



# Air Resources Board



**Matthew Rodriguez**  
Secretary for  
Environmental Protection

**Mary D. Nichols, Chairman**  
9480 Telstar Avenue, Suite 4  
El Monte, California 91731 [www.arb.ca.gov](http://www.arb.ca.gov)

**Edmund G. Brown Jr.**  
Governor

January 22, 2013

Reference No. CLC-2013-001

Peter F. Ward, Principal  
Alternative Fuels Advocates, LLC  
5030 Concord Road  
Rocklin, CA 95765

Dear Mr. Ward:

Thank you for your letter dated August 2, 2012, to the Air Resources Board (ARB), "Streamlining of Certain Natural Gas / Propane Vehicle and Engine Certification Procedures." ARB staff understands the issues facing the alternative fuel conversion (AFC) industry as described in your letter and is committed to working with the industry to address certification issues through flexible application of the current procedures and proposed new regulations specific to the conversion industry. This letter addresses the items listed in your letter with general suggested alternatives using current regulations. However, other suggested flexibilities may be available based on a manufacturer's particular situation. Please encourage your manufacturers to participate in certification preview meetings before they intend to certify engines and vehicles. Preview meetings provide manufacturers with opportunity to discuss specific issues of concern and staff to suggest alternatives.

As you know, on August 14, 2012, staff conducted a public workshop at our facilities in El Monte, California to explain the requirements and process for manufacturers to submit an application and obtain an Executive Order for the certification of alternative fuel conversions for new and used vehicles and engines. The presentation materials staff used at the workshop are posted in an ARB website; Attachment 1 provides information for accessing these materials. Staff believes the workshop addressed many of your concerns. In addition, at the October 23, 2012 meeting with you and other interested parties, staff offered other flexibilities available within the current regulations to address your issues. ARB's responses below will provide detailed explanations of these items discussed.

Some of the issues you raised would require changes to the regulations. Obviously, consideration of those changes will be undertaken in the public arena and determinations made on which changes introduce more flexibility without sacrificing emission benefits. Staff has begun considering changes based on industry's past comments and will kick off formal industry workgroup and public workshop meetings starting January 15 and 22, respectively. The plan is to present staff's recommendations to the Board this summer. The workgroup meeting scheduled on

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.*

California Environmental Protection Agency

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January 15, 2013 and the public workshop scheduled on January 22, 2013, will focus on ideas and concepts for proposed new regulations and certification procedures for new and used converted vehicles and engines. Staff encourages Alternative Fuels Advocates, LLC and its members to participate in this workshop and provide input in helping staff better understand the challenges facing the industry in order to craft the new regulations and procedures to address these issues.

Staff's responses below reflect the same numbering as in your letter.

1. Improved Guidance Documentation.

- What constitutes a complete OBD II application and what are reliable turnaround times?

The On-Board Diagnostic II (OBD II) regulations are in Title 13, California Code of Regulations, Section 1968.2, "Malfunction and Diagnostic System Requirements--2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines." Subsection (i) of this regulation lists the information requirements. Slides and the draft guidance document presented at the workshop provided further guidance for conversion manufacturers as the OBD work is mostly about software and calibration modifications rather than through use of new sensors and hardware. For further information on the OBD II application and approval process, please contact Mr. Michael McCarthy, Chief Technology Officer, Mobile Source Control Division, at mmccarth@arb.ca.gov or (626) 771-3614.

- Checklist of required submissions with estimated turnaround times for each is needed.

For new vehicle conversion certification, information required in the application is described in the "California Exhaust Emission Standards and Test Procedures for 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" (New Vehicle Procedures), Part I, H.4., which incorporates by reference Title 40, Code of Federal Regulations, §86.1844-01, "Information Requirements: Application for Certification and Submittal of Information Upon Request." For used AFC vehicle certification, the information required in an application is described in the "California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for Motor Vehicles Certified for 1994 and Subsequent Model Years" (Retrofit Procedures).

