

# Off-Highway Motorcycle (OHMC) Workshop: Assessment Update

**February 27, 2014 - El Monte**

March 6, 2014 - Sacramento



# Presentation Outline

Section 1: Assessment Overview

Section 2: Emissions Testing

Section 3: OHMC Procurement

Section 4: Owner Survey

Test Plan and the Survey Questions are available at:  
<http://www.arb.ca.gov/msprog/offroad/orrec/orrec.htm>

# Section 1

## Assessment Overview

# Board-Directed OHMC Assessment

**December 2013:**  
Workshop held to kickoff  
assessment

**November 2014:**  
Update Board on  
assessment findings

**July 2013:**  
Board directed staff to conduct  
red sticker OHMC assessment

**February/March 2014:**  
Assessment update  
workshop

**December 2015:**  
Propose comprehensive  
solution at Board Hearing

# Need for Assessment

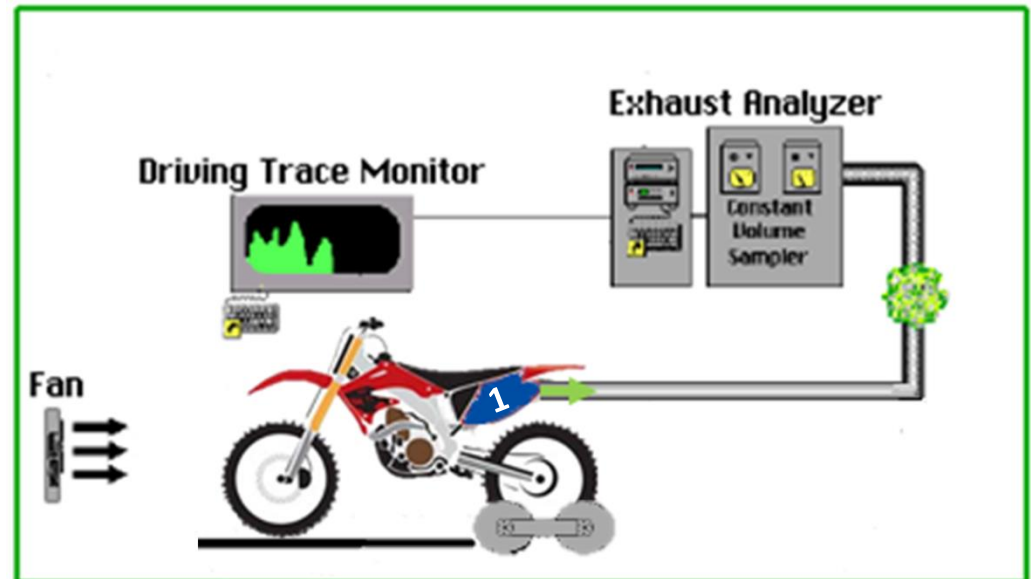
- OHMCs that do not meet exhaust or evaporative emission standards are certified as red sticker
- Percentage of red sticker OHMC sales have increased in recent years
- Exhaust and evaporative emission impacts of uncontrolled OHMCs must be determined
- Limited data available for emissions and activity

# Section 2

# Emissions Testing

# Emissions Testing Objectives

- Better understand OHMC evaporative and exhaust emissions
- Generate red and green sticker OHMC data for:
  - Two-stroke/four-stroke
  - Carbureted/fuel-injected
  - Unmodified/modified



# Vehicle Preconditioning

- Pre-test - Fuel Soak Preconditioning
  - Fuel tank full
  - 30 days for in-use OHMCs
  - 140 days for new OHMCs
  - Soak at 68°F to 86°F
- Cold Soak - Running Loss “Conditioning”
  - Fuel tank at 50% capacity
  - Soak for 12 to 36 hours
- Cold Soak - Normal “Test”
  - Fuel tank at 50% capacity
  - Perform one UDDS cycle
  - Soak at 68°F to 86°F for up to 36 hours



# Test Fuels

- Unmodified OHMCs

- E10 certification fuel
- 2-stroke premix: E10 blended with 2-cycle oil of engineering spec. & ratio recommended by mfg.

