purchase of an additional clean fuel vehicle either under the fleet program or a state program, the following formula will be applied, for each pollutant:

$$[\text{additional vehicle benefit} \times \text{VMT} \times \text{CF}] = \text{credit [grams/year]}$$

where:

(additional vehicle benefit) = In use emission rate change  
between conventional standard  
and clean fuel standard to  
which the vehicle is actually  
certified

VMT = vehicle miles traveled, on the clean fuel, in one  
year

CF = conversion factor (BSFC x Fuel Econ x Fuel Density);  
heavy-duty only (see below)

#### **Method 2. Purchases of Cleaner Vehicles.**

To calculate the credit generated by the purchase of a cleaner vehicle under the fleet program, the following formula will be applied, for each pollutant:



$$[\text{cleaner vehicle benefit} \times \text{VMT} \times \text{CF}] = \text{credit} [\text{grams/year}]$$

where

$$(\text{cleaner vehicle benefit}) = \begin{array}{l} \text{In use emission rate reduction} \\ \text{between LEV standard and} \\ \text{standard to which the vehicle} \\ \text{is actually certified} \\ \text{(ULEV, ZEV)} \end{array}$$

VMT = vehicle miles traveled, on the clean fuel, in one year

CF = conversion factor (BSFC x Fuel Econ x Fuel Density);  
heavy-duty only (see below)

For heavy-duty vehicles/engines, the above equations require the use of a conversion factor (CF) to convert the g/BHP-hr in use emission rate reduction values into gram per mile equivalents. This factor is a product of the Brake Specific Fuel Consumption (BSFC), fuel economy, and fuel density. It should be calculated separately for each vehicle/engine family involved as prescribed in EPA's heavy-duty engine trading and banking rule (See 55 FR 30584, July 26, 1990).

### Method 3. ILEVs/ Clean Air Vehicles.

For dedicated fuel vehicles such as ILEVs there will be a vapor emissions benefit which could be included. This would be calculated according to the following formula:

$$[(\text{vapor improvement}) \times \text{VMT}] = \text{credit} [\text{grams/year}]$$

where

$$(\text{vapor improvement}) = \begin{array}{l} \text{In use emission rate reduction between} \\ \text{conventional and low vapor emission} \\ \text{vehicles calculated using the latest} \\ \text{version of the Mobile emission factor} \\ \text{model: the difference between the total} \\ \text{vapor emissions for conventional fuel} \\ \text{vehicle (reformulated gasoline) and the} \\ \text{vehicle/fuel being evaluated. This} \\ \text{includes all evaporative categories} \\ \text{(hot soak, diurnal, running loss,} \\ \text{resting loss) as well as refueling for} \\ \text{situations without Stage II controls} \\ \text{and partial benefits for those with} \\ \text{Stage II. (If in lieu of Stage II,} \\ \text{onboard control of refueling emissions} \\ \text{is installed on the vehicle, the vapor} \\ \text{emission reductions will have to be} \end{array}$$





adjusted downward approximately ten percent over those with Stage II.)

VMT = vehicle miles traveled in one year

The current in use emission rate reduction factors needed for the above calculations are shown in Tables 2, 3, and 4. Tables 2 and 3 provide the appropriate factors for determining the emission reduction benefits for additional light and heavy duty vehicles. These tables reflect the difference in in-use emission rates between a vehicle which meets the Tier 1 standards and one which meets one of the four possible sets of clean fuel vehicle emission standards. Credit tables for conversions of previous year vehicles (1991, 1992, 1993, etc) can be constructed using the emission factors for the appropriate model year from the Mobile 5 emission model. Emission reduction benefits for cleaner vehicles are determined by subtracting the emission reduction benefits of LEVs from that of ULEVs or ZEVs as appropriate in Tables 2 and 3.

Table 4 contains the vapor emission reduction benefits for ILEVs with and without refueling controls assuming improved evaporative controls, onboard diagnostics, and enhanced I/M are in place and the vehicle is using reformulated gasoline. Slightly larger emission factors would be expected for dedicated conversions of vehicles not covered by these requirements. These also would need to be developed using Mobile 5 evaporative and refueling emission factors for the model year vehicle and in-use conditions of interest.

These factors have been developed by EPA's Office of Mobile Sources for the vehicle classes and standards groups of interest using the latest emission factor data contained in EPA's Mobile 5 emissions model and other information. These reflect the best information now available and in many cases are based on in use data for current technologies and fuels. As better information on the in-use performance of clean fuel vehicles becomes available these factors can and should be updated and other categories added as needed.

When electric vehicles are used, these calculation methods may be further adjusted to take into account any additional NMHC, CO, and NOx emissions related to generating the electricity used to power them. If included, it will be up to the relevant states to determine the size of that offset, depending on local electricity-generating factors.

## **VI. Special Problems**

A trading program such as the one described in this document poses at least two special problems. The first is that credits could be given for a vehicle that does not actually have reduced



emissions. The second is the case when vehicles are driven additional miles to generate extra credits.

The first case, when a vehicle is given credits even though it does not have reduced emissions, is the more serious problem. This may occur if the clean fuel vehicle is not properly maintained and/or it is defective. Since it is proposed that credits be calculated based on the standards to which vehicles are certified, and not based on emissions from an emission test on each vehicle, this problem would be discovered only as a result of emission inspections of that vehicle type.

While vehicle failures would defeat the purpose of this credit program, EPA does not believe this will occur at such a rate that more than the required I/M tests should be mandated. Since all areas with clean fuel vehicle fleet programs are required to have I/M programs, EPA believes that it is unlikely that credits would be allocated for vehicles that fail to reduce emissions. Credits are calculated annually and most emission failures would be brought to the attention of EPA and the states during that year through the I/M programs. In cases where a vehicle type fails an emission inspection, those vehicles would either not be allocated credits for that year, or would be allocated a prorated share of credits based on actual emissions. As noted above, information about the condition of relevant vehicles in those areas that do not require annual I/M testing will be derived from the national I/M experience. Similarly, emission credits would need to be adjusted if the vehicle model is involved in an emission recall.

