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Arnold Schwarzenegger
Governor

February 7, 2008

MAIL-OUT MSO # 2008-02

TO: All Highway (On-Road) Motorcycle Engine Manufacturers
All Commercial New Highway Motorcycle Chassis Builders
All Commercial New Highway Motorcycle Kit Builders
All Interested Parties

SUBJECT: California Certification Procedures for Highway Motorcycle Engines

I. Background

The Air Resources Board (ARB) last revised the highway motorcycle (HMC)¹ regulations at a public hearing in December, 1998. The revisions set forth more stringent emission standards for class III motorcycles beginning with model-year 2004 (MY2004) and again in MY2008. The revisions also added a definition for "motorcycle engine" to Title 13, California Code of Regulations, (13 CCR) Section 1900. A motorcycle engine means, "...an engine which is used to propel a new, street-use motorcycle." The inclusion of "motorcycle engine" into the HMC regulations clarified the ARB's pre-existing policy that the emission standards and other requirements of 13 CCR Section 1958 apply equally to HMC manufacturers, and manufacturers of motorcycle engines. ARB's certification program is designed to ensure that newly built engines and vehicles produced for sale in California conform to all certification requirements, including compliance with the exhaust and evaporative emission standards, anti-defeat device and anti-tampering provisions, and be covered by an emissions warranty. Newly built vehicles must conform to all certification requirements. Although several HMC engine manufacturers have received ARB certification for their HMC engines as replacement engines to be installed in existing HMC already certified, i.e., installed in an owner's used HMC, to date no engine manufacturer has applied for, or received ARB certification for a new HMC engine intended to be installed in a new HMC.

Several manufacturers have benefited currently from the certification of new replacement engines to certify and produce new, niche HMC. These manufacturers install the certified replacement engine in their test HMC, accumulate the minimum allowed mileage (~3500 kilometers or 2200 miles), and perform the emission tests to demonstrate compliance with the emission standards by using the durability data from the certified replacement engine. However, to certify new engines for use in new HMC

¹ Beginning with model-year 2006 ARB and U.S. EPA renamed their "on-road motorcycles" vehicle classification as "highway motorcycles".

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

under the current procedures, the engine manufacturer provides a comprehensive list of all the HMC models into which the engine is to be installed, and then installs and tests its engine in the model likely to have the highest emissions (i.e. the “worst case” emissions model) to demonstrate compliance with the applicable exhaust and evaporative emission standards. The engine manufacturer is responsible for the emissions warranty coverage and in-use emissions compliance of the certified HMC models listed on the certification Executive Order. Manufacturers of custom-built HMC have commented that certifying their new HMC engines according to the current ARB procedures is difficult because the custom characteristics and vehicle descriptions of their HMC may not be fully defined in advance of certification.

On December 23, 2003 the United States Environmental Protection Agency (U.S. EPA) promulgated its revised HMC regulations to better align with ARB’s HMC emission standards. Stemming from these revisions, on July 25, 2006 U.S. EPA issued a guidance letter² which set forth procedures allowing HMC engine manufacturers to certify new engines for installation into new HMC chassis and kits. Under this guidance procedure, a list of specific models that will use the engine is not required, which facilitates use of this procedure for custom motorcycles. However, compliance with the federal procedures will not necessarily guarantee compliance with the California-specific requirements. Of primary concern is how the engine manufacturer will demonstrate compliance with the whole-vehicle based evaporative emission standard. To address compliance with California requirements, staff met with the motorcycle industry in numerous meetings in 2006 and early 2007 to discuss the U.S. EPA guidance letter and provide industry with options within the current regulations for HMC engines to certify in California.

This Mail-out provides the guidance for HMC engine manufacturers to certify HMC engines that can be used to build new HMC for sale into California. The Mail-out follows the same order as the U.S. EPA guidance document.

II. California Certification Procedure

A. Applicability

Beginning with the 2007 model year ARB will certify new engines and evaporative emission control systems (ECS) for installation in (1) a new HMC chassis produced by a manufacturer or individual assembler, or (2) a HMC provided in kit form. New HMC built in this manner may be legal for sale in California without the need for the vehicle builder/assembler to certify the individual models. Below are listed the conditions under which the ARB will exercise its authority to grant such certifications.

