



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF  
ENFORCEMENT AND  
COMPLIANCE ASSURANCE

September 4, 1997

Addendum to Mobile Source Enforcement Memorandum 1A

SUBJECT: Tampering Enforcement Policy for Alternative Fuel Aftermarket Conversions

A. Purpose The purpose of this document is to clarify and revise the U.S. Environmental Protection Agency's (EPA's) "tampering" enforcement policy for motor vehicles and motor vehicle engines originally designed to operate on gasoline or diesel fuel and subsequently modified to operate exclusively or in conjunction with compressed natural gas (CNG) or liquified petroleum gas (LPG or propane), hereinafter referred to as "alternative fuels". The provisions of this Addendum shall apply to all persons subject to the tampering prohibition of Section 203(a) of the Act. For the purpose of this policy Addendum, the term "manufacturer" will apply to any person who designs, produces, and/or assembles components for converting vehicles or engines to operate on alternative fuels and is responsible for complying with all applicable requirements of this policy Addendum.

B. Background: EPA's policy is and has been that any alteration from an original configuration of a vehicle or engine as certified under Title II of the Act may constitute tampering under Section 203(a)(3). Routine maintenance and repair of vehicles and engines requires the use of replacement parts which may be non-original or "aftermarket" parts or systems. EPA's Office of Enforcement and General Counsel issued Mobile Source Enforcement Memorandum 1A (Memo 1A) on June 25, 1974 to provide guidance to covered parties regarding how the Agency intended to enforce the "tampering" prohibition under Section 203(a)(3) of the Clean Air Act (Act) with respect to maintenance and the use of aftermarket parts.

Memo 1A provides, in part, that the use of an aftermarket part, alteration or add-on part will not constitute tampering if the dealer has a "reasonable basis" to believe that such acts will not adversely affect emissions performance. It also provides specific procedures or options by which the dealer would have a "reasonable basis". One available procedure is emissions testing performed in accordance with "40 CFR 85" (subsequently revised and incorporated under 40 CFR Part 86) demonstrating compliance with emission standards for the useful life of the vehicle or engine. An alternate option is that "a Federal, state or local environmental control agency represents that a reasonable basis exists" based on testing done in accordance with procedures specified by that agency. Many vehicles converted from gasoline fueled to CNG or propane have relied on the second option utilizing procedures established by California or Colorado for demonstrating emissions compliance.

EPA has recently become aware of federal emission test data generated under a program conducted by the National Renewable Energy Laboratory (NREL) which indicate that a

significant number of these vehicles modified to run on alternative fuels may be exceeding one or more applicable federal emission standards. The installers involved in the NREL program had attempted to comply with Memo 1A by using conversion systems certified by the state of California under the “California Exhaust Emission Standards and Test Procedures for Systems Designed to Convert Motor Vehicles Certified for 1993 and Earlier Model Years to Use Liquefied Petroleum Gas or Natural Gas Fuels” (pre-1994 California Procedures). EPA has subsequently reviewed emission test data from other sources which generally substantiate the NREL results.

In response to concerns raised by these data, the Agency conducted a public stakeholders meeting on February 21, 1997, with representatives of the affected industries, regulatory agencies and interested fleet operators. The purpose of the meeting was to discuss these data and the causes of the emission failures as well as to explore all available options to identify and remedy the problems. Many reasons were provided for the emission problems, including inadequate initial testing, insufficient durability evaluations, overly broad vehicle application based on limited testing, inadequate systems/parts specifications, improper installation and fuel variability. The concerns of the affected industries and fleets subject to several alternative fuel statutory mandates were also discussed.

The most significant conclusion reached at that meeting, and from extensive data review and discussions subsequent to that meeting, was that the pre-1994 California and Colorado procedures as currently structured do not provide an adequate demonstration or assurance that a vehicle or engine modified to operate on an alternative fuel using an aftermarket conversion system will comply with the applicable emission standards for its useful life. As a result of the above and in light of the number of vehicles and engines that may be converted to alternative fuels in the near future, EPA believes it is appropriate to issue this Addendum to Memo 1A (this Addendum) to provide additional guidance to the regulated community, including manufacturers and installers of alternative fuel conversion systems.

C. Revised Policy: Effective immediately, EPA will no longer accept a representation based on the pre-1994 California Procedures for alternative fuel conversion systems or on the test procedures under Colorado Regulation No. 14 in effect prior to the date of this Addendum as a “reasonable basis” under paragraph 3(c) of Memo 1A. Consequently, any future installation of an alternative fuel conversion system, or the modification of any motor vehicle or motor vehicle engine in compliance with Title II of the Clean Air Act to operate exclusively or in part with an alternative fuel, or the causing thereof, may constitute tampering under Section 203(a) of the Act, where the installer or manufacturer has relied exclusively on a representation by Colorado or California, as described above, that a reasonable basis exists in accordance with paragraph 3(c) of Memo 1A. Effective immediately, the “reasonable basis” under paragraph 3 of Memo 1A that EPA agrees may be relied on by any person, including a manufacturer, installer or operator, when converting, or causing the conversion of, a motor vehicle or motor vehicle engine to operate on an alternative fuel is limited to one of the three options listed below.

