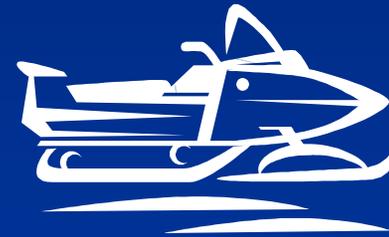
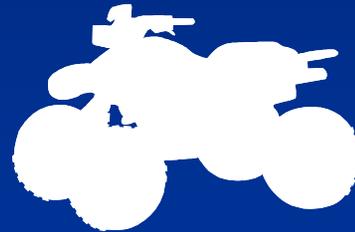


EVALUATION OF EVAPORATIVE AND EXHAUST EMISSIONS FROM OFF-HIGHWAY RECREATIONAL VEHICLES (OHRV)



September 06, 2006

Presentation Outline

1. **Objective**
2. Plan Overview
3. Activity and Usage
4. Inventory Development
5. Control Technology Testing
6. Correlation Study
7. In-use Durability Testing
8. Safety Study
9. Quality Assurance/Quality Control
10. Next Steps
11. Comments and Contact Information

Objective

- Evaluate technology to control:
 - Evaporative emissions
 - Running loss emissions
- The current emissions inventory needs to be re-evaluated
- Evaluate exhaust emissions control technology that will benefit from the evaporative emission control technology

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Plan Overview

Inventory Development

- Usage, emissions factors, and population will be used to refine the emissions inventory
- New usage data will be developed
- New emissions factors will be developed to augment the current emissions factors
- A new population has already been developed based on DMV registration data

Plan Overview (cont.)

Control Technology Evaluation

- OHRVs will be fitted with emissions control technology and evaluated
- The test plan will include an in-use safety study

Plan Overview (cont.)

Exhaust Emissions Study

- Changing the exhaust emission standards is not currently a part of this regulatory initiative
- Exhaust emissions reductions will be measured from:
 - ATVs and off-road motorcycles with fuel injection and high efficiency catalysts
- Exhaust emissions control technology will be part of the in-use safety study

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Activity and Usage

- How OHRVs are stored has a large effect on evaporative emissions
- Users will be surveyed to determine:
 - How the OHRVs are prepared for storage
 - Where the OHRVs are stored
 - How long OHRVs are stored
 - What the fuel level is during storage
 - What type of fuel is used in OHRVs

Activity and Usage (cont.)

- To determine OHRV usage:
 - Existing studies will be evaluated
 - OHRV usage will be measured by equipping popular models with data loggers

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Inventory Development

Baseline Emissions

- Baseline emissions for used and new OHRVs will include measuring:
 - Diurnal emissions
 - Hot soak emissions
 - Running loss emissions
 - Exhaust emissions
- Baseline emissions data will:
 - Provide a basis for the emissions inventory
 - Set baseline values for OHRVs control technology

Inventory Development (cont.)

Preliminary Equipment Testing

- Background emissions from OHRVs will be tested over a 65°F-105°F diurnal temperature profile
 1. OHRVs will be tested without fuel in the tank
 2. OHRVs will be tested with CE10 fuel in the tank only. Testing will continue weekly until permeation emissions have stabilized

Inventory Development (cont.)

Engine Loading for Running Loss Emissions

- OHRV running loss tests will be performed using the same load profile as those currently used for exhaust testing
 - Off-road motorcycles will be tested per the Urban Dynamometer Driving Schedule found in 40 CFR part 86, Appendix I
 - ATVs will be tested using SAE J1088*

*If a new ATV test cycle is accepted by the U.S. EPA before testing begins that load cycle will be used

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Control Technology Testing

- Test One OHRV from each sub-category
 - The off-road motorcycle will be the Honda CRF 450X will be used
 - For the ATVs the Polaris Sportsman 500 will be used
 - The snowmobile to be used is still to be determined

Control Technology Testing (cont.)

- Control technologies will be tested by progressively adding technology in the following order:
 1. Low permeation fuel tank and fuel line
 2. Passively purged carbon canister
 3. Fuel injection and an actively purged carbon canister*
 4. Catalytic converter*

*Snowmobiles emissions control technology will not include evaluation of fuel injection and an actively purged carbon canister.

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Correlation Study

- A correlation study of fuels and temperature profiles will be conducted.
- Fuel variations will include:
 - CE10
 - California Phase 2 Cert. Fuel
 - Commercial pump fuel
 - Indolene
 - California wintertime pump fuel
- Temperature profile variations will include:
 - 65°F-105°F Ozone profile
 - 72°F-96°F EPA profile
 - California annual average temperature profile
 - California wintertime temperature profile

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In-use Durability Testing

- The in-use testing will help define customer acceptance, real world durability, and rideability
- OHRV durability will be evaluated over 100 hours of operation
 - 70 hours of operation will be conducted on a dynamometer
 - 30 hours of operation will be conducted in the field
- During the in-use testing, control technology safety will also be evaluated

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Safety Study

- The following groups have been asked to participate in the safety study:
 - Consumer Products Safety Commissions (CPSC)
 - California State Fire Marshal
 - American Motorcyclist Association (AMA)
 - Motorcycle Industry Counsel (MIC)

Safety Study (cont.)

- Safety considerations include:
 - Exhaust gas and component temperature increases from catalytic converters
 - Exothermic reaction during carbon canister loading
 - Reduction of hydrocarbons being emitted into confined spaces

Safety Study (cont.)

- These issues will be evaluated by:
 - Measuring exhaust related temperatures on the dyno before and after control technology is added
 - Monitoring internal carbon canister temperature during a canister loading event
 - Quantifying hydrocarbon reductions in a SHED

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Quality Assurance/Quality Control

- Testing will be conducted pursuant to 40 CFR, Part 86, Section 86.107-90 and 96, and the *California Evaporative Emission Standards and Test Procedures for 1978-2000 Model Motor Vehicles*
- ARB will evaluate all fuels used for testing to ensure they meet CARB and SAE specifications
- SHED temperature data is collected and evaluated on a minute by minute basis

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Next Steps for Rule Development (Tentative)

- Emissions Inventory Development
 - Fall 2006 – Fall 2007
- Control Technology Evaluation
 - Fall 2006 – Winter 2007-2008
- Development of Staff Proposal
 - Winter 2007 – 2008
- Board Hearing
 - 2008 - 2009

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Comments?

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