- Modified OHMCs

- Fuel specified by owner
- 2-stroke premix: fuel, 2-cycle oil and ratio specified by OHMC owner



# Exhaust Testing

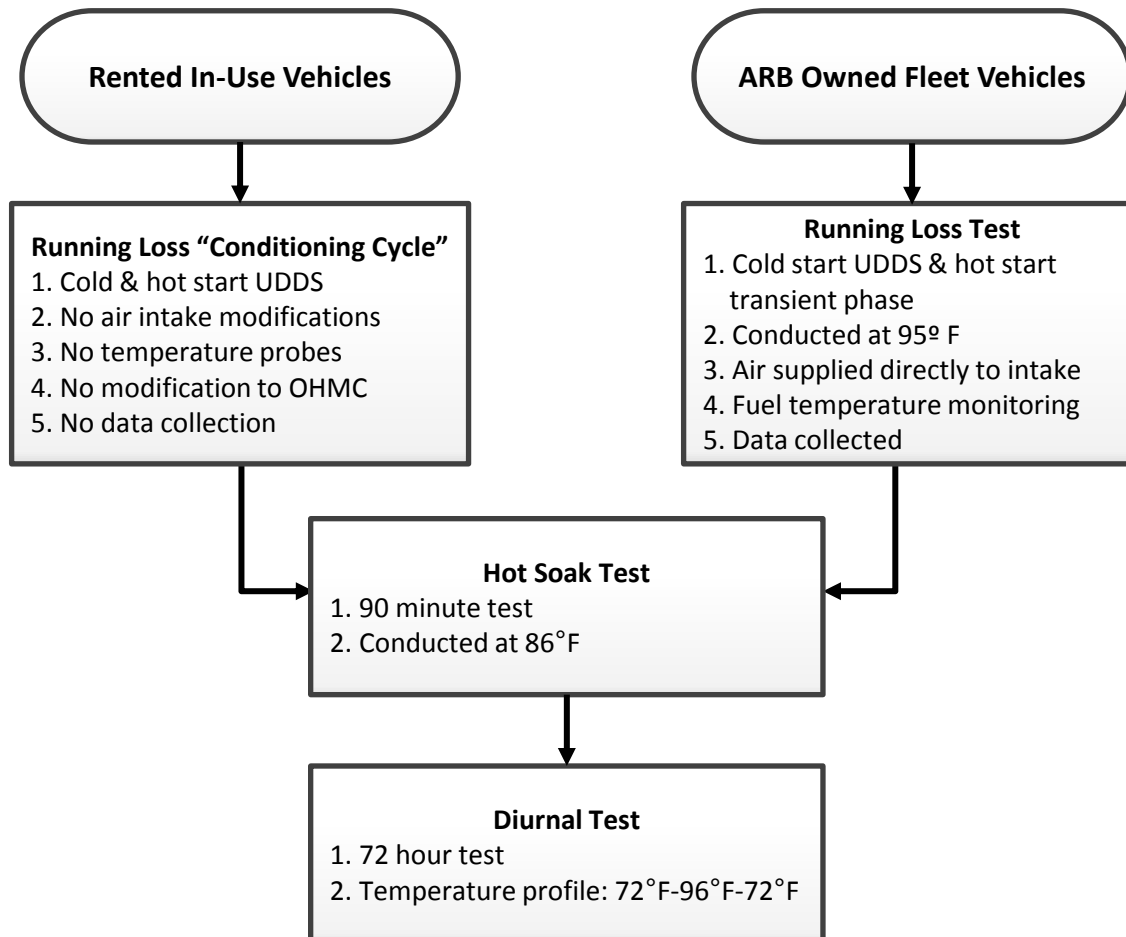
- Three-phase Federal Test Procedure (FTP) cycle consisting of:
  - A cold start UDDS
  - A hot start transient phase
- Speed profiles are specified in 40 CFR §86.515-78\*
- Pollutants measured for each phase of the FTP cycle will include:
  - Total hydrocarbon (THC)
  - Methane (CH<sub>4</sub>)
  - Non-methane hydrocarbon (NMHC)
  - Carbon monoxide (CO)
  - Carbon dioxide (CO<sub>2</sub>)
  - Nitrogen oxides (NO<sub>x</sub>)



\*Appendix I (c) for Class 1 MCs and Appendix I (b) for Class II and Class III MCs

# Evaporative Testing Test Paths

Two test paths:



# Section 3

## OHMC Procurement

# OHMC Test Matrix

- Development:
  - Based on 2004 - 2012 DMV registration data
  - 2- and 4-stroke OHMCs from the most common displacement ranges
  - Excluded discontinued models\*
  - OHMCs available with EFI, restricted to EFI equipped model years\*
  - Carbureted vehicles restricted to 3 most recent model years\*
- Matrix Includes:
  - 12 red sticker and 6 green sticker OHMCs
  - 4 of the 18 vehicles are in ARB's vehicle fleet