Attachments 2 and 3 provide checklists for applications for, respectively, new vehicle and used vehicle conversion certification. Staff uses this checklist to conduct a preliminary review of an application to determine whether all items are included and the application is accepted for filing. Staff responds to manufacturers on a first come, first served basis, and within 30 days after submission to ARB. After an application has been accepted for filing, staff reviews the documents to ensure all required information is submitted and begins the dialog with manufacturers to clarify any issues in order to determine that the submitted information demonstrates compliance with the emission standards and all other emissions-related requirements upon which a draft Executive Order will be prepared for approval.

ARB has maintained its 30 year policy to complete reviews within 90 days after an application has been accepted for filing, despite the great increase in the number of manufacturers and engine families, and the complexity of the regulations. With improvements implemented in 2012, the formal review leading to an Executive Order for approval took about 30 days, on average. Staff is currently working on additional streamlining efforts.

Further, manufacturers submit their new vehicle certification documentation electronically to ARB's Document Management System or DMS. Staff offers assistance to manufacturers to help them simplify submission of documents as part of their daily activities. In addition, formal training is offered to new manufacturers monthly as requested. Manufacturers may also track their applications from submittal through approval using DMS.

In addition, as an adjunct to the proposed regulatory changes currently under development, staff plans to provide all of the above information on a single web page later this year. This should make accessing all the information needed by AFC manufacturers much easier and should help streamline the application process.

- Requirements for dual-fuel vehicle and engine certification.

Many dual-fuel vehicles have been certified by ARB, most prominently during the late 1990s and early 2000s and most recently by Chrysler and Impco for the 2013 model year. In 1999, ARB issued Manufacturers Advisory Correspondence (MAC) 99-01 to clarify the certification requirements for dual-fuel vehicles, especially regarding evaporative emissions testing for dual-fuel vehicles. The certification procedures and requirements listed in the MAC are still in use for dual-fuel vehicles, except for the more stringent emission standards as applicable to all new vehicles.

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For AFC manufacturers seeking to certify a previously ARB certified vehicle or engine, as part of the regulatory changes, staff is working to determine the feasibility of providing a waiver as part of the proposed regulatory changes. Evaporative emissions data is needed to evaluate such a change.

- Post-Certification Responsibilities.

At our last meeting, we talked about ways to better provide the details of post certification requirements to manufacturers, such as a separate webpage. Until that is completed, below are initial comments in response to the items listed in your letter and appropriate staff contacts for more detailed discussions.

New Vehicles

- OBD II 1968.2 (j) Reporting. "Production Vehicle Evaluation Testing." For further information on OBD II testing report, please contact Mr. Michael McCarthy, Chief Technology Officer, Mobile Source Control Division, at mmccarth@arb.ca.gov or (626) 771-3614.
- Warranty/Recall Reporting. During a vehicle's emissions warranty period a manufacturer reports to ARB on a quarterly basis emissions-related defects that occur at a rate of four percent or greater per vehicle model or test group. For further information regarding ARB's Emission Warranty Information Reports (EWIR) please contact Mr. Jeff Wong, Manager, Field Operations and Warranty Section at jwong@arb.ca.gov or (626) 575-7009.
- Running Changes. The manufacturer informs ARB of an emission-related running change before the running change is implemented. Typically running changes are submitted to DMS and processed by ARB staff in the same manner as the new certification application. Staff responds within 30 days if there are any issues.
- NMOG Report and GHG Report. To quantify a manufacturer's Non-Methane Organic Gases (NMOG) credits and verify a manufacturer's Greenhouse Gas (GHG) fleet average, an NMOG report and GHG report are submitted to ARB annually following the end of the model year. In these reports, the certified test groups (TG) are listed together with their emission standards, the TG's NMOG and CO<sub>2</sub>-e values and actual production numbers that are used for the fleet average calculation. These reports must be submitted no later than May 1 of the calendar year following the close of the model year. (Small and intermediate volume manufacturers are not subject to GHG report until model-year 2016.)
- Certification Fee Production Report and Fee Payment. The manufacturer is notified annually by a Mail-out to provide its California production and is invoiced for the applicable certification fee based on its actual production for California.

#### Used Vehicles

- At the time of installation, manufacturers and installers of retrofit systems must maintain records of the converted vehicles and engines per section 3(d) and 3(e) of the Retrofit Procedures.
- Running Changes. AFC manufacturers must inform ARB of any changes they make to certified retrofit systems.