² Cisd-06-15 (MC)—Certification Procedures for Highway Motorcycle Engines.

However, if violations occur (i.e., if motorcycles in uncertified configurations with less than 7,500 odometer miles are acquired, sold or offered for sale), the ARB retains authority to seek penalties from all persons involved in the violations, including manufacturers.

B. Emissions Standards

The exhaust emission standards applicable to new HMC engines produced for sale into California are shown at 13 CCR Section 1958 (Attachment A). The engine manufacturer's annual California sales of new engines shall determine whether that manufacturer may be subject to the exhaust standards applicable to small-volume manufacturers (SVM)³. The evaporative standards for all HMC engine manufacturers are those applicable to motorcycles at 13 CCR Section 1976. They are also shown in Attachment A.

C. Identification of Worst Case Vehicle

Below are the criteria for determining the overall worst case vehicle.

1. ARB will consider the "worst case" vehicle for exhaust emissions purposes to be a motorcycle that has the highest test weight (loaded vehicle mass) and highest engine speed-to-vehicle speed (N/V)⁴ ratio of all motorcycles in which the engine is intended to be installed. The actual weight of the motorcycle tested should simulate the highest weight vehicle for which the engine is intended. The type of transmission used in the worst case vehicle shall be representative of the most common transmission the engine manufacturer expects to be used by its customers.
2. ARB will consider the "worst case" vehicle for evaporative emissions purposes to be a motorcycle that has the canister with lowest working capacity, fuel tank with highest vapor space when filled to 50 percent capacity, fuel tank configuration expected to sustain the maximum heat transfer from the engine, carbureted over fuel injected engine, and purge strategy that evacuates the lowest mass of fuel vapors from the canister during the applicable exhaust Federal Test Procedure. For further guidance see Manufacturers Advisory Correspondence (MAC) 81-005.

³ Ref. 13 CCR Section 1958 (f). An SVM is "...one which sells no more than 300 (combined) Class I, II, and III motorcycles per model year in California, starting with the 2004 MY."

⁴ The N/V ratio is the engine rpm in top gear divided by the vehicle speed in miles per hour. The N/V ratio may be determined based on dynamometer testing or calculated based on rolling radius and gear ratios for vehicles with manual transmissions and clutches that are locked up in top gear.

D. Vehicle Testing

The engine manufacturer shall arrange for the worst case vehicle identified under C. above to be tested for exhaust emissions using a worst case engine in accordance with the procedures in Title 40, Code of Federal Regulations (40 CFR) Sections 86.425-78 through 86.430-78, and for evaporative emissions using a worst case chassis configuration in accordance with the procedures referenced in 13 CCR Section 1976. During testing, the dynamometer shall be set to simulate loaded vehicle mass of the heaviest motorcycle in which the engine manufacturer intends for a certified engine to be installed. The manufacturer shall develop any required deterioration factors (DF) in accordance with 40 CFR Sections 86.432-78 through 86.436-78. As an option, an SVM may show compliance with the standards for the useful life of the vehicle by other engineering data and information. If the test results show, after application of any required DFs, that the worst case vehicle complies with the applicable standard for each pollutant, as set forth in 13 CCR Sections 1958 and 1976, and if all other requirements of this procedure are met, the engine and evaporative ECS shall be certified for use in all HMC having a N/V ratio and loaded vehicle mass equal to or less than those values for the worst case vehicle. If the engine is from a group defined under paragraph E. below, the engine with the highest horsepower rating will generally be selected as the representative worst case test engine; however, the engine manufacturer may propose a different model for testing if the manufacturer believes that it is likely to have higher exhaust or evaporative emissions with the DF applied. The selection of the worst case engine shall be based on the engine calibration, cam timing, and other factors that are likely to maximize emissions levels. The basis for the manufacturer's recommendation shall be explained in the application for certification.

