State of California
AIR RESOURCES BOARD

PUBLIC HEARING TO CONSIDER THE PROPOSED AMENDMENTS TO THE EVAPORATIVE EMISSION REQUIREMENTS FOR SMALL OFF-ROAD ENGINES

STAFF REPORT: INITIAL STATEMENT OF REASONS

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EXECUTIVE SUMMARY

Background

Air Resources Board (ARB or Board) staff proposes to amend the existing ARB regulations for controlling evaporative emissions from spark-ignited small off-road engines (SORE) rated at or below 19 kilowatts (25 horsepower). There are more than 16 million SORE currently being used in California to power a broad range of lawn and garden equipment including lawn mowers, leaf blowers, and lawn tractors, as well as generators and small industrial equipment. Evaporative emissions from gasoline-powered SORE equipment are a significant source of reactive organic gas (ROG) and toxic air contaminant (TAC) emissions, both when stored and during operation. In 2016, evaporation of gasoline from SORE equipment in California is estimated to have produced approximately 45 tons per day of ROG, which exceeds the emissions from the more than 10,000 gas stations statewide. ROG emissions contribute to ground-level ozone formation and the nonattainment of national ambient air quality standards (NAAQS) for ozone in parts of California, such as the South Coast Air Basin and San Joaquin Valley Air Basin, which are designated extreme nonattainment areas for these pollutants. Emissions of TACs such as benzene pose a near-source health risk and contribute to increased morbidity and mortality in California.

ARB first adopted regulations to reduce evaporative emissions from SORE in September 2003. SORE are split into three engine displacement categories for the purposes of evaporative emission standards: 1) engines with displacement less than or equal to 80 cc, intended for use in handheld applications; 2) engines with displacement greater than 80 cc but less than 225 cc, intended for use in walk-behind applications such as lawnmowers; and 3) engines with displacement greater than or equal to 225, intended for use in larger equipment such as riding mowers. The regulations are intended to control diurnal emissions from engines with displacement greater than 80 cc and fuel tank permeation emissions from engines with displacement less than or equal to 80 cc. Under the regulations, two options exist for certifying evaporative emission control systems for engines with displacement greater than 80 cc: performance and design certification. Performance certification uses diurnal emissions testing as the means to demonstrate compliance with diurnal emission standards, and was preferred by ARB staff when the regulations were initially proposed. Design certification requires the use of individually certified fuel tanks, fuel lines, and carbon canisters to assemble an evaporative emissions control system. SORE industry representatives proposed the inclusion of design certification as an option during the later stages of the 2003 rulemaking and it was reflected in the final rule that was adopted by ARB in 2003. Design certification was intended to be a less expensive option than performance certification that would ensure the same emissions reductions as diurnal emission testing would achieve. Because SORE was the first ARB program to include design certification of evaporative emissions control systems, industry agreed to have two validation studies incorporated in the regulations to give ARB the means to assess the effectiveness of the two certification pathways.

The SORE validation studies were conducted on model year 2008-2010 and 2013-2015 equipment. In total, between 2008 and 2016, 59 units of equipment were tested: 49 design-certified and 10 performance-certified. Each unit underwent three diurnal emissions tests. As part of the agreed-upon study design, equipment was tested at a combination of ARB and industry testing facilities. Fifty five percent of the design-certified units and 60 percent of the performance-certified units failed to meet the applicable diurnal emissions standard in at least one of three diurnal emissions tests. Emissions from failing equipment in 2013 were up to 14 times the applicable emissions standard. These results suggest over half of all SORE sold in California do not meet the diurnal emission standards and that changes are needed to increase compliance with those standards.

In addition, the current certification test fuel does not contain ethanol, unlike the gasoline dispensed at California fueling stations, which has contained 10 percent ethanol since 2010. This outdated certification fuel is no longer representative of the gasoline sold in California, and testing with it may lead to an underestimation of SORE evaporative emissions. Small differences between the ARB fuel tank test procedure adopted in 2003 and U.S. EPA's test procedure, adopted in 2008, require manufacturers to conduct two separate sets of tests to obtain certification from ARB and U.S. EPA. This leads to unnecessarily high testing costs and certification timelines for SORE manufacturers. Because the ARB and U.S. EPA fuel tank test procedures are very similar, minimizing the differences between the two procedures and enabling one set of tests to meet the requirements of both agencies will reduce overall costs and paperwork for manufacturers.

Staff Proposal

To address the serious compliance issues identified in the SORE validation studies, staff proposes a number of amendments to the SORE regulations, including:

- Subjecting design-certified SORE to diurnal emission standards;
- Reducing the number of SORE engine units needed to be tested before ARB can take enforcement action from five to one;
- Requiring bonds for manufacturers without sufficient U.S. assets to cover enforcement obligations;
- Requiring recertification of evaporative components every four years;
- Requiring test fuel formulation to contain 10 percent ethanol (E10) to reflect motor vehicle fuel currently available in California; and
- Aligning, where practical, and without compromising ARB requirements, SORE certification and test procedures with those of U.S. EPA.

Currently, only the individual evaporative emission system components (fuel tank, fuel lines, and carbon canisters) of design-certified SORE can be tested for compliance, without accounting for other sources of evaporative emissions, such as carburetors. Manufacturers of performance-certified SORE are only required to test a single unit for certification, while ARB currently is required to test five SORE units to determine

compliance. This proposal will harmonize the number of units needed for certification and compliance, thus enabling ARB to evaluate and take potential enforcement action against a larger number of SORE manufacturers.

The proposed revision to subject design-certified SORE to diurnal emission standards will allow ARB to compliance test the assembled SORE as a unit to ensure compliance with those standards. Aligning compliance testing and certification testing requirements will also facilitate compliance testing by making the two sets of requirements comparable. This alignment will have the benefit of allowing ARB to perform more compliance tests with the same level of resources.

By establishing bonding requirements for manufacturers with less than $3-10 million in U.S. assets, depending on the length of time they have had certified SORE in California, the proposed amendments will help ensure SORE manufacturers have the ability to meet any potential monetary obligations associated with enforcement actions, and will deter manufacturers from knowingly producing non-compliant SORE products. The proposed bonding requirements are similar to those already adopted by U.S. EPA and in use nationally.

Certification renewal every four years for evaporative components will require Executive Order holders to assess whether any changes have been made that would affect the components' evaporative emissions. This revision will also provide ARB with a mechanism through which deficiencies can be corrected by withholding certification until information is provided that demonstrates compliance with SORE evaporative emission standards.

The proposed change in test fuel formulation will have no immediate effect on real-world ROG emissions because motor vehicle fuel dispensed at California gasoline stations has already been changed. Fuel at gasoline stations has contained 10 percent ethanol since January 2010. Therefore, SORE currently in use in California operate using E10 fuel. SORE that comply with the diurnal emission standards when tested with the current certification test fuel are expected to also comply when tested with E10 fuel. However, requiring E10 certification test fuel, along with the other proposed amendments that are intended to increase compliance rates, will help to ensure SORE introduced into California commerce meet current emission standards with commercially available gasoline. Aligning ARB SORE certification and test procedures with U.S. EPA procedure, where possible, eliminates duplicative requirements and gives manufacturers the option to certify fuel tanks based on a common set of data acceptable to both ARB and U.S. EPA.

Staff estimates the total cost of implementing the regulation amendments over a five year period will be $32.7 million (2016 dollars). Executive Order holders may incur costs for testing, certification, labeling, reporting, and evaporative emissions control system components up to approximately $7.0 million per year (2016 dollars). Current SORE sales in California are estimated at approximately 1.77 million units per year; therefore, assuming that SORE manufacturers mark-up costs by 75 percent, the

maximum price impact on SORE sold in California is estimated as $3.68 per unit (assuming the costs are averaged over all SORE sales in California over five years). Additionally, by aligning ARB certification and test procedures with those used by U.S. EPA, the proposed amendments will provide SORE manufacturers the opportunity to conduct a single set of fuel tank certification tests that can be accepted by both ARB and U.S. EPA. Testing one set of fuel tanks to meet ARB and U.S. EPA requirements will allow manufacturers to potentially spread costs across SORE sold nationwide, reducing the cost per unit.

Staff Recommendation

In arriving at the staff recommendation, ARB performed validation testing for more than eight years (2008-2016), conducted extensive stakeholder outreach, and held two public workshops to solicit feedback during development of the proposed amendments. Based on input from stakeholders, staff considered alternatives to the current proposal including no action, eliminating design certification entirely, and a counter-proposal from SORE industry representatives. Taking no action would severely limit ARB's ability to conduct compliance testing on SORE equipment, and provide no assurance the disparity between certification test data and SORE validation study results could be eliminated; therefore, this alternative was rejected. Staff believes eliminating the option for design certification would place an undue economic burden on the entire SORE industry, and would unfairly penalize SORE manufacturers currently producing design-certified equipment capable of meeting current SORE emission standards; therefore, this alternative was rejected. Staff gave serious consideration to the regulatory proposal submitted by SORE industry representatives, and indeed included some of their suggestions in the current staff proposal. However, staff ultimately decided this counter proposal, in whole, would make compliance testing more resource-intensive and complex, and would not provide ARB the ability hold SORE manufacturers accountable to ARB emissions standards for SORE; therefore, this alternative was also rejected.

Staff concludes the current proposal will enhance ARB's ability to identify non-compliant equipment, while not unfairly penalizing compliant manufacturers, and recommends that the Board adopt the proposed SORE regulatory amendments. The current proposal will increase compliance with the existing diurnal emission standards, ensuring that ROG emissions reductions needed for the State Implementation Plan (SIP) are achieved, while reducing near-source exposure to TACs and the associated health risk.

Future Actions

In September 2016, the Board considered proposed amendments to California's SIP for attaining NAAQS for ozone. Emissions of ROG and oxides of nitrogen (NO_x) from SORE are currently about 27 percent of those from light-duty vehicles in California. Because already adopted regulations like the Advanced Clean Cars Program will significantly reduce emissions from light-duty vehicles, absent any new regulations SORE emissions are projected to be relatively unchanged, and by 2031 would be 77

percent of those from light-duty vehicles. To meet California's air quality challenges and ensure fair and equitable reductions from all source categories, the proposed 2016 SIP amendments include a provision to reduce ROG and oxides of nitrogen (NO_x) emissions from SORE by an additional 80 percent by 2031. This is consistent with the anticipated emission reductions needed from all mobile source categories. As a first step towards achieving additional reductions from SORE, ARB will increase compliance testing to ensure SORE introduced into California commerce meet existing evaporative emissions standards. An expanded SORE compliance testing program is tentatively scheduled to begin in late 2016 or early 2017.

Enhanced compliance is important in ensuring emission reductions from already adopted regulations are being achieved but will not provide the dramatic reductions in criteria pollutants needed to meet California's 2016 SIP commitments. In addition, existing SORE regulations are focused on reducing criteria pollutants and do not explicitly achieve greenhouse gas reductions which are needed to address California's climate goals. Consequently, staff will propose new SORE regulations in 2018 that will be designed to achieve ROG, NO_x, particulate matter, and greenhouse gas reductions of 80 percent by 2031. As part of this new rulemaking, an updated emissions inventory will be developed to confirm the magnitude of the emissions reductions that are needed from SORE equipment. This will include conducting a SORE population and activity survey and performing additional exhaust and evaporative emissions testing. The exposure of SORE equipment users, especially commercial landscapers, to TACs will be studied to assess the health risks associated with operation of gasoline-powered equipment. To determine the lowest feasible emission standards for SORE, factors such as the availability of zero-emissions equipment that can be used to replace SORE, banked emission credits, and technological advancements in engine design and emission control systems will be considered. It is likely that a combination of tightened emission standards, incentives for manufacturers and consumers to increase the use of zero-emission equipment, and enhanced compliance testing will be needed to reduce emissions from SORE and achieve ARB's air quality, health, and climate goals.

I. INTRODUCTION AND BACKGROUND

Mobile sources have historically been the largest contributor of reactive organic gas (ROG) emissions in California. As on-road mobile sources have become progressively cleaner, the emissions from off-road sources, as well as mobile sources under federal and international jurisdiction (e.g., ships, locomotives, and aircraft) have become relatively more significant. Because most California air basins are classified as nonattainment or extreme nonattainment with national ambient air quality standards (NAAQS) for ozone, it is necessary to explore emission reduction strategies from all mobile source categories.

Small off-road engines (SORE) are spark-ignited and rated at or below 19 kilowatts (25 horsepower). SORE are used to power a broad range of lawn and garden equipment including lawn mowers, leaf blowers, and lawn tractors, as well as generators, shown in Figure I-1. Evaporative emissions from gasoline-powered SORE equipment are a significant source of reactive organic gas (ROG) and toxic air contaminant (TAC) emissions, both when stored and during operation. ROG emissions contribute to ground-level ozone formation and the nonattainment of national ambient air quality standards (NAAQS) for ozone in parts of California, such as the South Coast Air Basin and San Joaquin Valley Air Basin, which are designated extreme nonattainment areas. Emissions of TACs such as benzene pose a near-source health risk and contribute to

Figure I-1. a) Lawn Mower, b) Leaf Blower, c) Lawn Tractor, d) Generator

increased morbidity and mortality in California. Staff estimates there are approximately 16.5 million SORE units currently in California with combined ROG evaporative emissions totaling approximately 45 tons per day, as shown in Figures I-2 and I-3. Residential lawn and garden equipment account for about three quarters of the population and evaporative emissions. California is preempted from setting emission standards for equipment types used primarily for construction or farming, labeled "federally regulated equipment types." These include larger chainsaws, larger pumps, compressors, and welders, among other equipment types.

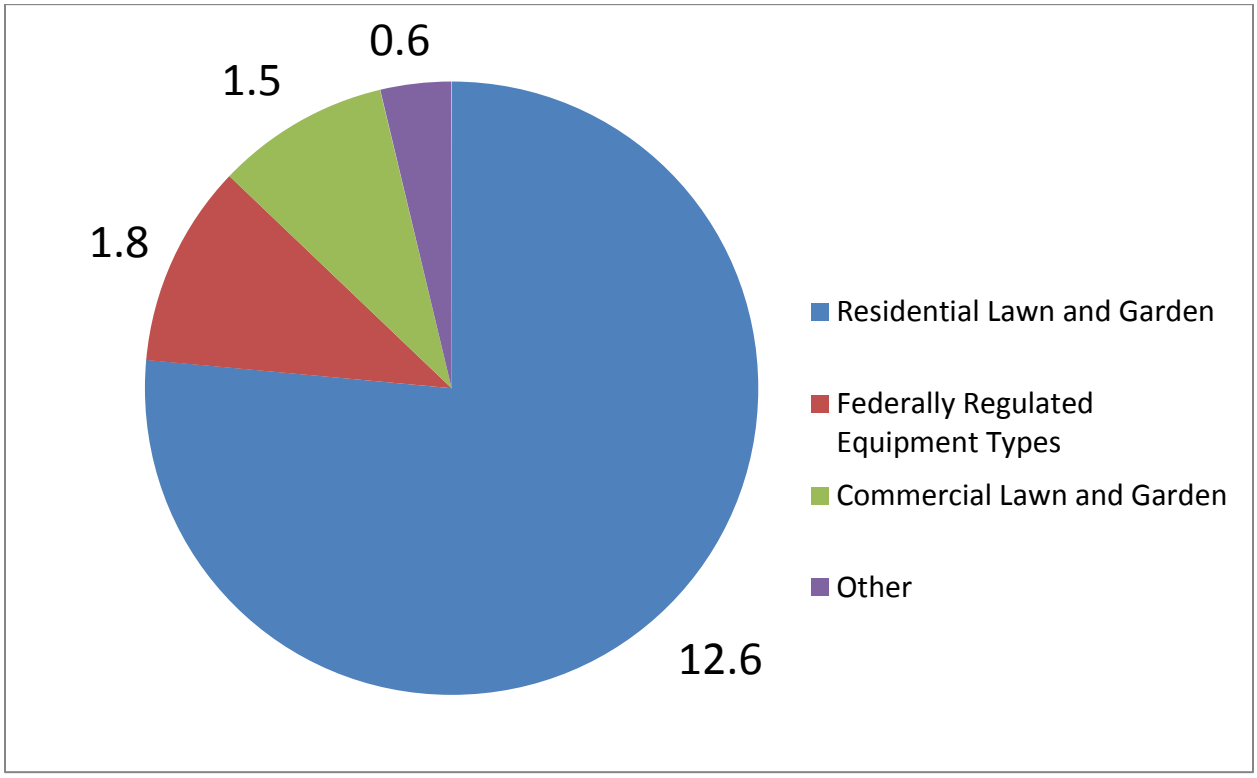

Figure I-2. Statewide SORE Population (Millions) in 2016 by Category

This staff report presents proposed amendments to the evaporative emission requirements for SORE introduced into California commerce. It illustrates the need for the proposed amendments, provides a summary of the proposed amendments, presents environmental and economic impacts of the proposal, and discusses alternatives along with staff's recommendation.

The proposed amendments include improvements to the certification procedures, revisions to the compliance testing procedure, an update of the certification test fuel to represent commercially available gasoline, and alignment of aspects of ARB's SORE requirements with those of the United States Environmental Protection Agency (U.S. EPA). SORE validation study testing performed by ARB has identified deficiencies in the ability of SORE equipment to meet current ARB diurnal emission standards, resulting in a potential shortfall of ROG emissions reductions from SORE. The proposed amendments are expected to

address current compliance issues and require fuel that is more representative of that currently dispensed at California gasoline stations.

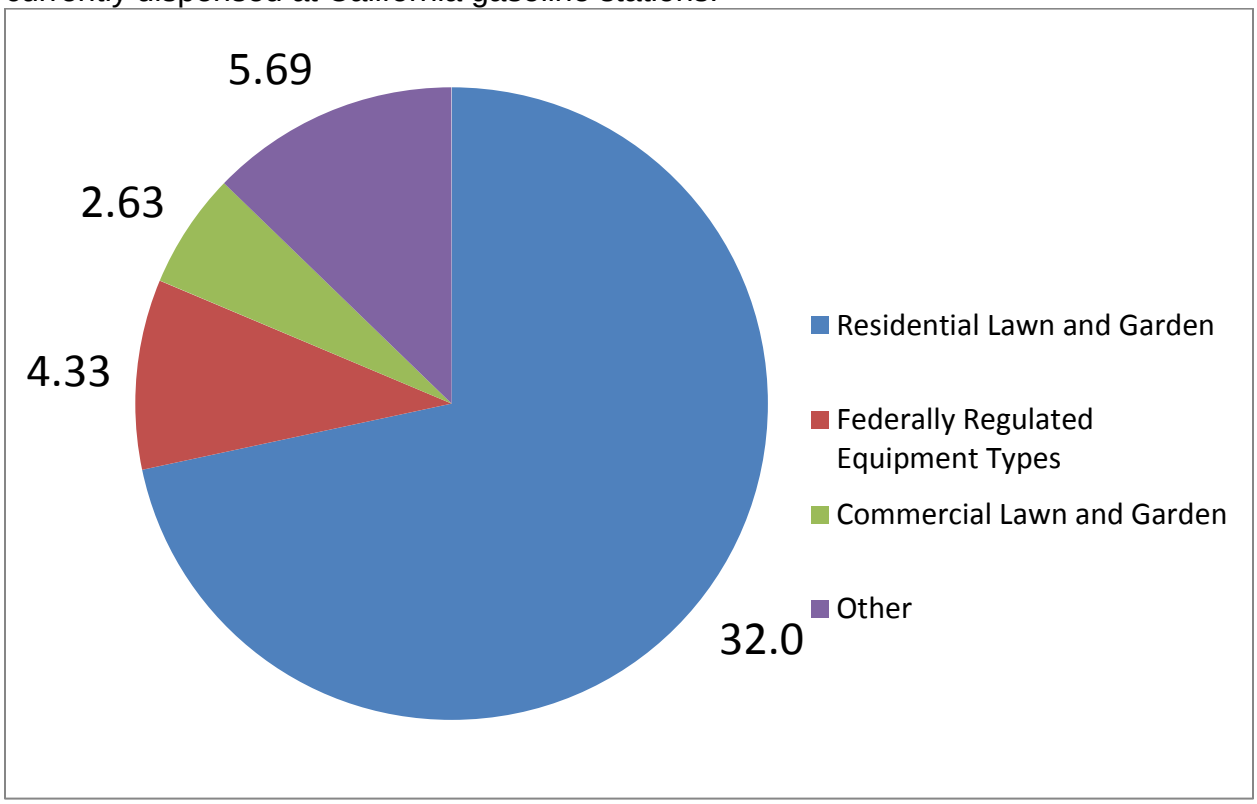

Figure I-3. Statewide SORE Evaporative Emissions (ROG, Tons Per Day) in 2016 by Category

A. Regulatory Authority and Regulatory History

1. Legal Authority

In 1988, the Legislature enacted the California Clean Air Act, which declared that attainment of state ambient air quality standards is necessary to promote and protect public health, particularly the health of children, older people, and those with respiratory diseases. The Legislature also directed that these standards be attained by the earliest practicable date.

Health and Safety Code (HSC) sections 43013 and 43018 direct ARB to achieve the maximum feasible and cost effective emission reductions from all mobile source categories, including off-road mobile sources such as SORE.

a. Authority to Control Mobile Sources Under the 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. California is allowed an exemption from CAA provisions that otherwise prevent states from setting their own standards for motor vehicle emissions. The exemption also recognizes California's long-standing air pollution challenges and honors the State's pioneering efforts to reduce motor vehicle emissions (NRC, 2006).

b. Legal Requirement to Submit a SIP

The CAA requires each state, including California, as codified in Title 42 of the United States Code (USC) Section 7410, to submit a State Implementation Plan (SIP) to U.S. EPA providing for the "implementation, maintenance, and enforcement" of primary as well as secondary air quality standards. These standards are designed to protect the public health and welfare within each air quality region of the State. The CAA also requires SIPs to be submitted within three years of the promulgation or revision of a NAAQS.

c. Regulatory Powers and Responsibilities Conferred by State Law

As named in HSC Sections 39500 and 39602, ARB is the air pollution control agency responsible for controlling emissions from motor vehicles "for all purposes set forth in federal law." Specifically named among ARB's general duties and powers (HSC §§ 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 §§ 43013, 43018).

d. Commitments under Proposed 2016 Amendments to the State Implementation Plan

In September 2016, the Board considered proposed amendments to the SIP. The 2016 State SIP Strategy describes State and local air quality planning to attain the 8-hour NAAQS for ozone of 80 parts per billion (ppb), set in 1997, by 2023, and the more recent 8-hour NAAQS for ozone of 75 ppb, set in 2008. The measures in the proposed State Strategy also form a framework for attaining the most recent 8-hour NAAQS for ozone of 70 ppb, set in 2015.

