

CARB Update for UNECE EPPR 6th Session

New California Off-Highway Recreational Vehicle (OHRV) Evaporative Emission Standards and Test Procedures

California Environmental Protection Agency
 **Air Resources Board**



February 14, 2014



OHRVs are for Off-road only .
Unlike L-category Vehicles (EPPR)



Off-road motorcycles

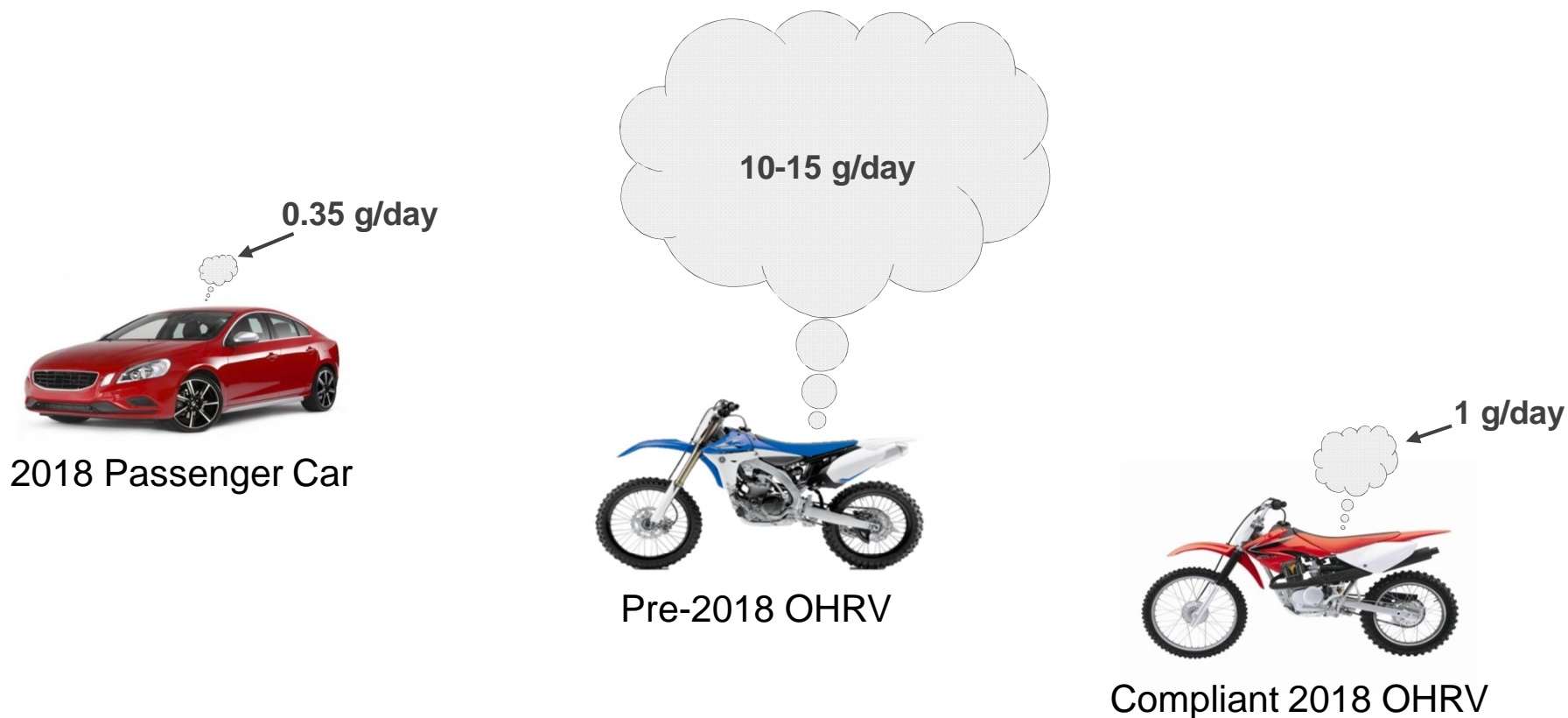


All-terrain vehicles



Specialty vehicles

Need for Evaporative Control in California





Two Evaporative Emissions Control Options

1. Source standards

- . Standards for each controlled component
- . Example: U.S. EPA OHRV evaporative standards