The evaporative standards and testing requirements set forth in 13 CCR Section 1976 must be met by the system to be installed by the engine manufacturer. Engine manufacturers producing 500 or fewer engine/evaporative ECS packages per model year for sale in California may certify the evaporative ECS by design. Under this option, testing for compliance with evaporative emission standards will not be required and compliance with the emission standards can be demonstrated by an engineering evaluation if the evaporative ECS has been in use on other certified vehicles. The engineering evaluation must show that the fully assembled motorcycle will comply with the applicable evaporative emission standard. This showing can be made by demonstrating that the stress levels on the evaporative ECS as installed on the fully assembled motorcycle covered under the manufacturer's certification are similar to those on a previously certified design, thereby demonstrating that the evaporative ECS will be durable and comply with the evaporative emission standards for the useful life of the motorcycle in use. For further guidance on this optional certification-by-design procedure, see MAC #86-06.

E. Grouping of Engines and Evaporative ECS

1. This procedure shall apply to each engine type separately, except that a manufacturer may group engines in the same engine family for the purpose of selecting one representative emissions test engine and establishing DFs. If grouping of engines is approved, ARB will issue one Executive Order (EO) covering all engine models in the group. The engine family criteria in 40 CFR Section 86.420-78 should be used to determine whether one engine may represent other engines for testing and establishing DFs.
2. Evaporative ECS should be grouped into evaporative families per 40 CFR Section 86.078-24, MAC 81-005, and U.S. EPA's Mobile Source Air Pollution Control Advisory Circular No. 59. Evaporative ECS components are those components which may contribute to fuel evaporative emissions or running loss emissions, and components designed to control evaporative emissions. Evaporative ECS components may include, but are not limited to, canister, purge valve, roll-over valve, fuel lines, hoses, connectors, fuel tank, fuel cap seal, fuel pump seals (non-immersed pump only), and carburetion or fuel injection system (fuel injectors, fuel rail, pressure regulator, etc.).

F. Delivery of Engines

Engine manufacturers shall provide installation instructions to the vehicle manufacturer, kit manufacturer, or assembler. These instructions shall meet the contents and format requirements as outlined in 40 CFR, Section 1051.130. (References to the federal emission standards shall mean California exhaust and evaporative emission requirements.) When an engine manufacturer delivers an engine that has been certified under this procedure to a vehicle manufacturer, a kit manufacturer, or assembler, the following information/items must also accompany the engine:

1. A statement that the engine, exhaust ECS, and evaporative ECS shall be installed only in a HMC or kit with an N/V ratio less than or equal to a specified value (which shall be the N/V ratio of the worst case test vehicle).
2. A statement that the engine and evaporative ECS shall be installed only in a HMC or kit below a specified weight (which shall be 80 kilograms less than the loaded vehicle mass used during testing).
3. A statement that no changes may be made to the engine and evaporative ECS, including, but not limited to: changes to the fuel metering system; changes to the

ignition system; changes to the camshaft; and modifying, recalibrating, removing, or failing to properly install any other specified component.

4. For engines and evaporative ECS to be installed in a completed chassis, the evaporative ECS must include an evaporative canister, purge valve, all necessary plumbing, and detailed installation instructions. Fuel tank specifications, e.g., tank material, maximum capacity, minimum distance from the engine, gas cap seals and pressure/vacuum relief settings, etc. shall be included to ensure that the assembled vehicle will comply with the evaporative emission standard. For engines to be installed as part of a kit, in addition to the items listed above, the kit must include a fuel tank and fuel line that can reasonably be expected, through good engineering judgment, to enable the vehicle to comply with the evaporative emission standard.
5.
 - a. For engines certified with an exhaust system containing one or more catalytic converters, a complete exhaust system designed to properly fit the motorcycle into which the engine is to be installed and a statement that the engine is not legal for use in a motorcycle unless the supplied exhaust system is installed.
 - b. For engines certified without catalytic converters, the minimum and maximum exhaust backpressure limits must be specified along with the point where backpressure is measured.
 - c. For engines certified with an exhaust system containing one or more oxygen sensors, the minimum and maximum distance from the exhaust port(s) where the sensor(s) are allowed to be installed.
6. A statement that failure to meet the requirements of paragraphs 1. through 5. above will cause the vehicle to violate ARB's certification requirements for which monetary fines and other penalties can be applied.
7. A label that meets the requirements of paragraph G. below, and an explanation of where and how the label is to be permanently installed on the vehicle.
8. An engine owner's manual that is to be provided to the ultimate purchaser that complies with the warranty, maintenance instructions, and anti-tampering requirements in H., I., and J. below.
9. A notice, printed on separate sheet of paper in 12 point or larger type explaining the documentation, record keeping, notification, access to records requirements

for motorcycles produced for sale in the state of California specified in paragraph K. below.

