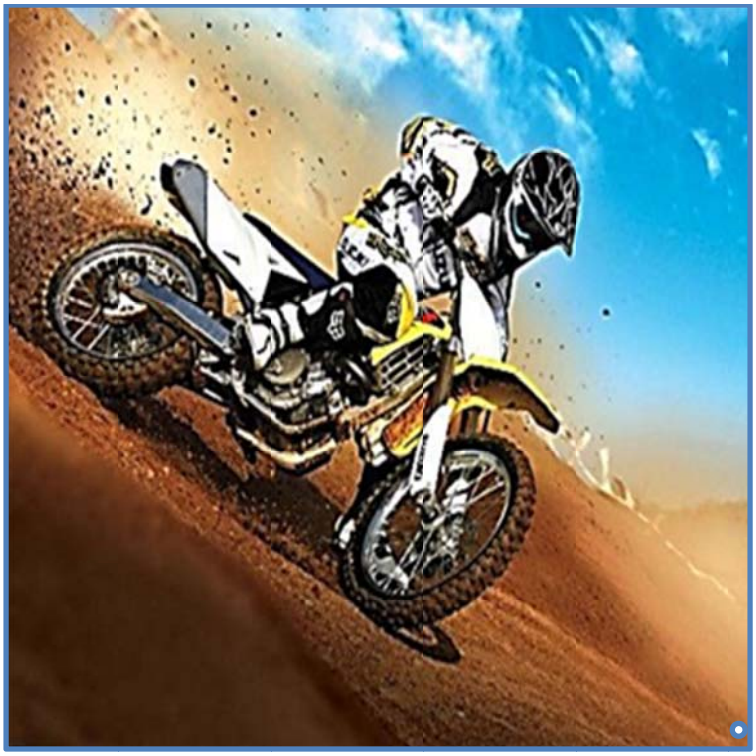
California Environmental Protection Agency

Air Resources Board

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

ADOPTION OF EVAPORATIVE EMISSION CONTROL REQUIREMENTS FOR OFF-HIGHWAY RECREATIONAL VEHICLES



Off-Road Motorcycles Specialty Vehicles All-Terrain Vehicles (ATV)

Date of Release: June 5, 2013

Scheduled for Consideration: July 25, 2013

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State of California

AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

PUBLIC HEARING TO CONSIDER THE PROPOSED ADOPTION OF EVAPORATIVE EMISSION CONTROL REQUIREMENTS FOR OFF-HIGHWAY RECREATIONAL VEHICLES

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Location: California Environmental Protection Agency (Cal-EPA)
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EXECUTIVE SUMMARY

In spite of a significant reduction in ozone precursors, California needs additional reductions of reactive organic gases (ROG) to achieve attainment of the ozone standard in all areas of the state. One of the largest sources of ROG is off-highway recreational vehicles (OHRV), which include all-terrain vehicles (ATV), off-road motorcycles, and specialty off-highway vehicles. Evaporative emissions produced by OHRVs operating in California account for 72 percent of the total ROG emissions from the category, with exhaust emissions accounting for the remaining 28 percent. Although evaporative emissions from these OHRVs are controlled by California OHRV permeation standards, this regulatory proposal will further reduce evaporative emissions from new OHRVs by more than 70 percent compared to existing OHRVs. Control of evaporative emissions from OHRVs will help to reduce ozone levels in non-attainment areas throughout California and especially in the San Joaquin Valley Air Pollution Control District (SJVAPCD) and South Coast Air Quality Management District (SCAQMD). This regulatory proposal to control evaporative emissions from OHRVs is a key element in the State Strategy for demonstrating attainment with the 8-hour ozone federal air quality standard.

BACKGROUND

Mobile sources have historically been the largest source of ROG emissions in California. As vehicles have become progressively cleaner, the emissions contribution of off-road equipment and vehicles has become more prominent. The 8-hour federal ambient air quality standard (AAQS) for ozone is both more challenging and more protective of public health than the previous standard; therefore, evaporative emissions from all mobile sources, including OHRVs will need to be controlled. For the SJVAPCD and SCAQMD, the State Strategy for demonstrating attainment with the 8-hour ozone federal air quality standard includes the adoption of more stringent emission standards for OHRVs by 2013.

In 2002, the United States Environmental Protection Agency (U.S. EPA) promulgated the first evaporative emissions standards for OHRVs. These standards took effect in 2008 and control permeation from fuel tanks and hoses. The standards limit fuel tank permeation to 1.5 grams per square meter per day (g/m^2/day) and fuel hose permeation to 15 g/m^2/day starting with model year (MY) 2008 OHRVs. The Air Resources Board (ARB or Board) harmonized California requirements with these standards in 2006. These existing permeation requirements only control a small fraction of evaporative emissions from over one million OHRVs operating statewide.

STAFF PROPOSAL

More comprehensive evaporative emissions control is an essential piece of the enforceable commitments for ROG emissions reductions in the State Strategy.

The proposed OHRV test procedure and evaporative emissions standard of 1 gram per day (g/day) of Total Organic Gas (TOG) for a 3-day diurnal utilizes the available evaporative emissions technology currently used in the on-road sector for OHRV

applications. The standard represents a greater than 90 percent reduction per vehicle compared to baseline emissions levels. This regulatory proposal will control statewide summertime ROG by 3.4 tons per day (TPD) in 2023 and 12.5 TPD when fully implemented (90 percent) in 2042.

The proposed regulation requires a carbon canister integrity tip test to verify canister protection from liquid fuel contamination when an OHRV is tipped. This test is especially important for off-road motorcycles, which are more likely to tip over than ATVs or specialty vehicles. The tip test is designed to ensure that evaporative emissions controls for OHRVs are properly designed for real-world operating conditions and last the life of the vehicle. The tip test remains an outstanding concern for OHRV manufacturers because it may require fuel tank re-design. As an alternative to the proposed tip test, manufacturers may submit an equivalent test procedure to ARB for an engineering review and approval by the Executive Officer.

It is critical that ARB achieves these additional ROG emissions reductions, particularly given the magnitude of California's ozone problem and the State Strategy's reliance on yet-to-be developed technology. These future benefits will be especially valuable to California as a warming climate makes ozone attainment more difficult.

ENVIRONMENTAL AND COST IMPACTS

The proposed regulation will deliver substantial ROG emissions reductions for the 2023 timeline set for attainment of the federal 8-hour ozone standard and it will continue to deliver air quality benefits far into the future because of the relatively long lifetime of OHRVs.

Staff has determined that no significant adverse environmental impacts would result from implementation of the regulatory proposal. This is because the regulatory provisions merely propose emission standards to reduce diurnal and spillage emissions from OHRVs, which would be easily accomplished by using already existing technologies.

This regulatory proposal has an average cost-effectiveness of 6.93 dollars per pound ($/lb.) compared to the inflation adjusted cost of 8.01 $/lb. for the on-road motorcycle exhaust regulation adopted in 1998. The cost to control emissions per OHRV increases significantly for manufacturers of evaporative families with sales of less than 150 OHRVs per year in California. These manufacturers account for a small fraction (less than 13 percent) of OHRV sales in the State. The cost of the regulation includes cost savings to the end user from reduced fuel consumption due to lower evaporative emissions resulting from the proposed diurnal standard. A likely indirect effect of this regulatory proposal is that OHRV manufacturers will choose to use electronic fuel injection to meet the stringent diurnal standard. Depending on the EFI engine control unit calibration, this could result in fuel cost savings from increased engine combustion efficiency.

STAFF RECOMMENDATIONS

Staff recommends that the Board adopt this regulatory proposal to greatly reduce evaporative ROG emissions from OHRVs. The standards were developed in close collaboration with stakeholders to minimize the cost to comply while still achieving the emissions reductions that California needs. In fact, the stringent diurnal standard in the proposed regulation was recommended by industry. The final form of the proposed emissions standard benefits from the input and knowledge of the OHRV manufacturers. In particular, the diurnal emissions test procedure has been designed to verify emissions control for running loss and hot soak events while minimizing the testing and compliance costs for industry.

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LIST OF ACRONYMS

AAQS	Ambient Air Quality Standard
ARB	[California] Air Resources Board
ATV	All-Terrain Vehicle
CAA	[Federal] Clean Air Act
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
DMV	[California] Department of Motor Vehicles
EVOH	Ethylene Vinyl Alcohol
HSC	[California] Health and Safety Code
ISOR	Initial Statement of Reasons
LSI	Large Spark-Ignition [engine]
MIC	Motorcycle Industry Council
MY	Model Year
OHRV	Off-Highway Recreational Vehicles
PY	Person Year
ROG	Reactive Organic Gases
SCAQMD	South Coast Air Quality Management District
SHED	Sealed Housing for Evaporative Determination
SJVAPCD	San Joaquin Valley Air Pollution Control District
SIP	State Implementation Plan
SORE	Small Off-Road Engine
TP	Test Procedure
TOG	Total Organic Gases
TPD	Tons per Day (emissions rate)
U.S.C.	United States Code
U.S. EPA	United States Environmental Protection Agency

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I. INTRODUCTION AND BACKGROUND

A. INTRODUCTION

This report presents the Initial Statement of Reasons (ISOR) in support of proposed adoption of comprehensive evaporative emission control requirements for off-highway recreational vehicles (OHRV).

Air Resources Board (ARB or Board) staff recommend adoption of regulatory provisions establishing evaporative emission standards for 2018 and subsequent model year (MY) OHRVs manufactured for use in California. The following are key aspects of the regulatory proposal:

- Expands control of evaporative emissions from OHRVs to include a stringent diurnal standard as well as a "tip test" to address potential fuel spillage on all vehicle modes;
- Provisions for certification, labeling requirements, enforcement, recall, and use restrictions;
- A flexible 4-year phase-in period (MY 2018, 2019, 2020, and 2021) where the manufacturer must show that 75 percent of their new sales are certified for those years; and
- A new test procedure to determine evaporative emissions from OHRVs.

The remainder of this section details the regulatory context, legal requirements, and need for comprehensive evaporative emission control of OHRVs. The rationale for the regulatory proposal, as well as the public process by which it was developed, are then briefly summarized.

Section II describes the problem as well as currently available control measures; Section III summarizes the recommended Board Action and its alternatives; Section IV presents the air quality benefits of the regulatory proposal; Sections V and VI detail the environmental as well as environmental justice impacts of the proposed regulation; Section VII offers an analysis of economic and fiscal impacts; and Section VIII summarizes the rationale for each regulatory provision.

The proposed regulation order (Article 3, Chapter 9, Division 3, Title 13, California Code of Regulations (CCR)) is presented in Attachment A. The proposed *Test Procedure for Determining Evaporative Emissions from Off-Highway Recreational Vehicles* (TP-933) is in Attachment B. Supporting information detailing relevant emission inventories is included in Attachment C. Supporting information relevant to economic and cost-benefit analysis is contained in Attachment D.

B. VEHICLES IN CATEGORY SUBJECT TO PROPOSED REGULATIONS

Proposed evaporative emission standards and test procedures apply to gasoline-fueled OHRVs. Specifically, this regulatory proposal applies to off-road motorcycles (also known as dirt bikes) (Figure I-1), all-terrain vehicles (ATVs) (Figure I-2), and specialty vehicles which includes off-road sport vehicles (Figure 3), off-road utility vehicles, sand cars (Figure 4),as defined in Cal. Code Regs., tit.13, § 2411.

Figure I-1: Off-Road Motorcycle

Figure I-2: All-Terrain Vehicle

Figure I-3: Specialty Vehicle (Off-Road Utility Vehicle)

Figure I-4: Specialty Vehicle (Sand Car Shown)

Gasoline-fueled golf carts and go-karts are not included in this regulatory proposal. Rather, they are subject to ARB's small off-road engine (SORE) or large spark ignition (LSI) engine regulations, depending on whether their engines are greater than 25 horsepower (see ARB's OHRV website). Snowmobiles are considered federal sources and are not subject to California's OHRV regulations.

Competition vehicles, also known as "race-only vehicles" or "racing vehicles" and defined as vehicles operated exclusively on closed courses in sanctioned racing events, are exempt from California's OHRV emissions regulations (Health and Safety Code (HSC) Section 43001).

C. REGULATORY AUTHORITY AND LEGAL REQUIREMENTS

Authority to adopt and enforce the proposed regulation is granted to California's Air Resources Board through a combination of federal and State laws. ARB's legal requirement to submit a State Implementation Plan (SIP) is also articulated by federal and state legislation. In 2007, the Board adopted amendments to California's SIP that commits ARB to comprehensively address OHRV evaporative emissions; current control is limited to permeation from fuel tanks and hoses (ARB, 2009).

1. Authority to Control Mobile Sources under Federal Clean Air Act

Under Section 209(b) of the Federal Clean Air Act (CAA), the State of California has the singular distinction of being granted the power to adopt and enforce rules to control emissions from new mobile sources (CAA, 1990). California's exemption from CAA provisions that otherwise prevent states from setting their own standards for motor vehicle emissions recognizes California's long-standing air pollution challenges and honors the State's pioneering efforts to reduce motor vehicle emissions (NRC, 2006).