2. Mode performance standards

- . Whole-vehicle standard
- . Example: North American passenger car standards

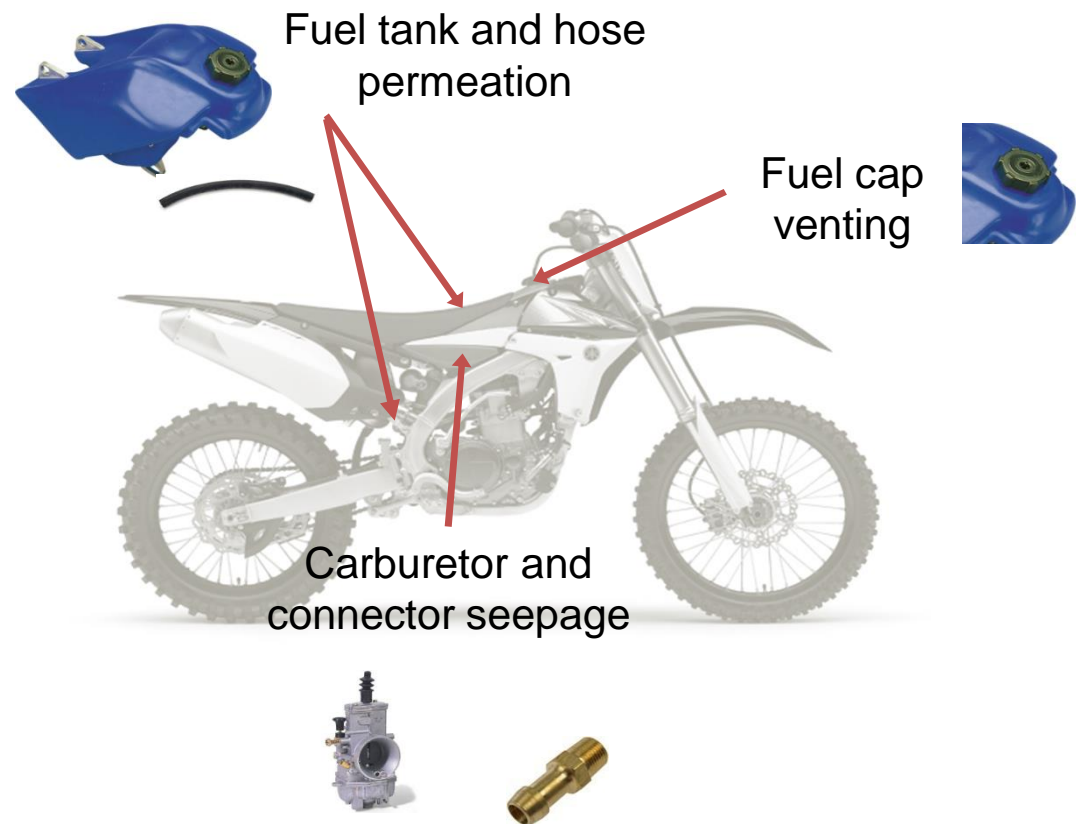
Evaporative Emission Control Option One: Sources Standards

“ Advantages

- . Allows partial control
- . Low testing costs

“ Disadvantages

- . Limited flexibility for manufacturers
- . Difficult to ensure effectiveness



Evaporative Emission Control Option Two: Mode Performance Standards

” Advantages

- Allows compliance flexibility
- Promotes innovation
- Ensures effectiveness

” Disadvantages

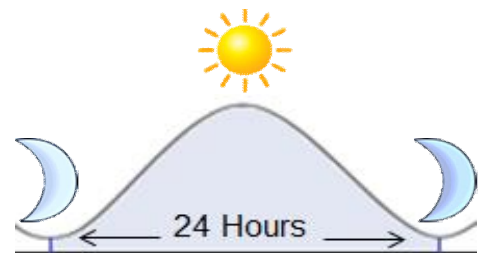
- Higher testing costs



Running Loss
Operating



Hot Soak
Immediately After
Operation



**Diurnal
Storage**





California's Evaporative Performance Standard

- “ California adopted 1 gram/day diurnal TOG performance standard for MY 2018
- “ Includes the following cost reducing measures
 - . Whole vehicle diurnal standard (not prescriptive)
 - . Advanced fuel system credits promotes electric OHRVs
 - . Small volume design-based alternative
 - . New test procedure (TP-933)

Overview of TP-933

Emissions are measured using new test procedure (TP-933)

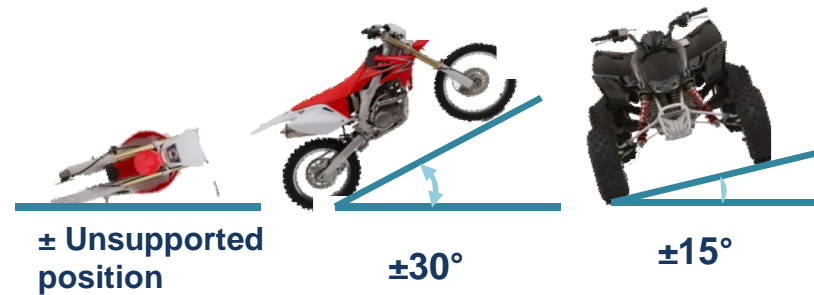
- “ Durability requirements built in
- “ Ensures running loss and hot soak reductions
- “ Innovative features limit testing cost