1. A Federal Certificate under 40 CFR Part 86 demonstrating compliance with the applicable standards or under 40 CFR Part 88 demonstrating compliance with Clean Fuel Fleet

standards for each engine family to be converted in accordance with 40 CFR Part 85, Subpart F;  
or

2. A Retrofit System Certification under the “California Certification and Installation Procedures For Alternative Fuel Retrofit Systems for Motor Vehicles Certified for 1994 and Subsequent Model Years” for a conversion system installed and tested under the above procedures on a vehicle or engine from a “50-state engine family” for use nationwide, or for a conversion system installed and tested under the above procedures on a vehicle or engine from a “California engine family” for use in California only; or

3. Until December 31, 1998, the use of an alternative fuel conversion system designed, tested and installed on a single engine family, or multiple engine families as provided under paragraph b.(4) below, if testing is completed by March 31, 1998, as follows:

a. With the alternative fuel conversion system installed on the certified engine family, the manufacturer shall perform, or cause the performance of, one federal emission test while operating with the alternative fuel and one test with the original certification fuel, if dual fuel operation is retained, in accordance with the applicable test procedures under 40 CFR Part 86 or Part 88 for that class and model year vehicle or engine. Prior to testing, the vehicle or engine shall be operated with the conversion system installed for at least the number of miles or hours equal to the service accumulation period needed to stabilize the emission control system specified by the original manufacturer in its certificate application submitted to EPA. EPA encourages manufacturers to conduct at least one baseline emission test with the certification fuel prior to conversion to ascertain that the vehicle or engine meets the applicable standards.

b. (1) With the application of an appropriate deterioration factor (DF) to the above test results, the vehicle or engine shall meet the applicable federal exhaust emission standards to which the vehicle or engine was originally certified. The DF shall be determined either based on full useful life durability testing, predictions based on engineering judgement for a similar light duty vehicle or heavy-duty engine with a similar emission control system using the same alternative fuel conversion system, or determined in accordance with the appropriate protocol contained in the “Dear Manufacturer” letter of September 27, 1995 - Assigned Deterioration Factors for Gaseous-Fueled Vehicles and Engines, identified as CD-95-14. For heavy-duty engines with aftertreatment (such as a catalyst), the deteriorated emissions are calculated by *multiplying* the DF with the exhaust emission results. For heavy-duty engines without aftertreatment, the deteriorated emissions are calculated by *adding* the DF with the exhaust emission results. For a vehicle or engine converted and tested prior to accumulating 50% of its useful life, the manufacturer shall apply the full DF. For a vehicle or engine converted and tested subsequent to accumulating 50% of its full useful life, apply a DF that is the midway point between no DF and the full DF. For example, an additive DF of 1.0 may become 0.5 and a multiplicative DF of 2.0 may become 1.5. For a vehicle or engine converted and tested subsequent to accumulating its full useful life, apply no DF.

(2) For heavy-duty engines used in vehicles with a gross vehicle weight rating (GVWR) less than or equal to 10,000 lbs, the manufacturer may demonstrate

compliance with the applicable light-duty truck standards in accordance with the preceding paragraph.

(3) In lieu of engine dynamometer testing for on-highway heavy duty vehicles with a GVWR less than or equal to 14,000 lbs, the manufacturer may conduct two or three emission tests as described below in accordance with the most current amendments to “California Exhaust Emissions Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles”. These shall consist of one baseline test using the certification fuel prior to conversion, one test after conversion with the alternative fuel and one test after conversion with the certification fuel if the vehicle is intended to be dual fuel. The two tests after conversion shall not result in any exhaust emissions that exceed 1.10 times any of the baseline emission levels. In the case of pure CNG operation, the after conversion NMHC emissions shall not exceed 0.9 times the THC emissions before conversion. For heavy-duty vehicles operating on a mixture of CNG and either diesel fuel or gasoline, the conversion system manufacturer should contact EPA’s Mobile Source Enforcement Branch to determine the appropriate ratio of NMHC emissions after conversion to THC emissions before conversion.