## 2. Alternative Fuels Specialists.

When a new manufacturer contacts ARB to certify vehicles and engines, the manager of the section assigns staff to work with the manufacturer. For AFC manufacturers, a limited number of staff reviews all alternative fuel applications. Where possible, the same staff is assigned both the manufacturer of the base vehicle and alternate fuel manufacturer to ensure familiarity with the emission control system.

In terms of outreach and streamlining the regulations, staff has begun the effort with the August 2012 workshop which focused on explaining the current regulations and the upcoming January 22, 2013 workshop which will focus on regulatory amendments.

## 3. Update of §2030 to Reflect Current State of the Art.

The requirements for AFC retrofit certification are provided in California Code of Regulations, Title 13, section 2030 and the Retrofit Procedures. Any changes to these requirements would require regulatory changes and staff is already in the process of updating section 2030. As part of the proposed regulatory changes, staff is reviewing the feasibility of providing manufacturers greater flexibility in combining engine families, the current carry-over and carry-across requirements, DF validation requirements, and the in-use testing requirements. Pending these regulatory changes, staff would like to provide explanations of what flexibilities may be provided under current regulations, as applicable, depending on a manufacturer's product.

#### On-Board Diagnostics

- The AFC manufacturers must comply with the same OBD requirements as the OEM complied with for the base vehicle. The OBD requirements are associated with the model year of the base vehicle, not the year the retrofit kit is approved or installed.
- Prior OBD approval of a manufacturer's new AFC vehicle certification may be acceptable for that manufacturer's retrofit system certification. If the AFC manufacturer's retrofit kit is identical to the system incorporated on the new AFC vehicle for the same base vehicle, same model year, and with the same

calibrations, the OBD staff may not need to perform a complete review of the OBD documentation again. If calibrations are different on the retrofit systems, it may affect OBD monitors. The AFC manufacturer would be required to supply documentation including an attestation that the systems are identical to what was granted OBD approval and request OBD approval for the retrofit kit.

#### Emissions/Durability

- Under current Retrofit Procedures, the same test procedures originally used by OEMs to certify the base vehicles/engines when new, apply to retrofit system certification (e.g. 2005 base vehicle is tested using 2005 test procedures).
- Assigned deterioration factors (DFs) may be used for retrofit certification if the AFC manufacturer provides emissions validation testing within two years using a high mileage vehicle. In addition, the AFC manufacturer must submit component durability data to show its components will be durable for the useful life of the vehicle similar to new vehicle certification upfront.
- California's Retrofit Procedures require certification be engine family-specific, and test groups/engine families cannot be combined. However, the Retrofit Procedures allow AFC manufacturer to request the use of carry-over of data. They must provide engineering analyses demonstrating the data is representative of the emission and durability performance of the retrofit system to be certified. MAC #95-05 provides more information. In addition, EPA Advisory Circular 17F may be used in support of catalyst temperature comparisons of engine families.
- For heavy-duty vehicles (Category III), the Retrofit Procedures allow the AFC manufacturer to demonstrate emissions durability using either mileage accumulation or bench aging to show emissions compliance for up to 180,000 miles. As an alternate, heavy-duty AFC manufacturers may use assigned DFs for certification followed by the validation testing within two years. However, for emissions testing, the AFC manufacturers must use the same engine test procedures to conduct the emissions testing as originally used by the OEM. There is no alternative to performing the engine emissions test procedure for compliance at this time. Alternatives may be considered as part of the upcoming regulatory effort. Staff is requesting data to support any changes.

#### Label/In-Use

- The supplemental label described in the Retrofit Procedures, paragraph 3(b)(ii) may list the engine family(ies) being certified to the OEM certified tier and standard or a more stringent standard within the same tier, i.e., tier 2 SULEV,

instead of the OEM certified tier 2 LEV. The EO shall specify that the system is being converted from the OEM standard to a stricter standard.

- The Retrofit Procedures require, for an engine family chosen, a minimum of 10 vehicles per engine family be tested to ensure that a statistically valid sample is used to make a determination of compliance or non-compliance. ARB may administratively agree to terminate testing at a lower number of vehicles, if all vehicles have all criteria pollutants below 85 percent of their applicable standards or if the compliance determination is agreed upon.