Durability - Lifetime Emission Reductions

“ Carbon canister tip test

- Protect canister from liquid fuel contamination



“ Durability testing required

- carbon canister
- Fuel system
- Moving parts





Alternative Diurnal Tests

- “ Measured 3-day diurnal
 - . Subjected to long storage periods
- “ Fuel injection with 2 psi pressure control
 - . Similar average control to 3-day diurnal standard
- “ Measured 1-day steady state with calculation
 - . Measure combined permeation, carburetor, and connections
 - . Calculate vented emissions
 - . Detailed on next slide

Diurnal Calculation Method

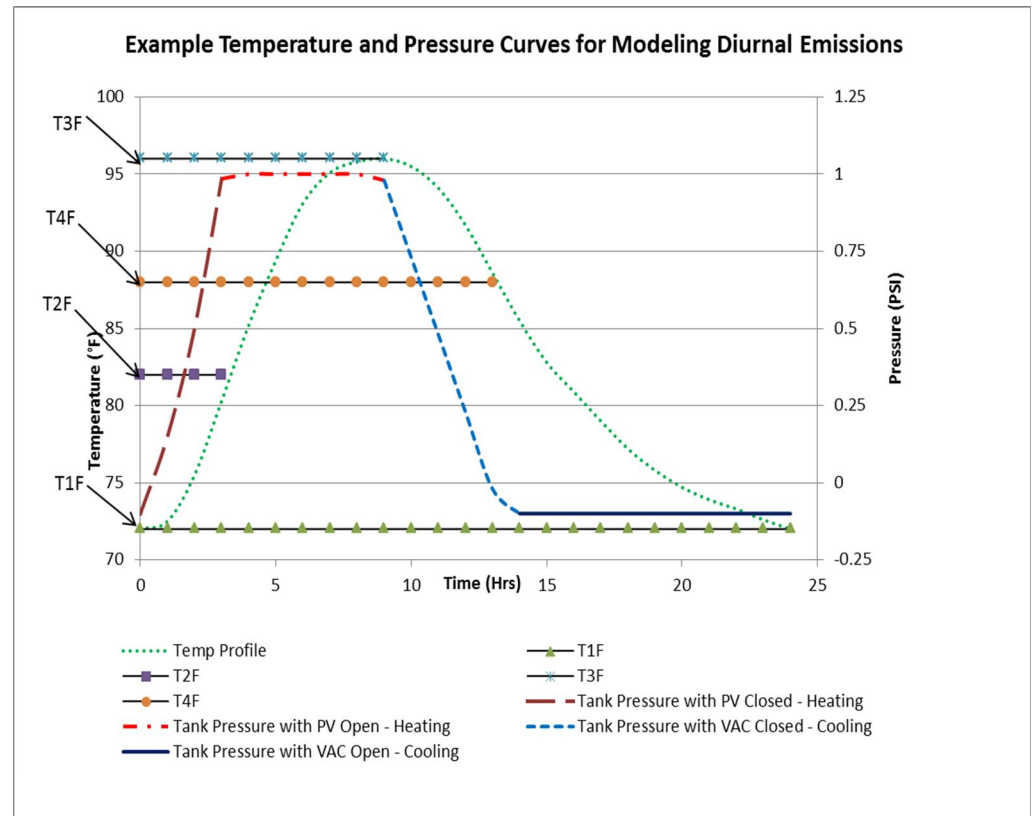
Vapor generation based on Industry accepted Reddy equation:

$$3\text{-day vapor loading} = 3 \cdot (VAPOR_{diurnal}) \cdot (2 \cdot VAPOR_{backpurge})$$

$VAPOR_{diurnal}$ = Vapor generation

$VAPOR_{backpurge}$ = Vapor back purge from canister

Carbon canister characters based on empirical data





Regulation Summary

- “ Performance standard begins in MY 2018
 - . Holistic approach ensures real-world emissions reductions
 - . Allows manufacturer flexibility
 - . Reduces compliance costs
- “ Flexible compliance options reduce testing costs
 - . Three compliance test options
 - . Small volume exemption
 - . Credits earned for zero and low emissions vehicles



Questions?

Contact Information

“ Jim Watson

- . Manager, Engineering and Regulation Development Section
 - “ (916) 327-1282, jwatson@arb.ca.gov

“ Pippin Mader

- . Project Lead, Engineering and Regulation Development Section
 - “ (916) 322-8930, pmader@arb.ca.gov