(4) With respect to light duty vehicles, light duty trucks, or heavy-duty engines meeting the requirements of paragraph (2) above, the above demonstration may be applied as a reasonable basis for up to a maximum of three additional light duty engine families to that tested, provided:

A. The results from testing done in accordance with the above procedures demonstrate compliance with low emission vehicle (LEV) or more stringent emission standards under 40 CFR § 88.104,

B. The additional engine families have engine displacements equal to, or within 0.8 liters (50 CID) less than, the engine tested,

C. The additional engine families comprise vehicles equal to or less than the gross vehicle weight of the vehicles covered by the engine family tested, and

D. The additional engine families are equipped with the same catalytic converter type (i.e. beaded vs monolith, OC vs OC/RC) and the same primary emission control technology (eg. EGR, Air Injection, EFI vs carburetor, closed loop vs open loop) as the engine family tested.

(5) Option 3 of this policy is not available for conversion of California only engine families.

(6) An alternative fuel conversion system that degrades a closed loop feedback system to a continuous non-feedback open loop system is not allowed under this option.

(7) Compliance with this policy may be demonstrated based on existing data provided such data are the result of testing in accordance with the procedures and protocols specified herein.

(8) Demonstration with the Cold CO requirements under 40 CFR Part 86 Subpart C is not required under Option 3 of this policy.

(9) The Certification Short Test requirements under 40 CFR Part 86, Subpart O is not required under Option 3 of this policy.

(10) The evaporative emissions requirements under 40 CFR 86.094-8(b) and 86.094-9(b) are not required under Option 3 of this policy.

c. The manufacturer of the conversion system shall specify all part numbers/calibrations associated with that conversion system and provide all such information, specifications and installation requirements, including a permanent conversion system label which appropriately identifies the conversion system with reasonable specificity, with each system that is sold or provided for installation.

d. In order to demonstrate that it has a reasonable basis to believe that its conversion system will not adversely affect emissions over the useful life of the vehicle or engine, the conversion system manufacturer should retain records including but not limited to all emission test data, including test results, description of vehicles and/or engines modified, all maintenance and modifications performed, laboratory data sheets, identification of test laboratory, test dates, test personnel and test procedures followed, engine families tested, data to support additional engine family coverage, if applicable, VIN's, vehicle and engine mileage and/or age as applicable, fuel specifications, conversion system part numbers and calibrations, durability procedures followed including all durability data and all calculations and engineering analyses performed to determine compliance with the above requirements.

e. In order to meet the requirements of this policy, any installation of a conversion system designed and tested in accordance with the above shall be done in accordance with the applicable part numbers/calibrations installed on the vehicle or engine that was tested, completed in accordance with manufacturer's specifications and/or instructions and the conversion system label affixed to the vehicle or engine. The system shall only be installed on a vehicle or engine of the same engine family as that tested or as permitted under paragraph 3.b.(3) above.

f. In support of an appropriate installation, the installer should retain records of each vehicle or engine converted in accordance with the above, including the VIN, make and year of each vehicle or engine so modified, the name of the installer, the date of installation and a copy of the manufacturer's or marketer's/distributor's representation that the conversion system has been demonstrated on that engine family to meet the requirements of this policy

g. In support of any marketer's or distributor's compliance with the requirements of this policy, such parties should retain records of each conversion system sold or distributed, copies of the representation from the manufacturer that the system meets this policy and records of sales to others including the name of the purchasers, part numbers, dates of sales and the numbers of systems sold.

h. Colorado has indicated that it will revise its administrative procedures under Colorado Regulation No. 14 to require that conversion system manufacturers conduct testing in accordance with option 3 of this Addendum in order to receive a Colorado Letter of Certification. Consequently, until December 31, 1998, EPA will not consider as tampering the sale and installation of a conversion system in Colorado pursuant to a Colorado Letter of Certification issued after the above-referenced administrative procedure revisions have been made by Colorado, provided testing in support of the Letter of Certification is done in accordance with option 3 of this Addendum and is completed by March 31, 1998.

D. Conclusion: EPA believes that the maximum degree of assurance that vehicles or engines modified to operate on alternative fuels will meet emissions standards throughout their useful life can only be achieved through full certification demonstration in accordance with 40 CFR Parts 86 or 88. However, the cost and time associated with such a demonstration may be prohibitive for some conversion system manufacturers in the short term and may not provide sufficient equipment for fleets currently subject to various alternative fuel mandates to comply with those mandates. In addition, EPA will be attempting to implement various procedures to streamline federal certification for alternative fuel vehicles and on-highway engines, but it is likely that implementation of those procedures will take some time. In the interim, the procedures and requirements outlined in option 3 above should allow alternative fuel conversion systems to be developed and evaluated more quickly and at less cost, while providing a reasonable assurance that emissions will not be deteriorated. After December 31, 1998, manufacturers, marketers and installers must utilize equipment which meets the requirements of option 1 or option 2 above to be covered by the non-tampering policy of Memo 1A.

EPA will be reviewing Memo 1A more thoroughly in the near future to determine if additional changes are required for other vehicle or engine modifications, parts or systems. Any questions regarding this interim policy should be directed to the Mobile Source Enforcement Branch at (202) 564-2255.

/s/

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