Section 209(e)(2) of the CAA (42 U.S.C § 7543) requires California to receive authorization from the Environmental Protection Agency (U.S. EPA) Administrator prior to enforcing regulations on mobile sources, including new off-road vehicles and engines. Authorization to regulate exhaust emissions

from OHRV was granted to California in December 1996 (Cal. Code Regs., tit.13, § 2411; 61 Fed. Reg. 69093, December 31, 1996).

2. Legal Requirement to Submit a SIP

The CAA also requires, as codified in 42 U.S.C § 7410, each State, including California, to submit a plan providing for the "implementation, maintenance, and enforcement" of primary as well as secondary air quality standards, which protect human health and welfare, respectively, within each air quality region of the State. SIPs are required to be submitted within three years of the promulgation or revision of a national ambient air quality standard (AAQS).

3. Regulatory Powers and Responsibilities Conferred by State Law

ARB is named as the agency responsible for control of emissions from motor vehicles in the HSC Section 39500 as well as the air pollution control agency "for all purposes set forth in federal law" in HSC Section 39602. Specifically named among ARB's general duties and powers (HSC Sections 39600-39619.8) are the responsibilities to prepare California's SIP and to coordinate all local air quality management district activities necessary to comply with the CAA. Furthermore, ARB must achieve the maximum feasible, cost-effective reductions of emissions from all mobile source categories under its jurisdiction (HSC Sections 43013, 43018).

4. Commitments under 2007 Amendments to the SIP

In September 2007, the Board adopted Amendments to the SIP, which comprises State and local air quality planning showing how and when California will meet AAQSs. The 2007 State Strategy articulated by the 2007 SIP Amendments is the first to address the federal 8-hour AAQS for ozone (0.08 parts per million, ppm) as well as the 24-hour and annual standards for fine particles ($PM_{2.5}$) (65 micrograms per cubic meter ($\mu g/m^{3)}$ and 15 $\mu g/m^3$, respectively). These federal AAQS were originated by U.S. EPA in 1997 in response to scientific evidence substantiating adverse health effects at lower levels than had previously been resolved. Due in part to litigation, as well as the extensive process required to establish area designations and boundaries, the 8-hour ozone standard was not finalized until 2004.

The 8-hour ozone standard is more stringent than the previous 1-hour standard and calls for more extensive emissions control strategies. Although California has already significantly reduced ambient ozone concentrations, the challenges posed by the more stringent standard provoked the reclassification of the San Joaquin Valley Air Pollution Control District (SJVAPCD) and South Coast Air Quality Management District (SCAQMD) nonattainment designations as "extreme" with regard to the 8-hour standard. "Extreme" nonattainment areas rely on the development of new technologies or improvement of existing technologies, in addition to other enforceable commitments, to reduce emissions of ozone precursors, namely oxides of nitrogen (NO_X) and reactive organic gases (ROG) (Section 182(e)(5) of the CAA; 42 U.S.C § 7511(e)(5)).

Proposed new SIP measures in the 2007 State Strategy include expanded evaporative emissions standards from OHRVs. These expanded OHRV evaporative emissions standards are projected to deliver necessary ROG emissions reductions statewide by 2023, including in California's most challenging regions with regard to ozone control, namely the SCAQMD and the SJVACPD.

When the Board originally adopted the 2007 Amendments to the SIP, the Board was expected to take action on expanded evaporative emissions from OHRV by 2010, with implementation beginning in the 2012-2015 timeframe (ARB 2009). However, the rulemaking was delayed so that the emissions inventory could be updated. The creation of a new emissions inventory required staff to update emissions factors, perform usage surveys, and modify the fundamental assumptions associated with the inventory. To accommodate the inventory update, ARB adopted revisions to the rulemaking calendar for California's $PM_{2.5}$ SIPs on May 18, 2011. The updated calendar commits ARB to expanding OHRV emission standards in 2013, with implementation schedules to be determined during the rulemaking process.

D. REGULATORY HISTORY OF OHRV EMISSIONS CONTROL IN CALIFORNIA

1. First Emissions Standards for OHRV Set in 1994

As with light-duty vehicles, California initially led the U.S. in setting emissions standards for off-road mobile sources. In 1994, the Board adopted the first exhaust emissions standards for OHRVs, including off-road motorcycles and ATVs, which were previously not subject to any emissions control requirements. These standards established compliance dates starting with MY 1997 and MY 1999 for engines greater than and less than 90 cubic centimeters (cc) displacement, respectively. Modifications to the original rulemaking reclassified the scope of off-highway vehicular controls such that specialty vehicles, gasoline-fuel golf carts, and go-karts with less than 25 horsepower are now subject to SORE regulations, while those producing 25 horsepower or more are subject to LSI engine regulations.

2. Limitations on Use of Uncontrolled OHRV in California

In 1998, the Board approved amendments to OHRV regulations that link registration with compliance to exhaust emission standards, creating the red/green sticker program. Year-round operation is allowed only for emission-compliant dirt bikes and ATVs. OHRVs that are not compliant with ARB emission standards are issued a limited use red registration sticker through the California Department of Motor Vehicles (DMV). OHRVs with red registration stickers can only be operated on public land in accordance with the ARB Red Sticker Open Riding Schedule. Although control of competition and racing vehicles is beyond the scope of ARB, their use is limited to operation on closed courses in sanctioned racing events or by adhering to rules that apply for red sticker vehicles.

3. Federal Regulation of Evaporative (Permeation) Emissions from OHRV

In 2002, the U.S. EPA promulgated the first evaporative emissions standards for OHRVs and engines, including off-road motorcycles and ATVs. These standards, which took effect in 2008, control permeation losses from fuel tanks and hoses. The standards limit plastic fuel tank permeation to 1.5 grams per square meter per day (g/m^2/day) and fuel system hose permeation at 15 g/m^2/day.

4. Harmonizing with Federal Evaporative Emissions Regulations

In 2006, ARB amended its OHRV emissions regulations to harmonize with evaporative emissions standards adopted by U.S. EPA in 2002, to control permeation emissions from fuel tanks and hoses. Additional revisions adopted in 2006 addressed the riding seasons for noncompliant vehicles, clarified which vehicles are subject to the OHRV regulation, and inserted into the regulations labeling requirements that had been previously incorporated by reference.

E. NEED FOR EMISSIONS REDUCTIONS

The South Coast and San Joaquin Valley air basins are currently the only extreme nonattainment areas in the nation. The federally approved State Strategy for demonstrating 8-hour ozone attainment in these areas relies on the use of a mix of currently available technologies in combination with the development of advanced technologies. This regulatory proposal is based on the transfer of currently available technology from the on-road sector that can be cost-effectively scaled for use on OHRVs.

Evaporative emissions control of OHRVs is currently limited to permeation from fuel tanks and hoses, which account for only a fraction of uncontrolled emissions. Expanding OHRV evaporative emissions control beyond their current scope is an essential piece of the enforceable commitments for ROG emissions reductions articulated in the State Strategy. The 2007 State Strategy estimates that by 2023, the SJVAPCD and the SCAQMD will need an additional 54 tons per day (TPD) and 25 TPD of ROG emissions reductions, respectively, from all sources, including OHRVs (ARB, 2009). This regulatory proposal will provide ROG emission reductions of 0.6 TPD and 1 TPD for SJVAPCD and the SCAQMD respectively in 2023. In 2035 the reductions will be over 1.6 TPD and 3 TPD respectively when the regulation is 70 percent implemented.

Due to the long vehicle life of OHRVs, the greatest reductions are expected after full implementation in 2042.. This regulatory proposal will deliver substantial longer term emissions reductions anticipated for future, more stringent air quality standards.

F. RATIONALE FOR CONTROLLING OHRV EVAPORATIVE EMISSIONS

Mobile sources have historically been the largest source of ROG emissions in California. As on-road mobile sources have become progressively cleaner, the role of off-road sources, as well as mobile sources under federal and international jurisdiction (e.g., ships, locomotives, and aircraft) has become more prominent. To attain the 8-hour federal AAQS for ozone, which is both more challenging and more protective of public health than the previous standard, it is necessary to incorporate expanded off-road mobile source emissions control into California's State Strategy.

Fortunately, technologies that have been successfully used for controlling evaporative emissions from on-road vehicles are readily available and can substantially reduce evaporative emissions from OHRVs. It is critical that ARB achieve these readily available evaporative emissions reductions from OHRVs, particularly given the magnitude of California's ozone problem and the State Strategy's reliance on yet-to-be developed technologies.

Specific rationale for each proposed regulatory provision is provided in Section VIII, Summary and Rationale for Each Regulatory Provision.

G. STAKEHOLDER PARTICIPATION

For the past six years, ARB staff have invited public participation during the development of the proposed regulation, test procedure, and analysis of underlying data. In early 2006, ARB mailed approximately 1,500 letters to dealers and manufacturers of OHRVs in California to invite participation in the rulemaking process. In March 2006, at a public workshop in El Monte, ARB introduced the idea of comprehensive evaporative emissions standards for OHRVs as a means of building on what was then the near-term effort to adopt U.S. EPA's design standards for limiting permeation emissions from fuel tanks and fuel lines.

Among key stakeholders involved in the initial workshop and ongoing discussions was the Motorcycle Industry Council (MIC), which represents all major manufacturers of OHRVs for California markets.[1] Since early 2006, four public workshops (Table I-1) and nearly forty stakeholder meetings (Table I-2) have been held on all aspects of the regulatory proposal (Table I-3 and Attachment E).

Table I-1: Public Workshops

LOCATION	DATE

[1] "More than 300 members represent manufacturers and distributors of motorcycles, scooters, parts and accessories, as well as allied trades such as publishing, insurance and consultants. While dealers, clubs and individuals are not eligible for membership, the MIC works with these groups on issues of mutual interest." (http://www.mic.org/)

El Monte	3/24/2006
Sacramento	9/6/2006
El Monte	4/20/2010
El Monte	12/18/2012

Table I-2: Pre-Hearing Meetings and Teleconferences

PARTICIPANTS	DATES
MIC and OHRV Manufacturers	1/14/2009, 1/15/2009, 4/7/2010, 4/29/2010, 7/21/2010, 9/30/2010, 11/8/2010, 11/9/2010, 11/7/2011, 3/22/2011, 4/27/2011, 8/18/2011, 9/26/2011, 3/5/2012, 4/17/2012, 4/25/2012, 10/17/2012, 3/6/2013, 3/25/2013, 4/4/2013, 4/12/2013
U.S. EPA	3/14/2013
Harley Davidson	8/26/2010, 9/27/2011, 11/7/2011, 5/4/2012,12/18/2012, 2/25/2013, 3/14/2013
MeadWestvaco	7/15/2009, 12/2/2009, 5/3/2011, 9/18/2012
Honda	11/2/2010, 11/9/2010, 3/27/2013
Evaporative Emissions Consulting Inc.	11/9/2009, 2/8/2010, 2/9/2010

Standards were developed in close collaboration with stakeholders. The final form of the proposed emissions standard represents a general consensus reached between ARB and industry (Table II-3). In particular, ARB proposes to adopt the diurnal standard proposed by industry.

Table I-3: Issues Raised by Industry and Stakeholders

ISSUES	STAFF RESOLUTION
Economic conditions make complying with the proposed	Delay implementation until MY 2018 and allow a flexible 4-year phase-in schedule.

regulation more difficult	
Make evaporative test plan aligned with exhaust testing to increase cost-effectiveness	Allow evaporative preconditioning to be completed in conjunction with the mileage accumulation for exhaust testing, so long as the fuel system continuously has E10 (10% ethanol) fuel in it for a total of 140 days.
High cost of vehicle testing	Reduce the number of required vehicle evaporative tests performed in a Sealed Housing for Evaporative Determination (SHED). Running loss and hot soak testing are now preconditioning cycles to the measured diurnal test.
High variable volume SHED testing cost	Develop a reduced cost, 24-hour fixed volume SHED test with calculated vented emissions.
Safety concerns with pressurized fuel tank	Require fuel tank pressure to be released before the fuel tank can be opened.
Vehicle tampering may limit effectiveness of this regulatory proposal	Include anti-tampering requirements on all OHRVs: evaporative component placement, tamper resistant fasteners, and a vehicle tag. The vehicle tag is expected to increase consumer awareness of illegal vehicle tampering.
Designing for the carbon canister integrity test is expensive	The carbon canister integrity test is essential to an effective regulation. To lower the cost of complying, the proposed number of required SHED tests was reduced. Running loss and hot soak tests are now preparation cycles, and a 24-hour SHED test with calculated vented emissions is allowed as an alternative to the 72 hour SHED test.

II. DESCRIPTION OF THE PROBLEM AND PROPOSED SOLUTIONS

A. MECHANISMS OF EVAPORATIVE EMISSIONS FROM MOBILE SOURCES

The TOG emissions targeted by this regulatory proposal are a class of hydrocarbon emissions that are precursors for criteria air pollutants such as ozone. Hydrocarbon emissions from OHRVs constitute two general categories,

namely tailpipe exhaust emissions and evaporative emissions. The proposed regulation focuses exclusively on evaporative emission control. Evaporative hydrocarbon emissions can be further classified by the mechanism through which they enter the ambient air: fuel permeation through fuel system components, vented emissions from vapor growth in the fuel tank, vented emissions from the carburetor, and liquid leakage and spillage emissions. In practice, vented carburetor and liquid leakage emissions are often grouped together because routine testing cannot distinguish between the sources.