Items that will be considered during the regulatory process are: Bench aging as an alternative to durability testing and other testing protocol; the use of PEMS to verify that a retrofit of a Category III vehicle does not cause excess emissions over the useful life from engine families for which certification is sought; and test procedure language which needs to be revised to make it clear, consistent and flexible.

#### 4. Harmonize Natural Gas Certification Fuel With Federal Standard.

Under current regulations, the certification fuel specifications are set forth in the New Vehicle Procedures, Part II, A. 100.3.5 and Title 13, California Code of Regulations, §2292.5. A regulation change is needed to harmonize the California specification with US EPA.

In the interim, recognizing the cost burden of requiring California specification fuel, ARB may allow the use of federal fuel with appropriate correction factor under the provisions of Title 40, Code of Federal Regulations, §86.1840-01, "Special Test Procedures", incorporated by reference in the California Exhaust Test Procedures. Test data from about a dozen vehicles, representing various AFC manufacturers and conversion components, will be needed to develop an acceptable correction factor. It may be developed by the AFC industry for application to all affected members or by individual manufacturer for its own products.

In addition, as part of the proposed regulatory changes, staff will recommend allowing the use of both natural gas and liquid propane gas that meet the federal standards for all AFC certification applications.

#### 5. Harmonize Natural Gas NMHC to NMOG Multiplier With Federal Standard.

The California test procedures currently have no provision for a CNG's NMHC to NMOG multiplier for new vehicle certification and in-use verification. [Ref. 40 CFR

§1810-01 and 40 CFR §1845-04, incorporated by reference in the New Vehicle Procedures. This issue will also be addressed in the proposed regulatory changes.

In the interim, given the high likelihood of complying with an NMOG standard when a NMHC 1.5× multiplier is applied, ARB will approve, upon request by the certifying manufacturer in its application for certification, the use of such a multiplier for certification and in-use testing of alternative fuel vehicles until a more accurate multiplier is established.

6. Relief From Aged Post-Exhaust Component Requirements.

The OBD II regulation requires the use of certification emission durability test vehicle(s), a representative high mileage vehicle(s), or a vehicle(s) aged to the end of the full useful life using an ARB-approved alternative durability procedure (ADP) for OBD II validation testing. A regulation change is needed to allow relief from this requirement and staff is in the process of determining the feasibility of such changes for inclusion in the proposed regulatory changes.

7. Relief From Re-Validating Dual-Fuel Gasoline Systems.

Under current New Vehicle Procedures, dual-fuel vehicles are required to undergo exhaust and evaporative testing with each fuel. Current Retrofit Procedures require exhaust emission testing on each fuel; for evaporative emissions, manufacturers can provide engineering justification for a test waiver with the original fuel. Testing with each fuel was deemed necessary to ensure that hardware and software modifications involved in the conversion work would not cause a converted vehicle to be out of emission compliance when operating on any fuel.

Regulatory changes would be needed for such a waiver for exhaust emission testing and as previously stated, for AFC manufacturers seeking to certify a previously ARB certified vehicle or engine, staff is seeking emissions data to support the feasibility of providing a waiver as part of the proposed regulatory changes.

8. Leverage Experience of the US EPA.

Due to differences in regulations and test procedures, the process for reviewing and approving applications for certification is not identical between agencies. In addition, ARB certification approvals are often one of the main requirements for certified alternate fuel vehicles to be eligible for financial incentives under state law; as a result ARB certification must be based on staff review and determinations. ARB and US EPA staff consult with each other as needed to ensure that each agency fulfills its obligations under respective programs with as much common technical and test data

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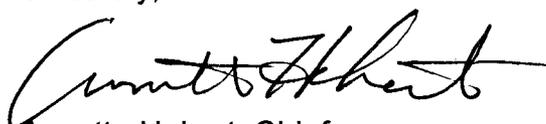
as permitted in regulations. However, staff will continue to investigate the feasibility of better aligning ARB's procedures with those of the US EPA as part of the proposed regulatory change development process.

