

# California Air Resources Board (ARB)

## SAND CAR EMISSIONS CERTIFICATION

October 24, 2006



### Major Steps

1. (New Mfrs.) Register with the U.S. EPA and ARB.
2. Group vehicles into engine/evaporative families.
3. Demonstrate useful life (UL) durability & emissions compliance for each family.
4. Submit Applications to U.S. EPA and ARB via the Internet.



## Major Steps

(cont'd)

5. Receive Certificate of Conformity from U.S EPA and Executive Order (EO) from ARB.
6. Produce and label each vehicle according to specifications described in applications.
7. Do not introduce vehicles into commerce in CA until certified with EOs.
8. Receive U.S. EPA and ARB approval for any emissions-related production running changes.



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## New MFRs Getting Registered

- Register with U.S. EPA as a MFR.
- ARB issues its Executive Orders (EOs) to the vehicle MFR. A business entity that has complete knowledge and control of the vehicle's specifications may certify on behalf of a MFR.
- ARB does not issue EOs to importers nor dealers that do not meet the above criteria.



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## New MFRs Getting Registered (cont'd)

- Submit to ARB via regular mail a hard copy “Letter of Intent” to certify vehicles in CA.
- ARB sends the applicant an Excel template to be completed.
  - Contact information, i.e., name, address, phone number, etc.
  - Vehicle type(s) you intend to certify, i.e., sand car, ATV, OFMC
  - U.S. EPA’s 3-character mfr.’s code
  - Mfr.’s name, or business entity’s name for which EO is issued
- ARB assigns unique ARB mfr.’s code to enable access to E-Cert & EDMS.



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## Certifying Manufacturers

A sand car must comply with exhaust and evaporative standards.

A sand car is certified as a vehicle by testing using either the chassis or optional engine test procedures.

### Option 1:

Sand Car OEM **A** produces the engine and chassis -----  
**A** is the certifying MFR carrying all compliance obligations and liabilities.



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## Certifying Manufacturers (cont'd)

### Option 2:

Sand Car OEM **B** buys complete engines from Engine OEM **C** and builds own chassis----  
**B** is the certifying MFR carrying all compliance obligations and liabilities.

(Mfr **C** can support mfr **B** by providing durability and emission data, AECD and adjustable parameter info, production running change info and test data, and by implementing any required corrective action for in-use noncompliance.)



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## Certifying Manufacturers (cont'd)

### Option 3:

Engine OEM **D** has a close business relationship with, and supplies complete engines to, Sand Car OEMs **E, F** and **G**-----

**D** is the certifying MFR using the engine test option and carrying all compliance obligations and liabilities.

**D** must include vehicle specifications, and fuel and evaporative systems for sand cars from **E, F** and **G** in its application.

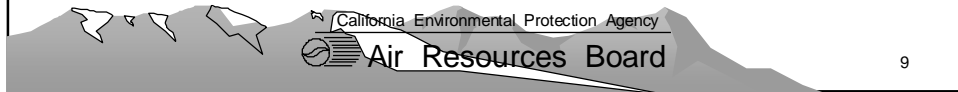
**E, F,** and **G** do not need to recertify.



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## Group Vehicles into Engine/Evaporative Families

- **Characteristics of Engine Families**
  - Displacement, number of cylinders, cylinder configuration
  - Emission Controls, i.e., catalytic converter number & location
  - Fuel System, i.e., carbureted vs. fuel injected
  - Cooling Mechanism, i.e., liquid vs. air
- **Characteristics of Evaporative Families**
  - Vapor Storage Device design, i.e., canister housing material & working capacity
  - Fuel Tank design, i.e., metal vs. plastic, vented vs. unvented
  - Fuel System, i.e., carbureted vs. fuel injected



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## Demonstrate UL Durability & Emissions Compliance

### 1. a. Durability Demonstration

Mfr. proposes a durability test procedure to demonstrate emissions compliance with the standards for the vehicle's useful life (UL) (5 years or 10,000 km.) If the test duration is less than the UL, the mfr. must justify how this duration correlates to real world vehicle usage.