\*Not applicable to existing ARB fleet vehicles

# Proposed OHMC Test Matrix

Vehicle Category	Model Year Range	Make	Model	Engine Type	Fuel Delivery System
<b>Red Sticker OHMCs</b>	2009 - 2014	Honda	CRF450R	4-Stroke	EFI**
	2012 - 2014	Honda	CRF150R	4-Stroke	Carbureted
	2011 - 2014	Kawasaki	KX250F	4-Stroke	EFI
	2012 - 2014	Kawasaki	KX85	2-Stroke	Carbureted
	2012 - 2014	KTM	300 XC	2-Stroke	Carbureted
	2011 - 2014	KTM	250 SX-F	4-Stroke	EFI
	2012 - 2014	KTM	SX 50	2-Stroke	Carbureted
	2008 - 2014	Suzuki	RMZ450	4-Stroke	EFI
	2010 - 2014	Yamaha	YZ450F	4-Stroke	EFI
	2012 - 2014	Yamaha	YZ250	2-Stroke	Carbureted
	2012 - 2014	Yamaha	YZ125	2-Stroke	Carbureted
<b>Green Sticker OHMCs</b>	2000*	Suzuki	RM250	2-Stroke	Carbureted
	2012 - 2014	Yamaha	WR450F	4-Stroke	EFI
	2012 - 2014	Honda	CRF250X	4-Stroke	Carbureted
	2012 - 2014	KTM	250XCF-W	4-Stroke	EFI
	2003*	Honda	XR50R	4-Stroke	Carbureted
	2007*	Yamaha	WR250FW	4-Stroke	Carbureted
	2007*	Honda	CRF450X7	4-Stroke	Carbureted
* ARB's Fleet Vehicles					
** Electronic Fuel Injection					

# Alternative OHMC Test Matrix

Vehicle Category	Model Year Range	Make	Model	Engine Type	Fuel Delivery System
	2011 - 2013	Honda	CFR 150 RB	4-Stroke	Carbureted
	2011 - 2013	Honda	CRF 250 R	4-Stroke	EFI
	2011 - 2013	Kawasaki	KX 450F	4-Stroke	EFI
	2011 - 2013	Kawasaki	KX 100	2-Stroke	Carbureted
	2011 - 2013	KTM	300 XC W	2-Stroke	Carbureted
<b>Red Sticker OHMCs</b>	2011 - 2013	KTM	250 XC	2-Stroke	Carbureted
	2011 - 2013	KTM	250 XC W	2-Stroke	Carbureted
	2011 - 2013	KTM	250 XC F	4-Stroke	EFI
	2011 - 2013	KTM	65 SX	2-Stroke	Carbureted
	2011 - 2013	KTM	85 SX	2-Stroke	Carbureted
	2011 - 2013	Suzuki	RMZ 250	4-Stroke	EFI
	2011 - 2013	Yamaha	YZ250F	4-Stroke	Carbureted
	2011 - 2013	Yamaha	YZ85	2-Stroke	Carbureted
	2011 - 2013	Honda	CRF 110F	4-Stroke	Carbureted
	2011 - 2013	Honda	CRF 100F	4-Stroke	Carbureted
	2011 - 2013	Honda	CRF 150F	4-Stroke	Carbureted
<b>Green Sticker OHMCs</b>	2011 - 2013	Honda	CRF 230F	4-Stroke	Carbureted
	2011 - 2013	KTM	350 XCF-W	4-Stroke	EFI
	2011 - 2013	Yamaha	WR250F	4-Stroke	Carbureted
	2011 - 2013	Yamaha	TT-R125LE	4-Stroke	Carbureted

# OHMC Procurement

- In-Use OHMCs
  - Contacting owners of makes and models in test matrix
  - Targeting newer model year OHMCs
- New OHMCs
  - Exploring multiple options to procure new OHMCs
  - May approach dealers to rent new/lightly used unmodified OHMCs





# In-Use OHMC Procurement Process

## Stage 1:

Solicitation package mailed to OHMC owners

## Stage 2:

Completed packages reviewed by ARB staff

## Stage 3:

Field inspection conducted on pre-approved OHMCs

# Stage 1: Solicitation Package

- Solicitation packages will be sent out to owners of OHMCs within 50 miles of El Monte
- Solicitation package will include:
  - Cover letters from ARB and logistics contractor
  - OHMC owner reply form
  - OHMC screening questionnaire
  - Owner activity survey
- Responses must be received within 30 days
- Monetary incentive offered to owners of OHMCs selected to participate in testing