The 8-hour ozone standards are more stringent than the previous 1-hour standard and call for more extensive emissions control strategies. Although California has significantly reduced ambient ozone concentrations, the challenges posed by the more stringent standards prompted the reclassification of the San Joaquin Valley Air Pollution

Control District (SJVAPCD) and South Coast Air Quality Management District (SCAQMD) nonattainment designations. Both regions are now classified as “extreme nonattainment” 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 and ROG (CAA § 182(e)(5)).

The 2016 State Strategy included a new SIP measure for reducing emissions and incentivizing zero-emission equipment from SORE. The SORE emissions measure is projected to deliver necessary ROG emissions reductions statewide by 2031, including California’s most challenging regions with regard to ozone control, namely the San Joaquin Valley and South Coast air basins. Before those additional emissions reductions can be realized, it is essential to make sure the emissions reductions from SORE that were committed to in the 2003 SIP are achieved through compliance with the current emission standards for SORE.

2. Regulatory History

The first ARB evaporative emission standards for SORE were adopted in 2003. SORE are split into three engine displacement categories for the purposes of evaporative emission standards: 1) engines with displacement less than or equal to 80 cc, intended for use in handheld applications; 2) engines with displacement greater than 80 cc but less than 225 cc, intended for use in walk-behind applications such as lawnmowers; and 3) engines with displacement greater than or equal to 225, intended for use in larger equipment such as riding mowers. ARB staff proposed to control running loss, permeation, and venting emissions from all engines with displacement greater than 80 cc, by proposing diurnal emission standards requiring emissions testing using a sealed housing for evaporative determination (SHED). This was referred to as the performance-based method or performance certification, since a diurnal emission standard is a performance standard. A SHED (with the door open) with a riding lawn mower in it is shown in Figure I-4.

Evaporative emissions from engines with displacement less than 80 cc would be subject to fuel tank permeation standards only. The SORE industry expressed concerns regarding the cost of SHED testing and the feasibility of the ARB staff proposal, and proposed an alternative method for controlling evaporative emissions from engines with displacement greater than 80 cc in which fuel lines, fuel tanks, and carbon canisters would have to meet design standards. This method, referred to as the design-based method or design certification, would reduce fuel line and fuel tank permeation emissions and fuel tank venting emissions relative to an

uncontrolled engine. The differences between performance and design certification are illustrated in Figure I-5. Design certification was intended to be a simple and inexpensive method for producing evaporative emission control systems for engines that would meet the diurnal emission standards without SHED testing, and promised to ensure the same emission reductions that the ARB staff proposal would have achieved.

Figure I-4. Riding Lawn Mower in a SHED

The adopted evaporative emission regulations for SORE represented a compromise. Performance certification was required for evaporative emission control systems on walk-behind lawn mowers with engine displacement greater than 80 cc and less than 225 cc, which is the most common application for SORE. Evaporative emission control systems for other engines with displacement greater than 80 cc could be certified using

either performance certification or design certification. Fuel tank permeation testing was required for engines with displacement less than or equal to 80 cc. This was the first ARB program with a design certification option for evaporative emissions.

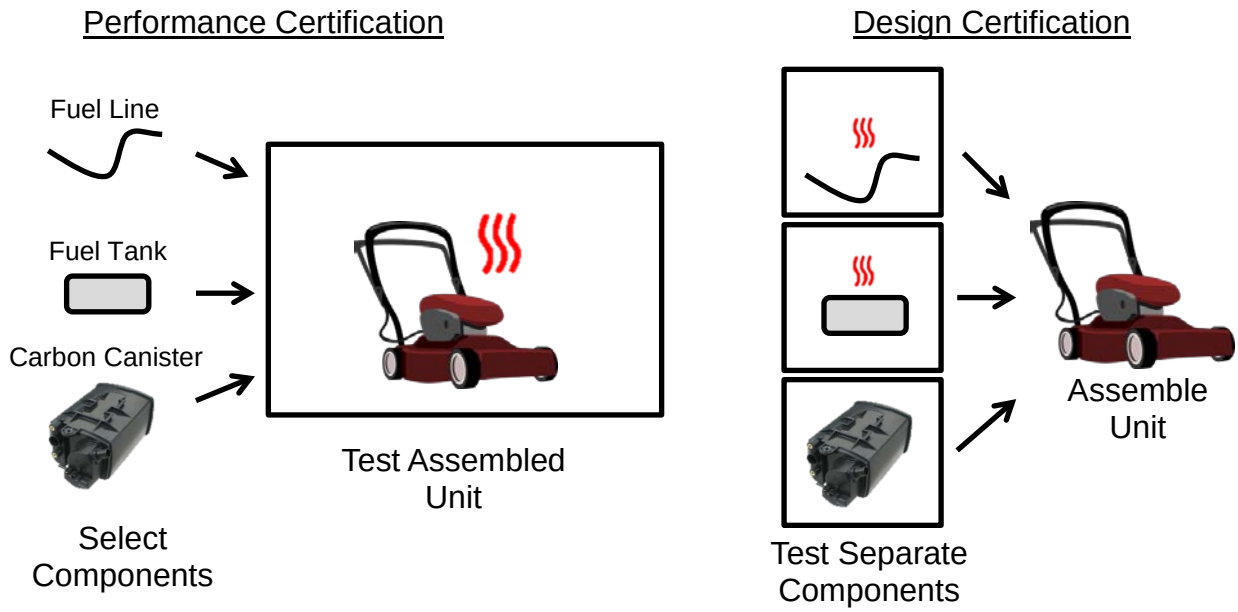

Figure I-5. Performance and Design Certification Procedures

Because design certification was a new option, the regulations included two validation studies to assess its effectiveness. The validation studies were conducted for model years 2008 through 2010, and model years 2013 through 2015, as summarized in Table I-1. The timing of the validation studies was chosen to provide information early in the implementation of the regulations and again several years later. All SORE units selected for the validation studies were tested for evaporative emissions using a SHED, regardless of their certification method. However, more design-certified units were tested because design-certified evaporative families were not SHED-tested for certification.

Table I-1. Test Units by Model Year for the Validation Studies

Model Year	Number of Performance-Certified Units	Number of Design-Certified Units
2008	3	15
2009	1	5
2010	1	5
2013	3	15
2014	1	5
2015	1	5

3. Federal Evaporative Emission Design Requirements

When California's SORE evaporative emission standards were adopted in September, 2003, no comparable federal rules existed. In 2008, the U.S. EPA adopted a rule with standards similar to the 2003 ARB design standards to control evaporative emissions from SORE.

The U.S. EPA requirements include controlling fuel tank permeation, fuel line permeation, and running losses, which may involve using a carbon canister. In addition, manufacturers must meet a fuel cap standard or test fuel tanks sealed with a fuel cap. The U.S. EPA also allows certification to the current ARB diurnal emission standards as an alternative to the fuel tank and fuel line requirements (40 CFR 1060.105(e)). In addition, the U.S. EPA rule includes a bond requirement to ensure specific manufacturers cover enforcement obligations and a fuel cap standard. U.S. EPA SORE regulations differ in other ways (see Section IV) from ARB's current SORE regulations. ARB's proposed amendments will align with a number of the U.S. EPA requirements but will retain where needed more stringent requirements needed to meet California's SIP commitments.

II. STATEMENT OF REASONS

A. Description of Problem Proposal is Intended to Address

1. Low Compliance Rate with Diurnal Emission Standards

The evaporative emissions regulations adopted by ARB in 2003 were the first to control evaporative emissions from SORE. ARB staff initially proposed certification to diurnal emission standards for all engines with displacement greater than 80 cubic centimeters (cc), but industry argued that the cost of testing all equipment for diurnal emissions would be too high. As an alternative to demonstrating control of evaporative emissions through diurnal emission testing, industry proposed to ensure equivalent emissions reductions from SORE by using individually certified components in the evaporative emissions control system.

The adopted regulations represented a compromise and attempted to address industry concerns by providing two separate pathways for certification. A manufacturer has the option to choose from either certification pathway for each evaporative family. In the first, known as performance certification, an engine is tested to ensure its diurnal emissions are below the diurnal emission standard. In the second, known as design certification, a fuel tank, fuel lines, and carbon canister certified to meet design standards are used in evaporative emission control systems. In design certification, diurnal emissions are assumed to be below the diurnal emission standard, but they are not measured for certification. Because this was the first ARB program to include design

certification, two validation studies were written into section 2754.2 of the regulations to give ARB the means to assess the effectiveness of the two certification options.

In the validation studies, diurnal emissions of design-certified and performance-certified equipment from model years 2008-2010 and 2013-2015 were measured. The goal of the validation studies was to provide the Executive Officer with data to determine whether design-certified and performance-certified equipment met the diurnal emission standards. Section 2754.2(f) states, in part, “The Executive Officer will evaluate the data collected and, based on reasonable criteria, make a determination whether the performance-based option in section 2754(a) and the design-based option in section 2754(b) are achieving ARB's overall emission reduction goals.” The implication was that, depending on the results of the validation studies, the certification options might be modified or one option would be eliminated.

Validation study test results for SORE model year 2008 through 2010, and model year 2013 through 2015 are summarized in Figure II-1 and Table II-1. ARB conducted all of the testing for model year 2008. Testing of design-certified equipment for model years 2009 and 2010 was conducted by laboratories selected by the Executive Order holders, and the performance-certified units were tested by ARB. Overall, the results for model years 2008 through 2010 showed neither certification method was producing compliant evaporative emission control systems reliably, with 18 of the 30 units failing at least one of the three diurnal emission tests, as shown in Figure II-1.

ARB conducted all validation study testing for model year 2013. Testing of design-certified units for model years 2014 and 2015 was again conducted by laboratories selected by the Executive Order holders with one exception. ARB tested the performance-certified units for 2014 and 2015 and one design-certified unit for 2014. Surprisingly, and despite the five years that had passed since the 2008-2010 validation study, the non-compliance rate observed for the units tested for model years 2013 through 2015 was again above 50 percent. Overall, 15 of 29 units failed at least one diurnal emission test. These results did not indicate significant progress on the part of Executive Order holders to improve the evaporative emissions performance of their products, and also point to a disconnect between the results obtained when ARB conducts testing versus when Executive Order holder-selected laboratories conduct the testing.

More detailed results from the validation studies are included in the “Technical Support Document: Small Off-Road Engine Validation Study and E10 Test Results.” When looking for trends among the results, staff noted several Executive Order holders, engine manufacturers, and equipment manufacturers had more than one unit represented during the six years of the validation studies; and each experienced both passing and failing results. Several of the design-certified units used the same fuel lines, but those units produced a

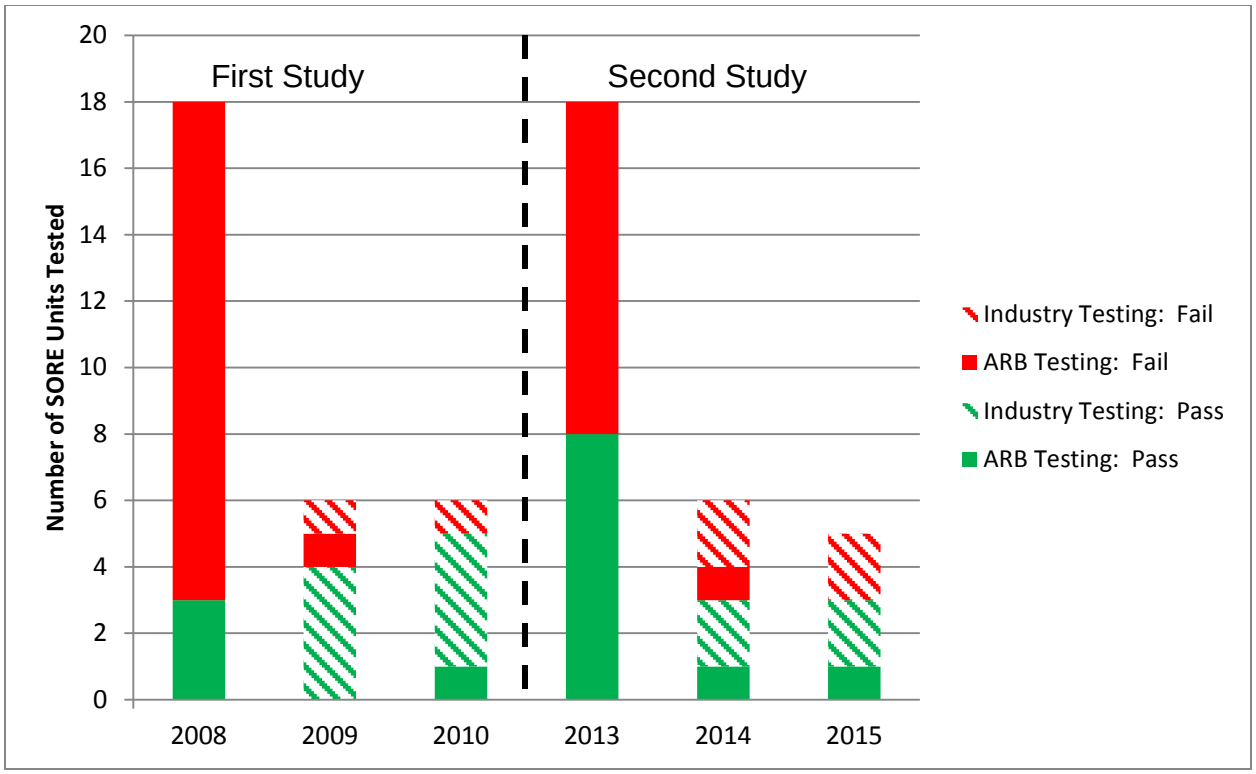

Figure II-1. SORE Evaporative Emission Validation Study Results by Year

mixture of passing and failing results. Staff also observed that many of the failing design-certified units used metal fuel tanks, and some of these had fuel leaks.

Other than visible fuel leaks, which contributed to the failure of some of the units with the highest emissions, the causes of the failures were not obvious. No explanations for the failures have been offered by the Executive Order holders whose equipment failed, nor have solutions for the affected evaporative families been disclosed to ARB, if they have been implemented. Since performance-certified evaporative families are tested in a SHED, the performance-certified units should have met the diurnal emission standards if

Table II-1. Validation Study Results by Model Year

Model Year	Passing Units		Failing Units	
	Design	Performance	Design	Performance
2008	2	1	13	2
2009	4	0	1	1
2010	4	1	1	0
2013	8	0	7	3
2014	2	1	3	0
2015	2	1	2	0
All Years	**22**	**4**	**27**	**6**

they were produced in the same way and with the same care as the units tested for certification. Design-certified evaporative families are not tested in a SHED for certification, but the use of certified fuel lines, fuel tanks, and carbon canisters was supposed to ensure that production units would meet the diurnal emission standards.

In summary, several conclusions can be drawn from the validation studies. First, the compliance rate of SORE with the diurnal emission standards has been low since 2008 and has not improved significantly; neither performance nor design certification is consistently resulting in SORE that meet ARB's overall emission reduction goals. Second, changes to the certification and compliance testing procedures need to be made to ensure all engines with displacement greater than 80 cc comply with the diurnal emission standards and allow ARB to take enforcement action when necessary. Third, Executive Order holders have not to date had sufficient incentives to ensure their equipment complies with the diurnal emission standards.

Results from the two SORE validation studies also indicate a disparity between applicant-submitted certification data and ARB's data for the same evaporative families. This disparity is highlighted in Figure II-2. The validation study results show greater than 50 percent of the SORE units tested fail to meet ARB's diurnal emission standard, even though manufacturer-submitted certification data show a 100 percent passing rate. Changes are needed to ensure that SORE sold to consumers consistently have the same diurnal emissions as units tested for certification. When non-compliant evaporative families are identified, ARB must be able to seek remedies effectively.

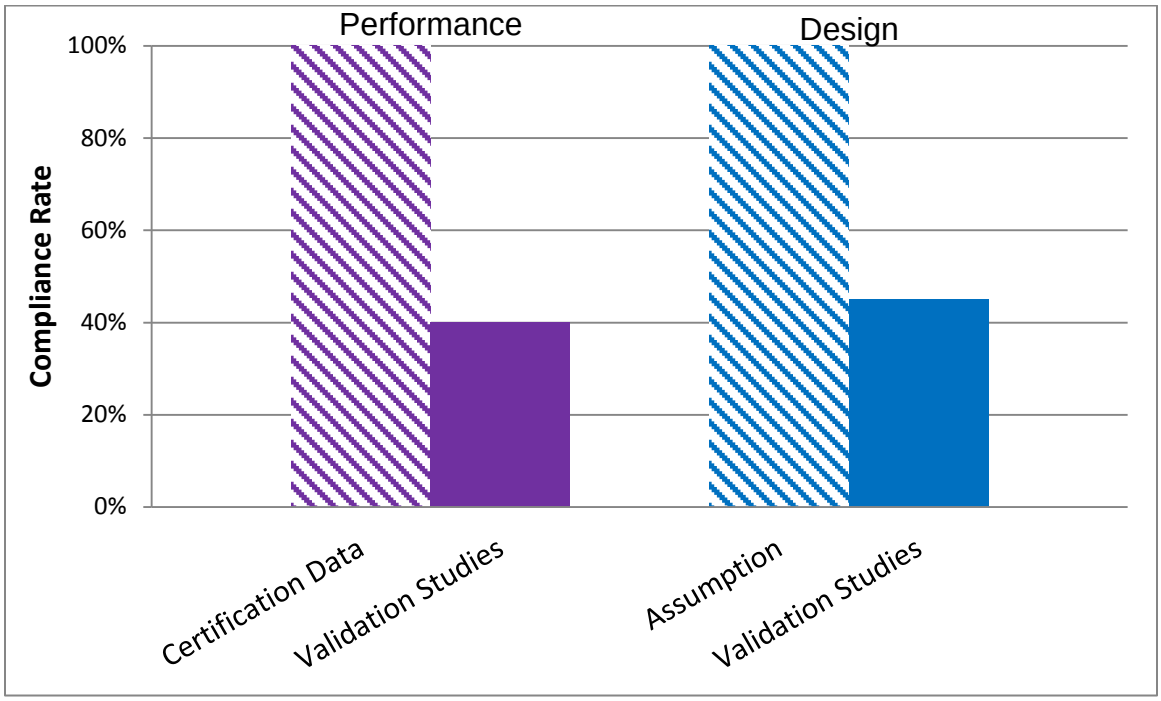

Figure II-2. Comparison of Certification Data to Validation Study Results

2. Outdated Certification Fuel

When the SORE evaporative emissions regulations were adopted in 2003, methyl tert-butyl ether (MTBE) was the primary oxygenate used in motor vehicle pump fuel, which is the fuel typically used to power SORE. The fuel specified for SORE certification testing for both evaporative and exhaust emissions also contained MTBE as the oxygenate. However, ARB has since amended the reformulated gasoline regulations to require motor vehicle pump fuel to contain 10 percent ethanol beginning in January 2010, and in 2011 amended the SORE exhaust emissions regulations to require certification fuel that contains 10 percent ethanol beginning in model year 2020. The change in gasoline formulation has resulted in an inconsistency between the fuel used to power SORE and certify exhaust emissions and the fuel used to certify evaporative emissions. Evaporative emissions from SORE in California may be higher than current certification tests indicate because of the difference in the current certification test fuel and pump fuel. The presence of ethanol in gasoline can increase the permeation emissions relative to fuel that does not contain ethanol.

3. Duplicative Federal and California Fuel Tank Testing Requirements

U.S. EPA adopted evaporative emission regulations for SORE in 2008. The fuel tank testing requirements in the U.S. EPA regulations are similar to ARB's, but they are different enough that manufacturers typically test two sets of fuel tanks to obtain certification with both ARB and U.S. EPA.

B. Proposed Solutions to the Problem

1. Increase Compliance Rate with Diurnal Emission Standards

The low compliance rate determined from the two validation studies necessitates changes to the SORE evaporative emissions control system certification and compliance testing processes. The proposed amendments in this staff report include a number of measures that will improve the certification and compliance testing procedures. Design-certified evaporative families will be required to meet the diurnal emission standards in compliance testing, and the requirements for compliance testing will be aligned with the certification testing requirements for performance certification. This will give ARB the ability to enforce the diurnal emission standards for all engines with displacement greater than 80 cc, as well as enable ARB to conduct compliance testing on a greater number of evaporative families. A bond requirement similar to U.S. EPA's will require Executive Order holders without sufficient U.S. assets to post a bond that will cover potential enforcement liabilities. This bond requirement will enable ARB to collect penalties from Executive Order holders whose evaporative families fail compliance testing, even if the Executive Order

holders are based outside of the U.S. or are non-responsive. Because the cost of the bond will rise if called to pay penalties, it will deter violations.

ARB was unable to return one design-certified test unit from the validation studies to the Executive Order holder because the holder was bankrupt and was not responsive to ARB's requests to arrange for shipping. This test unit had failed diurnal emission testing and had a fuel leak. ARB would not be able to collect penalties from this Executive Order holder under the current regulation, but the proposed amendments would allow ARB to collect penalties in a similar situation.

Under the current SORE regulatory structure, one unit is tested by an applicant in a SHED for certification, but five units have to be tested by ARB for compliance testing. Any certification test result that is at or below the emission standard is considered passing, but the upper limit of the 95 percent confidence interval for the five compliance test results would have to be up to 50 percent greater than the emission standard to be considering failing in a compliance test. The imbalance in certification versus compliance testing requirements requires ARB to expend a disproportionate amount of resources to conduct compliance testing to enforce the diurnal emission standards. The proposed amendments align the certification and compliance testing requirements to allow ARB to perform evaporative emissions compliance testing using one engine. A retest will be performed if the compliance test result is within five percent of the emission standard. This is similar to the requirement for an applicant to perform a retest if the certification test result is greater than 95 percent of the emission standard.