10. A notice explaining that the Manufacturer's Statement of Origin (MSO) for the engine will not be provided until the engine manufacturer receives a completed statement that the assembler, or engine manufacturer-designated inspector of a motorcycle assembled by an individual, has read and understood all of the above-described requirements for the proper installation of the engine and the record keeping and notification requirements described in paragraph K. below.
11. A statement, which must be completed by the assembler, or engine manufacturer-designated inspector of a motorcycle assembled by an individual, indicating that all of the above-described requirements for the proper installation of the engine and the record keeping and notification requirements described in paragraph K. below have been read and understood.

G. Label Requirements

The Vehicle Emission Control Information (VECI) label shall be a permanent, legible label that contains all the information specified in 13 CCR Section 1965, plus the engine serial number and the following statement: "See engine owner's manual for information regarding emissions warranty, maintenance instructions, and tampering prohibitions." The label may include other information required by ARB such as evaporative family, and designated hydrocarbon or hydrocarbon plus oxides of nitrogen emission standard. The label shall be installed on the frame of the motorcycle or on a component permanently attached to the frame of the motorcycle in a location that is visible when the seat of the motorcycle has been removed.

H. Replacement Parts, Service and Warranty

Any certification issued under this procedure shall be conditioned on full compliance with the design and defects emissions warranty requirements in the federal Clean Air Act (42 U.S.C. 207(a)) and the defects warranty requirements in 13 CCR Section 2036 for the applicable useful life of the motorcycle (as specified in 13 CCR Section 2036) in which the engine is installed. The owner's manual provided by the engine manufacturer under F. 8. above shall contain a statement of the applicable warranty, and a clear procedure for the vehicle owner to obtain parts, service and warranty repairs on the motorcycle.

I. Maintenance Instructions

The owner's manual provided by the engine manufacturer under F. 8. above shall contain maintenance instructions for the ultimate purchaser that comply with 40 CFR Sections 86.411-78 and 86.412-78, incorporated by reference in 13 CCR Section 1958 (c).

J. Tampering Prohibition

The owner's manual provided by the engine manufacturer under F. 8. above shall contain an explanation of the tampering and defeat device prohibitions applicable under the federal Clean Air Act (42 U.S.C 203(a) (3)) and California State law (Vehicle Code Section 27156).

K. General Requirements for Builders and Assemblers

The elements described below are intended as examples of some techniques that can be used by the engine manufacturers and others to help prevent new motorcycles (those with less than 7,500 odometer miles) in uncertified configurations from being acquired, sold or offered for sale in California. Other compliance and quality assurance procedures not listed here can and should be used to prevent these violations from occurring. A chassis builder, kit builder, seller, or assembler of HMC kits, or an individual who assembles a HMC kit not intended for resale, is not required to apply for or receive ARB certification for its newly built HMC, provided such person follow the steps below. However, if violations occur (i.e., if motorcycles in uncertified configurations with less than 7,500 odometer miles are acquired, sold or offered for sale), the ARB retains authority to seek penalties from all persons involved in the violations, including manufacturers.

1. Installs a certified engine and emission related components (exhaust and evaporative ECS) following the installation instructions provided by the engine manufacturer.
2. a. Does not install the engine in a vehicle that exceeds the weight or N/V limits used to certify the engine.

b. Does not modify the engine and emission related components.
3. [RESERVED]
4. Permanently affixes the required engine manufacturer's VECI label in a readily accessible location on the vehicle as specified by the engine manufacturer.