As mentioned at the beginning of my letter, I encourage you to actively participate in the development of the proposed regulatory changes. A workgroup meeting has been scheduled on January 15, 2013 and a public workshop has been scheduled on January 22, 2013 to discuss preliminary concepts on how to simplify the application process while preserving emissions benefits. For additional details, please view the workshop notice at

<http://www.arb.ca.gov/msprog/mailouts/msc1227/msc1227.pdf>

If you have any questions regarding conversions of new PC, LDT, and chassis certified MDV, please contact Mr. Duc Nguyen, Manager, On-Road Light-Duty Certification Section, at (626) 575-6844 or by email at [dnguyen@arb.ca.gov](mailto:dnguyen@arb.ca.gov). For questions regarding conversions of new HD vehicles and engines, including engines used in diesel and incomplete MDV 8,501 to 14,000 pounds gross vehicle weight rating, please contact Ms. Kimberly Pryor, Manager, Compression-Ignition and Heavy-Duty Certification Section, at (626) 575-6640 or by email at [kpryor@arb.ca.gov](mailto:kpryor@arb.ca.gov). For questions regarding aftermarket/retrofit system conversions of used vehicles and engines, please contact Mr. Tony Martino, Manager, Aftermarket Parts Section, at (626) 575-6848 or by email at [amartino@arb.ca.gov](mailto:amartino@arb.ca.gov). For questions regarding OBD, please contact Mr. Michael McCarthy, Chief Technology Officer, Mobile Source Control Division, at (626) 771-3614 or by email at [mmccarth@arb.ca.gov](mailto:mmccarth@arb.ca.gov).

Sincerely,



Annette Hebert, Chief  
Mobile Source Operations Division

Attachments (3)

cc: Tim Carmichael, President  
California Natural Gas Vehicle Coalition  
1029 K Street, Suite 24  
Sacramento, CA 95814

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Attachment 1.

References.

The web address below is the slide presentation, "Certification of Alternative Fuel Conversions for New and Used Vehicles/Engines" from the August 14, 2012 workshop held at ARB in El Monte.

<http://www.arb.ca.gov/msprog/onroad/cert/ldctp/altfuelwkshop2012.pdf>

OBD II specific presentation from the August 14, 2012 workshop.

<http://www.arb.ca.gov/msprog/onroad/cert/ldctp/altfuelwkshop2012obdii.pdf>

DRAFT Guidelines for Alternate Fuel Vehicle On-Board Diagnostic II (OBD II) Certification

[http://www.arb.ca.gov/msprog/obdprog/Draft\\_altfuelOBD\\_MO\\_Aug2012.pdf](http://www.arb.ca.gov/msprog/obdprog/Draft_altfuelOBD_MO_Aug2012.pdf)

On-Road Light-Duty Certification and Regulations web page.

<http://www.arb.ca.gov/msprog/onroad/cert/ldctp/ldctp.htm>

Attachment 2.

Checklist for Submitting a Complete Application for Certification of PC-LDT-MDV

Light Duty	
INCLUDED (Y/N)	Checklist
<input type="checkbox"/>	Signature Letter (FYWC)
<input type="checkbox"/>	DMS Work Flow
	Compliance Statements
	Warranty Statement
	Adjustable Parameters/Tamper Resistance*
	Catalyst Information*
<input type="checkbox"/>	VECI Label
<input type="checkbox"/>	EP Label
	Emission Related Parts List
<input type="checkbox"/>	AECD *
<input type="checkbox"/>	Sensor Table*
<input type="checkbox"/>	NMOG/VEC Compliance Plan
<input type="checkbox"/>	Carryover/Carryacross Table *
<input type="checkbox"/>	Test Vehicle Description
<input type="checkbox"/>	Durability/Test Log
	Durability Procedure (Approval Number)*
	DOR Approval*
	Modified Test Procedure*
<input type="checkbox"/>	Evap Control System Description
	ECS Description
	Running Loss Fuel Temperature Profile (all Models)
	Confirmatory Test*
FYWC - First Year or When Changed	
* - If Applicable	

Attachment 3.