The promise of design certification in 2003, when it was proposed, was that those evaporative families certified by this method would comply with the diurnal emission standards. The validation studies indicate that, more often than not, design-certified evaporative families do not comply with the diurnal emission standards. The proposed amendments to the certification and compliance testing procedures will correct this condition. Part of the reason for the low compliance rate may be a lack of incentive for Executive Order holders to produce compliant evaporative families. Under the current regulations, compliance testing of assembled engines does not result in monetary penalties or revocation of an Executive Order for design-certified equipment. Having a unit fail diurnal emission testing in the validation studies did not necessitate the Executive Order holder making changes to the evaporative family.

Design certification will also be improved so evaporative families using this method will be more likely to meet the diurnal emission standards. The current fuel tank test procedure allows tanks to be sealed without the use of fuel caps. Fuel tanks are also allowed to be tested without creating any of the holes that would normally exist in the tanks other than the one for filling

the tanks with fuel. The proposed amendments will require fuel tanks to be tested in a configuration that represents their real-world use, including sealing with a fuel cap. The proposed amendments also clearly apply the fuel line permeation emission standard to fuel lines that are used to connect carbon canisters to fuel tanks and to return unused fuel to the fuel tank. These two changes will result in a larger portion of the total emissions being accounted for in the certified components used in design certification.

Other improvements include requiring carbon canisters to be installed so that the carbon will not be exposed to liquid fuel or water, pressure testing all production fuel tanks, and testing fuel line assemblies to ensure the connections will remain secure throughout the useful life of the engine on which they are installed. Once the carbon in a carbon canister has been in contact with liquid fuel, it will not control fuel tank venting emissions as effectively. Pressure testing production fuel tanks and ensuring secure fuel line connections may prevent some of the fuel leaks observed in the validation studies. Although the importance of secure connections for liquid-containing fuel lines is intuitively obvious because of the flammability of gasoline, Executive Order holders do not always ensure secure connections for fuel lines that are intended to contain only fuel vapor. Barbed fittings were used for the vapor line connections on the units tested for the validation studies, but the use of clamps to maintain these connections was rare. Taken together, these changes may ensure production equipment performance like the units tested for certification and prevent failures like some of those observed in the validation studies.

In summary, the proposed amendments to the certification testing process provide several incentives for Executive Order holders to produce compliant evaporative families, whether they are design- or performance-certified. The likelihood of ARB conducting compliance testing on a given evaporative family during a model year will be higher since one unit will be required to be tested instead of five. If the evaporative family is not compliant with the diurnal emission standard, the Executive Order may be revoked and penalties may be assessed. Penalties can be costly, but having an Executive Order revoked is potentially more costly because products in the evaporative family would have to be removed from retail inventory. Another incentive for producing compliant evaporative families is the requirement to use performance certification for all evaporative families after being found to be out of compliance. This requirement would be for one model year after the first occurrence, five model years after the second occurrence, and ten model years after any subsequent occurrence.

2. Update Certification Fuel

The proposed amendments include requiring the fuel used for SORE testing to contain 10 percent ethanol, which represents fuel currently dispensed at

California gasoline stations. To assess the ability of SORE from recent model years to meet the diurnal emission standards with the updated test fuel (referred to as E10 fuel), ARB staff purchased SORE equipment from several retail stores in the Sacramento, California area. The equipment was tested in a SHED using E10 fuel. Several pieces of equipment from the validation studies, which were originally tested with the current certification test fuel (referred to as E0 because it contains no ethanol), were also tested with E10 fuel as part of the assessment.

The results of this testing are summarized in Table II-2, and more detailed results are provided in "Technical Support Document: Small Off-Road Engine Validation Study and E10 Test Results". A total of 22 units were tested. Six of these were design-certified and were also tested in the validation studies; six were walk-behind mowers, which are always performance-certified; five were other types of performance-certified equipment, one of which was tested in the validation studies; and five were equipment that used engines with displacement less than or equal to 80 cc.

Table II-2. Results of Diurnal Emissions Testing with Updated Certification Test Fuel

Displacement Category	Certification Method	Number of Units Tested	Passing Units	Failing Units
> 80 – < 225 cc	Design	1	0	1
≥ 225 cc		5	3	2
Walk-behind mowers	Performance	6	6	0
Other > 80 – < 225 cc		5	4	1
≤ 80 cc	Fuel Tank Only	5	5	0
All		**22**	**18**	**4**

Of the design-certified units, one had displacement greater than 80 cc and less than 225 cc. This unit had met the diurnal emission standard in the validation studies, but did not when tested with E10 fuel. However, the highest test result was less than two percent higher than the diurnal emission standard. The other five design-certified units had displacement greater than or equal to 225 cc. Three of these units had been tested with the current certification test fuel in the validation studies and met the diurnal emission standards in that testing. When these three units were tested with E10 fuel, two met the diurnal emission standards and one did not. The other two design-certified units were selected for testing with E10 fuel before they were selected for the validation studies. One of these met the diurnal emission standard with E10 fuel. It was not tested subsequently with the current fuel because it was assumed the diurnal emissions would

be the same as or lower than the results with E10 fuel. The other unit failed the tests with both fuels.

The diurnal emissions from the unit failing using both E10 fuel and E0 fuel were unusually high for a unit that did not have any visible fuel leaks. The unit was inspected visually and with a handheld hydrocarbon analyzer. It was noted that the fuel line connecting the outlet of the carbon canister to the air intake for the engine was not connected to the air intake, and that no clamps or other means were used to secure the fuel tank vent lines or carbon canister fuel lines. The unit is a lawn tractor with a hood that is hinged at the front and swings open to allow access to the engine; it is not known if the disconnected fuel line was connected at one time, but it is possible that it was pulled off when closing the hood. It was also observed that the fuel cap did not form a vapor-tight connection with the fuel tank, as fuel vapors were readily detected with the handheld hydrocarbon analyzer near the fuel cap when it was installed. This unit was tested with the fuel line connected as it should have been to the air intake and a rubber stopper instead of the fuel cap. The diurnal emissions decreased from 5.85 grams per day to 2.1 grams per day with these two changes.

Six of the performance-certified units were walk-behind mowers, and all six met the diurnal emission standards. The other five performance-certified units were other equipment types, and four of these met the diurnal emission standards. The unit that did not meet the diurnal emission standard was a chipper/shredder that stood on two wheels and a stand. The chipper/shredder had to be tilted to be moved on its wheels. It was observed that the carbon canister, which was contained in the fuel cap, did not lose a significant mass when it was purged before each diurnal emissions test. Liquid fuel could also be seen on the fuel cap when it was removed. These observations led ARB staff to question whether liquid fuel had leaked into the carbon canister while the unit was tilted so it could be moved in and out of the SHED. The fuel cap was heated overnight in oven at 65 °C. The mass of the fuel cap assembly was 4.5 grams less after being heated, indicating that some material, most likely liquid fuel, had desorbed from the carbon in the canister while it was in the oven. This material was not removed by repeatedly purging the carbon canister with nitrogen gas. The fuel cap was installed on the fuel tank after it had been heated in the oven, and the unit was carried into the SHED to avoid tilting it. A diurnal emissions test was conducted; the diurnal emissions rate measured was below the diurnal emission standard, suggesting the material that desorbed from the fuel cap when it was heated in the oven may have prevented the carbon canister from functioning as intended. If liquid fuel did leak into the carbon canister, it may have been the cause of the unit's failure to meet the diurnal emission standard, and it would be a defect in the evaporative emission control system.

There is no diurnal emission standard for engines with displacement less than or equal to 80 cc, so the units with those engines were tested for informational purposes and their diurnal emissions were compared to the standard for engines with displacement greater than 80 cc and less than 225 cc. All of these units had diurnal emissions below the diurnal emission standard for engines with displacement greater than 80 cc and less than 225 cc.

In summary, of the 17 units tested with E10 fuel in this study for which there is currently a diurnal emission standard, 13 units met their respective standards. Two of the units that failed seemed to have obvious defects that contributed to their failure. The other two units that failed the test were both design-certified generators with metal fuel tanks. Metal fuel tanks will be certified beginning with model year 2017, which may reduce their emissions. Problems such as carbon canisters being exposed to liquid fuel, high emissions from fuel caps, unsecure fuel line connections, and high permeation emissions from vapor-containing fuel lines that likely contributed to the failures observed in this study will be prevented upon implementation of the proposed amendments. Overall, these test results indicate that engines with well-designed and constructed evaporative emission control systems will meet the diurnal emission standards with E10 fuel. The proposed amendments will address common contributors to the high non-compliance rate observed in the validation studies; implementing the changes in the proposed amendments should bring all evaporative families into compliance with the diurnal emission standards. It is not expected that additional changes would need to be made to evaporative families that are compliant with the current diurnal emission standards using E0 fuel in order to continue to comply with the standards when tested with E10 fuel.

3. Align Fuel Tank Testing Procedure

The proposed amendments will align ARB's fuel tank testing requirements with U.S. EPA's without decreasing stringency. The revised ARB requirements will be at least as stringent as U.S. EPA's and more stringent in some respects. Some differences will still exist between ARB's and U.S. EPA's fuel tank testing requirements, but applicants will have the option of testing one set of fuel tanks to meet the requirements for both ARB and U.S. EPA.

C. Summary and Rationale for Each Regulatory Provision

1. Section 2750. Purpose.

Summary of Section 2750

Section 2750(a) was modified to replace “performance standards” with “evaporative emission standards.” Section 2750(b) was modified to replace “compliance programs” with “certification programs” and to replace “assume running loss emissions are controlled” with “require running loss emissions to be controlled.”

Rationale for Section 2750

These regulations are intended to control evaporative emissions from small off-road engines. “Evaporative emission standards” is more specific than “performance standards,” and therefore communicates more clearly the purpose of the regulations. Design certification and performance certification were both intended to ensure that engines met the diurnal emission standards, but ARB did not have a means to enforce compliance with the diurnal emission standards for design-certified equipment under the regulations adopted in 2003. The amended regulations will retain design and performance certification as options, but all engines with displacement greater than 80 cc will be required to meet the diurnal emission standards. Replacing “assume running loss emissions are controlled” with “require running loss emissions to be controlled” clarifies the existing requirement to obtain approval from the Executive Officer for a determination that running loss emissions are controlled.

2. Section 2751. Applicability.

Summary for Section 2751

A new section 2751(b) was added that prohibits the introduction into California commerce of any component of an evaporative system subject to this Article if it is not certified and labeled accordingly.

Rationale for Section 2751

Requiring all components that are sold for the evaporative systems subject to this Article to be certified and labeled accordingly will ensure that the use of replacement parts will not result in an increase in evaporative emissions versus the certified configuration.

3. Section 2752. Definitions.

Summary for Section 2752

The definitions of “CP-901” and “CP-902” in sections 2752(a)(2) and 2752(a)(3) were updated to reflect the amended titles and dates of the certification procedures.

The definition of “equivalent fuel tank” in section 2752(a)(5) was deleted.

The definition of “equivalent fuel line” in section 2752(a)(6) was modified by renumbering as (a)(5) and adding a requirement that it permeates less than the nominal fuel line being replaced and by updating the referenced test procedure and fuel used for measuring permeation emissions. An equivalent fuel line must meet the above requirements when tested with LEV III certification gasoline, but the fuel defined in 40 CFR Part 1065.710(b) or CE10 may be used as an alternative test fuel.

The definition of “evaporative emissions” in section 2752(a)(7) was modified by renumbering as (a)(6) and replacing “reactive organic gases” with “total organic gases.”

The definition of “evaporative emission control system” in section 2752(a)(8) was modified by renumbering as (a)(7).

The definition of “evaporative family” in section 2752(a)(9) was modified by renumbering as (a)(8), specifying that models in an evaporative family must be in the same engine class, and defining “cc” as the acronym for “cubic centimeters.” It was also modified by allowing “all models using fuel tanks constructed by the same process with the same material and the same permeation control” to be grouped into one evaporative family for engines with displacement less than or equal to 80 cc. The provision to consider an engine family and an evaporative family equivalent at the manufacturer’s discretion was extended to all engine families.

The definition of “evaporative model emission limit (EMEL)” in section 2752(a)(10) was modified by renumbering as (a)(9) and specifying that a declared diurnal emission rate must be based on diurnal emissions test results for the model “that is expected to exhibit the highest diurnal emission rate relative to the applicable diurnal emission standard” rather than for “a worst case model.”

The definition of “evaporative family emission limit differential (EFELD)” in section 2752(a)(11) was modified by renumbering as (a)(10) and replacing “effective standard level” with “diurnal emission standard in Table 1 of

section 2754(a)" and deleting "and is applicable to the entire evaporative family represented by the model."

The definition of "executive order of certification" in section 2752(a)(12) was modified by renumbering as (a)(11) and replacing "performance standards" with "evaporative emission standards."

The definition of "holder" in section 2752(a)(13) was modified by renumbering as (a)(12).

The definition of "hot soak emissions" in section 2752(a)(14) was modified by renumbering as (a)(13).

The definition of "hydrocarbon" in section 2752(a)(15) was deleted.

"LEV III certification gasoline" was defined in section 2752(a)(14).

The definition of "manufacturer" in section 2752(a)(16) was modified by renumbering as (a)(15).

The definition of "nominal capacity" in section 2752(a)(17) was modified by renumbering as (a)(16).

The definition of "nominal fuel tank" in section 2752(a)(18) was deleted.

The definition of "nominal fuel line" in section 2752(a)(19) was modified by renumbering as (a)(17).

The definition of "permeation emissions" in section 2752(a)(20) was modified by renumbering as (a)(18) and replacing "reactive organic gas" with "total organic gas."

The definition of "permeation rate" in section 2752(a)(21) was modified by renumbering as (a)(19), replacing "reactive organic gas" with "total organic gas," and adding "or fuel line."

The definition of "person" in section 2752(a)(22) was deleted.

The definition of "reactive organic gases" in section 2752(a)(23) was deleted.

The definition of "running loss emissions" in section 2752(a)(24) was modified by renumbering as (a)(20).

The definition of "SHED" in section 2752(a)(25) was modified by renumbering as (a)(21).

The definition of “small production volume tank exemption” in section 2752(a)(26) was deleted.

The definition of “structurally integrated nylon fuel tank” in section 2752(a)(27) was deleted.

The definitions of “TP-901” and “TP-902” in sections 2752(a)(28) and 2752(a)(29) were renumbered as (a)(22) and (a)(23), respectively, and updated to reflect the amended titles and dates of the test procedures.

The definition of “total hydrocarbons” in section 2752(a)(30) was deleted.

“Total organic gases (TOG)” was defined in section 2752(a)(24).

The definition of “walk-behind mower” in section 2752(a)(31) was modified by renumbering as (a)(25).

Rationale for Section 2752

The amended titles of CP-901 and CP-902 indicate the displacement range of the engines for which each is to be used.

The definition of “equivalent fuel tank” is not necessary because the provision for replacing nominal fuel tanks with equivalent fuel tanks has been removed.

Requiring an equivalent fuel line to permeate less than the nominal fuel line being replaced will ensure that diurnal emissions from the engine will not increase as a result of using an equivalent fuel line. Updating the reference to the test procedure and fuel used for measuring fuel line permeation emissions ensures testing is done with representative fuel and the most current test procedure. Allowing the fuel defined in 40 CFR Part 1065.710(b) or CE10 as an alternative test fuel provides some flexibility for Executive Order holders and fuel line manufacturers, as long as it can be demonstrated that the equivalent fuel line would permeate less than the nominal fuel line with LEV III certification gasoline.

Referring to total organic gases rather than reactive organic gases in the definition of “evaporative emissions” reflects the reality of what is measured in the test procedures for measuring evaporative emissions from SORE.

Requiring models in an evaporative family to be in the same engine class further clarifies the requirement that models in an evaporative family must have similar fuel systems characteristics as they relate to evaporative emissions. Defining “cc” as the acronym for “cubic centimeters” in the

definition of “evaporative family” removes any question of the meaning of “cc.” Allowing Holders to group all models using fuel tanks constructed by the same process with the same material and the same permeation control into one evaporative family is similar to the idea of carrying data across from one family to another. It will allow Holders to prepare fewer certification applications and emission labels. It will also reduce the amount of time necessary for ARB staff to review certification applications. Allowing an engine family and evaporative family to be considered equivalent at the manufacturer’s discretion for any engine family will enable manufacturers who produce engines with complete evaporative systems to simplify the emission labels for these families.

In the definition of “evaporative model emission limit,” requiring that a declared diurnal emission rate must be based on test results for the model “that is expected to exhibit the highest diurnal emission rate relative to the applicable diurnal emission standard” is more specific than requiring the rate to be based on test results for “a worst case model.” This will assist applicants in determining which models to test.

In the definition of “evaporative family emission limit differential (EFELD),” “diurnal emission standard in Table 1 of section 2754(a)” is clearer than “effective standard level.” Because an EFELD for one model may not be representative for all models in an evaporative family, it was necessary to remove “and is applicable to the entire evaporative family represented by the model” from the definition.

“Performance standards” was replaced with “evaporative emission standards” in the definition of “executive order of certification” to be more specific about the type of standards to which evaporative emission control systems are certified under this Article.

The definition of “hydrocarbon” was deleted because it is a commonly understood word.

“LEV III certification gasoline” was defined to clearly indicate the fuel that will be required for certification testing.

The definition of “nominal fuel tank” was deleted because it is no longer needed. The provision to replace nominal fuel tanks with equivalent fuel tanks has been deleted.

Referring to “total organic gas” molecules rather than “reactive organic gas” molecules in the definition of “permeation emissions” reflects the reality of what is measured in the test procedures for measuring permeation emissions from SORE.

Referring to “total organic gas” molecules rather than “reactive organic gas” molecules in the definition of “permeation rate” reflects the reality of what is measured in the test procedures for measuring permeation emissions from SORE. Adding “or fuel line” to the definition clarifies that permeation rate is measured for fuel lines in addition to fuel tanks.

The definition of “person” was deleted because “person” is defined in section 19 of the California Health and Safety Code.

The definition of “reactive organic gases (ROG)” was deleted because the term is no longer used in the Article.

The definition of “small production volume tank exemption” was deleted because the exemption has been eliminated.

The definition of “structurally integrated nylon fuel tank” was deleted because all references to this type of fuel tank have been removed from the Article.

The word “Equipment” was removed from the title of TP-901 because it was not needed.

The title of TP-902 was italicized and underlined to distinguish it as the title of a document.

The definition of “total hydrocarbons” was deleted because TOG is used instead throughout the Article.

“Total organic gases (TOG)” was defined to clarify the type of compounds for which the emissions are set.

4. Section 2753. Certification Requirements and Procedures.

<u>Summary for Section 2753</u>

Section 2753(a) was modified by removing the sentence, “For engines less than or equal to 80 cc, the evaporative emission control system consists of the fuel tank only,” and replacing “performance-based or system design standards” with “evaporative emission standards.” In addition, applicants will be required to follow the versions of CP-901 and CP-902 adopted in 2004 through model year 2017 and will have the option of following either the versions adopted in 2004 or the amended versions for model years 2018 and 2019. Starting in 2020, the amended versions of CP-901 and CP-902 must be followed for certification applications. Applicants will be required to meet the bond requirements beginning in model year 2020.

Section 2753(b) was modified by clarifying that an applicant must demonstrate that the model of engine that is expected to exhibit the highest diurnal emission rates relative to the applicable diurnal emission standard meets that standard by submitting 1) diurnal emission test results; 2) fuel tank, fuel line, and carbon canister test results; or 3) Executive Order numbers for the fuel tank, fuel lines, and carbon canister used on the engine.

Section 2753(b)(3) was renumbered to 2753(c) and was modified by clarifying that an applicant must demonstrate that the model of fuel tank with the highest permeation rate relative to the applicable permeation emission standard meets that standard by including permeation data for that fuel tank in the certification application. In addition, a requirement was added to detail the criteria used to determine which fuel tanks in the evaporative family are expected to have the highest and lowest permeation rates relative to the applicable permeation emission standards.

Section 2753(c) was renumbered to 2753(d) and modified by deleting the provision to replace a nominal fuel tank with an equivalent fuel tank, replacing "that complies with the performance-based standards specified in section 2754" with "for which diurnal emission test results were submitted as part of the certification application," and deleting the sentence, "All other evaporative emission control components in a system that complies with the performance-based standards in section 2754 must function similarly and have equivalent or better performance to those components used to certify the control system." The requirement to recertify an evaporative family if any modification other than replacement of a nominal fuel line is made was modified by specifying the certification procedure as either the 2004 or amended version of CP-902, as applicable.

A new section 2753(f) was added. This section requires an applicant to submit diurnal emission test results the first year they apply for certification of an evaporative system on engines with displacement greater than 80 cc, beginning in model year 2020.

A new section 2753(g) was added. This section requires an applicant to submit diurnal emission test results for all evaporative families using engines with displacement greater than 80 cc for one to ten model years after having an Executive Order suspended or revoked.

Rationale for Section 2753

Limiting the evaporative emission control system to only the fuel tank for engines with displacement less than or equal to 80 cc was done to minimize the requirements placed on engine manufacturers to comply with the evaporative emission standards for engines that are typically handheld.

However, it also had the effect of excluding parts that produce or control evaporative emissions from the warranty. Removing this statement will ensure that all parts that produce or control evaporative emissions are included in the emission warranty, and is consistent with U.S. EPA requirements in 40 CFR 1060. Replacing “performance-based or system design standards” with “evaporative emission standards” provides additional clarity as to the type of standards set in this Article. Allowing the 2004 versions of CP-901 and CP-902 to be followed by applicants through model year 2019 will give sufficient lead time to transition to using the amended versions and will avoid causing delays in certification. Requiring applicants to meet the bond requirements for model year 2020 will ensure Holders without U.S. assets can meet potential enforcement liabilities.

The changes made to section 2753(b) will ensure the model most likely to have emissions above its diurnal emission standard, rather than simply the model with the highest overall diurnal emissions, is tested for certification. This distinction is important because emission standards depend on fuel tank size, while various other factors (fuel line length and type, induction type, tank material, component configuration, etc.) may substantially affect actual emissions.

The changes made to section 2753(b)(3), which has been renumbered to 2753(c), will ensure the fuel tank model most likely to have emissions above its permeation emission standard, rather than simply the model with the highest overall permeation emissions, is tested for certification. The requirement to detail the criteria used to determine which fuel tanks in the evaporative family have the highest and lowest permeation rates relative to the applicable permeation emission standards will ensure the Executive Officer can verify that all fuel tanks in a family are expected to meet the permeation emission standards.