5. Ensures that the owners manual and warranty booklet are provided to the ultimate purchaser.
6. Maintains, for a period of not less than two years, written and photographic records documenting (1) the N/V ratio⁵; (2) weight⁶; (3) evaporative canister installation (photograph required); (4) installation of the label meeting the requirements of paragraph G above (photograph required); (5) the appearance of the finished motorcycle from both the right and left sides (photographs required); and (6) for emission control systems using one or more oxygen sensors, photographic evidence that the oxygen sensors were installed in the proper location.
7. Notifies ARB within 10 days of producing the first motorcycle using an engine certified under the procedures specified in this Mail-out of the location where inspections can be performed and where records will be kept.
8. Provides for immediate inspection of records documenting the proper assembly of each motorcycle upon the request of ARB. The photographic requirements of subparagraph 6. above shall not apply to a business registered as a vehicle manufacturer by the California Department of Motor Vehicles. The requirements of subparagraphs 6.-8. shall not apply to HMC assembled by the registered owner for personal use that is to be registered as a specially constructed vehicle per California Vehicle Code Section 580. Any dealer selling a complete motorcycle kit that includes a Vehicle Identification Number shall be responsible for the requirements of subparagraphs 6-8 and shall not provide the Vehicle Emissions Control Information label, described under paragraph G. above, to the purchaser of the kit until the records required by subparagraph 6. have been completed.
9. Reports the Vehicle Identification Numbers (VIN) of the newly built vehicle(s) to the engine manufacturer.
10. The MSO is used by the engine manufacturer to identify a vehicle that it (manufacturer) believes has been built in conformance with the descriptions and specifications in its application for certification with ARB. Under ARB certification of engines for use to build new motorcycles, only bikes with an MSO issued by

⁵ N/V ratio may be documented by providing the primary drive ratio, transmission top gear ratio, final drive gear ratio, and rear tire size along with the name of the manufacturer and part number or model designations for each of these components.

⁶ Weight may be documented by providing the weight of the assembled vehicle (or an identical vehicle) or a listing of the individual weights of each component or sub-assembly used in the construction of the motorcycle.

the certified engine manufacturer is deemed legal for sale and registration in California. Therefore, the MSO should be obtained promptly from the engine manufacturer upon completion of the vehicle's construction in order to prevent the vehicle from being found by ARB to be in violation of the certification requirements while on commercial display or being offered for sale to the public.

In the special case of authorized dealer-builders, i.e., dealers that have a close business relationship with the engine manufacturer and build bikes for retail sale under agreement with and/or factory support (e.g., up-to-date factory service information bulletins for latest design changes, part changes, vehicle assembly changes, service procedure changes) and factory recognition (e.g., authorized display of engine manufacturer's brand and logo on *vehicle*) from the engine manufacturer, the ARB considers these authorized dealer-builders as an extension of an engine manufacturer's vehicle assembly process. The engine manufacturer should have a procedure to assure that HMC newly built by authorized dealer-builders can be reasonably expected to be in compliance with all certification requirements. Any contractual agreements between authorized dealer-builders and the engine manufacturer can be required by the engine manufacturer to assure compliance of vehicles built by authorized dealer-builders. The engine manufacturer shall maintain such agreements and make them available to ARB upon request. An authorized dealer-builder may follow the procedures described in paragraphs 1. through 9. above, or any other procedures stipulated by the engine manufacturer. However, if violations occur (i.e., if motorcycles in uncertified configurations with less than 7,500 odometer miles are acquired, sold or offered for sale), the ARB retains authority to seek penalties from all persons involved in the violations, including manufacturers.

L. Production Report

A manufacturer of engines certified under this procedure shall submit to ARB, no later than 60 days after the completion of a model year, a report that provides the total number and serial numbers of certified engines produced for the model year, as specified in 13 CCR Section 1958, and the VINs of the vehicles built with these engines.

M. Application

An engine manufacturer that desires to have an engine exhaust and evaporative ECS certified under this procedure must submit a copy of the written application required herein that contains all information needed to demonstrate compliance with the ARB certification procedure for HMC engines, evaporative ECS, and the supplemental requirements listed above. The application shall contain a list of all

vehicle models into which the engine and evaporative ECS is installed, if available.⁷ When a model's name is not known at the time of certification (e.g., unique custom-built vehicles), other means of identifying the vehicle may be used, but must include at a minimum the builder's name, and the VIN or unique frame number. This must be reported to the ARB within ten working days after completion to prevent possible citation by ARB of the vehicle as uncertified. As explained in K.10. above, only bikes with an MSO issued by the certified engine manufacturer are deemed certified and legal for commercial display and/or being offered for sale. Therefore, it is imperative that the certified engine manufacturer ensure that builders of unique custom-built motorcycles promptly seek the pertinent MSO for their newly built bikes ready for commercial display and being offered for sale. With the MSO issuance, the certified engine manufacturer shall have the required information (builder's name, VIN, frame number, etc.) of the unique custom-built bikes to report to ARB.