**Alternative Fuel Retrofit System Certification Application Checklist**

1. Identification and description of the engine families for which the retrofit system is to be certified.
  - a. Specify the applicable emission standards.
2. Complete description of the retrofit system to include:
  - a. Details of the system components.
  - b. List of parts and part numbers.
  - c. Necessary modifications to the engine and emission control system of the vehicle.
  - d. Original equipment manufacturer (OEM) systems/components removed.
  - e. OBD system.
3. Generation of deterioration factor (DF)
  - i. If generated through mileage accumulation and durability vehicle:
    - a. Durability data vehicle (DDV) identification/engine label.
    - b. Mileage accumulation schedule.
    - c. If other than AMA route, technical justification for the mileage accumulation schedule. Also enclose test data such as catalyst temperatures, engine out emissions, etc. to support request for an alternative aging schedule.
    - d. Required maintenance schedule.
    - e. Maintenance and mileage log.
    - f. Engineering report to include diagnosis and resolution of any unscheduled maintenance.
    - g. Emission data points and DF calculations.
  - ii. If DF is a carry-over/carry-across (MAC 95-05):
    - a. Justification for carry-over/ carry-across.
    - b. Catalyst temperature traces, if applicable.
    - c. Procedures for obtaining catalyst temperatures, including information on the vehicles used, driving schedule and location of temperature probes.
    - d. DF values.
  - iii. If gasoline DF's are used (MAC 95-05):
    - a. Justification used to qualify for use of gasoline DF's.
    - b. Data to demonstrate durability over the useful life of the system. Include explanation for choice of "worst case vehicle", emission data, calibrations and catalyst temperatures at the 4,000-mile and end of useful life.

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- c. Procedures for obtaining calibration data with the comparative calibration data (gasoline vs. alternative fuel) at 4,000-mile. Also include information on vehicles used.
    - d. Procedures for obtaining catalyst temperature data and the 4,000-mile comparative traces. Also include information on the vehicles used, driving schedule and location of temperature probes.
    - e. DF values.
  - iv. If derived DF's are used (MAC 95-07/MAC 95-10):
    - a. Performance characteristics of the retrofitted vehicle/ engine (comparison between OEM and retrofit power curves, torque curves, fuel feed curves, catalyst temperatures, etc.).
    - b. Data to demonstrate durability of components.
    - c. Values of derived DF's and justification for their use.
    - d. An ARB approved plan to validate the derived DF's.
4. Emission Data
  - a. Emission data vehicle information (VIN, engine family, mileage, etc.).
  - b. 4,000-mile emission data (or 100 hours of operation using representative drive cycle on a dynamometer for heavy-duty engines).
  - c. Emission levels at the end of useful life.
  - d. Comparison of the retrofitted vehicle's emission levels to either certification emission standards or baseline emissions.
5. Owner's Manual to include:
  - a. Brief description of the retrofit system.
  - b. Refueling procedure.
  - c. List of service and service intervals, as well as tune-up data which differs from OEM specifications.
  - d. Name, address and phone number of installer, and list of names, addresses and phone numbers of major dealers in California for parts and service.
  - e. Warranty information.
6. Emission Control Label to show the following:
  - a. Vehicle model year and Executive Order number.
  - b. Retrofit system manufacturer name, address and phone number.
  - c. Statement that the system complies with California emission requirements. Where applicable, state the emission standards the retrofitted vehicle is certified to.
  - d. Original parts removed or modified, including any changes to tune-up specifications (for example, spark plug gap).
  - e. Alternative fuel to be used.
  - f. Information on the installer and when the system was installed.
  - g. Mileage on the retrofitted vehicle and the date warranty expires.

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- h. Hose routing diagram.
7. Warranty Information to include:
    - a. Manufacturer's warranty statement.
    - b. Documentation used to identify parts with extended warranty (7/70) including estimated retail parts cost, labor rates in \$/hr, and hours necessary to replace the parts.
    - c. List of qualified installers and their warranty statements.
  8. Installation Instructions and Maintenance to include:
    - a. Procedures for installing the retrofit system.
    - b. Maintenance Schedule.
    - c. Tune-up specifications and any special tools or techniques required for proper installation, maintenance or operation.
  9. Statement to supply to the ARB, within 45 days of the Executive Officer's request, with any one or more DDV's or EDV's or equipment to inspect and test such vehicles at the applicant's facility.