“Equivalent fuel tanks” were intended to be used as replacement fuel tanks for performance-certified engines if a nominal fuel tank became unavailable. Testing was not required when replacing a nominal fuel tank with an equivalent fuel tank because it was assumed a performance-certified engine would continue to meet the diurnal emissions standard when using a metal or coextruded multilayer fuel tank if it had met the standard with a tank made of another material. Results of the validation studies indicate that engines using metal and coextruded multilayer fuel tanks do not always meet the diurnal emission standards. Removing the provision to replace a nominal fuel tank with an equivalent fuel tank will result in testing to confirm diurnal emissions from performance-certified engines do not exceed the emission standards.

Holders will still have the ability to replace a nominal fuel line with an equivalent fuel line. Replacing “that complies with the performance-based

standards specified in section 2754" with "for which diurnal emission test results were submitted as part of the certification application," clarifies that, while all engines > 80 cc will be certified to the diurnal emission standards, this provision is specifically for those systems whose diurnal emissions were measured for certification. The sentence, "All other evaporative emission control components in a system that complies with the performance-based standards in section 2754 must function similarly and have equivalent or better performance to those components used to certify the control system," was removed because it was unnecessary in light of section 2753(c)(2), which has been renumbered to 2753(d)(2). As revised, section 2753(d)(2) states, in part, "Modification of any certified evaporative emission control systems in any manner other than replacement of the nominal fuel lines with equivalent fuel lines invalidates the certification of the control system." Requiring evaporative families to be recertified per the 2004 or amended version of CP-902, as applicable, when modifying the evaporative system clarifies that the version of CP-902 that must be followed depends on the model year as specified in section 2753(a).

Requiring a manufacturer who has never certified an evaporative system for engines with displacement greater than 80 cc in California to submit diurnal emission test results will give greater assurance that the manufacturer can produce evaporative systems which meet the diurnal emission standards. Similarly, requiring a manufacturer to submit diurnal emission test results for all evaporative families using engines with displacement greater than 80 cc for one to ten model years after having an Executive Order suspended or revoked will ensure the Executive Order holder's evaporative families can meet the diurnal emission standards. This requirement will also serve as a deterrent to produce non-compliant evaporative systems.

5. Section 2754. Diurnal Emission and Design Standards.

<u>Summary for Section 2754</u>

The paragraph at the beginning of section 2754 was renumbered to 2754(a) and modified by changing "evaporative emission performance and design standards" to "diurnal emission and design standards" and by adding "on and after the model years indicated." Table 1 was included in the renumbered section 2754(a). The diurnal emission standards in Table 1 of section 2754(a) were modified by changing "Grams HC/day" (grams of hydrocarbons per day) to "g TOG·day^{-1}" (grams of total organic gases per day) and by changing "tank vol." to "nominal capacity." The fuel line and fuel tank permeation emission standards were modified by changing "Grams ROG/m^2/day" (grams of reactive organic gases per square meter per day) to "g TOG·m^{-2}·day^{-1}" (grams of total organic gases per square meter per day). The carbon canister or equivalent butane working capacity standard was modified by changing "Grams HC" (grams of hydrocarbons) to

“g TOG” (grams of total organic gases). The “greater than” symbol (>) in the heading “Displacement Category: >225 cc” was replaced with a “greater than or equal to” symbol (≥). References to the small production volume tank exemption were deleted. Section 2754(a) was modified to require all evaporative systems on engines with displacement greater than 80 cc to have diurnal emissions below the diurnal emission standards in Table 1 of section 2754(a).

Section 2754(a)(1) was renumbered to 2754(b) and modified by requiring test data for all fuel lines “exposed to liquid fuel or fuel vapor, except those segments whose external surface is normally exposed to liquid fuel inside the fuel tank and primer bulbs that contain liquid fuel only for priming the engine before starting” as determined by using LEV III Certification Gasoline in the test procedure SAE J1737 (Stabilized May 2013). Some of the other fuel options were eliminated, but CE10 was retained and the fuel defined in 40 CFR Part 1065.710(b) was added as an alternative test fuel.

The first paragraph of the existing section 2754(b) was deleted. Section 2754(b)(1)(A) was also deleted. Section 2754(b)(1) was renumbered to 2754(c) and modified to list requirements for applicants certifying engines to comply with the diurnal emission standards rather than the design standards. Section 2754(b)(1)(A) was deleted. A new section 2754(c)(1) was added that requires an applicant to “provide diurnal emission test data for the engine or equipment model in the evaporative family that exhibits the highest diurnal emission rate relative to the applicable diurnal emission standard, in accordance with TP-902.” Section 2754(b)(1)(B) was renumbered to 2754(c)(2) and modified by requiring the use of “fuel tank gaskets and fuel caps meeting the requirements of Title 40, Code of Federal Regulations, Part 1060.240(d)(1)(i) through (iii).” The sentences, “Provide test data in the certification application showing that fuel lines meet the permeation requirement of 15 grams/m2/day using test procedure SAE J1737 (Issued August 1997). The permeation testing must be conducted at 40ºC, or higher, and ambient pressure using Phase II California Reformulated Certification (CERT) fuel, CE10, CM15, or Indolene. Alternatively, manufacturers can submit the Executive Order number approving the component pursuant to section 2767.1 of this Article,” were also deleted from section 2754(b)(1)(B).

A new paragraph (d) was added that requires carbon canisters to be installed in a way that prevents exposing the carbon to water or liquid fuel. A new paragraph (e) was added that requires all fuel lines to be securely connected to prevent fuel leakage throughout the useful life of the evaporative system and tested according to the Fuel Line Assembly Tensile Test in section 5.4 of ANSI/OPEI B71.10-2013.

Rationale for Section 2754

Referring to “diurnal emission and design standards” is more specific than “evaporative emission performance and design standards” and is consistent with the revised language throughout the Article. Modifying the emission standards to refer to TOG rather than ROG or HC reflects the compounds that are measured in the test procedures, so it is a more accurate representation. The heading “Displacement Category: >225 cc” was intended to read “Displacement Category: ≥ 225 cc” when the regulations were adopted in 2003. However, an underlined “greater than” symbol was used rather than a “greater than or equal to” symbol inadvertently. This was interpreted as a “greater than” symbol. Correcting this symbol clarifies the intent that the emission standards under this heading apply to evaporative systems on engines with displacement greater than or equal to 225 cc. Requiring all evaporative systems on engines with displacement greater than 80 cc to have diurnal emissions below the diurnal emission standards in Table 1 of section 2754(a) will ensure that ARB can enforce compliance with the diurnal emission standards, but it does not preclude design certification, as discussed in the rationale for section 2754(b).

Currently, some manufacturers use certified fuel lines only for those sections that carry liquid fuel from the fuel tank to the carburetor. They may use materials with no permeation barrier for fuel lines that return fuel from the carburetor to the fuel tank and fuel lines connected to carbon canisters. Requiring more types of fuel lines to meet the permeation emission standard than are required under the current regulations will better enable manufacturers to produce equipment that meets the diurnal emission standards. Testing with LEV III Certification Gasoline according to SAE J1737 (Stabilized May 2013) will ensure testing is performed with current procedures and fuel that is representative of what is sold at gasoline dispensing facilities in California. Allowing CE10 and the fuel defined in 40 CFR Part 1065.710(b) as test fuels provides flexibility for manufacturers who have historically used these fuels or who are seeking certification with U.S. EPA for their fuel lines.

The changes to the existing section 2754(b) were made to clarify the requirement for all evaporative systems in engines with displacement greater than 80 cc to have emissions below the diurnal emission standards. The new section 2754(c) requires either submission of diurnal emission test results or test data for the fuel tank and carbon canister. The requirement to provide test data for fuel lines was deleted because it is already stated in the revised section 2754(b)(2). Likewise, the requirement to submit a determination that running loss emissions are controlled from being emitted to the atmosphere was deleted because it is already stated in section 2754(b)(1).

The requirement to install carbon canisters in a way that prevents exposing the carbon to water or liquid fuel will prevent carbon canisters from being rendered ineffective by becoming saturated with liquid. The carbon in a carbon canister would absorb water or liquid fuel if exposed; the water or liquid fuel would not be effectively removed by purging the carbon canister, so the carbon would not be effective at adsorbing fuel vapors to prevent their emission to the atmosphere.

Installing all fuel lines securely to prevent fuel leakage throughout the useful life of an evaporative system will help to prevent problems observed in the validation studies and testing with E10 fuel discussed in section II of this report. Some Executive Order holders already install at least fuel lines intended to contain liquid fuel securely and test them according to ANSI/OPEI B71.10-2013. This requirement will apply to all fuel lines, preventing not only liquid fuel leaks but also disconnection of fuel lines that are not intended to contain liquid fuel. Disconnection of fuel lines connected to a carbon canister can have a large impact on diurnal emissions, as seen for one of the units tested in the E10 testing study.

6. Section 2754.1. Certification Averaging and Banking.

<u>Summary for Section 2754.1</u>

Section 2754.1(a) was modified by adding “or 2757” and “and tested according to TP-902.” References to “manufacturer” were changed to “Holder” throughout the section. The missing “(5)” was added to section 2754.1(b)(5), and this paragraph was modified by requiring each model within an evaporative family to be certified to an EMEL. A corresponding EFELD is also required for each model. The sentences, “The EFELD is determined based on the diurnal test results, in accordance with TP-902, of the worst case model of engine or equipment within an evaporative family. The worst case model of engine or equipment is defined as the engine or equipment expected to produce the highest negative or the smallest positive EFELD within the family on a per unit basis,” were deleted.

A new section 2754.1(d)(4) was added that states, “Commencing with the 2018 model year, any previously banked diurnal emission credits and any new diurnal emission credits earned can be used for up to five years. In the sixth year, any unused diurnal credits will expire. (For example, if a 2018 model year evaporative family earns diurnal emission credits, those diurnal emission credits may be used or banked until the 2023 model year. Any remaining banked diurnal emission credits earned within the 2018 model year will be invalid for use in the 2024 and subsequent model years.).”

Section 2754.1(e)(1) was modified by requiring the “smallest positive or largest negative” EFELD in the evaporative family to be used for credit

calculation. "Upon Executive Officer approval, an engine or equipment manufacturer may calculate its eligible sales through market analysis," was replaced with "A Holder may calculate its eligible sales through market analysis." The clause, "Because of the multiple steps in the product distribution chain and confidential nature of sales information for many retailers and original equipment manufacturers," was deleted.

Section 2754.1(f)(1) was modified by requiring the EFELD to be calculated for each model, and replacing "and the values required to calculate credits as given in section 2754(e)" with "the EMEL, and the EFELD." Section 2754.1(g)(1) was modified by replacing "Declared EFELD" with "EMEL for each model within the evaporative family." Section 2754.1(h) was modified by adding "a description of the method used to determine the sales volume" to the list of items required in end-of-year and final reports. This section was also modified to include a new name for the ARB Division that will receive and review sales reports.

Rationale for Section 2754.1

Adding "or 2757" and "and tested according to TP-902" to section 2754.1(a) clarifies that the averaging and banking provisions only apply to those evaporative systems whose diurnal emissions have been measured and are below either the diurnal standards in section 2754 or the optional diurnal emission standards in section 2757. Referring to a "Holder" rather than a "manufacturer" improves the clarity of the text, since a Holder is not always the engine or equipment manufacturer, although such representations are made to consumers in some cases.

Requiring an EMEL to be declared and EFELD to be calculated for each model will ensure that accurate limits are set for evaporative families with more than one fuel tank volume. Under the current requirements, a manufacturer's choice of a "worst case" model may not have been the model most likely to have diurnal emissions above the emission standard. The diurnal emission rate measured, and the corresponding EFELD, for the test unit might not have represented other models. For example, consider an evaporative family with two models: one with a diurnal emission standard of 1.200 grams per day and the other with a diurnal emission standard of 1.500 grams per day. If the Holder determined the worst case model was the model with the 1.500 grams per day standard and measured diurnal emissions of 1.000 grams per day, she or he might choose to set an EMEL of 1.200 grams per day for this model, which would yield an EFELD of 0.300 grams per day. Without measuring the diurnal emissions of the model with a 1.200 grams per day standard, it would be difficult to demonstrate that it could meet a standard of 0.900 grams per day as would be required if the EFELD of 0.300 grams per day were to be applied. By testing the model most likely to exceed the diurnal emission standard for

each fuel tank volume, accurate EMELs can be declared and accurate EFELDs can be calculated.

The provision to allow diurnal emission credits to be used for only five model years after the model year in which they are earned will prevent excessive banking of credits as occurred with SORE exhaust emission credits. Because the exhaust emission standards adopted in 2003 were very easily met, Holders banked large quantities of credits that could result in excessive deferred emissions from SORE in the future. While the use of averaging and banking of diurnal emission credits is not as extensive as the use of averaging and banking of exhaust emission credits for SORE due to the popularity of the design certification method, it is necessary to implement similar changes to the diurnal emission credit program to avoid the unsustainable situation observed with the SORE exhaust emission credits.

Requiring the smallest positive or largest negative EFELD to be used to calculate credits will ensure no excess credits will be earned beyond what is justified by the lower-than-required measured emissions of equipment participating in the averaging and banking program. Deleting the requirement to obtain approval from the Executive Officer to estimate sales volume will reduce the administrative burden on ARB staff. The clause, “Because of the multiple steps in the product distribution chain and confidential nature of sales information for many retailers and original equipment manufacturers,” was deleted because it did not provide any substantive guidance or requirements.

Requiring the EFELD to be calculated for each model in section 2754.1(f)(1) is consistent with the requirements throughout the revised section 2754.1. Replacing “and the values required to calculate credits as given in section 2754(e)” with “the EMEL, and the EFELD” clarifies which values are used for the calculation. Replacing “Declared EFELD” with “EMEL for each model” in section 2754.1(g)(1) clarifies that the EMEL, not the EFELD, is declared. Requiring a description of the method used to determine the sales volume to the list of items required in end-of-year and final reports will ensure ARB can confirm the method used to determine sales volume is appropriate.

In section 2754(h)(3)(A) and (B), “Mobile Source Operations” has been replaced with “Emissions Compliance, Automotive Regulations, and Science” to reflect a recent change to the name of the Division within ARB that is responsible for receiving and reviewing end of year sales reports.

7. Section 2755. Permeation Emission Standard.

Summary for Section 2755

Section 2755 was modified by changing the applicability of the fuel tank permeation emission standard from “Equipment That Use Gasoline Powered Small Off-Road Engines With Displacements < 80 cc” to “Small Off-Road Engines With Displacements ≤ 80 cc” and by specifying that the internal surface area of a fuel tank, measured in square meters, is used in determining the fuel tank permeation emission standard for a fuel tank. A fuel line permeation emission standard was added that requires fuel lines to meet the requirements of section 2754(b)(2). It was specified that data documenting the permeation rate for fuel lines must be included in the certification application. The provision to omit permeation data for equivalent fuel tanks and fuel tanks exempt under section 2766 was deleted. The test procedure for fuel lines was specified as SAE J1737 (Stabilized May 2013).

Rationale for Section 2755

The change made to the applicability of the fuel tank permeation emission standard clarifies the intent that the standard would apply to fuel tanks on engines with displacement less than or equal to 80 cc. The words “equipment that use gasoline powered” were not necessary because the applicability of the Article in section 2751 excludes engines fueled by gaseous fuels. The standard was intended to apply to fuel tanks on engines with displacement less than or equal to 80 cc when it was adopted in 2003, but an underlined “less than” symbol was used instead of a “less than or equal to” symbol. This symbol was inadvertently changed to a “less than” symbol in the adopted regulations. The updated applicability reflects the original intent for the fuel tank permeation emission standard. The fuel tank permeation emission standard depends on the area in square meters, but it was not specified in this table that it was the internal surface area of the fuel tank that should be used in calculating the standard for a fuel tank. This clarification will make the table easier to interpret.

The fuel line permeation emission standard was added to align with U.S. EPA requirements in 40 CFR 1060. It will also ensure greater control of evaporative emissions from engines with displacement less than or equal to 80 cc. Certification applications must contain data for fuel lines to allow ARB to confirm the fuel lines meet the permeation emission standard. The reason permeation data were not required for some types of fuel tanks was that it was assumed they would always meet the permeation standards. The validation studies revealed that products with metal and coextruded multilayer fuel tanks do not always meet the emission standards. Deleting the provision to omit permeation data will ensure all fuel tanks are tested for

certification. The test procedure for fuel lines is the same as in section 2754, but is stated in this section for convenience.

8. Section 2756. Fuel Cap Performance Standard.

Summary for Section 2756

Section 2756 was modified by replacing “For the model year set out herein” with “On or after the model year set out herein.” The applicability was changed by removing the words “SORE Equipment With” and by replacing a “greater than” symbol with a “greater than or equal to” symbol.

Rationale for Section 2756

Requiring fuel caps to meet the standards of this section “on or after the model year set out herein” clarifies that the fuel cap requirements apply to all model years beginning with the model years listed in the table. The words “SORE Equipment With” were removed from the applicability because they were not needed. Changing the “greater than” symbol to a “greater than or equal to” symbol in the applicability clarifies the original intent that the standards in this section would apply to all engines with displacement greater than or equal to 225 cc beginning with model year 2008. An underlined “greater than” symbol was used instead of a “greater than or equal to” symbol when the regulations were proposed in 2003. This symbol was inadvertently changed to a “greater than” symbol in the adopted regulations.

9. Section 2757. Optional Evaporative Emission Standards.

Summary for Section 2757

A new optional fuel tank permeation emission standard of 0.40 grams TOG per square meter of internal surface area per day was added for model year 2018 and later engines with displacement less than or equal to 80 cc. A new optional diurnal emission standard of 0.20 grams TOG per day was added for model year 2018 and later engines with displacement greater than 80 cc but less than 225 cc. A new optional diurnal emission standard of 0.40 grams TOG per day was added for model year 2018 and later engines with displacement greater than or equal to 225 cc.

Rationale for Section 2757

The existing optional evaporative emission standards are set at 50 percent of the current emission standards. Several evaporative systems have achieved diurnal emissions below the optional standards, and several fuel tanks for engines with displacement less than or equal to 80 cc have

achieved permeation emission rates below the optional standard. In addition, ARB's Mobile Source Strategy targets an 80 percent reduction in emissions inventory from mobile sources by 2031. For these reasons, more aggressive targets for emissions reductions from SORE are needed to warrant a "Blue Sky" designation.

10. Section 2758. Test Procedures.

Summary for Section 2758

The phrase "adopted July 26, 2004," was removed from the test procedure names.

Rationale for Section 2758

The test procedures TP-901 and TP-902 have been amended, and the dates they were adopted and amended are included in the definitions of TP-901 and TP-902 in section 2752. Therefore, the adoption dates are not needed in section 2758.

11. Section 2759. Equipment and Component Labeling.

Summary for Section 2759

Throughout the section, several references to a "manufacturer" were changed to "Holder." Section 2759(b)(1) was modified by adding "fuel lines, fuel tanks, and carbon canisters." Section 2759(c)(1) was modified by replacing "plastic or metal label" with "certification label." References to "engine or equipment label" or "label" throughout the section were changed to "certification label." Section 2759(c)(4)(C) was modified by updating the date of publication of the standard SAE J1930 to October 2008. Section 2759(c)(4)(D) was modified to require the date and location of manufacture of the evaporative emission control system to be listed on the emission label. Section 2759(c)(4)(F) was modified by adding "and Attachment 1 of CP-902, adopted July 26, 2004, and amended MMMM DD, YYYY."

A new section 2759(d) was added that requires certified fuel lines, fuel tanks, and carbon canisters to be labeled or marked with the Holder's name, Executive Order number, and model or part number. The label must be readily visible when installed on an engine or equipment unit and use letters that are raised or contrast with the background. This paragraph provides for an Executive Order holder's three-character manufacturer code to be used instead of the holder's name if the code is declared in the certification application.

Section 2759(e) was renumbered to 2759(f) and the sentence, “The label may be under a hinged door or other readily opened cover. It may not be hidden by any cover attached with screws or any similar designs,” was added.

Rationale for Section 2759

Changing references to manufacturers to refer to Holders is consistent with the text throughout the Article and clarifies that the requirements of the section are for Holders, whether they are manufacturers or not. Adding “fuel lines, fuel tanks, and carbon canisters” to the applicability of the requirements clarifies that these components must be labeled to allow identification. It was not necessary to specify that a label must be plastic or metal because durability requirements are given in this section that will ensure the label will remain in place and be legible for the life of the engine or equipment unit regardless of the material from which it is made. Referring to a “certification label” is more specific than an “engine or equipment label” or “label” because SORE also have exhaust emission labels and other product labels. Updating the publication date of SAE J1930 to October 2008 will ensure the most recent version of this standard is used when determining the appropriate abbreviations to use.

Requiring the location of manufacture to be included on the certification label will assist in determining whether any compliance issues affect engines or equipment from certain production plants. The location of manufacture is already included on the emission label in some cases. Including the date and location of manufacture of the evaporative emission control system regardless of who certifies the evaporative emission control system simplifies this requirement and will make the information consistent across all evaporative families. Specifying that the classification criteria for determining an evaporative family are in both the 2004 version and amended version of CP-902 will ensure Holders will use the appropriate version of CP-902 depending on the model year.

The new section 2759(d) that contains component label content and location requirements clarifies the labeling content requirements for components, which differ from those for complete evaporative systems. These requirements are designed to enable ARB to identify the components and confirm that they are certified. Provisions such as printing the information directly on the component, using abbreviations, and omitting model or part numbers when there is only one model or part on an Executive Order allow space to be conserved while meeting the labeling requirements. Allowing a label to be in a concealed but readily accessible location, such as under a hinged door or other readily opened cover, will ensure ARB can easily find and read emission labels and will not place an

undue burden on Holders to make labels visible. This requirement is also consistent with U.S. EPA labeling requirements in 40 CFR 1068.

12. Section 2760. Defects Warranty Requirements for Small Off-Road Engines.

Summary for Section 2760

The applicability was modified to refer to evaporative emission control systems used on SORE subject to the emission standards in this Article. Throughout section 2760, "manufacturer issuing the warranty" was replaced with "Holder or the Holder's contracted warranty provider." Section 2760(c)(2) was modified by changing, "A statement in such written instructions to the effect of "repair or replace as necessary" will not reduce the period of warranty coverage," to, "A statement in such written instructions to the effect of "repair or replace as necessary" shall advise owners of the warranty coverage for evaporative emissions related parts. Replacement within the warranty period is covered by the warranty and will not reduce the period of warranty coverage." Section 2760(c)(7) was modified by adding "and must obtain additional parts if that supply is exhausted." Section 2760(c)(8) was modified by requiring replacement parts used in the performance of any warranty maintenance or repairs must not increase the exhaust or evaporative emissions. Section 2760(c)(9) was modified to state "The use of add-on or modified parts may be grounds for disallowing a warranty claim made in accordance with this Article."