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## Demonstrate UL Durability & Emissions Compliance (cont'd)

### 1. a. Durability Demonstration

Items to describe:

- Test duration (km or hours)
- Driving cycle or engine dynamometer cycle
- Test points & number of tests
  - Recommended minimum of three test points
  - If there is scheduled maintenance during the test cycle, an emission test before and after the maintenance must be performed
- Test fuel(s) (service accumulation & emission tests)
- Maintenance schedule as given in the owner's manual



## Demonstrate UL Durability & Emissions Compliance (cont'd)

### 1. b. Test worst case configuration vehicle in engine family, i.e., the configuration which has the greatest probability of exceeding the standards.

- Highest fuel flow rate
- Highest test vehicle weight
- Highest engine speed vs. vehicle speed (N/V)
- Transmission type, i.e., manual vs. automatic

### c. Unscheduled maintenance must be approved by ARB.

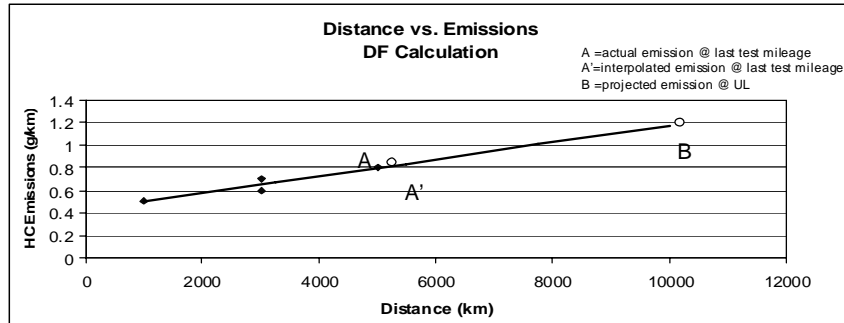
### d. All test data and projected emissions must be below applicable standard.



## Demonstrate UL Durability & Emissions Compliance (cont'd)

1. e. Determine UL deterioration factors (DFs)

$$DF = \frac{B}{A'} = \frac{\text{projected emissions @ UL mileage}}{\text{interpolated emissions @ last test mileage}}$$



## Demonstrate UL Durability & Emissions Compliance (cont'd)

2. Certification emission level, all pollutants

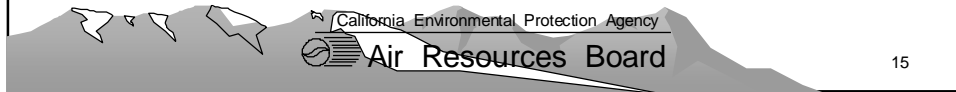
$$A \times DF \leq \text{standard}$$

$$\text{actual emission @ last test mileage} \times DF \leq \text{standard}$$

3. Retain test vehicle for possible confirmatory testing at ARB and for testing future production running changes.

## Adjustable Parameters Fuel & Ignition System

1. Adjustable parameters (e.g., idle air fuel mixture):
  - Should employ measures approved by ARB to discourage adjustments by owners.
    - Plugs
    - Limiting Caps
  - Must be described in application.
2. ARB can specify, for emission testing, any setting within the physical range of adjustments.



## Auxiliary Emission Control Devices (AECDs)

1. AECD: Any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameters for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system.





## Auxiliary Emission Control Devices (AECDs) (cont'd)

2. All AECDs must be described in the application and approved by ARB.
3. Unapproved AECDs may be deemed a defeat device – a violation of certification.



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## Submit Certification Documents Via The Internet

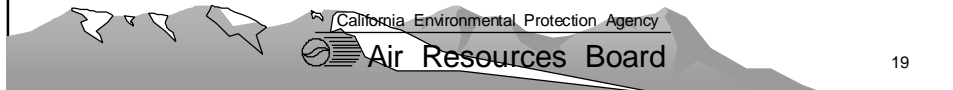
- Vehicle specifications and emission data are submitted to the U.S. EPA's VERIFY database.
- Mfr.'s data is automatically forwarded to ARB's Electronic Certification (E-Cert) database.
- Mfr. submits supporting certification-related documents to ARB's EDMS.