Permeation occurs when hydrocarbon molecules diffuse through the walls of the fuel tank and fuel lines and is continuous whether the OHRV is in operation or in storage. Permeation is a function of fuel and material properties, material thickness, and temperature.

Vented hydrocarbon emissions are driven by two mechanisms. First, emissions occur when a rise in the surface temperature of the liquid fuel causes a corresponding increase in the hydrocarbon vapor concentration of the head space. Second, emissions occur when the vapor volume increases with temperature, as described by the ideal gas law. Vented emissions are generated by engine heat and natural diurnal temperature swings.

Carburetors can emit vented hydrocarbon emissions when heated during operation or immediately after the engine is shut off. The hydrocarbons that are lost due to venting represent the constituents of gasoline that have the highest partial pressures and thus evaporate most quickly.

Liquid fuel leaks seep through loose connection points such as gaskets and fuel lines, as well as spillage associated with vehicular tipping. Seeping through fuel line connection points can occur when a connection mechanism degrades and does not seal properly. Seeping from gaskets is generally from the carburetor and occurs because of poor or degrading gasket material. Gasket seepage is exacerbated by vibration as well as changes in fuel level associated with changes in spatial orientation. Liquid fuel leaks occur during operation and storage.

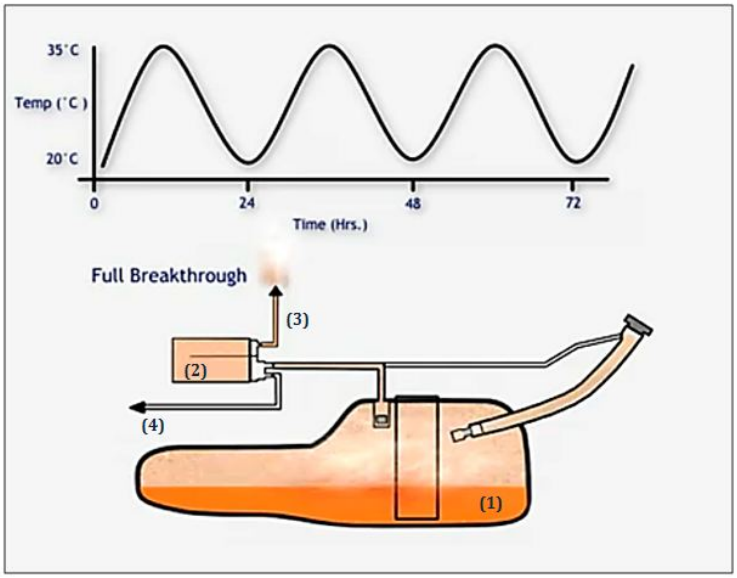
B. CHARACTERIZING EVAPORATIVE EMISSIONS FROM OHRVS

For regulatory purposes, mechanisms of evaporative emissions delineated above must be subjected to specific usage modes, namely running loss, hot soak, and diurnal, which are defined below. As described in the proposed regulation order (Attachment A) and Sections III and VIII, the proposed regulation establishes emission standards to reduce evaporative emissions produced by OHRVs during permeation, venting, liquid leakage, and spillage. The evaporative emission testing cycle begins with a fuel system tip test to visually verify the absence of liquid leakage. Next, a running loss and hot soak preconditioning cycle is conducted to replicate vehicle operation, canister purging, and to subject the vehicle to a soak that occurs directly after operation. Upon completion of the preconditioning cycles, the diurnal test, which is designed to replicate real-world vehicle storage patterns, is performed and measured. The proposed emission

standards eliminate redundancy in testing and allow manufacturers flexibility to choose the combination of technology that works best for their application.

The proposed diurnal standard is measured in three consecutive 24-hour increments over a total test time of 72 hours (Figure II-1), which assesses carbon canister breakthrough. The standard ensures that canisters must be adequately designed to control long-term diurnal storage emissions. The bottom half of Figure 5 shows a evaporative control system including the (1) fuel tank, (2) carbon canister, (3) vent line, and (4) intake manifold line.

Figure II-1: Carbon Canister Multi-Day Diurnal Emissions



Source: MeadWestvaco, 2013

Running Loss evaporative emissions are emitted while the OHRV is in use. For an uncontrolled OHRV, running loss emissions come from carburetor venting, liquid leakage, fuel tank venting, and to a lesser degree, permeation. Running loss permeation emissions are generally not significant for OHRV because the typical duration of engine operation for OHRVs is relatively short.

Hot soak emissions occur immediately after a running loss event. The sources of hot soak emissions arise from the carburetor, leakage, venting, and permeation. Venting emissions tend to dominate this mode, because the hot engine transfers heat to the fuel tank. Carburetor and leakage emissions can also be significant. Permeation emissions tend to be small because the duration associated with hot soak emissions is short.

Diurnal emissions occur while the OHRV is in storage. Permeation and vented emissions account for a substantial portion of diurnal emissions. In a poorly designed or aged system, carburetor and leakage emissions can also be significant. Note that all references to diurnal emissions in this document consist of both diurnal and resting loss processes as defined in Attachment C.

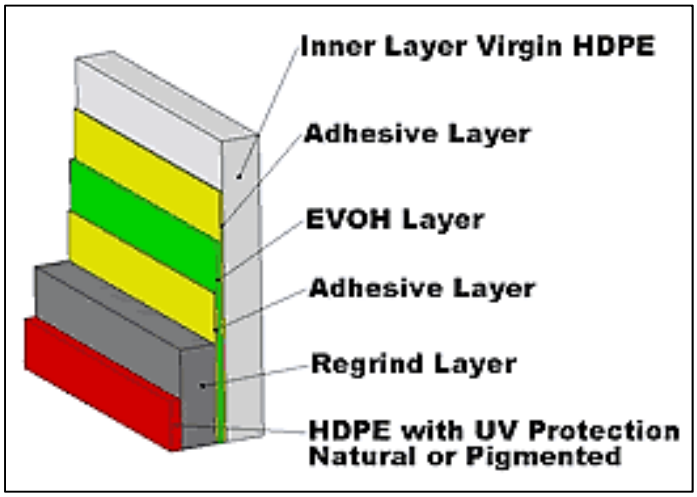
C. TECHNOLOGY TO CONTROL EVAPORATIVE EMISSIONS FROM MOBILE SOURCES

A variety of technologies are available to help manufacturers meet the proposed emission standards. Staff anticipate that this regulatory proposal will encourage manufacturers will use downsized and proven on-road automobile technology for control of OHRV evaporative emissions.

1. Low-Permeation Materials

Permeation is controlled through the use of low permeation barrier layers such as post mold barrier treatments, co-extruded barrier layers, resin based additives, and/or nylon barriers added during the manufacturing process. Fuel tank permeation can be eliminated by using metallic materials like aluminum or steel. Where polyethylene resins are necessary, permeation rates can be mitigated through the use of post mold barrier surface treatments like fluorination. Fluorination exposes the fuel tank to fluorine gas which replaces hydrogen atoms with fluorine atoms on the tank surface. The fluorinated surface layer 'blocks' the path that hydrocarbon molecules would normally take through the resin, thereby reducing permeation rates. In addition to barrier treatments, permeation rates can be reduced using co-extruded barrier layers such as ethylene vinyl alcohol (EVOH). Co-extruded tanks using an EVOH barrier generally consist of six layers, with the EVOH layer sandwiched between layers of adhesive and High Density PolyEthylene ,HDPE (see Figure II-2). In the case of monolayer applications, a special additive called DuPont Selar RB® can be blended with certain polyethylenes during the blow molding process. Selar RB® results in a laminar that produces overlapping layers within the tank wall. The overlapping layers create a "tortuous path" that impedes the permeation of gasoline. For fuel tank production processes involving rotational molding, the introduction of nylons offer low permeation rates due to its crystalline structure.

Figure II-2: Co-Extruded Fuel Tank Barrier Layers



Source: Agri Industrial Plastics, 2013

In addition to fuel tanks, low-permeation control strategies can be applied to fuel lines. Aside from running rigid non-permeable metal lines, there are several flexible fuel hoses (many contain a fluoroplastic permeation barrier) commercially available for OHRVs. Many of the hoses are capable of meeting the proposed 5 g/m2/day design-based small volume design standard.

2. Activated Carbon Canisters

Vented emissions can be controlled by using an activated carbon canister to trap hydrocarbon molecules that are forced out of the fuel tank vent line (see Figure II-1). Two mechanisms are available to prevent the carbon canister from reaching its saturation point and "overflowing" into the ambient air. First, passive purging occurs when hydrocarbons are pulled back into the tank head space during the contraction associated with diurnal cooling. When properly designed, a passively purged carbon canister can be as much as 65 percent efficient at preventing vented hydrocarbons from being emitted to the ambient air. The second mechanism for unloading a carbon canister is to use intake manifold vacuum to pull hydrocarbons from the canister into the engine, where they are combusted. OHRVs often spend long periods of time in storage between uses. During these storage periods, the carbon canister is only passively purged because active purging using intake manifold vacuum requires the vehicle to be in operation. In practice, this places an upper limit on control of diurnal emissions from OHRVs.

3. Pressure Relief Valves

Vented emissions can also be controlled by a pressure relief valve on the vent of the fuel tank. The valve holds pressure on the fuel and prevents vapors from escaping below a predetermined pressure.

4. Strategic Placement or Insulation of Fuel Tank

Another means by which to minimize vented emissions is to locate or insulate the fuel tank so that the head space and fuel inside the tank are not affected by large temperature increases due to engine heat or ambient temperature.

5. Connectors, Improved Carburetors, and Fuel Injection

Carburetor and leakage emissions are each controlled in different ways. Leakage emissions are controlled by using better fuel line connectors such as constant tension spring clamps on properly sized hose barbs or O-ring snap connections. Carburetor emissions can be controlled by re-designing the carburetor to eliminate gaskets that could be exposed to fuel, improving the gasket material, or using fuel injection instead of a carburetor. Fuel injection is extremely effective at controlling both leakage and carburetor emissions because the higher pressure in the fuel line renders use of proper connections imperative for safety and because the closed nature of the fuel system eliminates carburetor emissions. Fuel injection also eliminates carburetor leakage due to a tipped OHRV.

D. TEST RESULTS FOR UNCONTROLLED AND CONTROLLED OHRV EQUIPMENT

To verify the effectiveness of using proven automotive technology on OHRVs, ARB conducted extensive testing of a popular off-road motorcycle and an ATV for baseline emissions as well as emissions with evaporative control technology (Figure II-3 and Figure II-4). Both OHRVs were tested over the running loss, hot soak, and diurnal emissions modes. The controlled and uncontrolled evaporative emissions OHRV test results are summarized in

Table II-1 in grams (g) of Total Organic Gas (TOG).

Figure II-3: ATV SHED Testing in El Monte

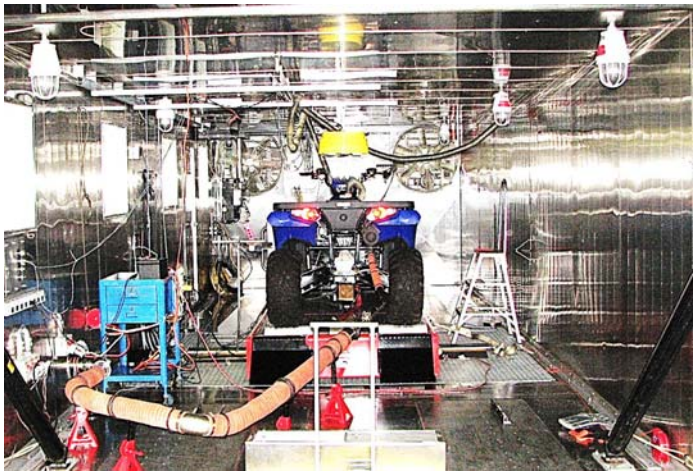


Figure II-4: Off-Road Motorcycle SHED Testing in El Monte

Table II-1: Summary of Results from the OHRV SHED Tests

Emission Control Status	Test Run ID	ATV (g TOG)			Off-Road Motorcycle (g TOG)		
		Running Loss (g)*	Hot Soak (g)**	Diurnal (g)***	Running Loss (g)*	Hot Soak (g)**	Diurnal (g)***
Uncontrolled	1	11.649	1.632	5.603	9.802	6.712	20.264
	2	11.511	2.233	5.643	10.342	5.705	17.735
	3	4.211	0.988	5.956	8.366	4.782	19.507
Uncontrolled Average (g):		**9.124**	**1.618**	**5.734**	**9.503**	**5.733**	**19.169**
Controlled	1	0.178	0.363	1.242	0.111	0.552	0.761
	2	0.097	0.268	1.093	0.129	0.712	0.968
	3	0.126	0.377	1.222	0.146	0.667	0.876
Controlled Average (g):		**0.134**	**0.336**	**1.186**	**0.129**	**0.644**	**0.868**
Percent Reduction:		**98.53%**	**79.23%**	**79.32%**	**98.64%**	**88.77%**	**95.47%**

*23 minute test at 95°F
**1.5 hour test conducted at 95°F
***Diurnal temperature range was 72-96-72°F per 24-hour period

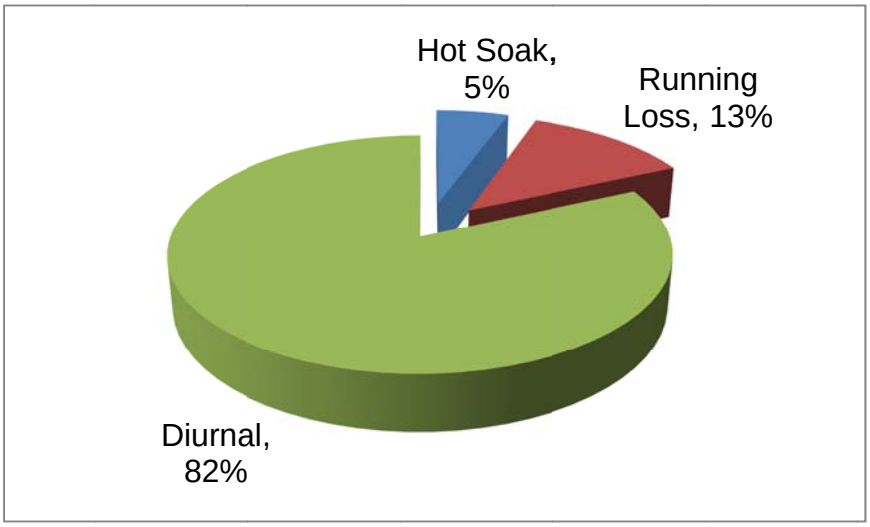
The data demonstrate that by fitting an OHRV with proven evaporative emissions control technology, already being used in the automotive sector, such as a carbon canister, low-permeation fuel systems, and fuel injection, evaporative emissions can be reduced significantly for all usage modes.