Section 2760(d) was modified to require a Holder to list all parts whose failure would increase evaporative emissions instead of specifying the parts that must be listed. The parts list in section 2760(d) was retained as a list of parts that may be included in an evaporative emissions control system. The part "Fuel Line" was changed to "Fuel Lines (for liquid fuel and fuel vapors)," and "Vapor Hoses" was changed to "Gaskets." The sentence, "Note: The parts list for equipment less than or equal to 80 cc only includes the fuel tank," was deleted. A requirement was added to submit written instructions for the maintenance and use of the evaporative emissions control system by the owner with a certification application.

A new section 2760(h) was added that prohibits warranty statements other than the emissions warranty from implying a limitation on the evaporative emissions warranty period or its applicability to subsequent owners after the ultimate purchaser.

Rationale for Section 2760

Referring to the "Holder or the Holder's contracted warranty provider" rather than the "manufacturer issuing the warranty" clarifies that the Holder is

responsible for the warranty requirements of this section whether the Holder provides the warranty service or has contracted with another company (who may or may not actually manufacture anything) to provide warranty service. Changing, “A statement in such written instructions to the effect of “repair or replace as necessary” will not reduce the period of warranty coverage,” to “A statement in such written instructions to the effect of “repair or replace as necessary” shall advise owners of the warranty coverage for evaporative emissions related parts. Replacement within the warranty period is covered by the warranty and will not reduce the period of warranty coverage,” is intended to prevent consumer confusion about whether a part is covered under the evaporative emissions warranty. Advising owners of the warranty coverage will encourage them to seek warranty service. Requiring a Holder to obtain additional parts if the supply maintained to meet expected demand is exhausted clarifies that actual demand must be met if it exceeds expected demand. Requiring that replacement parts must not increase exhaust or evaporative emissions will ensure that the level of control found on the original equipment is not compromised due to the use of replacement parts. Stating that use of add-on or modified parts “may” be cause for disallowing a warranty claim clarifies that such use will not necessarily cause the failure of a warranted part. The failure of the warranted part must be caused by the use of an add-on or modified part to justify disallowing the warranty claim.

A Holder is required under the current requirements to provide with each new engine or equipment unit a copy of a list of warranty parts specified in section 2760(d). For engines with displacement less than or equal to 80 cc, the fuel tank is the only part listed. In contrast, U.S. EPA requires all parts whose failure would increase evaporative emissions to be warranted, including for engines with displacement less than or equal to 80 cc. The modified section 2760(d) also requires the Holder to list all parts whose failure would increase evaporative emissions for all evaporative systems subject to this Article. This will align ARB’s warranty requirements with those of U.S. EPA and ensure no evaporative-emissions-related parts are omitted from the warranty. The modified parts list in section 2760(d) contains some parts that may be included in evaporative emission control systems.

Written instructions for the maintenance and use of the evaporative emissions control system by the owner are required under the current regulations. These instructions must now be included in the certification application, which will allow ARB to review them during the application review. The new section 2760(h) is intended to prevent consumers from being misled to believe their evaporative emissions warranty lasts fewer than two years. Some equipment manufacturers do not warrant their products for commercial use or provide very limited warranty periods for commercial use. A commercial user with such a product might incorrectly

assume he or she had no evaporative emissions warranty after reading the product warranty. Requiring specific statements that other warranties do not limit the evaporative emissions warranty period or its applicability to subsequent owners after the ultimate purchaser will provide owners with assurance that the evaporative emissions warranty applies to all types of users.

13. Section 2761. Emission-Related Defect and Sales Reporting Requirements.

Summary for Section 2761

Throughout the section, “manufacturer” was changed to “Holder” and “Mobile Source Operations” was replaced with “Emissions Compliance, Automotive Regulations, and Science.” A new section 2761(f) was added that required end-of-year and final sales reports for all evaporative families.

Rationale for Section 2761

Referring to Holders rather than manufacturers is consistent with the text throughout the Article. Requiring sales reports for all evaporative families will assist with updating the emissions inventory for SORE and will help determine the number of affected evaporative systems in defect and compliance cases. In order to minimize the burden of compiling and submitting end-of-year and final reports, the specific requirements contained in section 2761(f) are based on similar requirements in section 2754.1.

Throughout section 2761, “Mobile Source Operations” has been replaced with “Emissions Compliance, Automotive Regulations, and Science” to reflect a recent change to the name of the Division within ARB that is responsible for receiving and reviewing end of year sales reports.

14. Section 2762. Voluntary Emission Recall Program.

Summary for Section 2762

Throughout the section, “manufacturer” was changed to “Holder.”

Rationale for Section 2762

Referring to Holders rather than manufacturers is consistent with the text throughout the Article.

15. Section 2763. Ordered Recalls.

Summary for Section 2763

Throughout the section, “manufacturer” was changed to “Holder.” In section 2763(a)(1), “section 2754(b)” was changed to “section 2753” and “performance or design standards” was changed to “evaporative emission standards.”

Rationale for Section 2763

Referring to Holders rather than manufacturers is consistent with the text throughout the Article. Changing “section 2754(b)” to “section 2753” clarifies that ordered recall provisions in this section apply to all evaporative systems subject to this Article, consistent with the requirements for all evaporative systems to comply with evaporative emission standards and the applicability of the defect reporting and voluntary recall requirements. Changing “performance and design standards” to “evaporative emission standards” specifies which standards must be met.

16. Section 2764. Evaporative Emission Control System Warranty Statement.

Summary for Section 2764

Section 2764(a) was modified to read, “Any application for an evaporative emission control system certification must include a copy of the warranty statement in subsection (b) of this section. Text in parentheses shall be replaced with the appropriate information. A combined exhaust and evaporative warranty statement is acceptable. For combined warranty statements, “evaporative emission” may be replaced with “emissions” where “emissions” is understood to mean both exhaust and evaporative emissions. If a Holder contracts with a third party to provide warranty service, the Holder’s contracted warranty service provider’s name may be specified in lieu of the Holder’s name in the warranty statement.”

The warranty statement was moved to a new section 2764(b). Throughout the section, “manufacturer” was changed to “Holder.” The sentence, “(Manufacturer’s name) must warrant the evaporative emission control system on your (equipment type) for the period listed below provided there has been no abuse, neglect or improper maintenance of your equipment,” was modified to read, “(Holder’s name) must warrant the evaporative emission control system on your (equipment type) for the period listed below provided there has been no abuse, neglect or improper maintenance of your equipment leading to the failure of the evaporative emission control system.” The sentence, “Your evaporative emission control system may

include parts such as: carburetors, fuel tanks, fuel lines, fuel caps, valves, canisters, filters, vapor hoses, clamps, connectors, and other associated components," was changed to "Your evaporative emission control system may include parts such as: carburetors, fuel tanks, fuel lines (for liquid fuel and fuel vapors), fuel caps, valves, canisters, filters, clamps, connectors, and other associated components." The sentences, "For engines less than or equal to 80 cc, only the fuel tank is subject to the evaporative emission control warranty requirements of this section. A combined exhaust and evaporative warranty statement is acceptable. For combined warranty statements, "evaporative emission" can be replaced with "emissions" where "emissions" is understood to mean both exhaust and evaporative emissions," were deleted.

Rationale for Section 2764

Clarifying that text in parentheses in the warranty statement shall be replaced with the appropriate information will reduce any confusion which may have resulted from a lack of explanation. Moving the provision to have a combined warranty statement for exhaust and evaporative emissions to section 2764(a) ensures that those sentences will not be included unnecessarily in a warranty statement. Providing for a Holder's contracted warranty service provider's name to be specified in the warranty statement is consistent with the practice of several Holders to contract with a third party to provide warranty service, and will enable consumers to obtain warranty service directly from the warranty service provider.

Moving the warranty statement to a new section 2764(b) clarifies which language is part of the warranty statement and which language is not part of the warranty statement. The change to the statement about abuse, neglect and improper maintenance specify that abuse, neglect or improper maintenance leading to the failure of the evaporative system may be cause for disallowing a warranty claim. Referring to "fuel lines (for liquid fuel and fuel vapors)" rather than separately referring to "fuel lines" and "vapor hoses" in the sentence, "Your evaporative emission control system may include parts such as: carburetors, fuel tanks, fuel lines (for liquid fuel and fuel vapors), fuel caps, valves, canisters, filters, clamps, connectors, and other associated components," is consistent with the modified sample parts list in section 2760 and the requirement that fuel lines for liquid fuel and fuel vapors meet the fuel line permeation emission standard. The limitation of the warranty to only the fuel tank for engines with displacement less than or equal to 80 cc was removed to be consistent with U.S. EPA warranty requirements and ensure all parts whose failure would increase evaporative emissions are warranted.

17. Section 2765. New Equipment Compliance Testing.

Summary for Section 2765

Throughout the section, “manufacturer” was changed to “Holder.” Section 2765(a)(1) was modified to require “one or more fuel lines, carbon canisters, fuel tanks, engines, or equipment units” for compliance testing rather than five. A new section 2765(a)(2) was added that provided for the Executive Officer to obtain fuel lines, carbon canisters, fuel tanks, engines or equipment units from the California marketplace for compliance testing. Section 2765(a)(4) was renumbered to 2765(a)(5) and a provision was added to allow durability testing and preconditioning to be omitted from compliance testing at the Executive Officer’s discretion.

Section 2765(a)(7) was renumbered to 2765(a)(8) and the sentence, “Five fuel lines, carbon canisters, tanks, engines or equipment of the same model within an evaporative family or subgroup will be selected for testing per the applicable test procedure,” was deleted. The confidence interval test was removed. The revised section 2765(a)(8) specifies that an evaporative family will pass compliance testing if all tested units meet the applicable emission standards in sections 2754 or 2757, or the EMEL, if applicable. An evaporative family will fail compliance testing in any tested unit has diurnal emissions more than five percent above the applicable diurnal emission standard, and any unit with diurnal emissions less than five percent above the standard will be retested. If all retested units meet the diurnal emission standard on the retest, the evaporative family will pass compliance testing; if not, the evaporative family will fail compliance testing. Fuel lines, carbon canisters, or fuel tanks will pass compliance testing if all tested units meet the applicable emission standards in sections 2754, 2755, or 2757, and will fail if any tested unit has emissions that exceed the applicable emission standards. Section 2765(a)(9) was added to clarify that any sign of visual leakage constitutes a failure of compliance testing.

Section 2765(b) was modified to include notification of failure for fuel lines, carbon canisters, and fuel tanks. Notification of failure to meet labeling requirements was also added to the section. A requirement was added that the Executive Officer select the five units for independent testing if a Holder chooses to provide independent test results for the Executive Officer’s consideration.

Section 2765(c) was modified to include suspension and revocation of Executive Orders for fuel lines, carbon canisters, and fuel tanks. When a Holder fails to meet the labeling requirements, he or she will be required to demonstrate that the fuel line, carbon canister, fuel tank, or evaporative family meets the requirements and submit production labels before a suspended Executive Order will be reinstated. Section 2765(c)(7) was

modified to require the test units to be selected by the Executive Officer when a Holder conducts testing to demonstrate a modified evaporative family meets the applicable standards after an Executive Order has been revoked.

Rationale for Section 2765

Referring to Holders rather than manufacturers is consistent with the text throughout the Article. Requiring one or more test units for compliance testing rather than five is consistent with the certification requirements for evaporative systems and will reduce the testing burden on ARB staff. Providing for the Executive Officer to obtain units from the California marketplace will give ARB more flexibility when choosing equipment for compliance testing. Conducting compliance testing without durability testing or preconditioning will allow for much faster initial testing. A compliance test with durability testing and preconditioning might take six months or more, but one without durability testing and preconditioning could be completed in a few days. This faster testing can be used to identify non-compliant evaporative families sooner and prevent sales of non-compliant evaporative systems from continuing. If ARB does conduct compliance testing with the durability demonstration and/or preconditioning, performing the durability demonstration or preconditioning at a room temperature of approximately 20 °C at the Executive Officer's discretion will not result in higher diurnal emissions than if the temperatures specified in TP-902 were used. If the results differ at all, they might be slightly lower than those produced if the temperatures specified in TP-902 were used. However, the flexibility provided will allow ARB to conduct more compliance testing. Compliance testing can also be conducted on multiple models in an evaporative family more easily, if desired.

Removing the confidence interval test and requiring all test units to pass are consistent with testing one or more units, and will ensure that all evaporative systems are designed to have emissions below the emission standards. Conducting a retest for any unit that has diurnal emissions less than five percent above the diurnal emission standard is consistent with the certification requirement to conduct a retest if the diurnal emissions are greater than 95 percent of the standard. The retest will either confirm that the unit fails consistently, in which case the evaporative family will fail, or will indicate that the unit can meet the standard, in which case the evaporative family will pass. Section 2765(a)(9) was added so that equipment showing signs of visual leakage would not need to be tested. ARB testing has shown that equipment with visible fuel leaks is certain to have emissions far above the diurnal emission standard. Testing such equipment is also likely to contaminate the SHED, resulting in a time consuming and expensive decontamination process. Since leaking equipment presents air quality, near-source exposure, and safety risks, it is

critical to make a determination of failure as quickly as possible so the evaporative family can be recalled or its sales can be stopped if necessary.

The additions to the notification of failure paragraph, section 2765(b), clarify the procedure to be followed when labeling requirements are not met or emissions from fuel lines, fuel tanks, or carbon canisters exceed the emission standards. Requiring the test units to be selected by the Executive Officer if a Holder chooses to provide independent test results for the Executive Officer's consideration will ensure the test units are randomly selected and representative of the units introduced into California commerce.

Adding fuel lines, carbon canisters, and fuel tanks to the suspension and revocation provisions clarifies the procedure to be followed when an Executive Order for one of these components must be suspended or revoked. Requiring a Holder to demonstrate compliance with the labeling requirements and providing sample labels before an Executive Order will be reinstated will allow ARB to confirm the revised labels meet the requirements and avoid additional violations for the same labels. If an Executive Order has been revoked, having the Executive Officer select the test units for the Holder's testing of the modified evaporative family will ensure the test units are randomly selected and representative of the units to be introduced into California commerce.

18. Section 2766. Exemptions.

Summary for Section 2766

The exemptions for metal, coextruded multilayer, and structurally integrated nylon fuel tanks on engines with displacement less than or equal to 80 cc was deleted. The Small Production Volume Tank Exemption was deleted. The exemption for generators fueled by a vehicle fuel tank was modified to refer to "diurnal emission, fuel tank permeation, and carbon canister design standards in section 2754" rather than "diurnal performance requirements in section 2754 and the fuel tank permeation and carbon canister requirements in section 2754(b)."

Rationale for Section 2766

Deleting the exemption from the requirements of section 2755 for metal, coextruded multilayer, and structurally integrated nylon fuel tanks on engines with displacement less than or equal to 80 cc will give ARB the ability to enforce the emission standards for all fuel tanks on these engines, and will require a demonstration that these tanks meet the emission standards in order to be certified. Deleting the Small Production Volume Tank Exemption will also ensure fuel tanks meet the emission standards.

This exemption was being used by large corporations, although the intent was to ease the testing burden on small businesses when California was the only state in which certified evaporative systems were required. Since the adoption of the ARB SORE evaporative emission regulations in 2003, however, U.S. EPA has also adopted evaporative emission regulations. Therefore, the Small Production Volume Tank Exemption is no longer necessary because the same fuel tanks can be used throughout the country. Referring to "diurnal emission, fuel tank permeation, and carbon canister design standards in section 2754" rather than "diurnal performance requirements in section 2754 and the fuel tank permeation and carbon canister requirements in section 2754(b)" in the exemption for generators fueled by a vehicle fuel tank clarifies the standard from which these generators are exempt.

19. Section 2767. Innovative Products.

Summary for Section 2767

Section 2767(c), in which the Executive Officer may make a determination that fuel tanks have undergone special treatment or have been manufactured from a unique material, was deleted. Section 2767(g), in which the Executive Officer would specify the test methods for determining "equivalency" of a fuel tank, was deleted. Section 2767(h), in which a manufacturer must notify the Executive Officer of changes to an innovative product "equivalent" fuel tank, was deleted.

Rationale for Section 2767

The provisions for innovative product "equivalent" fuel tanks were deleted because they are no longer necessary given that replacement of a "nominal fuel tank" with an "equivalent fuel tanks" is no longer allowed. All tanks will be subject to permeation testing and must meet the applicable standard, regardless of the tank material or construction method. Merely meeting the fuel tank permeation standards does not make a fuel tank innovative. The provisions for using "equivalent fuel tanks" have also been deleted, so the innovative product "equivalent" determination would not have any further use. Holders of Executive Orders for these fuel tanks can pursue Executive Orders for fuel tanks via the conventional pathway.

20. Section 2767.1. Approved Evaporative Emission Control System Components.

Summary for Section 2767.1

Section 2767.1(a) was modified to include certification to the emission standards in sections 2755 and 2757. Section 2767.1(b) was modified to

require the certification test samples of a component to be production samples intended for installation on SORE. The certification period was limited to four years, rather than the indefinite time period that would apply under the current requirements. Section 2767.1(e) was modified to invalidate all component approvals if the test procedures for a product category are amended. A new paragraph (g) was added that provides for renewal of certification for fuel lines and fuel tanks if no changes have been made that could affect the evaporative emissions and if the test data originally submitted to ARB still represent the model of the component with the highest permeation rate relative to the permeation emission standard. A new paragraph (h) was added that provides for renewal of certification for carbon canisters if no changes have been made that could affect the butane working capacity and if the test data originally submitted to ARB still represent the working capacity of the carbon canister.

Rationale for Section 2767.1

Specifying that components can be certified to the emission standards in sections 2755 and 2757 clarifies the original intent that these components could be certified for use on SORE. Requiring certification test samples of a component to be production samples intended for installation on SORE clarifies that changes may not be made to the components after certification testing without the Executive Officer's approval. Shortening the certification period for components to four years will prevent components that go into disuse from remaining certified unnecessarily. It is important to allow only components certified to meet the emission standards with the current test procedures to be installed on new SORE. The amendments to the test procedures presented herein will require the use of LEV III Certification Gasoline and will result in additional changes that are intended to improve the test procedures. Therefore, components not tested according to the amended test procedures must not be installed on SORE certified by following the amended CP-901 and CP-902.

Certification renewal will allow for formal periodic evaluation of certified components. In this evaluation, component Executive Order holders will determine whether previously-collected test data still represent the component to ensure all certified components meet the emission standards. If no changes have been made that could affect the component's evaporative emissions or butane working capacity, as applicable, and the data are still representative, certification renewal will be granted. If a Holder determines that changes have been made that were not previously recognized, new testing will be required to renew certification of the component. Through this process, components will only remain certified if they continue to meet their respective standards.

21. Section 2768. Variances.

Summary for Section 2768

Section 2768(a) was modified by deleting “or fuel tanks.” A reference to “sections 2753 through 2756” was changed to “sections 2754 through 2757” in section 2768(f)

Rationale for Section 2768

Variances may be desired by Holders of Executive Orders for evaporative families if they cannot meet the requirements of the Article. Since fuel tanks are used in evaporative systems, the evaporative system Executive Order Holder could apply for a variance if the fuel tank were to cause an evaporative family to not comply with the requirements of the Article. It is not necessary to separately provide for a fuel tank manufacturer to apply for a variance. The references to the requirements of “sections 2753 through 2756” were changed to refer to “sections 2754 through 2757” because these are the sections with the applicable requirements.

22. Section 2769. Inspection.

Summary for Section 2769

“Holder” was added to the list of entities’ facilities that ARB may periodically inspect and whose failure to allow such inspection shall be grounds for suspension or revocation of an Executive Order.

Rationale for Section 2769

The clarification that Holders’ facilities may be inspected is important because they certify that evaporative systems will comply with the requirements of the Article. Inspections may be necessary to verify that the Holder is producing evaporative systems that comply with the requirements of the Article. If the Executive Officer cannot inspect these facilities, he or she cannot verify the production methods are compliant, and, therefore, it may be necessary to suspend or revoke the Executive Order.

23. Section 2770. Denial, Suspension or Revocation of Certification.

Summary for Section 2770

A provision was added that the Executive Officer may suspend or revoke an Executive Order if a Holder does not meet the bond requirements.

Rationale for Section 2770

The bond requirements are intended to ensure Holders meet any compliance and enforcement obligations under this Article. If a Holder does not meet the bond requirements, the Executive Officer will suspend or revoke the Holders Executive Orders to prevent the sale of evaporative systems that may not comply with the emission standards.

24. Section 2771. Appeals.

Summary for Section 2771

The first paragraph of the section was numbered 2771(a), and the length of time to file a request for a hearing was changed from fifteen working days to twenty days from the date the action for which review is sought became final. Section 2771(b) was renumbered to 2771(c) and section 2771(c)(2)(C) was replaced with "A statement of the objections to the decision upon which review is requested; a verified statement of the facts, data and other relevant evidence in support of the objections; a demand for the specific relief the petitioner seeks; a short, concise statement of legal argument, with citation to authorities, in support of the objections and the relief requested. The verification may be made on information and belief." Section 2771(c)(3) was modified to specify that a request for review must be received by the Clerk of the Board. Section 2771(c)(4) was modified to specify that ARB staff's written response to the Holder's submission shall be filed with the Clerk of the Board and served on the petitioner within 15 days of appointment of a hearing officer.

Rationale for Section 2771

The length of time to file a request for a hearing was changed from fifteen working days to twenty days from the date the action for which review is sought became final. This change was made in order to be consistent with the time period in section 2771(c)(2). The revised section 2771(c)(2)(C) is consistent with Cal. Code Regs., title 17, section 60055.16(b)(4). Requiring a request for review to be received by the Clerk of the Board provides a standardized method for submitting such requests, and is consistent with ARB's policies for requests for review. Filing ARB's written response to a request for review with the Clerk of the Board and serving it on the petitioner within 15 days of appointment of a hearing officer also provides a standard procedure. Responding "within 10 days after receipt of the manufacturer's submission," which was in section 2771(c)(4), is not consistent with responding within 15 days of appointment of a hearing officer, so it was deleted.