EPA believes that the second case, where a vehicle is driven additional miles only to generate credits, is unlikely to occur. The additional costs of generating those credits, in both fuel and time may not be worth the value of the extra credits. However, if fleets operate their clean fuel vehicles in preference to their conventional vehicles for the purpose of generating credits, this is in keeping with the spirit of both programs, which is to generate fewer emissions. Fleets that adopt this strategy are entitled to the extra credits they generate. To ensure against misrepresentations, states may consider comparing fleet miles traveled on a year-to-year basis, to detect unlikely increases in number of miles traveled. This may also be used as a check against tampered odometers on vehicles as could fuel use records.

## **VII. Administration of the Program**

As noted above, states would be required to design and administer their own emission reduction credit programs. However, EPA advises that all state programs contain elements and methods of calculation similar to those described above to ensure that emission reductions are being achieved. If a state does not follow this guidance, it must show that the emission reductions are achieved.



Finally, it should be noted that the states in which the program will be run have the ultimate responsibility of ensuring that both the clean fuel vehicle fleet and fleet emission reduction programs are implemented in accordance with their respective requirements.



Table 1

**STATES AND AREAS AFFECTED BY CAA FLEET PROGRAM**

<b>AFFECTED AREAS:</b>		<b>STATES:</b>
1.	Atlanta .....	Georgia
2.	Baltimore .....	Maryland
3.	Baton Rouge .....	Louisiana
4.	Beaumont-Port Arthur .....	Texas
5.	Boston-Lawrence-Worcester (Eastern Massachusetts) .....	Massachusetts
6.	Chicago-Gary-Lake County .....	New Hampshire
7.	Denver-Boulder .....	Illinois,
8.	El Paso .....	Indiana
9.	Greater Connecticut .....	Colorado
10.	Houston-Galveston-Brazoria .....	Texas
11.	Los Angeles-South Coast Air Basin .....	Connecticut
12.	Milwaukee-Racine .....	Texas
13.	New York-Northern New Jersey-Long Island .....	California
		Wisconsin
		Connecticut,
14.	Philadelphia-Wilmington-Trenton .....	New Jersey,
		New York
		Delaware,
		Maryland,
		New Jersey,
		Pennsylvania
15.	Providence (All Rhode Island) .....	Rhode Island
16.	Sacramento Metro .....	California
17.	San Diego .....	California
18.	San Joaquin Valley .....	California
19.	Southeast Desert Modified AQMA .....	California
20.	Springfield (Western Massachusetts) .....	Massachusetts
21.	Ventura County .....	California
22.	Washington (District of Columbia) .....	Maryland,
		Virginia,
		District of
		Columbia





Table 2

**EXHAUST EMISSION REDUCTION RATES  
FOR CLEAN FUEL VEHICLES (g/mi)**

	<u>NMHC</u>	<u>CO</u>	<u>NOx</u>
<u>LDV/LLDT1</u>			
TLEV	.062	- -	- -
LEV	.093	1.527	.091
ULEV	.120	1.527	.091
ZEV	.342	6.491	.427
<u>HLD1</u>			
TLEV	.078	- -	- -
LEV	.115	1.975	.138
ULEV	.153	1.975	.138
ZEV	.383	7.122	.561
<u>LLDT2</u>			
LEV	.073	1.975	.008
ULEV	.117	1.975	.138
ZEV	.383	7.122	.561
<u>HLD2</u>			
LEV	.088	2.354	.012
ULEV	.147	2.354	.229
ZEV	.425	7.501	.739
LLDT1	< 6000 lbs. GVWR (0-3750 lbs. LVW)		
HLD1	< 6000 lbs. GVWR (3751-5750 lbs. LVW)		
LLDT2	> 6000 lbs. GVWR (3751-5750 lbs. TW)		
HLD2	> 6000 lbs. GVWR (>5750 lbs. TW)		



Table 3

**EXHAUST EMISSION REDUCTION RATES FOR CLEAN FUEL  
HEAVY DUTY VEHICLES (g/bhp-hr)**

	<u>NMHC + NOx</u>		<u>NMHC + NOx</u>
<u>LHDGV</u>		<u>MHDGV</u>	
LEV	0.9	LEV	1.4
ULEV	1.6	ULEV	1.7
ZEV	3.5	ZEV	3.9
<u>LHDDV</u>		<u>MHDDV</u>	
LEV	0.7	LEV	0.6
ULEV	1.5	ULEV	1.4
ZEV	3.6	ZEV	3.4
LHDGV	8,500 - 14,000 lbs. GVWR		
MHDGV	14,001 - 26,000 lbs. GVWR		
LHDDV	8,500 - 19,500 lbs. GVWR		
MHDDV	19,501 - 26,000 lbs. GVWR		

Table 4

**VAPOR EMISSION REDUCTION RATES FOR  
ILEVs/CAVs (g/mile)**

	<u>VAPOR</u>	<u>VAPOR WITH STAGE II CONTROL</u>
LDV	.33	.19
LDT1	.38	.20
LDT2	.39	.21
HDGV	1.23	.94



## ERRATA SHEET

6/23/93

Conversion Factor Equation: The equation for the calculation of the conversion factor in the guidance reads:

$$\text{c.f.} = \text{BSFC} \times \text{Fuel Economy} \times \text{Fuel Density}$$

This equation should read:

$$\text{c.f.} = \text{Fuel Density} / (\text{BSFC} \times \text{Fuel Economy})$$