E. RATIONALE FOR PROPOSED STANDARDS

The proposed standards were defined based on the test results in Section D above where existing OHRVs were retrofitted with currently available evaporative emissions control technology. The standards reflect an emphasis on diurnal emissions control for two reasons. First, OHRV activity patterns include large periods of time when they are not operated, such that diurnal emissions contribute more than running loss and hot soak emissions. Secondly, the locations of diurnal emissions are concentrated where OHRVs are stored, in contrast to hot soak and running loss emissions, which occur where they are operated. Since OHRVs registered in California tend to be stored in urban areas with greater air pollution control issues than the rural areas where they are operated, diurnal emissions

control is even more critical. Figure II-5 shows the breakdown of California OHRV evaporative emissions by usage mode. As shown, diurnal processes account for by far the largest fraction (82%) of evaporative emissions from currently operated OHRV in California. This is due largely to the relatively low usage and long storage periods for this type of equipment. Evaporative emissions associated with vehicle operations, namely from running loss and hot soak processes, account for the remaining 18% of evaporative emissions from the current fleet of OHRV in California. The data used to generate the graph is based on the emissions inventory data contained in Attachment C.

Figure II-5: Breakdown of California OHRV Emissions by Usage Mode

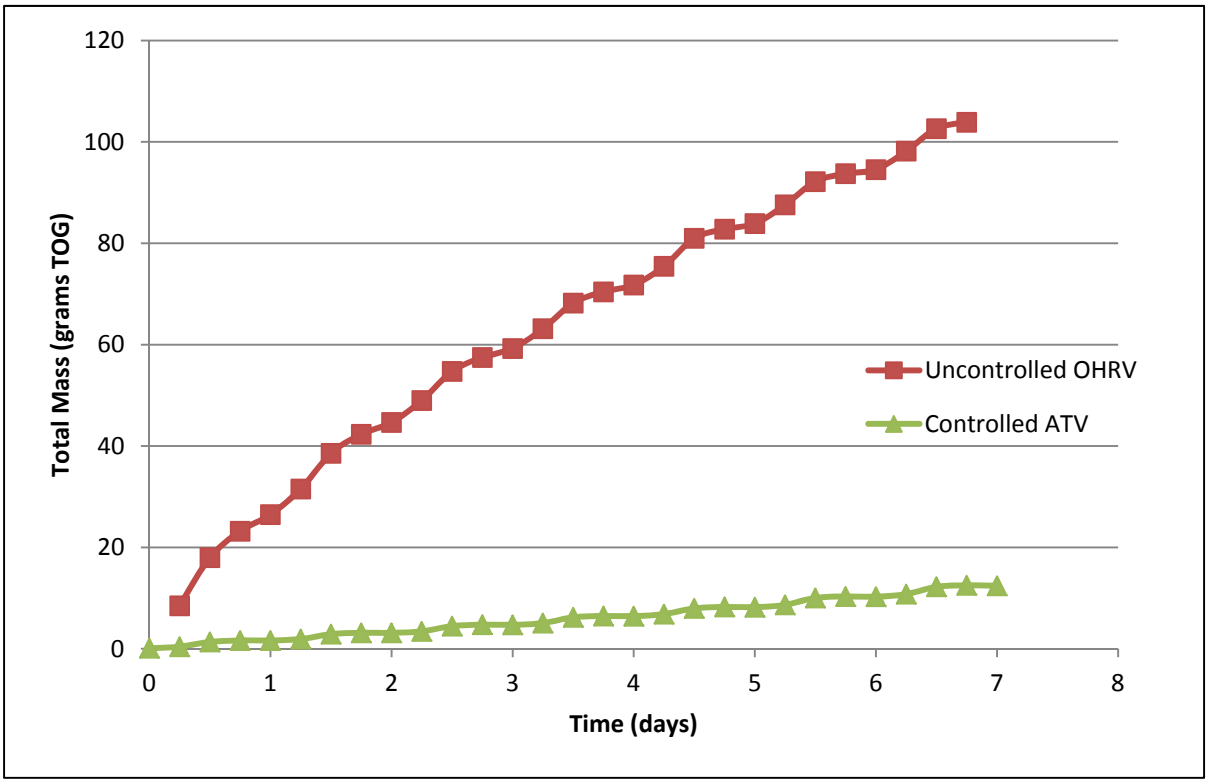


Ethanol is major component of California pump fuel so a standard based on TOG was chosen as opposed to ROG, which excludes ethanol. The 1 g TOG/day diurnal standard is very effective at controlling emissions and is supported by emissions testing data. The stringent diurnal standard allows manufacturers to perform the running loss and hot soak tests as preparation cycles to further reduce evaporative testing costs (see Attachment D).

Figure II-6 shows controlled and uncontrolled diurnal evaporative emissions from an OHRV over seven days. The 7-day test length is representative of an average period between weekend uses. The controlled data shows that a standard based on a 3-day diurnal effectively controls long-term storage emissions.

Figure II-6: 7-Day Diurnal Emission Test Results

for a Controlled and Uncontrolled OHRV



F. SAFETY PRECAUTIONS INCORPORATED INTO PROPOSED REGULATION

Based on experience with the same technology for on-road vehicles, the technology that manufacturers are likely to use has been demonstrated to be safe. In general, control technology will make OHRVs safer by limiting opportunities for escaped liquid fuel to cause fires. Pressurized fuel systems are a notable exception to enhanced safety associated with evaporative emissions controls. To address concerns raised by pressurized fuel systems, the proposed regulation requires that any pressure built up in the fuel system be slowly released before the fuel cap can be removed.

III. RECOMMENDED BOARD ACTION

A. SUMMARY OF RECOMMENDED BOARD ACTION

The recommended Board Action will achieve cost-effective emissions reductions of ROG (as described in Section VII) through comprehensive evaporative emissions standards that allow flexibility in the certification protocol and ensure the durability of control technology throughout a vehicle's useful life. This section describes key components of the recommended Board Action, as well as alternatives considered.

1. Comprehensive Evaporative Emissions Standards for OHRVs

This rulemaking proposes comprehensive control of evaporative emissions from OHRVs. This category of vehicles is currently subject to federal evaporative permeation standards as well as ARB exhaust standards that were originally adopted in 1994 and most recently amended in 2006. This rulemaking expands the current federal evaporative permeation standards, which are of limited scope, to include emission standards that apply to all evaporative emissions from OHRVs. Specifically, the proposed rulemaking sets diurnal emission standards.

2. Independent Emission Standards for Evaporative and Exhaust Emissions

The proposed evaporative emission standards are handled separately from the current, primarily exhaust-oriented, OHRV emissions regulation. Currently, OHRVs that do not meet exhaust standards and are issued a red registration sticker. The benefit of separate regulations is that the red sticker OHRVs will be required to meet evaporative standards, therefore providing a substantial reduction in ROG emissions from this class of vehicles. Furthermore, this rulemaking is written to avoid any duplicative requirements between the current exhaust and proposed evaporative emissions regulations in labeling, testing, and certification.

3. Flexibility for Certification

This proposal accommodates diversity in vehicle type and testing capabilities within the regulated community by offering multiple certification options. Manufacturers may certify OHRVs by meeting a stringent 1 g TOG/day diurnal standard, proposed by industry stakeholders. Manufacturers can demonstrate evaporative family compliance by following the test procedures associated with the 72-hour diurnal standard or the steady state diurnal standard. The standards associated with this rulemaking are described in detail in Table 1 of proposed Cal. Code Regs., tit.13, § 2418 (a)(1).

Manufacturers that produce less than 50 OHRVs per model year, for three consecutive MYs, are eligible to certify to the small volume evaporative emission design standard proposed in Cal. Code Regs., tit.13, § 2418(b). The small volume manufacturers may apply for a design-based certification that does not require a whole-vehicle SHED test.

The use of advanced fuel system technology is encouraged by allowing manufacturers to generate emissions credits from certification using diurnal test results that are lower than emission standards, or zero-emission vehicles. OHRV manufacturers may use earned credits to produce evaporative families above the diurnal standard; however, no single evaporative family may exceed three times the proposed diurnal standard (upper limit). The upper limit of three times the standard was reached through negotiation with stakeholders after considering their need for flexibility to minimize the cost impact of the regulatory proposal and ARB's need for emissions reductions. Placing an upper limit on evaporative family certification values, or the evaporative family emissions limit, EFEL, is needed because of the relatively long lifetime associated with OHRVs. The advanced fuel system credit program is designed to encourage the production of zero-emission vehicles, therefore increasing the availability of this technology in the off-road market.

4. Incorporation of New Test Procedure

A new test procedure, TP-933 (Attachment B), is incorporated into this regulatory proposal to determine OHRV evaporative emissions. TP-933 is the result of years of collaboration between ARB and industry to develop a testing sequence that mimics emissions that occur during real-world use.

5. Durability Requirements to Ensure In-Use Control

Both the test procedure and regulation emphasize verifying the durability of control technology. The test procedure subjects the vehicle to conditions that mimic what the components would endure throughout the useful life of the OHRV. These conditions include exposure to vibration, dust, and ultraviolet radiation. The proposed regulation includes a warranty period of 30 months for components with repair costs under $200 (adjusted for inflation) and 60 months for more expensive components. Following the precedent set by regulations in the light-duty motor vehicle sector, replacement costs are established based on dealers' list prices as well as standard labor price and time limits for warrantied components. Further durability provisions include the requirement that OHRVs have tamper-resistant emission control components and careful placement to help reduce emission control component tampering by the end user.

B. SUMMARY OF ALTERNATIVES PRESENTED

During the development of this regulatory proposal, three other proposals, including no action, were considered as alternatives to the proposed package. These alternatives are described below along with the rationale for staff's rejection of them.

1. No Action

Were the Board to abstain from adoption of more comprehensive OHRV evaporative regulations, the only evaporative emissions regulation for OHRVs would be the permeation design standards promulgated by U.S. EPA.

Although this course of action (inaction) would incur no additional cost to OHRV manufacturers, it would default on the State's 2007 SIP commitment to comprehensively address OHRV evaporative emissions. Moreover, to meet 2007 SIP commitments for specific reductions in ROG by specific dates, the ROG shortfall associated with not taking action on OHRV evaporative emissions would need to be made up in other areas. Proven ROG controls, such as those established in the light-duty motor vehicle sector are ready for transfer to OHRVs and do not exist for all other ROG sources.

2. Removal of the Tip Test from the Current Proposal

The durability tip test is important because carbon canisters are permanently damaged if exposed to liquid fuel when tipped during regular OHRV operation. Thus, to ensure that expected emissions reductions are achieved under real-world conditions, the tip test demands that canisters have minimal exposure to liquid fuel when tipped.

If the tip test were removed from the proposed rulemaking, it is expected that carbon canisters on OHRVs would not control emissions throughout their useful life. An OHRV usage survey suggests that off-road motorcycles are typically tipped at least once during each day of use. Without proper design, verified through the performance of a tip test, fuel would be repeatedly introduced into the carbon canister, causing virtually all off-road motorcycles to fail the emissions standard within months of being sold.