25. Section 2773. Severability.

Summary for Section 2773

The word “Article” was capitalized in three places.

Rationale for Section 2773

“Article” is conventionally capitalized in California law.

26. Section 2774. Bond Requirements.

Summary for Section 2774

Section 2774 requires Holders to post a bond, obligated to ARB, to cover any potential compliance or enforcement actions under this Article unless the Holder has sufficient long-term U.S. assets. The per-engine bond amount is $500, and the minimum bond amount is $500,000, except that Holders with sales of fewer than 1000 evaporative systems are subject to a $25,000 minimum bond. A Holder must get the bond from a third-party surety that is cited in the U.S. Department of Treasury Circular 570. The surety agent remains responsible for obligations under the bond for two years after the bond is cancelled or expires without being replaced.

Rationale for Section 2774

The bond requirements were added for a number of reasons. The high non-compliance rate observed in the validation study highlights the need to make improvements that will deter Holders from introducing non-compliant evaporative systems into California. Numerous changes have been made to try to prevent non-compliant evaporative systems from being brought into California. However, once non-compliant evaporative families have been identified, suspension and revocation of Executive Orders and monetary penalties are the tools that the Executive Officer can use to deter Holders from continuing to sell non-compliant evaporative systems. It is difficult to assess a penalty if the Holder is not responsive. Some Holders only certify evaporative systems for one model year, and at least one Holder whose equipment was tested for the validation study went bankrupt before the test unit could be returned to the Holder. The validation study was not an enforcement matter, but it would not have been possible to collect a penalty from the Holder that went bankrupt if it were. An enforcement case could extend well beyond the end of the model year. The bond requirements will ensure that penalties can be collected, even if a Holder no longer certifies evaporative systems in California or becomes non-responsive.

These bond requirements were also added to be consistent with those in 40 CFR 1054, the U.S. EPA exhaust regulations for SORE. The per-engine amount is larger in section 2774 than in 40 CFR 1054 to be consistent with the per-engine, per-day maximum penalty for a violation under this Article.

27. CP-901. Certification Procedure for Evaporative Emission Control Systems on Engines With Displacement Less Than or Equal to 80 Cubic Centimeters

Summary for CP-901 Section 1

The title of CP-901 was changed from "Certification And Approval Procedure for Small Off-Road Engine Fuel Tanks" to "Certification Procedure for Evaporative Emission Control Systems on Engines With Displacement Less Than or Equal to 80 Cubic Centimeters." Section 1 was modified to specify that CP-901 contains the procedure for certifying evaporative emission control systems rather than just fuel tanks.

Rationale for CP-901 Section 1

The title change and the changes to section 1 reflect the revised purpose of CP-901, which is to provide the procedure to certify evaporative emission control systems for engines with displacement less than or equal to 80 cc. Previously, this procedure was only for fuel tanks on these engines.

Summary for CP-901 Section 2

Section 2 was modified by changing the title to "Permeation Emission Standards." The section was also modified to specify the citation for the fuel tank and fuel line permeation emission standards for engines with displacement less than or equal to 80 cc.

Rationale for CP-901 Section 2

The fuel tank permeation emission standard had been referred to as a "performance standard," but that could have been confusing considering the diurnal emission standards had also been referred to as "performance standards." To be more specific, the standard is now referred to as a "permeation emission standard." The new fuel line permeation emission standard is also referenced for completeness.

Summary for CP-901 Section 3

The title of section 3 was changed from "Optional Performance Standards" to "Optional Evaporative Emission Standards." Section 3 was modified to

reflect the new optional diurnal emission standard for engines with displacement less than or equal to 80 cc.

Rationale for CP-901 Section 3

The title of section 3 was changed to be more specific as to the standards discussed in the section. Applicants may choose to certify to the optional fuel tank permeation emission standard in section 2757 instead of the fuel tank permeation emission standard in section 2755.

Summary for CP-901 Section 4

Section 4 was modified to require certification of evaporative systems rather than fuel tanks. "Maximum allowable permeation emissions performance standard" was changed to "permeation emission standards." The requirement for the fuel tank selected for testing to have the highest permeation emissions in an engine family was changed to a requirement to test the tank with the highest permeation rate relative to the application permeation emission standard within the evaporative family.

Rationale for CP-901 Section 4

The change to require certification of evaporative systems rather than fuel tanks is consistent with the changes throughout the certification procedure. The term "permeation emission standards" is simpler and clearer than "maximum allowable permeation emissions performance standard," and is consistent with the terminology used through the Article. Testing the fuel tank with the highest permeation rate in the evaporative family relative to the applicable permeation emission standard will ensure the test unit is the one most likely to exceed the emission standard.

Summary for CP-901 Section 5

Section 5.1 was modified to require testing of five samples of the fuel tank that is expected to exhibit the highest permeation rate relative to the applicable permeation emission standard of all fuel tanks within the evaporative family. The phrase "worst case emissions, (e.g., the highest permeation emissions)" was replaced by "the highest permeation rate relative to the applicable permeation emissions standard." The sentence, "Fuel lines that meet the requirements of section 2754(b)(2) must also be used in all evaporative families," was added. Section 5.1.2 was deleted. Section 5.2 was modified to require an applicant to obtain certification of an evaporative system rather than requiring equipment manufacturers to certify fuel tanks. The description of testing in TP-901 was removed from section 5.3. The test procedure for fuel lines was specified as SAE J1737

(Stabilized May 2013). The provision to carry data across to other evaporative families was deleted.

Rationale for CP-901 Section 5

Requiring testing of five samples of the fuel tank that is expected to exhibit the highest permeation rate relative to the applicable permeation emission standard of all fuel tanks within the evaporative family is clearer than requiring testing of the "worst case" tank. Applicants will be better able to determine which tank they should test with the revised guidance. Testing five samples is consistent with the requirements for certification testing of a fuel tank for use on design-certified evaporative systems. Section 5.1.2 was deleted because it specified including evaporative emissions information in an exhaust certification application. The two applications are processed separately, so this section was not needed. Requiring certification of evaporative systems rather than fuel tanks is consistent with the added fuel line permeation emission requirements and the revision to the evaporative emission warranty. The description of testing in TP-901 was not needed in CP-901, as the procedure is more fully detailed in TP-901. The test procedure for fuel lines is as specified in section 2754, but was listed here for convenience. The data carry across provision was no longer necessary, given the revised definition of "evaporative family" in section 2752, which allows all models using fuel tanks constructed by the same process with the same material and the same permeation control to be grouped into one evaporative family.

Summary for CP-901 Section 6

Section 6 was modified to describe certification of evaporative systems rather than fuel tanks. The sentence, "Manufacturers must submit all revisions to the application to the ARB for approval," was deleted. The existing section describing letters of intent was deleted. The requirements for letters of intent include listing the evaporative families for which the applicant will apply for certification and date of expected submission for each application. A letter of intent may be combined with that required for SORE exhaust certification. The cover letter section (6.3) was deleted. The labeling section (6.4) was renumbered to 6.3 and the existing text was replaced with a reference to section 2759. The test procedures for fuel tanks and fuel lines were specified as TP-901 and SAE J1737 (Stabilized May 2013), respectively, in section 6.4 (previously 6.5). Section 6.6 was renumbered to 6.5, and the sentences, "Alternative test procedure approval shall be granted on a case-by-case basis, only after all necessary comparison testing has been conducted. The applicant shall demonstrate equivalency between the reference test procedure and the proposed alternative test procedure according to the procedure in "Method 301 – Field Validation of Pollutant Measurement Methods from Various Waste Media,"

which is in Appendix A to 40 CFR Part 63 and is incorporated by reference herein," were added. Section 6.7 was renumbered to 6.6, and the test fuel specification was replaced with a reference to TP-901 for the fuel tank test fuel and section 2754(b)(2) for the fuel line test fuel.

Section 6.8 was renumbered to 6.7 and modified to require resubmission of the entire certification application if revisions are made that affect the permeation emissions of the fuel tank. Section 6.9 was renumbered to 6.8 and modified to require running change requests and field fix requests to be submitted as part of a revised certification application. The revised section 6.8 requires a Holder to submit new test data if a change is made that affects permeation emissions or results in a new fuel tank in the evaporative family exhibiting the highest permeation rate relative to the applicable permeation emission standard. Section 6.10 was renumbered to 6.9 and revised to specify that information designated by an applicant as confidential shall be handled in accordance with the procedures specified in title 17, Cal. Code Regs., sections 91000-91022. Section 6.11 was renumbered to 6.10 and modified to require a summary of the certification process for each evaporative family, rather than for each "engine family fuel tank." A new section 6.11 was added that would require an applicant to submit for inspection or testing an engine or equipment unit from an evaporative family with the certification application upon the request of the Executive Officer.

Rationale for CP-901 Section 6

Describing certification of evaporative systems rather than fuel tanks is consistent with the changes throughout the certification procedure. The sentence, "Manufacturers must submit all revisions to the application to the ARB for approval," was deleted because it was redundant. The first paragraph, in which this sentence appeared, indicated that applications must be submitted to ARB. Section 6.7 (previously 6.8) discusses the requirement to submit application revisions to ARB for approval, so no information was lost by deleting the sentence. The revised section on letters of intent provides updated guidance for preparing a letter of intent, including referencing the most current exhaust emissions test procedures. The cover letter section was deleted because it is not needed in this certification procedure. Applicants will likely continue to prepare cover letters to accompany their certification applications, but it is not necessary to detail requirements for such a letter in this certification procedure. The emission labeling section was replaced with a reference to section 2759 because the labeling requirements are fully explained in section 2759. It is not necessary to reproduce section 2759 in this certification procedure. The test procedures for fuel tanks and fuel lines are as specified in section 2755. Alternative test procedures, when they have been granted, have been on a case-by-case basis, but adding such a statement in this section clarifies that

alternative test procedures are not generally applicable to all applicants. Specifying the procedure for demonstrating equivalency between the reference test procedure and the proposed alternative test procedure will assist applicants in preparing their requests and enable timely review by the Executive Officer. The certification test fuel references describe the test fuels, so it is not necessary to repeat them in this certification procedure.

Requiring the entire certification application to be resubmitted if a change is made that affects the permeation emissions will ensure that the most current information for the affected evaporative family is contained in a single application and allow ARB to easily review the complete application. Including running change and field fix requests in revised certification applications will give ARB context in which to consider the implications of such requests. Requiring new test data when a change is made that affects permeation emissions will ensure the evaporative family will comply with the emission standards. Since the handling of information designated as confidential by an applicant is discussed in title 17, Cal. Code Regs., sections 91000-91022, it is sufficient to have a reference to those sections in this certification procedure to indicate ARB's handling of such information. The change to the certification summary requirements is consistent with the revisions to CP-901 to be a procedure for evaporative systems. Requiring an applicant to submit an engine or equipment unit will allow ARB to confirm that the engine or equipment unit complies with the requirements of CP-901. Improper labeling, use of components other than those specified in the application, and fuel leaks could easily be identified during the review of the application without increasing the amount of time necessary to make a determination and issue an Executive Order.

Summary for CP-901 Section 7

The recommendation to see the exhaust emission certification application for information regarding the format of the certification application was deleted. The information that shall be contained in a certification application was listed in section 7, and includes information about the applicant, the exhaust and evaporative family names, projected sales, proof of meeting the bond requirements, test results, lists of equipment types and models included in the evaporative family, descriptions of the fuel tank and fuel lines, labeling and warranty information, a description of the evaporative system, and a description of the criteria used to determine which fuel tanks in the evaporative family exhibit the highest and lowest permeation emission rates relative to the applicable permeation emission standards.

Rationale for CP-901 Section 7

Since different information is needed for exhaust and evaporative emission certification applications, specifying the information required in an

evaporative emission certification application in this section provides the clearest guidance for applicants to prepare their certification applications. Aside from general information about the applicant, the production plant and projected sales, much of the information in the certification application allows ARB to confirm an evaporative family can be expected to comply with the emission standards in the Article. The requirement to include all results from all tests performed on the units tested for certification, including test results from invalid tests or from any other tests, is nearly identical to a requirement in 40 CFR 1060.205, but pertains only to the units tested for certification, whereas U.S. EPA's requirement might be interpreted to apply more broadly. Other test results, such as for research and development testing, are not required to be included in a certification application. This requirement is intended to ensure that failing test results are not omitted from a certification application. If a failure occurs, the applicant would need to determine the cause for the failure, develop a solution, and test units that incorporate the solution to the problem that caused the failure.

The lists of equipment types, engine and equipment models in the evaporative family will help ARB to confirm that engines and equipment labeled as being in a particular evaporative family are in fact included in that evaporative family. The list of warranty parts and description of the evaporative system will allow ARB to verify that the evaporative system can be expected to comply with the emission standards and other requirements. The description of the criteria used to determine which fuel tanks in the evaporative family exhibit the highest and lowest permeation emission rates relative to the applicable permeation emission standard will give ARB information to understand the applicant's choice of test fuel tanks and the unique factors which contribute to higher emissions on some fuel tanks in a particular evaporative family.

Summary for CP-901 Section 8

Section 8 was modified to specify that Executive Orders shall include equipment types and models in addition to engine models in the evaporative family. Other items added to the list that shall be on the Executive Order include fuel line diameter, length, material, and permeation barrier, the highest tested permeation rates for the fuel tank and fuel lines, and the fuel tank and fuel line Executive Order numbers, if applicable.

Rationale for CP-901 Section 8

Including engine and equipment models in an evaporative family on the Executive Order will clarify that only those models listed are certified for sale in California. Any model not identifiable as one on the list will not be considered to be in the evaporative family. Including information about the fuel lines and the Executive Order numbers for the fuel tank and fuel lines

will help ARB verify the fuel tank and fuel lines used on an engine are those included in the certification application. Including the permeation rates for the fuel tank and fuel lines is useful for emissions inventory purposes and for comparison to ARB's test results.

Summary for CP-901 Sections 9 and 10

Sections 9 and 10 were deleted.

Rationale for CP-901 Sections 9 and 10

Sections 9 and 10 contained information that is already stated elsewhere, and were therefore not needed.

28. CP-902. Certification Procedure for Evaporative Emission Control Systems on Engines With Displacement Greater Than 80 Cubic Centimeters

Summary for CP-902 Section 1

The title of CP-902 was changed from "Certification And Approval Procedure for Evaporative Emission Control Systems" to "Certification Procedure for Evaporative Emission Control Systems on Engines With Displacement Greater Than 80 Cubic Centimeters." Section 1 was revised to refer to certification to "evaporative emission standards" rather than "evaporative emission performance standards."

Rationale for CP-902 Section 1

The title change clarifies that CP-902 is the certification procedure for evaporative systems on engines with displacement greater than 80 cc, whereas CP-901 is for evaporative systems on engines with displacement less than or equal to 80 cc. Referring to "evaporative emission standards" is consistent with the revised language throughout the Article.

Summary for CP-902 Section 2

Section 2 was replaced with a reference to the diurnal emission and design standards in section 2754.

Rationale for CP-902 Section 2

The existing text in section 2 explained performance standards, performance specifications, and design requirements. This information was not needed in this certification procedure, since the standards are stated in section 2754.

Summary for CP-902 Section 3

Section 3 was modified to refer to “optional evaporative emission standards” rather than “optional performance standards.”

Rationale for CP-902 Section 3

Referring to evaporative emission standards is more specific than referring to performance standards, and is consistent with the language used throughout the revised Article.

Summary for CP-902 Sections 4 and 5

Section 4.1 was modified to require a new Executive Order each model year for “each evaporative family” rather than for “any small off-road engine or equipment subject to any of the performance standards or design requirements prescribed herein.” The requirement for engine and equipment models in an evaporative family to have “similar evaporative emission characteristics” was changed to “similar diurnal emission rates.” The requirement to submit test data documenting compliance with the applicable diurnal evaporative emission standard was changed to a requirement to submit “all test results from all tests performed on the units tested for certification, including test results from invalid tests or from any other tests, whether or not they were conducted according to TP-901, TP-902, or SAE J1737 (Stabilized May 2013).”

The option was added for an applicant to submit test results or Executive Order numbers for the fuel tank, fuel lines, and carbon canister instead of diurnal emission test results when certifying to the diurnal emission standards. The requirement to test the model expected to have the highest evaporative emissions within an evaporative family was changed to a requirement to test the model expected to have the highest diurnal emission rate relative to the applicable diurnal emission standard within the evaporative family. The test unit will also be required to have a complete and functional evaporative system with all the emission control systems and components specified in the certification application. The paragraph that discussed certifying to the design standards and Figure 1 were deleted.

The first two paragraphs of section 5.1.1, which discussed selection of a test engine and providing test data for components, were deleted. The last paragraph of section 5.1.1 was incorporated into section 4.1. Section 5.1.2 was deleted. Section 5.2 was renumbered to 4.2 and modified by replacing “manufacturers are required to obtain ARB certification” with “an applicant is required to obtain ARB certification.” Section 5.3 was renumbered to 4.3 and modified by removing the sentence, “Prior to the time of production, an

evaporative family test engine or equipment is durability tested and preconditioned as specified in TP-902 to stabilize the evaporative and permeation emissions," and referring to "diurnal emission testing" rather than an "emission test." The provision to carry data across to other evaporative families was deleted.

Rationale for CP-902 Sections 4 and 5

Requiring a new Executive Order each model year for "each evaporative family" rather than for "any small off-road engine or equipment subject to any of the performance standards or design requirements prescribed herein" clarifies that evaporative families, not individual models, are certified. Requiring models in an evaporative family to have similar diurnal emission rates gives applicants a more specific criterion on which to group models into families. The requirement to include all results from all tests performed on the units tested for certification, including test results from invalid tests or from any other tests, is nearly identical to a requirement in 40 CFR 1060.205, but pertains only to the units tested for certification, whereas U.S. EPA's requirement might be interpreted to apply more broadly. Other test results, such as for research and development testing, are not required to be included in a certification application. This requirement is intended to ensure that failing test results are not omitted from a certification application. If a failure occurs, the Executive Officer would like to review a report that details the cause for the failure, the solution, and test results for an engine that has a revised evaporative system.

Some of the text in sections 4 and 5 was moved or consolidated where the same topics were addressed in both sections. Applicants have been able to submit component test data or component Executive Orders when using the design certification method, but now all evaporative systems will be required to comply with the diurnal emission standards, whether they certify using diurnal emission test data or component test data or Executive Orders. The design certification method will allow applicants to certify evaporative families to the diurnal emission standards without performing diurnal emission testing, since evaporative systems using certified components are expected to have diurnal emissions below the diurnal emission standards. The requirement to have a complete and functional evaporative system with all the emission control systems and components specified in the certification application was previously in section 5.1.1 and was moved to section 4.1 since much of the other text in section 5.1.1 was redundant.

The paragraph that discussed certifying to the design standards was deleted because applicants will be required to certify to the diurnal emission standards, although they can do so by submitting component test data or Executive Order numbers. Figure 1 was deleted because it was not

needed. Since not all applicants are manufacturers of the equipment for which they apply for certification, it is more accurate to refer to “applicants” rather than “manufacturers” when discussing certification. The sentence that referred to testing an engine or equipment unit “prior to the time of production” was deleted because an engine or equipment unit cannot be tested before it is produced. The evaporative system in units produced throughout the model year must also be identical to the evaporative system on the unit tested for certification, unless changes are approved by the Executive Officer.

The data carry across provision was deleted because it is not necessary to allow data to be carried across for similar models to be grouped together. Models in an evaporative family must share similar fuel systems, engine designs, and evaporative emission control features such that the equipment can be expected to exhibit similar diurnal emission rates. This change will not require Holders to create more evaporative families than they currently have, since all similar models can be in one evaporative family.

Summary for CP-902 Section 6

Section 6 was deleted.

Rationale for CP-902 Section 6

Section 6 was not needed because it defined two certification options that would not have any difference in requirements, and it discusses nominal fuel tank and fuel line replacement. Nominal fuel tank replacement has been deleted, and nominal fuel line replacement is discussed in section 2753.

Summary for CP-902 Section 7

Section 7 was renumbered to section 5 and modified to indicate that the instructions are specific to certification of evaporative systems on engines with displacement greater than 80 cc. The existing section describing letters of intent was deleted. The requirements for letters of intent include listing the evaporative families for which the applicant will apply for certification and date of expected submission for each application. A letter of intent may be combined with that required for SORE exhaust certification. The cover letter section (7.3) was deleted. The labeling section (7.4) was renumbered to 5.3 and the existing text was replaced with a reference to section 2759. The engineering description section (7.5) was renumbered to 5.4 and modified to specify that the engineering description of the technology used to control evaporative emissions shall be included in an application for certification and shall include the method used to control running loss emissions.

Section 7.6, the Certification Summary Sheet, and 7.7, the Certification Database Form, were deleted. Section 7.8 was renumbered to 5.5 and modified by adding a reference to the warranty statement in section 2764. The test procedures were specified as TP-901, SAE J1737 (Stabilized May 2013), and TP-902 in section 5.6 (previously 7.9). Section 7.10 was renumbered to 5.7 and modified to include unique equipment designs as a reason for seeking approval of modified test procedures. The sentences, "Alternative test procedure approval shall be granted on a case-by-case basis, only after all necessary comparison testing has been conducted. The applicant shall demonstrate equivalency between the reference test procedure and the proposed alternative test procedure according to the procedure in "Method 301 – Field Validation of Pollutant Measurement Methods from Various Waste Media," which is in Appendix A to 40 CFR Part 63 and is incorporated by reference herein," were added. Section 7.11 was renumbered to 5.8 and modified to require an applicant rather than a manufacturer to prevent unauthorized or in-use adjustments of any adjustable parameters of an evaporative system. Section 7.12 was renumbered to 5.9, and the test fuel specification was replaced with a reference to the test procedures and section 2754.

Section 7.13 was renumbered to 5.10 and modified to require the applicant's or Holder's name rather than the manufacturer's name and resubmission of the entire certification application if revisions are made that affect the evaporative emissions of the evaporative family. Section 7.14 was renumbered to 5.11 and modified to require running change requests and field fix requests to be submitted as part of a revised certification application. The revised section 5.11 requires a Holder to submit new test data if a change is made that affects evaporative emissions or results in a new model in the evaporative family exhibiting the highest diurnal emission rate relative to the applicable diurnal emission standard. Section 7.15 was renumbered to 5.12 and revised to specify that information designated by an applicant as confidential shall be handled in accordance with the procedures specified in title 17, Cal. Code Regs., sections 91000-91022. Section 7.16 was renumbered to 5.13. A new section 5.14 was added that would require an applicant to submit for inspection or testing an engine or equipment unit from an evaporative family with the certification application upon the request of the Executive officer.