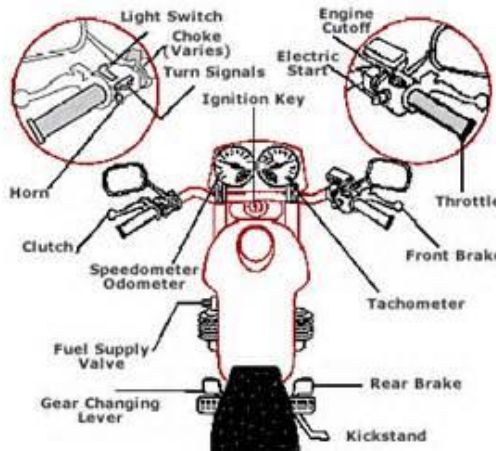
# Stage 2: Solicitation Package Review

- ARB Staff will review responses received
- OHMC screening questionnaire responses received will be segregated into 2 categories:
  - Modified
  - Unmodified
- OHMCs will be disqualified based on:
  - Safety concerns
  - Operational defects
  - Structural alterations



# Stage 3: Field Inspection

- OHMCs that pass the initial screening will proceed to field inspection stage
- During the field inspection a qualified ARB contractor will:
  - Verify the vehicle make, model, model year and VIN
  - Verify that the OHMC is in proper operating condition
  - Conduct an inspection based on the Motorcycle Safety Foundation's T-CLOCS form ([www.msf-usa.org](http://www.msf-usa.org))



# Section 4

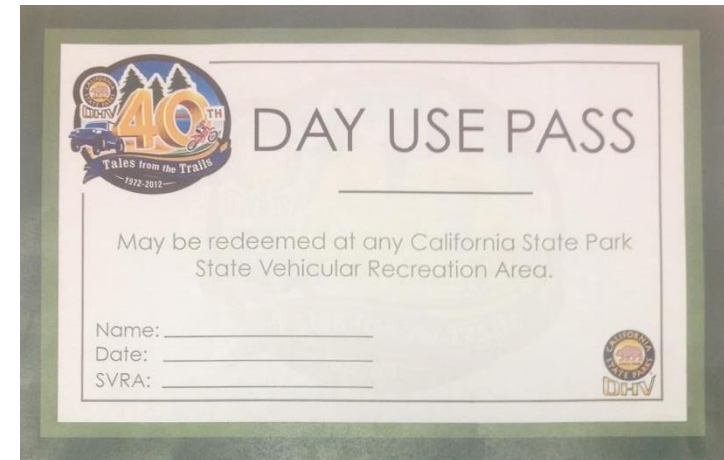
# Owner Survey

# OHMC Owner Survey Overview

- Purpose: To better understand the vehicle characteristics, usage, and activity of OHMCs
- Population:
  - 1,000 red sticker; 1,000 green sticker; 500 dual sport
  - Participants randomly selected by CSUS from DMV database
- Outreach:
  - Online survey invitation sent out via post card and text message
  - Free day pass to State OHV Park provided as incentive

# Owner Survey Structure

- 25 question online survey
  - Specific vehicle identified at beginning of survey
  - Single question to appear on screen at a time
  - Questions available on ARB's website
- 100 participant pilot study
  - Questions may be revised based on pilot responses
- Incentive
  - Emailed to OHMC owner
  - Any name can be requested for pass
  - Clear expiration date



# Owner Survey Significance

- The OHMC owner survey results will be used to:
  - Determine the range of modifications on OHMCs
  - Define the fraction of OHMCs modified
  - Update the emissions inventory
- Findings made on modifications will help ARB staff determine the in-use OHMCs selected for testing
- Results will provide better understanding of how red sticker program limits OHMC operation





# Next Steps- 2014

**March 13:**

Comments on test plan and survey due to ARB

**May:**

Evaporative and exhaust testing begins

**November:**

Evaporative testing ends

**March - April:**

Vehicle procurement begins/  
Owner survey begins

**August - September:**

Exhaust testing and  
owner survey end

**November 20:**

Update Board on  
assessment findings

# ARB Staff Contact Information

## Monitoring and Laboratory Division

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Questions?