Although canister damage from liquid fuel could be found during enforcement of in-use emission standards, the inclusion of a tip test in the certification process pre-empts a situation wherein a population of poorly designed OHRVs could be introduced into the California market, creating an enforcement burden, demanding re-design to address in-use compliance, and ultimately sacrificing emissions reductions. In other words, OHRVs that satisfy in-use compliance requirements will also satisfy the tip test. Hence, this test is not deemed to add additional burden and is retained in the regulatory proposal.

The solution to the carbon canister contamination issue is a roll-over valve similar to the one shown in Figure III-1. In the event of a vehicle roll-over, the valve is designed to prevent fuel leakage. The cost of a roll-over valve is approximately 5 dollars and in some cases may require tank modification; many on-road motorcycles already use them.

Figure III-1: Fuel Tank Roll-Over Valve

3. Propose Separate Standards for Each Mode of Use

An earlier regulatory proposal required emissions from each OHRV usage mode, defined as running loss, hot soak, and diurnal, to be measured in a SHED enclosure. During regulatory development, stakeholders proposed a 1 g TOG/day diurnal standard. Their proposal requires use of sufficiently advanced technology so as to render hot soak and running loss evaporative emissions standards redundant. The current proposal removes the running loss and hot soak requirements and focuses on the major emissions source from this category, which is diurnal emissions (Attachment C).

The dominance of diurnal emissions reflects the fact that OHRVs are typically stored for long periods of time between uses. Moreover, OHRVs are often stored in urban areas that are non-compliant with regard to AAQSs for ozone, but are typically operated in rural areas, which have less severe air quality problems. Accordingly, it is more critical from an air quality perspective to control diurnal emissions.

The proposed standards offer sought-after flexibility to manufacturers while focusing on the dominant emissions mode. Relative to running loss and hot soak emissions, the diurnal emissions reductions achieved with this regulatory proposal are obtained in those parts of the State with the most significant air quality issues.

IV. AIR QUALITY BENEFITS

The primary air quality benefit associated with the regulatory proposal is the curtailment of ambient ozone through emissions reductions of ROG, a family of ozone precursors. Quantification of these benefits is supported by extensive emissions inventory modeling (Attachment C). The modeling reflects an updated population and vehicle life of OHRVs based on DMV registration data (DMV 2010), updated activity factors derived from a California-based OHRV user survey, technology trends such as the shift from carburetor to fuel injection delivery systems,

and empirical evaporative emissions factors adjusted for a variety of influences such as garage temperature and spatial allocation.

Evaporative emissions reductions associated with this regulatory proposal are modeled based on the emissions inventory methodology described in Attachment C. The OHRV emissions inventory includes exhaust emissions and categories of vehicles, specifically snowmobiles and gasoline-fueled golf carts that are not subject to the proposed regulation. All material relating to these categories have been excluded in the calculation of emissions reductions associated with this regulatory proposal, unless otherwise noted. Projected ROG emissions reductions associated with the proposed regulation are presented below. Although climate change considerations are beyond the scope of the OHRV emissions inventory model, a brief discussion of the direction of climate change impact associated with this regulatory proposal is also included. Also provided is a brief discussion of the co-benefits associated with reduced exposure to air toxics, specifically benzene in confined garage spaces.

A. ROG EMISSIONS REDUCTIONS IN SUPPORT OF OZONE ABATEMENT

Ozone is the criteria pollutant that motivates this regulatory proposal, which will yield substantial emissions reductions of ROG. These emissions reductions help fulfill commitments associated with the 2007 SIP and are necessary to meet the 8-hour ozone standard in California's two extreme non-attainment areas, namely the air basins for SJVAPCD and SCAQMD. ROG emissions reductions associated with the proposed regulation are also necessary, in whole or in part, for attainment of the 8-hour federal ozone standard for Ventura, Sacramento, and other areas downwind of major urban centers.

This regulatory proposal is expected to yield substantial statewide and select regional summertime ROG emissions reductions as shown in Table IV-1, which presents expected emissions reductions in key attainment years identified in the 2007 SIP as well as in the year 2035. Due to an OHRV's longer-than-expected lifetime, benefits from this regulation accrue further into the future than time horizons planned for in the 2007 SIP. Table IV-1 shows that the expected statewide emission reductions from the baseline summertime evaporative ROG emissions from OHRVs to be 10.7 percent in 2020, 25.8 percent in 2023, and 65.5 percent in 2035, when the fleet is 70 percent controlled. This degree of control will significantly reduce the overall ROG emissions from OHRV as evaporative emissions account for approximately three-quarters of the ROG emissions from the current fleet of vehicles.

Table IV-1: Summertime Evaporative ROG Reductions Expected from the Regulatory Proposal in TPD, for Key Attainment Years and Regions in California.

2020	Baseline	Proposed Rule	Benefit	Reduction
Statewide	12.50	11.16	1.34	10.7%
SJVAPCD	2.03	1.81	0.22	10.8%
SCAQMD	3.86	3.48	0.38	9.8%
2023	**Baseline**	**Proposed Rule**	**Benefit**	**Reduction**
Statewide	13.00	9.65	3.35	25.8%
SJVAPCD	2.12	1.57	0.55	25.9%
SCAQMD	4.02	3.05	0.97	24.1%
2035	**Baseline**	**Proposed Rule**	**Benefit**	**Reduction**
Statewide	15.12	5.21	9.91	65.5%
SJVAPCD	2.46	0.85	1.61	65.4%
SCAQMD	4.70	1.71	2.99	63.6%

The magnitude in TPD of emissions reductions is less than those envisioned based on the 2007 inventory estimates. The lower emissions reduction estimate is due to the fact that the inventory of ROG emissions from this category is, in part due to the 2008 economic recession, less than anticipated. Thus, while the degree of control of this category is as strong as originally envisioned, the size of the problem, and thus the aggregate benefit associated with control, is somewhat less.

B. CLIMATE CHANGE CONSIDERATIONS

Although the focus of the proposed diurnal emission standard is a criteria air pollutant (ROG), this standard is also expected to have a slight benefit in reducing emissions of climate change pollutants in California.

1. Reduced Fuel Consumption

Evaporative emissions account for a small fraction of the fuel consumed by OHRVs. The decrease in OHRV evaporative emissions associated with the

regulatory proposal will reduce OHRV fuel consumption by over two percent, and thus greenhouse gas emissions, by a small amount.

A more substantial effect that would reduce climate change emissions could result from reduced in-use fuel consumption associated with technology shifting. One means by which manufacturers are expected to comply with the proposed regulation is through shifting from carburetor to fuel injection technology. Since fuel injection engines tend to be substantially more fuel-efficient, the shift away from carburetor technology could yield substantial benefits in terms of reduced fuel consumption and therefore emissions of carbon dioxide.

2. Indirect Warming Impacts

This regulatory proposal is also expected to exert small, indirect climate change impacts through its effects on the burden of climate forcing pollutants in the atmosphere. Since ROG emitted into the atmosphere is oxidized within a relatively short timeframe, it exerts substantial climate impacts through its effects on atmospheric chemistry (Collins et al., 2002). These indirect impacts are mediated through changes in the concentrations of tropospheric methane, CH_4, and tropospheric ozone, O_3. For example, curtailment of tropospheric ozone associated with ROG emissions reductions is a climate benefit, since tropospheric ozone is currently associated with radiative forcing of approximately 0.39 Watts per square meter, W/m^2 (Shindell et al., 2005). Similarly, ROG perturbs atmospheric chemistry such that methane has a longer atmospheric lifetime. Since methane is the second most-important of the relatively long-lived greenhouse gases tabulated by the Intergovernmental Panel on Climate Change (2007) in terms of radiative forcing, averting ROG emissions and the associated impacts on methane's atmospheric lifetime constitute a climate benefit.

C. REDUCTION OF EXPOSURE TO TOXIC EMISSIONS

One of the expected co-benefits of the proposed regulation is reduced exposure to toxic air pollutants, specifically benzene, which makes up about 1 percent of current blends of gasoline. More than 80 percent of the evaporative emissions from the current fleet of OHRVs in California are produced during diurnal processes, or more specifically when these OHRVs are stored, oftentimes in enclosed garages for periods of a week or more. During these extended storage events, gasoline vapors, including benzene, can build up significantly. The concentration of benzene in a garage is dependent on the air exchange rate of the garage and the emission rate. The concentration of benzene in a garage can be over two orders of magnitude higher than the ambient level with the garage door closed. These elevated benzene levels may pose a health risk to individuals in the garage or to residents of homes with attached garages. OHRVs equipped with evaporative controls compliant with the proposed emission standards, will reduce not only total TOG emissions, but also benzene, significantly.

V. ENVIRONMENTAL IMPACTS ANALYSIS

A. INTRODUCTION

This chapter provides an environmental analysis for the proposed adoption of evaporative emission control requirements for OHRVs. Staff has determined that implementation of the proposed regulation would not result in any potentially significant adverse impacts on the environment. This analysis provides the basis for reaching this conclusion. This section of the ISOR also discusses environmental benefits expected from implementing the proposed regulation.

B. ENVIRONMENTAL REVIEW PROCESS

ARB is the lead agency for this regulatory proposal and has prepared this environmental analysis pursuant to its regulatory program certified by the Secretary of the Natural Resources Agency (Cal. Code Regs., tit.14, § 15251(d); Cal. Code Regs., tit.17, § 60005-60007). In accordance with Public Resources Code Section 21080.5 of the California Environmental Quality Act (CEQA), public agencies with certified regulatory programs are exempt from the requirements for preparing environmental impact reports, negative declarations, and initial studies (Cal. Code Regs., tit.14, §15250). As required by ARB's certified regulatory program, and the policy and substantive requirements of CEQA, ARB has prepared as part of this ISOR, an assessment of the potential for significant adverse and beneficial environmental impacts associated with the proposed regulation and a succinct analysis of those impacts (Cal. Code Regs., tit.17, § 60005(b)). The resource areas from the CEQA Guidelines Environmental Checklist were used as a framework for assessing the potential for significant impacts (Cal. Code Regs., tit.17, § 60005(b)).

If comments received during the public review period raise significant environmental issues, staff will summarize and respond to the comments in writing. The written responses will be included in the Final Statement of Reasons for the regulation. Prior to taking final action on any proposed action for which significant environmental issues have been raised, the decision maker shall approve the written responses to these issues (Cal. Code Regs., tit.17, § 60007(a)). If the proposed regulation is adopted, a Notice of Decision will be posted on ARB's website and filed with the Secretary of the Natural Resources Agency for public inspection (Cal. Code Regs., tit.17, §60007(b)).

C. PRIOR ENVIRONMENTAL ANALYSIS

In 1994, the Board adopted the first exhaust emissions standards for OHRVs, including off-road motorcycles and ATVs, which were previously not subject to any emissions control requirements. The regulation adopted in 1994, as well as several Board approved revisions, are discussed in Section I (D) of this ISOR. The Staff Reports for the original exhaust regulation and its subsequent revisions adopted by the Board identified the potential for a slight increase in NO_x, due to leaner calibrations and a shift from two-stroke to four-stroke technology, which was determined to be insignificant. They also identified potential for a small

increases in toxics, ambient particulate matter (PM) and emissions in attainment areas, which were determined to be unavoidable, but less than significant. The previous Staff Reports identified no other adverse environmental impacts.

In 2006, the Board adopted amendments to the OHRV regulation which included harmonizing with evaporative emissions standards adopted by U.S. EPA in 2002. The staff report identified air quality benefits due to the reduction of evaporative emission. The evaporative emissions standards identified no adverse environmental.

D. PROPOSED REGULATION

1. Description

The proposed regulatory provisions are described in detail in Section III (A) of this Staff Report. Briefly, the regulatory proposal includes the following:

- Expands control of evaporative emissions from OHRVs to include a stringent diurnal standard as well as a “tip test” to address potential fuel spillage on all vehicle modes;
- Provisions for certification, labeling requirements, enforcement, recall, and use restrictions;
- A flexible 4-year phase-in period (MY 2018, 2019, 2020, and 2021) where the manufacturer must show that 75 percent of their new sales are certified for those years; and
- A new test procedure to determine evaporative emissions from OHRVs (TP-933).

2. Methods of Compliance

The proposed regulation introduces OHRV evaporative emission standards to control diurnal and spillage emissions. A variety of technologies are available to help manufacturers meet the proposed amended standards. Staff anticipates that manufacturers will use downsized, proven on-road automobile technology to reduce emissions from OHRVs. A detailed description of the available technologies to meet each proposed emission standard is included in Section II of this Staff Report.

This regulatory proposal accommodates diversity in vehicle type and testing capabilities within the regulated community by offering two diurnal testing options, and a small volume manufacturer design based standard. Additional flexibility is granted by allowing manufacturers to certify using advanced fuel system credits. Manufacturers may produce OHRVs both above and below diurnal emission standards so long as no single evaporative family exceeds three times the diurnal standard; provided that all yearly fleet credits and debits are equal to or below zero at the end of each model year. Corporate fleet averaging can encourage manufacturers to produce more zero-emission OHRVs and thus increase available zero-emission technology.

E. ENVIRONMENTAL IMPACTS

1. Beneficial Impacts

The proposed regulatory provisions would curtail ROG emissions released into the atmosphere, resulting in improved air quality that will help California meet the federal 8-hour air quality standard for ozone. Additionally, the proposed regulation would result in reduced exposure to benzene, a toxic air contaminant. Due to reduced fuel consumption as well as ROG emissions reductions, climate co-benefits are also anticipated. These air quality benefits are detailed in Section IV.