Rationale for CP-902 Section 7

Stating that the instructions in this section are for evaporative systems on engines with displacement greater than 80 cc clarifies that they are not for evaporative systems on engines with displacement less than or equal to 80 cc, which are covered in CP-901. The revised section on letters of intent provides updated guidance for preparing a letter of intent, including

referencing the most current exhaust emissions test procedures. The cover letter section was deleted because it is not needed in this certification procedure. Applicants will likely continue to prepare cover letters to accompany their certification applications, but it is not necessary to detail requirements for such a letter in this certification procedure. The emission labeling section was replaced with a reference to section 2759 because the labeling requirements are fully explained in section 2759. It is not necessary to reproduce section 2759 in this certification procedure. Applicants have included engineering descriptions in their certification applications, but they have not always been sufficiently detailed. Clarifying that engineering descriptions are required and shall include the method used to control running loss emissions will enable ARB to better assess the effectiveness of control technologies and running loss control methods. The Certification Summary Sheet and Certification Database Form were deleted because they do not need to be included in this certification procedure. They may continue to be used to collect information required in this certification procedure, but are not included here because they may need to be updated periodically. Providing a reference to the warranty statement in section 2764 will assist applicants in preparing their applications. The test procedures for fuel tanks and fuel lines are as specified in sections 2754 and 2755. The change to allow unique equipment designs as a reason to seek approval to use a modified test procedure acknowledges that certain equipment designs may not be suited to the test procedures as written. Alternative test procedures, when they have been granted, have been on a case-by-case basis, but adding such a statement in this section clarifies that alternative test procedures are not generally applicable to all applicants. Specifying the procedure for demonstrating equivalency between the reference test procedure and the proposed alternative test procedure will assist applicants in preparing their requests and enable timely review by the Executive Officer. Since applicants are not always manufacturers of the evaporative systems, it is the applicant, not the manufacturer, who will be responsible to prevent unauthorized or in-use adjustments of any adjustable parameters of an evaporative system. The certification test fuel references describe the test fuels, so it is not necessary to repeat them in this certification procedure.

Requiring the applicant's or Holder's name to be on a certification application is necessary because the manufacturer may not be the applicant or Holder. Requiring the entire certification application to be resubmitted if a change is made that affects the evaporative emissions will ensure that the most current information for the affected evaporative family is contained in a single application and allow ARB to easily review the complete application. Including running change and field fix requests in revised certification applications will give ARB context in which to consider the implications of such requests. Requiring new test data when a change is made that affects evaporative emissions will ensure the evaporative family will comply with

the emission standards. Since the handling of information designated as confidential by an applicant is discussed in title 17, Cal. Code Regs., sections 91000-91022, it is sufficient to have a reference to those sections in this certification procedure to indicate ARB's handling of such information. Requiring an applicant to submit an engine or equipment unit will allow ARB to confirm that the engine or equipment unit complies with the requirements of CP-902. Improper labeling, use of components other than those specified in the application, and fuel leaks could easily be identified during the review of the application without increasing the amount of time necessary to make a determination and issue an Executive Order.

Summary of CP-902 Section 8

Section 8 was renumbered to section 6, and the information that shall be contained in a certification application was listed. This includes information about the applicant, the exhaust and evaporative family names, projected sales, proof of meeting the bond requirements, test results, lists of equipment types and models included in the evaporative family, description of each model in the evaporative family including the fuel tank, fuel lines, and carbon canister, test unit volume, and fuel system type, labeling and warranty information, a description of the evaporative system, and a description of the criteria used to determine which models in the evaporative family exhibit the highest and lowest diurnal emission rates relative to the applicable diurnal emission standards.

Rationale for CP-902 Section 8

Specifying the information required in an evaporative emission certification application in this section provides the clearest guidance for applicants to prepare their certification applications. Aside from general information about the applicant, the production plant and projected sales, much of the information in the certification application allows ARB to confirm an evaporative family can be expected to comply with the emission standards in the Article. The requirement to include all results from all tests performed on the units tested for certification, including test results from invalid tests or from any other tests, is nearly identical to a requirement in 40 CFR 1060.205, but pertains only to the units tested for certification, whereas U.S. EPA's requirement might be interpreted to apply more broadly. Other test results, such as for research and development testing, are not required to be included in a certification application. This requirement is intended to ensure that failing test results are not omitted from a certification application. If a failure occurs, the applicant would need to determine the cause for the failure, develop a solution, and test units that incorporate the solution to the problem that caused the failure.

The lists of equipment types, engine and equipment models in the evaporative family will help ARB to confirm that engines and equipment labeled as being in a particular evaporative family are in fact included in that evaporative family. The description of each model in the evaporative family will allow ARB to confirm that the components of an evaporative system are the same as those used on test units and comply with the requirements of the Article. The list of warranty parts and description of the evaporative system will allow ARB to verify that the evaporative system can be expected to comply with the emission standards and other requirements. The description of the criteria used to determine which models in the evaporative family exhibit the highest and lowest diurnal emission rates relative to the applicable diurnal emission standards will give ARB information to understand the applicant's choice of test units and the unique factors which contribute to higher emissions on some models in a particular evaporative family.

Summary for CP-902 Section 9

Section 9 was renumbered to section 7 and modified to specify that Executive Orders shall include equipment types in addition to engine and equipment models in the evaporative family. Other items added to the list that shall be on the Executive Order include the highest tested diurnal emission rate, the highest tested permeation rates for the fuel tank and fuel lines, and the carbon canister working capacity.

Rationale for CP-902 Section 9

Listing the equipment types in an evaporative family will help with identification and emissions inventory development. Including engine and equipment models in an evaporative family on the Executive Order will clarify that only those models listed are certified for sale in California. Any model not identifiable as one on the list will not be considered to be in the evaporative family. Including the diurnal emission rate or the permeation rates for the fuel tank and fuel lines and the working capacity of the carbon canister is useful for emissions inventory purposes and for comparison to ARB's test results.

Summary for CP-902 Sections 10 and 11

Sections 10 and 11 were deleted.

Rationale for CP-901 Sections 10 and 11

Sections 10 and 11 contained information that is already stated elsewhere, and were therefore not needed.

Summary for CP-902 Attachment 1

Attachment 1 was modified to allow models with the same venting control and fuel tank barrier to be grouped into more than one evaporative family. The revised Attachment 1 also provides for additional alphanumeric characters to be added to the evaporative family code as necessary to distinguish between evaporative families using the same venting control and fuel tank barrier type.

Rationale for CP-902 Attachment 1

Generally, an applicant will want to group all models with the same venting control and fuel tank permeation barrier into one evaporative family to reduce testing and other costs. An applicant may choose to group models with the same venting control and fuel tank barrier into more than one evaporative family if models with the same venting control and fuel tank barrier have otherwise dissimilar evaporative systems. If more than one evaporative family with the same two-letter code is created, the applicant will need to add additional characters to distinguish between them. This may be as simple as creating “CC1” and “CC2” evaporative families, for example.

Summary for CP-902 Attachments 2 and 3

Attachments 2 and 3 were deleted.

Rationale for CP-902 Attachments 2 and 3

Attachments 2 and 3 are forms that only request information required by sections 5 and 6. Therefore, they do not need to be included in CP-902.

29. TP-901. Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Fuel Tanks

Summary for TP-901 Section 1

The title of TP-901 was changed from “Test Procedure for Determining Permeation Emissions from Small Off-Road Engines and Equipment Fuel Tanks” to “Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Fuel Tanks.” Section 1 was modified by specifying that the fuel tank permeation emission standards are found in sections 2754, 2755, and 2757. Section 1.1 was modified by specifying that certification of an evaporative system does not exempt it from compliance with other applicable codes and regulations.

Rationale for TP-901 Section 1

The title change is a simplification, since equipment subject to the requirements of this Article has an engine on it. Referring to sections 2754, 2755, and 2757 clarifies where the fuel tank permeation standards can be found. Specifying that certification of an evaporative system does not exempt it from compliance with other applicable codes and regulations clarifies that all certifications that use data generated using this test procedure are only for ARB requirements and do not affect other codes or regulations.

Summary for TP-901 Section 2

Section 2 was deleted.

Rationale for TP-901 Section 2

Since this is a test procedure incorporated by reference in the regulations, a section on emission standards is not necessary. Applicants will be aware of the emission standards from reading the certification procedures.

Summary for TP-901 Section 3

Section 3 was renumbered to section 2 and modified to reflect changes to align the test procedure more closely with U.S. EPA's fuel tank test procedure in 40 CFR 1060.520, such as using the corrected daily mass of five fuel tanks to calculate the permeation rate, exposing the fuel tanks to ultraviolet radiation, and performing fuel cap installation cycles during durability testing. The section was also modified to reflect the addition of the option to test fuel tanks in a SHED using a flame ionization detector (FID) to measure permeation emissions.

Rationale for TP-901 Section 3

Aligning ARB's SORE requirements with those of U.S. EPA where possible, without reducing the stringency of ARB's requirements, is one of the goals of these proposed amendments. Testing is one area where changes can be made to ARB's requirements as part of that alignment. SORE industry stakeholders have also expressed an interest in this alignment of testing requirements. The option to test fuel tanks in a SHED using a FID to measure permeation emissions will give applicants flexibility in choosing how to test their tanks. In some cases, a SHED test may be less expensive, and it may be more feasible than the gravimetric permeation test.

Summary for TP-901 Section 4

Section 4 was renumbered to section 3 and modified by deleting a discussion of sealing fuel tanks to ensure no evaporative emissions occur. A sentence stating that the test fuel does not contain ethanol was deleted.

Rationale for TP-901 Section 4

It is not necessary to discuss sealing fuel tanks completely in this section, since fuel tanks will be tested in a configuration that represents their actual use. If a fuel tank has permeation emissions below the permeation emission standard, it can be certified. Previously, the certification test fuel did not contain ethanol, but the updated certification test fuel does contain 10 percent ethanol, as does gasoline sold in California fueling stations.

Summary for TP-901 Section 5

Section 5 was renumbered to section 4 and “more then” was replaced with “more than.”

Rationale for TP-901 Section 5

This was a typographical error; “more than” is the phrase that was intended.

Summary for TP-901 Section 6

Section 6 was renumbered to section 5 and the hot plate was listed as optional equipment. The requirement for the balance to be top-loading was removed. The temperature control requirement for the vented enclosure was modified to be within 2.0 °C of the specified temperature over the duration of the test. The allowance for the temperature to deviate by more than 3.0 °C from the required temperature for 15 minutes each day was deleted. A relative humidity instrument was added to the list of required equipment. Instrumentation meeting the requirements of section 4 of the revised TP-902 was added to the list. This instrumentation is only required if permeation testing will be performed according to section 12 of TP-901.

A new section 6 was added that specified the test fuel to be used in this test procedure. LEV III certification gasoline and U.S. EPA’s low level ethanol-gasoline blend are the two options for test fuels, except that California Phase II certification fuel can be used through model year 2019.

Rationale for TP-901 Section 6

The hot plate is optional because it will not be needed for fuel tanks that don’t have any holes that aren’t already covered in some way. The

sensitivity requirements for balances are given in section 4, so it is not required that a balance be top-loading. The temperature control requirement in the permeation test is to stay within 2.0 °C of the specified test temperature, so allowing larger temperature excursions would not be consistent. The U.S. EPA test procedure in 40 CFR 1060.520 also requires the temperature to remain within 2.0 °C of the test temperature. A relative humidity instrument will allow the relative humidity to be recorded, so that testing personnel can ensure it is not changing significantly during a test. Requiring instrumentation meeting the requirements of section 4 of the revised TP-902 to be used if permeation testing will be performed according to section 12 of TP-901 will ensure that valid and repeatable test results will be generated.

LEV III Certification Gasoline is the certification test fuel used for current model year automobiles and other engines, and will be used for model year 2020 and later SORE exhaust emissions certification. It is also representative of fuel sold at California fueling stations. U.S. EPA's low level ethanol-gasoline blend is similar to LEV III Certification Gasoline, but has a higher Reid vapor pressure, so use of this fuel may result in minimally higher testing emissions than LEV III Certification Gasoline. However, if one set of tests is performed for certification with U.S. EPA and ARB, the certification testing emissions would be smaller than if two sets of tests were performed, regardless of the test fuel used. Phase II California certification fuel will continue to be allowed for certification through model year 2019 to provide sufficient time for applicants to transition to one of the newly specified test fuels.

Summary for TP-901 Section 7

Section 7 was modified to require calibration of all instruments and equipment used in this procedure at the interval specified by the manufacturers of the instruments and equipment. In addition, the balance shall be calibrated annually by an independent organization using National Institute of Standards and Technology (NIST)-traceable mass standards. A requirement was added to calibrate instrumentation for measuring permeation emissions according to section 12 of TP-901 as specified in section 4 of the revised TP-902.

Rationale for TP-901 Section 7

Instrument and equipment manufacturers typically recommend periodic calibration, so it is not necessary to calibrate most instruments every time they are used. Calibration at the manufacturers' recommended intervals should ensure reliable measurements. Since the permeation rate is determined by the mass loss of the fuel tanks, it is important to calibrate the balance as recommended by the manufacturer and quickly check the

accuracy each time it is used. Calibrating the instrumentation for measuring permeation emissions according to section 12 of TP-901 as specified in section 4 of the revised TP-902 will ensure the instrumentation is working as expected and the test results are accurate.

Summary for TP-901 Section 8

The durability demonstration in section 8 was modified to align the test requirements with those in 40 CFR 1060.520. The pressure test was modified to be compatible with that in 40 CFR 1060.520. However, if normal operating or storage conditions cause pressure changes greater than + 13.8 or – 3.4 kPa to accumulate in the fuel tanks, the actual high and low pressure limits experienced during normal operation or storage would be used for the pressure test in TP-901. The provision to eliminate holes for insertion of fuel line and grommet systems was deleted. The slosh test was modified to be the same as that in 40 CFR 1060.520 except that openings in the fuel tank shall be as they would be when installed on a production engine. The ultraviolet radiation exposure test and fuel cap installation cycles from 40 CFR 1060.520 were added to the durability demonstration. A provision was included to omit the ultraviolet radiation exposure test if no part of the fuel tank, including the filler neck and fuel cap, will be exposed to light when installed on an engine.

Rationale for TP-901 Section 8

Aligning the requirements of the durability demonstration in TP-901 with U.S. EPA's in 40 CFR 1060.520 will reduce testing costs for applicants and allow them to perform one set of tests for a fuel tank family rather than two to certify with ARB and U.S. EPA. The requirement to use actual pressure limits where normal operating or storage conditions cause pressure changes greater than + 13.8 or – 3.4 kPa to accumulate in the fuel tanks will ensure repeated pressure cycling in the fuel tanks will not cause them to exceed the emission standards. Similarly, sealing openings in the fuel tank as they would be when installed on a production engine will ensure exposure to sloshing fuel in the fuel tank will not cause any components to degrade to the degree that the fuel tank will not meet the emission standard. The ultraviolet radiation exposure test and fuel cap installation cycles will also simulate aging processes that occur and may contribute to higher emissions from fuel tanks during their useful lifetime. Requiring fuel tanks to meet the permeation emission standard after this durability demonstration will increase the likelihood that design-certified evaporative families will meet the diurnal emission standards.

Summary for TP-901 Section 9

Section 9 was modified to require preconditioning with a production fuel cap expected to have permeation emissions at least as high as the highest-emitting fuel cap that will be used with fuel tanks from the evaporative family. The direction to seal the outlets was deleted. The preconditioning temperature was changed from 30 ± 10 °C to a temperature that never falls below 38 °C. A provision was added to allow the time of the durability demonstration to be counted as part of the preconditioning procedure if the ambient temperature remains within the specified temperature range, the same fuel cap is used, and each fuel tank is at least 50 percent full.

Rationale for TP-901 Section 9

Since all the openings in the fuel tank are sealed for the slosh test, it is not necessary to seal them again for preconditioning. It is only necessary to remove the fuel cap when adding or removing fuel. Preconditioning with a fuel cap installed and the other openings sealed as they would be when installed on a production engine will ensure that all permeable materials on the fuel tank assembly are preconditioned before the permeation test. Testing with a fuel cap that has permeation emissions at least as high as the highest-emitting fuel cap that will be used with fuel tanks from the evaporative family will ensure no other fuel caps used with the fuel tanks would cause the fuel tank to have permeation emissions higher than the emission standard. U.S. EPA also requires applicants to account for fuel cap emissions either by testing fuel tanks with the highest-emitting fuel cap or separately measuring fuel cap emissions, so requiring testing with a fuel cap for TP-901 further aligns TP-901 with 40 CFR 1060.520.

The preconditioning temperature was increased to be consistent with the permeation test temperature of 40 ± 2 °C in both TP-901 and 40 CFR 1060.520. The purpose of the preconditioning procedure is to ensure the permeation rate measured in the permeation test is as high as it would be at any point during the useful lifetime of the fuel tank. Therefore the preconditioning temperature should be the same at the permeation test temperature. A fuel tank preconditioned at a lower temperature might show stable mass loss at the preconditioning temperature but have permeation emissions that are unrepresentative at the higher permeation test temperature. Preconditioning at 38 °C or greater will ensure the permeation test results are more representative, since the permeation test temperature range is 38 to 42 °C.

There are two options for preconditioning in 40 CFR 1060.520: soak 28 ± 5 °C for at least 20 weeks or at 43 ± 5 °C for at least 10 weeks. The revised preconditioning period in TP-901 is compatible with these requirements. If the permeation emissions of the fuel tanks would not increase with further

preconditioning after 10 weeks of soaking at 38 °C or greater, an applicant could stop the preconditioning procedure and satisfy both the ARB and U.S. EPA requirements. Allowing the time of the durability demonstration to be counted as part of the preconditioning procedure if the ambient temperature remains within the specified temperature range, the same fuel cap is used, and each fuel tank is at least 50 percent full is also consistent with U.S. EPA's requirements, and will result in cost and time savings for applicants. Overall, the changes to the preconditioning procedure will ensure permeation test results are more representative and will result in cost and time savings for applicants.

Summary for TP-901 Section 10

Section 10 was modified by requiring the use of the fuel specified in section 6 rather than Phase II certification fuel and by requiring the fuel tanks to be sealed with the same fuel caps used for the durability demonstration and preconditioning procedure. The leak check was deleted. The provision to seal fuel tanks using the technique described in SAE 920164 was deleted. A new paragraph (b) was added that describes the requirements for the reference container that must be used if the fuel tanks will be tested using the gravimetric permeation test – it shall be identical to the other fuel tanks, filled with inert material so it has approximately the same mass as the test fuel tanks, and sealed in the same manner as the test fuel tanks were sealed.

Rationale for TP-901 Section 10

Updating the certification test fuel is one of the major reasons for these proposed amendments, so the fuel used in the permeation test must be updated. Sealing the fuel tanks with the same fuel caps used for the durability demonstration and preconditioning procedure will ensure the permeation test results are representative of a fuel tank as used on an engine. The leak check was deleted because submersion under water of a fuel tank with a fuel cap and other accessories installed may damage the fuel cap or another accessory. Sealing according to SAE 920164 is not necessary since the fuel tanks will be sealed with a fuel cap. The reference tank requirements are the same as those in 40 CFR 1060.520. Filling the reference tank with inert material will prevent any error in mass measurement, albeit small, due to buoyancy differences between the test fuel containers and the reference container. Sealing the reference tank in the same manner as the test fuel tanks were sealed will make the reference tank as similar as possible to the test fuel tanks and prevent any unnecessary bias in the mass measurements. A reference container is not needed if the fuel tanks will be tested according to section 12 of TP-901.

Summary for TP-901 Section 11

The gravimetric permeation test procedure in section 11 was modified to be more similar to that in 40 CFR 1060.520. The revised text of section 11 is largely the same as that in 40 CFR 1060.520(d), with some differences such as additional clarification on which internal surfaces to consider when determining the internal surface area of the fuel tanks and more frequent temperature recording. In the case where the coefficient of determination is not at or above 0.95 after 10 days of testing, the U.S. EPA procedure allows testing to be stopped if the measured permeation rate is less than 50 percent of the applicable standard, but the revised section 11 of TP-901 also requires the upper limit of the 95 percent confidence interval to be below the applicable standard.

Rationale for TP-901 Section 11

The changes made to the gravimetric permeation test procedure are minor, but make it very similar to that in 40 CFR 1060.520(d). The effect is that one set of fuel tanks can be tested to meet both sets of requirements. This will save money and time for applicants. The clarification provided regarding calculating fuel tank internal surface area was already in section 14 of TP-901, but was moved to this section for clarity. The temperature recording requirement in TP-901 was already more frequent (every 5 minutes) than that in 40 CFR 1060.520(d) (at least once daily). The revised section 11 of TP-901 keeps the current temperature recording requirement to ensure the temperature is within the required range throughout the test. Requiring the upper limit of the 95 percent confidence interval to be below the applicable standard in addition to the measured permeation rate being less than 50 percent of the applicable standard if the coefficient of determination is less than 0.95 will provide confidence that fuel tanks in a family will have emissions below the permeation emission standard even if the measured daily permeation rates are not consistent.

Summary for TP-901 Section 12

The title of section 12 was changed to “Permeation Test with Flame Ionization Detector.” The sentence, “This section is reserved for future specification,” was deleted. A new subsection (a) was added that describes the permeation test in a SHED with emissions detected by a FID. The surface area of a fuel tank must be determined as in section 11 of TP-901. The fuel tank must then be placed in an enclosure meeting the requirements of section 4 of the revised TP-902 (a SHED) that is equilibrated to 40 ± 2 °C. The enclosure must be purged, and the permeation emissions measured over 24 hours with a FID.

Rationale for TP-901 Section 12

The option to test fuel tanks in a SHED and measure permeation emissions with a FID was added to give applicants flexibility in choosing how to test their fuel tanks. The test is similar to the diurnal emission test in TP-902, but uses a constant temperature of 40 ± 2 °C rather than the diurnal temperature profile of TP-902.

Summary for TP-901 Section 13

Section 13 was modified to allow a data sheet other than that in Figure 1 to be used to record data.