The application shall be amended to reflect any additional vehicle models added during that model year's production. At a minimum, amendments to the application shall be submitted to ARB no later than 45 days after the end of each production quarter if new models were produced during the preceding quarter. In general, the application should contain the same information needed for certification of a motorcycle chassis, as specified in 40 CFR Section 86.416-80, except where the information requirements under this procedure are different. There are several handouts from the U.S. EPA March 9, 2005 workshop on HMC certification that provide guidance to the most recent U.S. EPA application format for HMC and how it may be modified to meet the requirements of this procedure. These handouts can be found on the U.S. EPA's "On-road Vehicles and Engines, Motorcycles" web page listed in Attachment A. The ARB regulations and MACs referenced herein can be found on the "Highway Motorcycle Certification Requirements" web page also listed in Attachment A. ARB will notify the manufacturer within 30 days of receipt of an application if additional information is needed, and will specify the required information.

Manufacturers planning to obtain ARB certification for the first time should send a "Letter of Intent" to certify vehicles and engines in California to:

Ms. Annette Hebert, Chief
Mobile Source Operations Division
California Air Resources Board
9480 Telstar Avenue, Suite 4
El Monte, CA 91731
Attn: On-Road Certification/Audit Section

⁷ 40 CFR Section 86.416-80 (a)(2)(i) specifies that the certification application shall include "Identification and description of the vehicles covered by the application...".

The Letter of Intent should include general information on the company's product offering and contact information including (i) persons authorized to signed documents for submittal to ARB, (ii) persons authorized to submit signed documents into ARB's Document Management System (DMS), and (iii) persons authorized to communicate with ARB staff during the certification review process. Upon receiving the Letter of Intent, the ARB will assign a manufacturer code to the manufacturer and register the authorized personnel in the ARB's DMS. Thereafter, all certification related documents must be submitted via the Internet into the ARB's DMS. Information about the DMS may be found in the ARB's "Document Management System" web page listed in Attachment A.

N. Issuance of Executive Orders (EO)

ARB will issue an EO to the engine manufacturer for an engine exhaust and evaporative ECS that meets the requirements of these procedures. The certification EO will contain all appropriate requirements as deemed necessary by the ARB to assure compliance with these procedures. The manufacturer named on the EO shall be liable for meeting all emissions requirements in use for all vehicles listed in the certification application that are built under this guidance procedure.

For general information or assistance on this matter, please contact Ms. Jackie Lourenco, Chief, New Vehicle/Engine Programs Branch, at 626-450-6152 or jlourenc@arb.ca.gov. For technical certification questions, please contact Mr. Duc Nguyen, Manager, On-Road Certification/Audit Section, at 626-575-6844 or dnguyen@arb.ca.gov.

Sincerely,

/s/

Annette Hebert, Chief
Mobile Source Operations Division

Attachment

ATTACHMENT A

Air Resources Board (ARB) and United States Environmental Protection Agency (U.S. EPA) emission regulations, test procedures, and certification requirements may be found at the Internet addresses listed below:

Title 13, California Code of Regulations, Section 1958 (13 CCR §1958), ARB's highway motorcycle exhaust emission standards.

<http://www.arb.ca.gov/msprog/onroad/cert/hmcctp/13ccr1958.pdf>

13 CCR §1976, ARB's highway motorcycle evaporative emission standards.

<http://www.arb.ca.gov/msprog/onroad/cert/hmcctp/13ccr1976.pdf>

U.S. EPA's "On-road Vehicles and Engines, Motorcycles" web page.

<http://www.epa.gov/otaq/roadbike.htm>

ARB's "Highway Motorcycle Certification Requirements" web page.

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

ARB's "Document Management System" for certification web page.

<http://www.arb.ca.gov/msprog/dms/dms.htm>