2. Resource Areas with No Impacts

Based on ARB's review of the regulatory proposal, staff concludes that the regulatory proposal would not have a significant adverse impact on the environment. Compliance with the proposed regulatory provisions would not result in any physical change to the existing environment. The proposed regulatory provisions will reduce evaporative emissions from OHRVs by setting emission standards that are easily met by incorporating currently available technologies during vehicle construction. Thus, the regulatory proposal would not involve or result in any physical changes to the existing environment, such as new development, modifications to existing buildings or facilities, or new land use designations. ARB staff finds that it is not reasonably foreseeable that there will be any adverse impacts on aesthetics, air quality, agricultural and forestry resources, biological resources, cultural resources, geology and soils, greenhouse gases, hazardous materials, hydrology and water quality, land use planning, mineral resources, noise, population and housing, public services, recreation, or traffic and transportation. The proposed regulatory provisions would not require any action by regulated parties that could affect these resources.

No discussion of alternatives or mitigation measures to address significant adverse environmental impacts is necessary because no significant adverse environmental impacts would result from implementation of the regulatory proposal. This is because the regulatory provisions merely propose emission standards to reduce diurnal and spillage emissions from OHRVs, which would be easily accomplished by using already existing technologies.

VI. ENVIRONMENTAL JUSTICE

California Government Code (Section 65040.12(e)) defines environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. ARB is committed to supporting the achievement of environmental justice. In 2001, the Board adopted a framework for incorporating environmental justice into the ARB's programs consistent with the directives of State law (ARB, 2001). Although ARB's environmental justice policies apply to all communities in California, they recognize that environmental justice issues have been raised more often in the context of low-income and minority communities.

As a result of ARB's work with the public, the business sector, local government, and air districts, California's ambient air is the cleanest since air quality measurements have been recorded (ARB, 2013a). Whereas the Los Angeles Air Basin experienced 148 smog alerts in 1970, by the year 2000, there was not a single smog alert (ARB, 2013b). However, large numbers of Californians live in areas that continue to experience episodes of unhealthy concentrations of ozone and $PM_{2.5}$.

The proposed rulemaking was designed to achieve ROG emissions reductions in support of attainment of the federal 8-hour ozone standard. In particular, the proposed rulemaking supports attainment in the only two areas nationwide whose nonattainment status has been classified as "extreme," namely the SJVAPCD and SCAQMD. Both areas have strong environmental justice groups that have lobbied ARB to take aggressive action in pursuit of ozone attainment to ease air quality-related health burdens on their communities. The air quality impacts of this regulatory proposal promote environmental justice by improving California's air quality is areas that are simultaneously the most adversely affected with respect to ground level ozone and home to many minority and low-income groups.

VII. ECONOMIC IMPACT ANALYSIS

This section analyzes the economic impacts of the regulatory proposal on OHRV manufacturers inside and outside California, individual consumers, and local and state government agencies. At present, there are no major OHRV manufacturers affected by this regulation headquartered in California, therefore all discussions of manufacturer cost in this section is related to facilities located outside of the State. The estimated cost to comply with this regulatory proposal is based on self-reported industry estimates. The increased cost for OHRVs is from higher manufacturing and certification costs, which are expressed both as incremental costs per vehicle and in fixed costs per evaporative family. Large volume manufacturers, which account for nearly 86 percent of California's annual OHRV sales (see Attachment D), can spread the evaporative control implementation costs across many OHRVs to cost-effectively, comply with this regulatory proposal.

A potential outcome of this regulatory proposal is that OHRV models with low sales volumes may be adversely impacted, resulting in a disproportionate price increase for their model offerings or decreased model availability in California. To mitigate this, a small volume evaporative emission design standard is proposed in the regulation, to provide further flexibility for manufacturers that produce fewer than 50 new OHRVs per MY. Consumers will have similar types of OHRVs available. However, they may have fewer options within a given OHRV class if manufacturers are unable to consolidate low volume models into higher volume evaporative families. In a situation where a specialized OHRV is no longer available, a consumer could have a custom OHRV built using the small volume design standard.

Despite the current reduction in OHRV sales due to the state of the economy, projected OHRV sales are expected to move towards pre-recession levels before MY 2018 (see Attachment C). Over the longer term, OHRV sales are expected to rebound as the economy continues to improve and disposable income increases. Staff remained sensitive to this topic by working closely with industry to develop a regulatory proposal with cost-effective evaporative emission reductions. The average cost to comply with this regulatory proposal ranges from $216 to $465 per OHRV, or a 4 to 9 percent increase (based on an OHRV costing $5,000), across all OHRV evaporative families. All the cost data used to calculate the cost of this regulation was self-reported by industry. Over time the cost of compliance is expected to decline as manufacturers develop more innovative solutions to meet the evaporative emission standards, and as scaled down evaporative components are more widely produced. Additionally, staff has developed the proposed regulations and test procedures with support from major manufacturers that produce vehicles for the on-road motorcycle industry. Future implementation of similar requirements for on-road motorcycles would further reduce the cost of compliance for OHRV manufacturers.

A. LEGAL REQUIREMENTS

Section 11346.3 of the California Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative

regulation. The assessment shall include a consideration of the impact of the regulatory proposal on California jobs; business expansion, elimination or creation; and the ability of California business to compete with business in other states.

State agencies are also required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate is to include any non-discretionary cost or savings to the local agencies and the cost or savings in federal funding to the State.

The determinations made by the Board's Executive Officer concerning the costs or savings necessarily incurred by public agencies and private persons and businesses to comply with the proposed regulatory action are presented in the following sections.

B. ESTIMATED COSTS OF THE PROPOSED REGULATORY ACTION

The proposed rulemaking reflects several years of active collaboration between ARB staff and industry stakeholders to collectively agree upon proposed emissions standards that maximize emission reductions while avoiding unnecessary costs. On January 22, 2013, a cost survey was sent out to manufacturers to determine the incremental and fixed costs associated with implementation of the regulatory proposal. Staff received responses from four OHRV manufacturers representing approximately 50 percent of the total California market share. The respondents represented large and small manufacturers. After careful review and clarification of cost data and responses, staff omitted data for eight of the OHRV evaporative families received because projected sales and manufacturer information was not included. Based on survey responses, staff sought to reduce the cost of compliance by streamlining certification testing. Hot soak and running loss standards were removed from the proposal. The test procedure was revised to require running loss and hot soak events as preparation cycles. In spite of the procedural change, the emissions reductions remained the same but the certification costs were reduced. A second survey was sent out on April 18, 2013, to update vehicle cost information. Only one response was received from industry, and was used to replace the manufacturer's previous cost numbers. All the costs used to calculate costs for the regulatory proposal are industry supplied and self-reported. The cost associated with the warranty requirement of this regulatory proposal are estimated to be small as discussed in attachment D. Data from the surveys were used to generate cost values used in this document (see Attachment D).

The total incremental and fixed costs per evaporative family are used to summarize the total additional OHRV cost per vehicle, as shown in Figure VII-1.

The wide range of this data is explained by the high cost of compliance for evaporative families with very few OHRV sales in California per year. The “high estimate”, “low estimate”, and “average estimate” are based on the cost numbers received from manufacturers for each evaporative family.

Figure VII-1: Summary of OHRV Cost per Vehicle per Evaporative Family

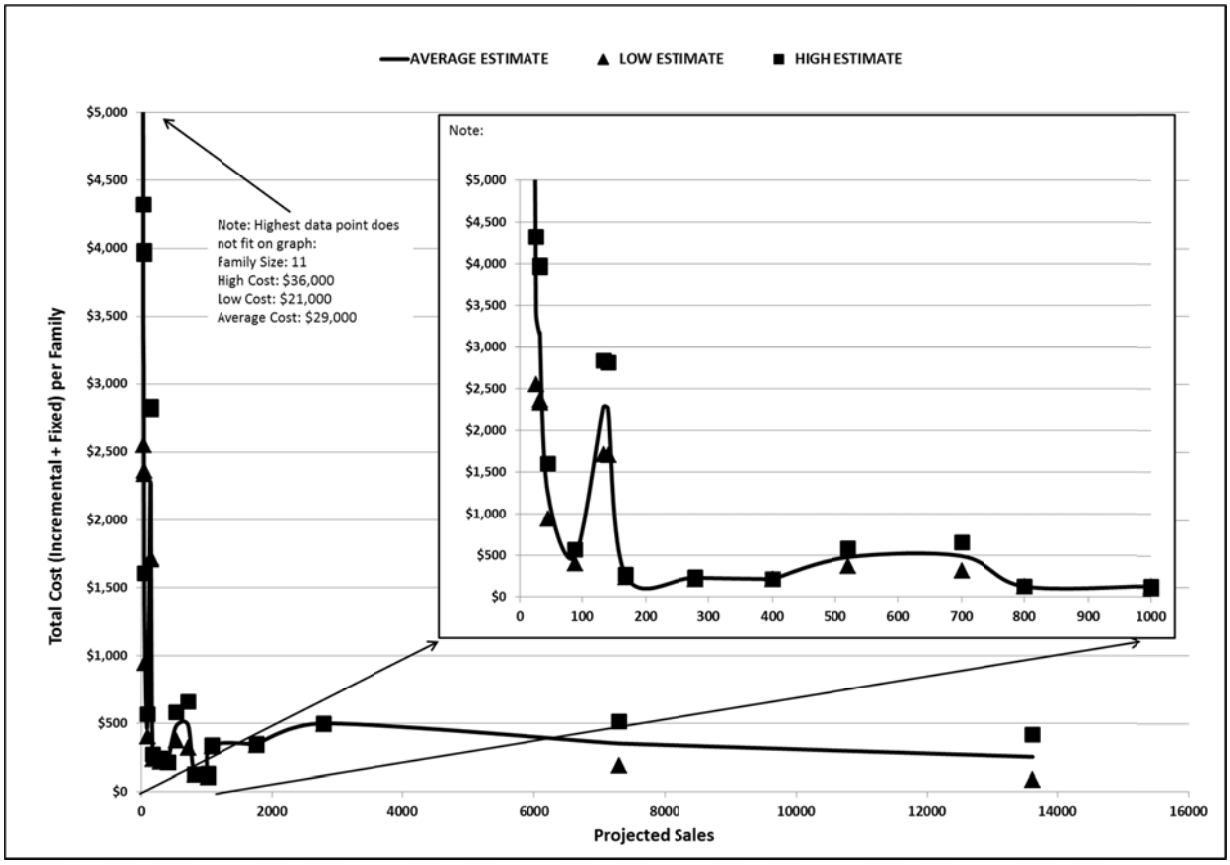
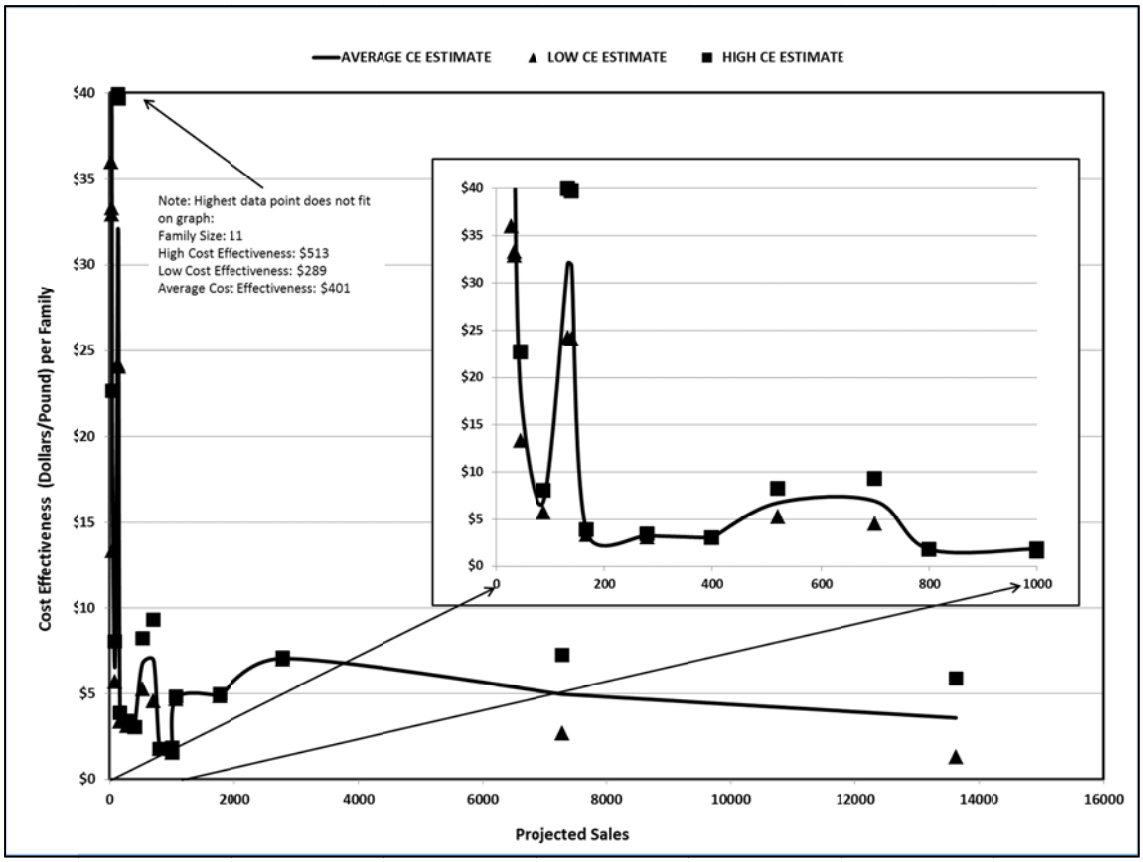