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## Submit Certification Documents Via The Internet (cont'd)

- Documents to be submitted to ARB's EDMS:
  - manufacturer's identification
  - vehicle description
  - test procedures, e.g., durability, worst-case vehicle selection criteria
  - maintenance instructions
  - AECDs
  - adjustable parameters
  - anti-tampering devices for adjustable parameters
  - emissions label design
  - compliance statements



## EDMS Training & Contacts

- Electronic Document Management System (EDMS) Training
  - "GOTO" on-line, hands-on, live training
  - Scheduled for Wednesday, Nov. 15, 2006
  - Contact Ms. Ivonne Guzman-Cicero, On-Road Certification/Audit Section at [iguzmanc@arb.ca.gov](mailto:iguzmanc@arb.ca.gov)
- For mfr.'s information Excel template, contact Ms. Kimberly Pryor, On-Road Certification/Audit Section at [kpryor@arb.ca.gov](mailto:kpryor@arb.ca.gov)



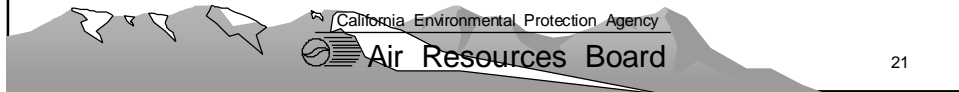
**INTERNET ADDRESSES TO OHRV  
CERTIFICATION RELATED WEB PAGES**  
(Applicable to Sand Car Certification)

The recommended application format for the supporting documents is in the "Recommended Application Format for Certification of Off-highway Motorcycles and All-terrain Vehicles" jointly developed by ARB and U.S. EPA.  
<http://www.epa.gov/otaq/regs/nonroad/recveh/5-atv-app-doc.pdf>

The supporting documents are submitted to ARB via the EDMS. To learn about the EDMS, please see this page.  
<http://www.arb.ca.gov/msprog/dms/dms.htm>

Here is the U.S. EPA's VERIFY home page.  
[https://cdx.epa.gov/epa\\_home.asp](https://cdx.epa.gov/epa_home.asp)

Here is the ARB's EDMS home page.  
<https://secure.arb.ca.gov/certdms>



**INTERNET ADDRESSES TO OHRV EMISSIONS REGULATIONS**  
(Applicable to Sand Car Certification)

Off-Highway Recreational Vehicles (OHRV) includes off-road motorcycles, all-terrain vehicles, off-road utility vehicles, off-road sport vehicles, sand cars, and electric golf carts. The OHRV regulations are in Title 13, California Code of Regulations (13 CCR), Sections 2410 through 2415. For the current OHRV regulations, from the web page below, click on [Search for a Specific Regulatory Section](#), then for [Title](#) enter 13 and for [Section](#) enter the individual sections as 2410, 2411, etc.  
<http://www.calregs.com>

The OHRV regulations reference the "California Exhaust Emissions Standards and Test Procedures for 1997 and later Off-Highway Recreational Vehicles and Engines" available here (includes proposed amendments):  
<http://www.arb.ca.gov/regact/ohn2006/test.pdf>

On July 20, 2006 the OHRV regulations were amended to broaden the vehicle types to include off-road utility vehicles, off-road sport vehicles, and sand cars. Evaporative permeation standards were also set forth for model year 2008 and beyond. The proposed regulations are at:  
<http://www.arb.ca.gov/regact/ohn2006/prereg.pdf>

The California OHRV regulations heavily reference the U.S. EPA's regulations in Title 40, Code of Federal Regulations, Part 86, Subparts E and F. These regulations are available from the U.S. EPA's Highway Motorcycle Information Page.  
<http://www.epa.gov/otaq/roadbike.htm>

Also referenced are the U.S. EPA's regulations in Subparts B, C, F, and I as they apply to nonroad recreational vehicle regulations.  
<http://www.epa.gov/otaq/recveh.htm>

Excluding off-road motorcycle manufacturers, manufacturers who choose to certify to the engine dynamometer-based emission standards can find the Small Off-Road Engine (SORE) regulations and test procedures here:  
<http://www.arb.ca.gov/msprog/offroad/sore/sore.htm>