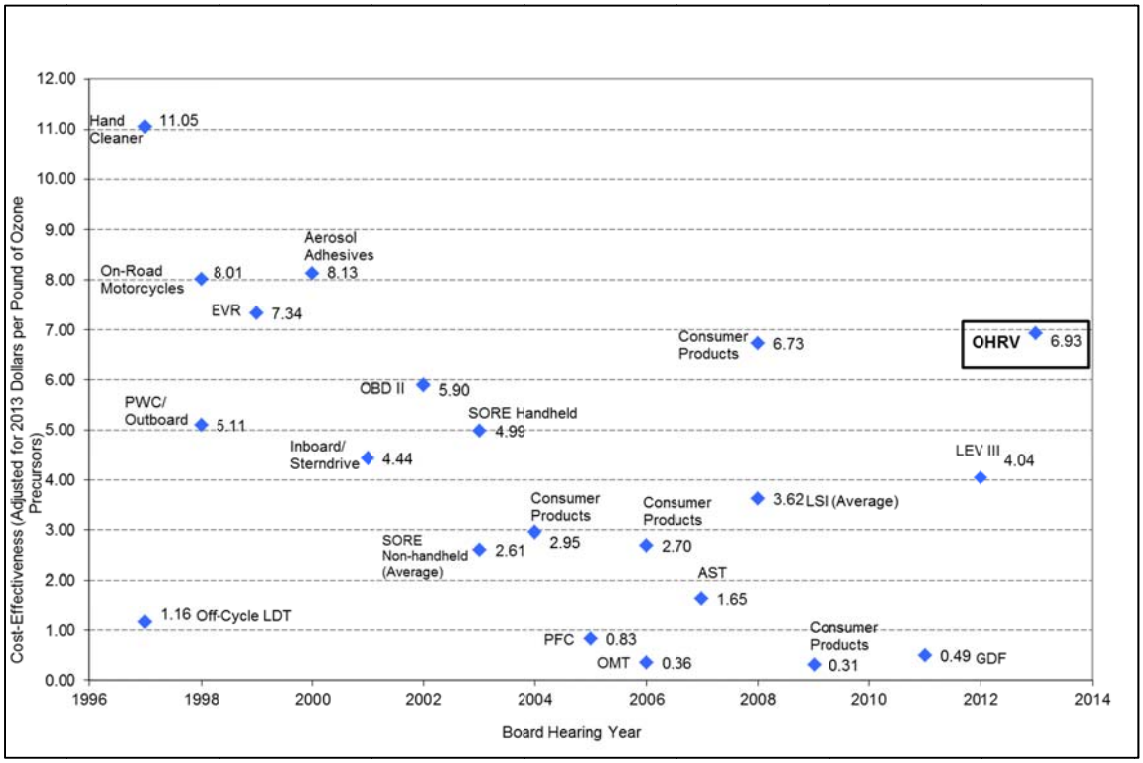
Figure VII-2 shows a summary of OHRV cost per pound per evaporative family based on the results of ARB’s cost survey. The graph shows that the evaporative family cost decreases as projected sales increase.

Figure VII-2 Summary of Cost-Effectiveness per Vehicle



The total cost of the regulation, based on the methodology detailed in Attachment D, ranges from $90 million to $215 million over 21 years. The cost-effectiveness of the regulatory proposal in terms of ROG emissions reductions is $6.93/lb., which falls within the range of previous regulations. The cost-effectiveness of this proposal is lower than the inflation adjusted cost of 8.01 $/lb. for the on-road motorcycle exhaust regulation adopted in 1998. Figure VII-3 compares the cost per pound of this regulatory proposal to the cost from other regulations adopted by the Board. Historic cost-effectiveness values are adjusted to 2013 dollars from the year of adoption.

Figure VII-3: OHRV Cost-Effectiveness Compared to Similar Regulations



The cost of compliance is calculated based on the incremental cost for control technology components, and the annualized per-OHRV costs associated with fixed costs such as redesign, testing, and certification. It is assumed that the first four years of implementation follow a vehicle phase-in schedule of 50 percent in 2018, 75 percent in 2019, 75 percent in 2020, and 100 percent in 2021. Manufacturers are given the flexibility to adjust the phase-in schedule to best fit their needs, so long as 75 percent of the MY 2018-2021 OHRVs have controls and all evaporative controls are fully implemented for 2022 and subsequent MYs.

C. POTENTIAL IMPACT ON BUSINESSES, BUSINESS COMPETITIVENESS, EMPLOYMENT, AND BUSINESS CREATION, ELIMINATION, OR EXPANSION

1. Potential Impact on Businesses

Staff verified that there are no major OHRV manufacturers located in California, and that those listed as manufacturing locations are actually large manufacturer vehicle distribution facilities. California's OHRV manufacturing population consists of a few small volume spark ignition sand car manufacturers that meet small business criteria. These manufacturers already purchase ARB compliant engines and fuel management packages, and if promulgated, staff anticipate that they will also purchase ARB certified fuel storage systems in order to comply with the proposed evaporative emission standards. Given their low annual production volumes (50 or less), California's sand car manufacturers are expected to qualify for the small volume OHRV

manufacturer design-based standard. As such, the typical small business in California will not find it necessary to assume costs associated with certification and redesign as long as they purchase ARB certified components. Annual reporting and incremental component costs are estimated to be the only impacts to small business. The cost of this regulatory proposal, if added to a sand car, is expected to be virtually indistinguishable within the overall price of these typically expensive vehicles.

Most OHRV manufacturers sell their products through distributors and dealerships, most of which are independently owned and carry OHRVs from multiple manufacturers. This regulatory proposal will have some indirect impact, although not significant, on small businesses that buy and sell OHRVs. During the initial years of implementation, the increased cost of OHRVs may lead to a slight drop in demand that could result in lower profits. The retailer would carry unsold stock over to the next year, possibly incurring less profit on the sale of these units. However, these impacts have been mitigated by the flexible phase-in schedule of emission controls, the ability for manufacturers to certify OHRVs with credits, and an implementation year that coincides with a steady increase in projected vehicle sales. Manufacturers will incur the costs associated with annual reporting, however the costs are small compared with fixed and technology costs. All manufacturers are required to submit similar annual reports for compliance with the OHRV exhaust emission regulation, therefore, the additional costs associated the evaporative reporting requirements is expected to be minimal.

2. Potential Impact on Business Competitiveness and Employment

This regulatory proposal would have no significant impact on the ability of any OHRV manufacturing business to sell outside or within California. Specific to California sales, all OHRV manufacturers are subject to the proposed regulations regardless of where they are manufactured. The California businesses impacted by this regulatory proposal are indirectly affected as they are affiliated businesses such as vehicle dealers, aftermarket parts shops, and excursion companies that rent OHRVs to vacationers. These businesses compete within the State and are generally not subject to competition from out-of-state businesses. Therefore, this regulatory proposal is not expected to impose significant competitive disadvantages on affiliated businesses.

A potential indirect employment impact could be that dealers, distributors, or importers downsize their staff due to a decrease in OHRV sales associated with the increase in costs to control evaporative emissions from OHRVs. However, these losses could be offset by increases from new technology development and demand.

3. Potential Impact on Business Creation, Elimination, or Expansion

This regulatory proposal is not expected to have a noticeable impact on any OHRV manufacturers located within California because there are no major OHRV manufacturing facilities located in the state. OHRV sales in California

represent only about 10 percent of national sales (MIC, 2012). However, some small businesses operating outside of California may decide to discontinue producing vehicles for the California market due to cost increases, which would result in a decrease in model availability. For the first time, the regulatory proposal allows zero-emission OHRVs to generate advanced fuel system credits. This allowance will provide an incentive for OHRV manufacturers to expand existing zero-emission vehicle production or to begin investing in the technology. Additionally, the several small zero-emission OHRV manufacturing facilities that exist in California may benefit from an increase in demand and market availability.

4. Potential Impact on Consumers

The cost of implementation is expected to be passed down to the consumer and is estimated to result in a 4 to 9 percent cost increase per OHRV (based on an average retail cost of $5,000 per vehicle) (see Attachment D). A retail price increase would be less noticeable for OHRVs that can more readily absorb fixed cost increases, such as OHRVs with high sales volumes or higher priced OHRVs. The end user will save an average of $53 in fuel costs over the life of the vehicle as a result of reduced evaporative emissions. Consumers who purchase OHRVs with fuel injection will also see a reduction in fuel consumption depending on the fuel control tune. There may be fewer options in a particular OHRV segment, but there is expected to be at least one OHRV model available for sale in each significant segment. Segments that are very specialized can be filled with OHRVs certified to meet the small volume manufacturer design standard.

D. POTENTIAL IMPACT TO CALIFORNIA STATE OR LOCAL AGENCIES

Staff anticipates that the regulatory proposal will have little to no adverse impacts on local, state and federal agencies that purchase OHRVs. OHRVs are typically an incidental component of certain public fleets that are used on a fractional basis. Although future OHRV procurement patterns are unknown, staff does not believe that the marginal per unit cost increases imposed by this regulation are significant enough to require budgetary baseline augmentations. With respect to local agencies (cities, counties and school districts), this regulation will not trigger the subvention clauses enumerated in Article 13 B, Section 6 of the State Constitution and Sections 17500 et. seq. of California Government Code. This regulatory proposal applies to all residents generally and equally, and does not represent a new or expanded program for local agencies.

Although this regulatory proposal will have no adverse fiscal impacts on local and federal agencies, there is a small impact to the State. Staff estimates that the ARB will require an additional 2.5 person years (PY) to certify new OHRVs and ensure compliance. Staff recommends that the additional 1.5 PYs associated with certification will be needed in perpetuity starting during the 2016-2017 fiscal year, followed by the 1.0 PY for enforcement starting in fiscal year 2017-2018.

E. ALTERNATIVES

Alternatives to the proposed rulemaking are described in Section III, part B. Economic impacts of these alternatives are considered below.

1. Economic Impacts of Taking No Action

Under this alternative, it is likely that no vehicle manufacturers would voluntarily incorporate additional emission control technology into their designs. A manufacturer that did would be at a competitive disadvantage. No additional direct costs would be imposed on manufacturers or stakeholders. However, no benefits in the form of ROG emissions reductions would be realized. Moreover, failure to meet 2007 SIP commitments could lead to a finding of non-implementation resulting in sanctions under Section 110(m) of the CAA.

2. Economic Impact of Eliminating the Carbon Canister Protection Tip Test

Staff considered industry's request to remove the carbon canister protection tip test from the proposal. However, after consideration and analysis it was retained. Eliminating a carbon canister protection tip test would reduce the redesign costs for manufacturers that must comply with the proposed regulation. However, both ATVs and off-road motorcycles operate at extreme angles and off-road motorcycles tip onto their sides during typical use. Without a carbon canister protection tip test there is no way to verify that the carbon canister is not exposed to liquid fuel during a tip over, which could permanently damage the canister within the first few running events. Adding a carbon canister protection tip test during certification is a proactive means to prevent manufacturers and consumers from bearing the cost of control technology that does not fully control emissions. Poorly designed evaporative emissions control systems could create an enforcement burden, demand re-design to address in-use compliance, and forfeit expected emission reductions.

TP-933 introduces a carbon canister protection tip test that is designed to be inexpensive but effective at verifying protection. In the case where manufacturers would like to use other methods, the test procedure outlines the general guidelines for developing a carbon canister protection test that ensures compliance with the emission standards at full useful life. For further details on estimated vehicle redesign costs see Attachment D.

3. Economic Impact of Separate Standards for Each Mode of Use

A possible alternative to the proposed regulation would be to adopt separate standards for each mode of use: running loss, hot soak, and diurnal. This alternative was proposed during the regulatory development period, but it was withdrawn due to the added regulatory complexity, which provided little or no emissions benefit. Originally this regulatory proposal required all OHRVs to measure emissions from each usage mode in a SHED enclosure. The vehicle could certify to emission standards by comparing test data to a variety of standard options. The additional flexibility of multiple standards for each test

would have made the record keeping of credit calculations unnecessarily complicated and time-consuming for both manufacturers and ARB. Furthermore, the need for additional variable volume SHED enclosures to perform all three of these tests on each vehicle family would place an unnecessary financial burden on manufacturers. The proposed rulemaking reduces SHED testing to only one test per vehicle, which substantially cuts manufacturers' testing costs.

VIII. SUMMARY AND RATIONALE FOR EACH REGULATORY PROVISION

The proposed changes address the 2007 SIP commitments for comprehensive OHRV evaporative emissions reductions. The purpose and implications of each section of the proposed regulation order are explained below. The Proposed Regulation Order (Attachment A) presents the full text of proposed changes, which comprise the adoption of Cal. Code Regs., tit.13, § 2416-2419.5.

PROPOSED ADOPTION OF CAL. CODE REGS., TIT.13, § 2416 - APPLICABILITY

Section 2416 states that MY 2018 and later OHRVs that are sold or offered for sale in California must meet the evaporative emissions requirements of this regulation. OHRVs excluded from this regulatory proposal include electric golf carts, zero-emissions OHRVs (apart from OHRVs used to generate emission credits), snowmobiles, and diesel-powered OHRVs.

PROPOSED ADOPTION OF CAL. CODE REGS., TIT.13, §2417 - DEFINITIONS

This section incorporates definitions previously set forth (Cal. Code Regs., tit.13, § 1900(b)) with several additional of terms needed to support the proposed regulatory language.

The following definitions are added in addition to references to existing definitions:

(1) The definition of “Conventional Tool” is being added to reduce end-user tampering with the evaporative emission control system by requiring that common tools are not used to secure visible evaporative system components.
(2) The definition of “Diurnal Emissions” is being added to clarify evaporative emissions produced when the vehicle is subject to the specific 24-hour temperature profile indicated in associated test procedures.
(3) A definition for “Fuel Injection” is being added to clarify the type of technology required by the small volume manufacturer design standard.
(4) A definition for “Off-Highway Recreational Vehicle (OHRV)” is being amended so it includes any vehicle powered by an OHRV engine.
(5) A definition for “Off-Highway Recreational (OHRV) Certification Value” has been added to clarify the emissions value measured during testing that is used to certify a specific evaporative family. An OHVR certification value that is different than the applicable emission standard will result in the generation or deficit of evaporative emission credits, as applicable.
(6) A definition for “Permeation emissions” or “Permeation” is being added to clarify emissions due to diffusion through fuel system components.
(7) A definition for “SAE J1737”, is being added to incorporate the test procedure for certifying fuel hoses for the design-based standard by reference and include the title: *Test Procedure to Determine the Hydrocarbon Losses from Fuel Tubes, Hoses, Fittings, and Fuel Line Assembly by Recirculation*, revised November 2004 (SAE, 2004).

(8) A definition for “Small Volume Off-Highway Recreational Vehicle (OHRV) Manufacturer” is being added to limit the exemption to vehicle manufacturer that sell less than or equal to 50 new OHRVs per MY, on average for three years.
(9) A definition for “Tampering” is being added to clarify tampering vs. tamper which for this regulation will mean the same thing.
(10) A definition for “Total Organic Gases” or “TOG” is being added to clarify all gases containing carbon, except carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which are not required to be measured by the diurnal emission standards.
(11) A definition for “Vehicle Identification Number (VIN)” is being added as to clarify the alphanumeric code assigned by a manufacturer to identify a specific OHRV.
(12) A definition for “TP-902” is being added to incorporate the test procedure for certifying carbon canister for the design-based standard by reference and include the title: *Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines*, adopted July 26, 2004, which is incorporated by reference herein (ARB, 2004).
(13) A definition for “TP-933” is being added incorporate the test procedure by reference and include the title: *Test Procedure for Determining Evaporative Emissions from Off-Highway Recreational Vehicles*, adopted [adoption date].

PROPOSED ADOPTION OF CAL. CODE REGS., TIT.13, §2418 - EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES

Section 2418(a) specifies that TP-933 must be used to measure the emissions detailed in Table 1 of this section. To offer flexibility to manufacturers, the regulation offers two test options by which an OHRV can meet evaporative emissions standards.

Table 1 presents the two test options for evaporative emission standards. Both test options include a 1 g TOG/day diurnal emission standard and a zero liquid leakage allowance during a fuel system leakage tip test. The “72-Hour Diurnal Standard” option requires three 24-hour diurnal SHED tests to directly measure vehicle emissions per day. The “Steady State Diurnal Standard” requires a 24-hour SHED test to demonstrate control of permeation emissions and proper evaporative system construction, in addition to vented emission calculations (evaluated and approved by Dr. Reddy of Evaporative Emissions Consulting, Inc.) to show compliance with the standard. Manufacturers that choose to certify OHRVs using the “Steady State Diurnal Standard” are permitted to use a pressurized fuel system with a relief pressure of 2 pounds per square inch gauge.

To maximize emissions control from refueling, ATVs with fuel tanks over 3.5 gallons that are redesigned to be geometrically different after MY 2017, must meet the same fuel tank sealing surface specifications as on-road vehicles (International Standards Organization 13331:1995(E)).

Section 2418(b) allows manufacturers who sell less than 50 OHRVs in California for an average of three years, to certify using a design-based standard with prescriptive technology. The intent of this section is to mitigate per-vehicle certification testing costs. As shown in Table 2, required control technology for small volume manufacturers includes low permeation fuel hoses, carbon canisters, and fuel

injection. The fuel tank permeation standard remains unchanged from the current federal standard.

Section 2418(c) specifies the test procedures required for certification testing to comply with the required standards.

Section 2418(d) describes the phase-in schedule for OHRV manufacturers to meet the proposed evaporative standards. The phase-in provides flexibility over a four-year timeframe as long as the average compliance of the total California OHRV fleet over this time period is greater than or equal to 75 percent.

PROPOSED ADOPTION OF CAL. CODE REGS., TIT.13, § 2419.1 - EVAPORATIVE EMISSION CONTROL LABELS

All OHRV manufacturers subject to this regulation must attach an evaporative emissions label that provides the requisite information for proper vehicle identification and maintenance. To eliminate duplicative language, OHRVs that are certified to both exhaust and evaporative emissions standards are permitted to use an integrated emissions label. All requirements for the exhaust emission label remain as specified in Cal. Code Regs., tit.17, §2413. This section describes the evaporative labeling requirements.

PROPOSED ADOPTION OF CAL. CODE REGS., TIT.13, § 2419.2 - DEFECTS WARRANTY REQUIREMENTS FOR EVAPORATIVE EMISSION SYSTEMS OF 2018 AND SUBSEQUENT MODEL OFF-HIGHWAY RECREATIONAL VEHICLES

All OHRV manufacturers subject to the proposed regulation must warranty their “high priced” evaporative emissions components including labor for 60 months, 5000 miles, or 500 hours, whichever comes first, from the date of final sale to the end user. Any part which costs $200, adjusted for inflation, or more is considered “high priced”. All other evaporative components must have a warranty of 30 months, or 2500 miles, or 250 hours, whichever comes first. The warranty covers all parts not scheduled for replacement as required by the Air Resources Board “Emissions Warranty Parts List” dated December 14, 1978, as amended on February 22, 1985. Parts scheduled for replacement as required maintenance in the written instructions are warrantied for the period of time prior to the first scheduled replacement point for that part. Each manufacturer must provide written instructions for the maintenance and use of the vehicle by the owner and a list of warranted parts installed on that vehicle or engine. The only warranty exclusion is if the manufacturer can demonstrate that the vehicle was abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for the repair or replacement of the part.

PROPOSED ADOPTION OF CAL. CODE REGS., TIT.13, §2419.3 - EVAPORATIVE EMISSIONS CONTROL SYSTEM WARRANTY STATEMENT

The manufacturer must provide a copy of the warranty statement for all OHRVs sold in compliance with this regulation in California. The warranty statement is a general

description of the obligations and rights of the vehicle manufacturer and owner as they relate to this regulation. The format of the statement shall follow the outline below.

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

- YOUR WARRANTY RIGHTS AND OBLIGATIONS
- MANUFACTURER'S WARRANTY COVERAGE
- OWNER'S WARRANTY RESPONSIBILITIES

PROPOSED ADOPTION OF CAL. CODE REGS., TIT.13, §2419.4 - NEW OFF-HIGHWAY RECREATIONAL VEHICLE ENGINE EVAPORATIVE EMISSION STANDARDS, ENFORCEMENT AND RECALL PROVISIONS, WARRANTY, QUALITY AUDIT, AND NEW ENGINE TESTING

All OHRVs subject to this regulation must follow the same vehicle emission-related recall procedures that have been used for light-duty vehicles since 1982.

PROPOSED ADOPTION OF CAL. CODE REGS., TIT.13, § 2419.5 - EVAPORATIVE SYSTEM TESTING AND CERTIFICATION REQUIREMENTS

Section 2419.5(a) states that manufacturers must meet all other applicable codes and regulations.

Section 2419.5(b) outlines the requirements for manufacturers to certify OHRVs to the emission standards in 2418(a) or the OHRV small volume manufacturer design-based standards in 2418(b). Manufacturers must obtain an Executive Order of Certification from ARB for any OHRV offered for sale in California. Manufacturers that certify to the emission standards must supply data showing test results at or below the standard, generated in compliance with the regulation using TP-933 or another approved test procedure.

A small-volume manufacturer can choose to certify using the evaporative design-based standards of section 2418(b). The application for design-based certification must include test results showing compliance for each component used or reference an Executive Order that documents compliance. Component certification can be done by following the requirements of Section 2767.1 of the SORE evaporative regulation

Section 2419.5(c) specifies how manufacturers can use advanced fuel system credits to certify their fleet, where credits are generated based on certification values or zero-emission vehicle credits; credits can only be applied within the MY they were generated and can not to be sold or traded; eligible zero-emission OHRVs are awarded a 0.75 g/day TOG credit per OHRV; and no single family of OHRVs can have a certification value over 300 percent of the standard. Manufacturers must certify zero-emission OHRVs to generate evaporative emission credits. To certify a zero-emission vehicle evaporative family, a manufacturer only needs to comply with administrative requirements. Zero-emission golf carts are not eligible for credits because their gasoline-powered counterparts are regulated under SORE provisions.

Manufacturers may use credits to certify OHRVs that exceed evaporative emission standards. Manufacturers certifying evaporative families using credits must submit calculations detailing their annual production plans and certification test results, and they must submit their actual sales data at the end of each MY. If a shortfall of credits is documented, based on final sales, all OHRVs sold under that Executive Order of Certification will be considered non-compliant. Manufacturers that participate in the advanced fuel system credits program must follow the administrative and final reporting requirements of Section 2419.5(d).

Section 2419.5(d) describes the administrative requirements manufacturers must follow, as required by an Executive Order of Certification. An OHRV manufacturer is responsible for establishing, maintaining, and retaining records for each evaporative family for a minimum of eight years including vehicle identification data, projected sales, actual sales, and certification test results. Additionally, manufacturer calculations associated with vehicle phase-in and advanced fuel system credits must be included in the evaporative family records. Actual sales volumes are defined as shipments to distributors of products intended for sale in California.

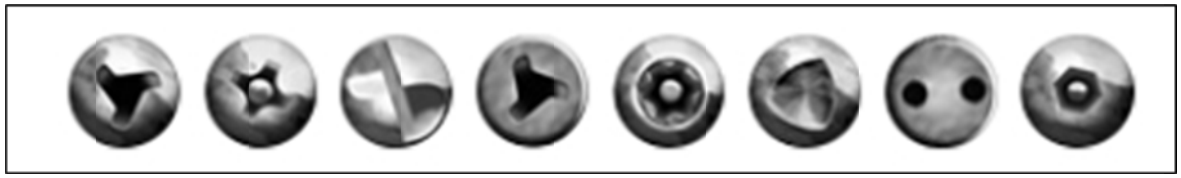
Section 2419.5(e) requires manufacturers to submit final reports within 90 days of the end of a MY. The final reports must include projected sales volumes, actual sales volumes, and certification values. Additional requirements for compliance demonstrations by calculation apply for manufacturers that participate in the vehicle phase-in period or advanced fuel system credits.

Section 2419.5(f) specifies evaporative testing requirements including compliance test procedures and notification of failure.

Section 2419.5(g) expresses the terms and conditions for suspension or revocation of an Executive Order of Certification.

Section 2419.5(h) tamper resistant vehicle design is required by the regulation to discourage end users from removing evaporative emission components from OHRVs. The carbon canister must be installed within the cross-sectional profile of the vehicle, or mounted such that non-conventional tools are required to remove it and the vapor line connections to the canister. Non-conventional tools are defined by the regulation as tools an owner would not have in their tool box, for example the screw types in Figure VIII-1, therefore making removal of the evaporative components more challenging. A vehicle tampering statements is also required as part of the anti-tampering provisions, to educate owners about the legal requirement to maintain the OHRVs emission control system. Manufacturers are encouraged to place the vehicle tampering statement on a tag that will visibly hang from the vehicle prior to sale, to educate both the final purchaser, and all other customers that view the vehicle at the dealership. However, in cases where this is not possible, the tag may be adhered to the front cover of the owner’s manual.

Figure VIII-1: Example of Tamper-Resistant Screw Types



Section 2419.5(f) allows staff to periodically inspect OHRV manufacturing facilities. Failure of a manufacturer, distributor, or retailer to allow access for inspection purposes may be grounds for suspension or revocation of an Executive Order of Certification, as stated in subdivision (g).

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