Rationale for TP-901 Section 13

The data sheet in Figure 1 is one example of a sheet that could be used to record data, but applicants or laboratories may have data sheets they prefer to use. As long as all the required data are recorded, any organized data sheet may be used for this test procedure.

Summary for TP-901 Section 14

The calculation for daily weight loss was changed to a cumulative daily mass loss calculation similar to that in 40 CFR 1060.520. New calculations were added for daily mass loss, daily permeation rate, upper limit of the 95 percent confidence interval, and final permeation rate for the gravimetric permeation test. A calculation was added for permeation rate for fuel tanks tested according to section 12 of TP-901. The equations for diurnal emissions in section 5.5 of the revised TP-902 are specified for calculating the permeation rate. The existing calculation for permeation rate was deleted.

Rationale for TP-901 Section 14

The changes to the calculations are to make them consistent with those in 40 CFR 1060.520. The confidence interval calculation is a standard statistical calculation, but is presented in this test procedure for applicants' convenience. The final permeation rate calculation for the gravimetric permeation test now produces an average permeation rate, whereas the existing permeation rate calculation uses a linear regression. The difference in permeation rate is very small under most circumstances, so the effect of the change is small. The permeation rate calculation for fuel tanks tested in a SHED is consistent with the calculations for diurnal emissions in TP-902.

Summary for TP-901 Section 15

The requirement to make documentation of alternative test procedures available upon request and the provision for any manufacturer to reference an approved alternative test procedure were deleted.

Rationale for TP-901 Section 15

Alternative test procedures are approved on a case-by-case basis and require demonstration of equivalency to TP-901 for the particular fuel tank tested. It would not be consistent to both grant approval for alternative test procedures on a case-by-case basis and allow any applicant to reference an approved alternative test procedure. Alternative test procedures will continue to be granted on a case-by-case basis, so it was necessary to delete the requirement to make documentation of alternative test procedures available upon request and the provision for any manufacturer to reference an approved alternative test procedure.

Summary for TP-901 Section 16

Section 16 was deleted.

Rationale for TP-901 Section 16

The reference in section 16 is no longer used. Other references in TP-901 are cited in such a way that they can be found by a reader without being listed separately in a references section.

Summary for TP-901 Section 17

The title of Figure 1 was updated from “Field Data Sheet (Trip Blank Correction)” to “Data Sheet.”

Rationale for TP-901 Section 17

The data sheet in Figure 1 is not necessarily used in the field, and the term “reference container” is used in place of “trip blank,” so “Data Sheet” is a more appropriate title for Figure 1.

30. TP-902. Test Procedure for Determining Diurnal Emissions from Small Off-Road Engines

Summary for TP-902 Section 1

The title of TP-902 was changed from “Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines and

Equipment" to "Test Procedure for Determining Diurnal Emissions from Small Off-Road Engines." The phrase "small off-road engines and equipment less than or equal to 19 kilowatts" was changed to "small off-road engines with gross power production less than or equal to 19 kilowatts."

Rationale for TP-902 Section 1

The title was changed because diurnal emissions are a type of evaporative emissions, which makes "diurnal evaporative emissions" redundant. Also, equipment subject to the requirements of this Article always uses SORE, so calling out "equipment" separately from engines is redundant. The phrase "with gross power production" was added to the statement about the rating of engines for clarification.

Summary for TP-902 Section 2

Section 2 was deleted.

Rationale for TP-902 Section 2

Since this is a test procedure incorporated by reference in the regulations, a section on emission standards is not necessary. Applicants will be aware of the emission standards from reading the certification procedures.

Summary for TP-902 Section 3

Section 3 was renumbered to section 2 and modified to specify the tests that shall be in a durability demonstration rather than require applicants to submit a durability demonstration for approval by the Executive Officer. The provision to eliminate holes for insertion of fuel line and grommet systems was deleted. The fuel cap installation cycles from 40 CFR 1060.520 were added to the durability demonstration. The pressure test was modified to be compatible with that in 40 CFR 1060.520 and the same as that in the revised TP-901. As in the revised TP-901, if normal operating or storage conditions cause pressure changes greater than + 13.8 or – 3.4 kPa to accumulate in the fuel tanks, the actual high and low pressure limits experienced during normal operation or storage would be used for the pressure test in TP-902. The slosh test was modified to be similar to that in 40 CFR 1060.520 and TP-901. The slosh test may be performed with the fuel tank installed in the test unit or with the fuel tank removed from the test unit and sealed in the same manner as when it is installed in the test unit. The carbon canister vibration exposure test was modified to require an acceleration of 4.5g, where g is the acceleration due to Earth's gravity, 9.8 $m \cdot s^{-2}$. The ultraviolet radiation exposure test from 40 CFR 1060.520 was added to the durability demonstration. A provision was included to omit

the ultraviolet radiation exposure test if no part of the evaporative system will be exposed to light when installed on an engine.

Section 3.2 was renumbered to 2.2 and modified to refer to the “fuel tank nominal capacity” rather than the “nominal fuel tank volume” when discussing the vapor storage capacity requirement for carbon canisters. Section 3.3 was renumbered to 2.3 and the sentence, “This requirement may not apply to Small Production Volume Tanks specified in 13 CCR 2766,” was deleted.

Rationale for TP-902 Section 3

Specifying the tests that shall be in the durability demonstration will result in uniform requirements for all evaporative families. Eliminating the requirement for applicants to submit their durability test procedure for the Executive Officer’s approval will save time and money for applicants, and will save time for ARB, since the procedures will not have to be reviewed or approved. The provision to eliminate holes in a fuel tank for the durability demonstration was not practical, since the fuel tank must be installed on the test unit and remain in place for the diurnal emission test. This provision may have also caused confusion. Deleting the provision to eliminate holes in a fuel tank for the durability demonstration will ensure the fuel tank is tested in its normal configuration, and prevent confusion. The fuel cap installation cycles will simulate the aging that occurs from removing and replacing the fuel cap during fueling.

Using the same pressure test as in TP-901 will create further uniformity in the durability demonstration requirements, so fuel tank manufacturers and applicants can expect the same aging from either TP-901 or TP-902 testing. The slosh test should also have the same effect on a fuel tank as it does in TP-901. Since some SORE equipment is large and heavy, it may not be possible to perform the slosh test with the fuel tank installed on the engine or in the chassis of the equipment. In these cases, the fuel tank could be removed and sealed so fuel would not spill out during the slosh test. The existing carbon canister vibration exposure test specified a “peak horizontal vibration force of 4.5G.” The symbol “g” is the more conventional symbol for the acceleration due to Earth’s gravity. The revised requirement of a “peak horizontal acceleration of 4.5g will provide clearer direction for applicants and test laboratories. The ultraviolet radiation exposure test will simulate aging due to sunlight exposure of the evaporative system throughout its useful lifetime, which may affect the diurnal emission rate.

The term “fuel tank nominal capacity” is used instead of “nominal fuel tank volume” for consistency throughout the Article. The reference to small production volume tanks was deleted because the small production volume tank exemption has been deleted.

Summary for TP-902 Section 4

Section 4 was modified by specifying that the mass of total organic gases, rather than total hydrocarbons, is calculated, and a correction factor for ethanol is used. The step involving purging the carbon canister with nitrogen or dry air was removed from the summary. The temperatures specified for the tests were expressed in degrees Celsius rather than Fahrenheit.

Rationale for TP-902 Section 4

The updated certification test fuel contains 10 percent ethanol, so the compounds emitted from a test unit will not all be hydrocarbons. The flame ionization detector will detect the total organic gases, but the response will be smaller for ethanol than for a hydrocarbon because it is partially oxidized. The correction factor will account for the difference in response. The carbon canister purging step was removed because it has been deleted from the test procedure. The temperatures were expressed in degrees Celsius because it the Celsius scale is more commonly used in scientific writing than Fahrenheit.

Summary for TP-902 Section 5

Section 5 was renumbered to section 4. The reference to the description of the instrumentation necessary to perform evaporative emission testing was updated from 40 CFR 86.107-96 to 40 CFR 86.107-98. The statement regarding “mini-SHEDs” was deleted. The sentence, “For the purposes of this section 4, methanol shall mean ethanol and CH_3OH shall mean C_2H_5OH when testing with ethanol-containing fuel,” was added. Throughout the section, “methanol” was changed to “ethanol” and “CH_3OH” was changed to “C_2H_5OH.”

Section 5.1 was renumbered to 4.1 and the sentence, “References to methanol in this test procedure can be disregarded,” was deleted. References to “paragraph III.D.10. (diurnal breathing loss test) of the “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles”” were changed to “section III.D.10. (diurnal breathing loss test) of the “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” as last amended September 2, 2015.”

Section 5.2 was renumbered to 4.2. The sentence, “Methanol measurements may be omitted when methanol-fueled engines will not be tested in the evaporative enclosure,” was deleted. A reference to “paragraph I.A.1.3 of the “California Evaporative Emission Standards and

Test Procedures for 2001 and Subsequent Model Motor Vehicles"" was changed to "section III.A.1.3. of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," as last amended September 2, 2015." References to "paragraph III.D.10.1.7 of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles"" were changed to "section III.D.10.3.7 of the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," as last amended September 2, 2015." The sentences, "Inject into the enclosure a known quantity of propane between 2 to 6 grams and a known quantity of methanol in gaseous form between 2 to 6 grams. For evaporative emission enclosures that will be used for testing equipment subject to the standards shown in Table 2-1, use a known amount of propane or gaseous methanol between 0.5 to 1.0 grams," were changed to "Inject into the enclosure a known quantity of propane between 0.50 to 1.00 grams and/or a known quantity of methanol in gaseous form between 0.50 to 1.00 grams."

Rationale for TP-902 Section 5

The reference to the instrumentation necessary to perform evaporative emission testing was updated to reflect the current version of the appropriate section the CFR. The "mini-SHED" statement was deleted because it was not needed. Mini-SHEDs are just smaller SHEDs that still meet the requirements of 40 CFR 86.107.98. The new sentence that specifies that methanol shall mean ethanol and CH_3OH shall mean C_2H_5OH was added because methanol fuel is no longer used, but ethanol-containing fuel will be used. Some of the documents incorporated by reference refer to methanol and CH_3OH; the requirement to interpret these as ethanol and C_2H_5OH, respectively, clarifies that ethanol measurements and calculations are part of this test procedure. Changing methanol to ethanol and CH_3OH to C_2H_5OH throughout the section is consistent with the certification test fuel that will be used and the requirement to interpret methanol as ethanol and CH_3OH as C_2H_5OH.

The sentence in the revised section 4.1 (previously 5.1) that provided for references to methanol to be omitted was deleted because references to methanol have been changed to ethanol and will important in determining diurnal emissions from test engines. Updating references to the evaporative emission standards and test procedures for motor vehicles ensures the current version of that document will be used where it is referenced in this test procedure.

The sentence in section 4.2 (previously 5.2) that allowed methanol measurements to be omitted was deleted because methanol-fueled engines will not be tested, but all engines will be tested with ethanol-containing fuel,

and references to methanol will be interpreted as references to ethanol in the revised test procedure. Deleting this sentence avoids confusion. Updating references to the evaporative emission standards and test procedures for motor vehicles ensures the correct sections and the current version of that document will be used where it is referenced in this test procedure. Changing the injection volume from 2-6 grams to 0.50-1.00 grams is consistent with the evaporative emission standards and test procedures for motor vehicles and the existing diurnal emission standards for SORE.

Summary for TP-902 Section 6

Section 6 was renumbered to section 5. The sentence, “Methanol measurements may be omitted when methanol-fueled equipment will not be tested in the evaporative enclosure,” was deleted. The sentence, “Testing a representative piece of equipment for each evaporative family and comparing the results to the appropriate performance standard determines compliance with requirements of CCR Title 13, Chapter 15, Article 1, Section 2754,” was deleted. The carbon canister purging step was deleted from Figure 1. The description of the preconditioning period was changed to refer to the evaporative emission control system rather than the fuel system. The initial engine run to circulate fuel through the system was modified to be at maximum governed speed rather than rated speed. The preconditioning temperature was changed from 30 ± 10 °C to a temperature that never falls below 38 °C.

The sentence, “As an alternative, accelerated preconditioning of the evaporative emission control system can be accomplished by soaking at an elevated temperature,” was added to replace the paragraph describing accelerated preconditioning, which was deleted. The requirement to provide data for evaporative systems soaked less than 140 days was modified to specify that the data must document that the diurnal emissions will not increase with further preconditioning. A provision was added that allows the period of the ultraviolet radiation exposure test to be considered part of the preconditioning period provided the ambient temperature remains within the specified temperature range and each fuel tank is at least 50 percent full. A provision was added to add or replace fuel as needed to conduct the specified durability tests.

The carbon canister purging step during refueling and hot soak was deleted. Temperatures for the hot soak test, forced cooling, and 24-hour diurnal test were expressed in degrees Celsius. The reference to the calculations for mass of the hot soak and diurnal emissions was updated to the current version of the *California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles*, which was last amended September 2, 2015. Two differences between the calculations as

described for motor vehicles and those for SORE were noted: 1) the actual volume of the test unit shall be used rather than the volume of 50 ft^3 specified for a vehicle, and 2) a modified version of the equation in section 11.2 of the motor vehicle procedures was specified for the ethanol mass calculation.

Rationale for TP-902 Section 6

The sentence that allowed methanol measurements to be omitted was deleted because methanol-fueled engines will not be tested, but all engines will be tested with ethanol-containing fuel, and references to methanol will be interpreted as references to ethanol in the revised test procedure. Deleting this sentence avoids confusion. The sentence that discussed testing according to TP-902 to determine compliance was deleted because it was not needed in this test procedure. Compliance testing is more completely discussed in section 2765 of the regulations. The carbon canister purging step was deleted to prevent unnecessary removal of the carbon canister during the test. It is also not representative of typical use of SORE equipment to have the canister purged with 400 bed volumes of nitrogen or air. Running the engine will purge the carbon canister in a way that is more representative of typical use of the unit. While the fuel system does become preconditioned since it is part of the evaporative system, changing the description of the preconditioning procedure to refer to the evaporative emission control system is more accurate, since parts of the evaporative system other than the fuel system also become preconditioned. Referring to the maximum governed speed rather than the rated speed will alleviate any confusion that may occur regarding what speed to select when running the engine to circulate fuel through the system. Changing the preconditioning temperature is consistent with the change in TP-901, and the revised temperature of 38 °C is still within the previously specified range. Since the diurnal temperature profile reaches 40.6 °C, using the higher preconditioning temperature will ensure more representative results in the diurnal emission test and ensure evaporative systems in use by consumers in California will meet the diurnal emission standards.

Accelerated preconditioning will still be possible, and may be conducted in a manner similar to that used under the current requirements. As in the current requirements, an applicant will have to provide data for any evaporative system preconditioned fewer than 140 days, regardless of the preconditioning temperature. Requiring the data to demonstrate that diurnal emissions will not increase with further preconditioning will ensure that further preconditioning would not cause an evaporative system to exceed the diurnal emission standard. Short preconditioning periods, such as the 30 day period for SORE with fuel tanks whose nominal wall thickness is less than or equal to 0.15 inch, may continue to be sufficient for some evaporative families. However, insufficient preconditioning periods could

have contributed to the low compliance rate and the discrepancy between certification data and ARB's test results observed in the validation studies. The time required for preconditioning depends on factors other than the thickness of the fuel tank walls, so it is important that a determination is made that preconditioning is complete before proceeding to a diurnal emission test. Allowing the period of the ultraviolet radiation exposure test (along with the slosh test, which was already allowed) to be considered part of the preconditioning period will save applicants money and time. Adding or replacing fuel as needed will ensure the fuel tank is filled to the required level at all times.

The temperatures for the hot soak test, forced cooling, and 24-hour diurnal test were expressed in degrees Celsius because the Celsius scale is more commonly used in scientific writing than Fahrenheit. Using the version of the *California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles* amended September 2, 2015, will ensure the calculations are conducted using the most up-to-date version of the equations. Using the equation provided for ethanol mass will give the most accurate results for evaporative systems on SORE because these systems are typically much smaller than that used in a motor vehicle.

Summary for TP-902 Section 7

Section 7 was renumbered to section 6, and the test fuel to be used in this test procedure was updated. LEV III certification gasoline and U.S. EPA's low level ethanol-gasoline blend are the two options for test fuels, except that California Phase II certification fuel can be used through model year 2019.

Rationale for TP-902 Section 7

LEV III Certification Gasoline is the certification test fuel used for current model year automobiles and other engines, and will be used for model year 2020 and later SORE exhaust emissions certification. It is also representative of fuel sold at California fueling stations. U.S. EPA's low level ethanol-gasoline blend is similar to LEV III Certification Gasoline, but has a higher Reid vapor pressure, so use of this fuel may result in minimally higher testing emissions than LEV III Certification Gasoline. However, if an applicant uses ARB certification test results to meet U.S. EPA requirements, the certification testing emissions would be smaller than if two sets of tests were performed, regardless of the test fuel used. Phase II California certification fuel will continue to be allowed for certification through model year 2019 to provide sufficient time for applicants to transition to one of the newly specified test fuels.

Summary for TP-902 Section 8

Section 8 was renumbered to section 7. The requirement to make documentation of alternative test procedures available upon request and the provision for any manufacturer to reference an approved alternative test procedure were deleted.

Rationale for TP-902 Section 8

Alternative test procedures are approved on a case-by-case basis and require demonstration of equivalency to TP-902 for the particular evaporative system tested. It would not be consistent to both grant approval for alternative test procedures on a case-by-case basis and allow any applicant to reference an approved alternative test procedure. Alternative test procedures will continue to be granted on a case-by-case basis, so it was necessary to delete the requirement to make documentation of alternative test procedures available upon request and the provision for any manufacturer to reference an approved alternative test procedure.

Summary for TP-902 Section 9

Section 9 was deleted.

Rationale for TP-902 Section 9

The references in section 9 are no longer used. Other references in TP-902 are cited in such a way that they can be found by a reader without being listed separately in a references section.

Summary for Attachment 1 to TP-902

The applicability of Attachment 1 to TP-902 was changed to “all cases where small off-road engines are sold, supplied, offered for sale, or manufactured for use in the State of California.” The working capacity was described as the mass of total organic gases, rather than hydrocarbons, that can be stored in the canister under controlled conditions. The minimum sensitivity of the balance was specified as 0.01 grams for mass measurements greater than 1000 grams and 0.001 grams for mass measurements less than or equal to 1000 grams. Details were added to the requirement for mass flow meter calibrations that specify a plot of the rate measured by the flow meter versus the true flow rate shall have a coefficient of determination of 0.99 or greater. The balance calibration requirement was modified by specifying that it shall be calibrated annually by an independent organization using NIST-traceable mass standards. The measured working capacity was specified as the lower value of the butane adsorbed by the canister for the last two repeatable cycles, rather than the

average of the two. References to weight were changed to mass. Section 8 of Attachment 1 was deleted.

Rationale for Attachment 1 to TP-901

The applicability was changed because this procedure may be used for certification testing of carbon canisters, compliance testing, or additional purposes other than by manufacturers seeking an Executive Order for an evaporative system utilizing a carbon canister. Expressing the working capacity in terms of the mass of total organic gases that can be stored in the canister under controlled conditions is consistent with the updated emission standards and the composition of LEV III Certification Gasoline, which contains 10 percent ethanol. The specified minimum sensitivity of the balance will ensure accurate and precise mass measurements for determining working capacity. The details added to the mass flow meter calibration clarify the existing requirement without changing it. The balance calibration requirement is the same as that in TP-901. Since the working capacity is determined by the mass gain of the carbon canister, it is important to calibrate the balance as recommended by the manufacturer and quickly check the accuracy each time it is used. Reporting the working capacity as the lower of the last two measured values will result in carbon canisters being rated more conservatively. Since balances measure mass in grams, it is correct to refer to mass, rather than weight, when referring to the measurements. Section 8 was deleted because it had no useful content.

III. AIR QUALITY

A. Air Quality

The validation studies indicate that more than half of the SORE equipment using engines with displacement greater than 80 cc do not comply with the diurnal emission standards. The proposed amendments are intended to address the shortfall in emissions reductions caused by this non-compliance and to update the certification test fuel to reflect motor vehicle pump fuel currently available in California, which contains 10 percent ethanol. The current certification procedures specify fuel that does not contain ethanol.

Amending the existing regulations to require certification fuel that better reflects motor vehicle fuel in use in California today is necessary to accurately measure emissions from SORE, and ensure SORE introduced into California commerce are emissions compliant with the current motor vehicle fuel formulation. It is possible that using the updated certification test fuel with ethanol will increase the measured evaporative emissions in certification testing. Certification testing is typically performed on a small number of units each year since only one piece of equipment per performance-certified evaporative family is required for

certification testing and five evaporative components are required for component certification testing. Certification data for an evaporative family are often carried over for several model years, and evaporative component certification data are only collected when a component is certified. A significant increase in emissions is not expected from certification testing with the updated certification fuel. Also, the gasoline dispensed at California gas stations since January 2010 already contains ethanol, so the real-world emissions from SORE will not increase. Therefore, the certification fuel change will have no effect on ROG emissions in the inventory. The emissions inventory already accounts for higher emissions from SORE after the introduction of motor vehicle fuel containing 10 percent ethanol. However, the change in fuel formulation will decrease the potential of manufacturers introducing SORE into commerce that exceed ARB's diurnal emission standards, and will help to achieve the emissions reductions commitments laid out in the SIP needed to attain the ozone NAAQS throughout the state.

Since implementation of ARB's SORE diurnal emission standards began in 2007, one hundred percent of the test data submitted by applicants seeking SORE certification show compliance with the standards, and it was assumed that design-certified equipment would meet the diurnal emission standards when tested. Performance-certified evaporative families often rely on data that are carried over from one model year to subsequent model years if no changes have been made, because it is assumed that production SORE will be identical to the units tested for certification. Similarly, design-certified families also rely on certification tests for components for several model years after the tests are conducted.

In contrast, results from the validation studies indicate more than 50 percent of the SORE equipment sold in California from 2008-2010 and 2013-2015 fail to meet ARB's diurnal emission standard. If the validation study results are representative of the entire population of SORE sold in California since 2008, the emissions reductions that were expected as a result of the SORE evaporative emissions regulations are not being achieved. The discrepancy between certification data and the validation study results indicates that certification tests do not continue to reflect the diurnal emissions of production SORE in many cases.

To resolve this discrepancy, the proposed amendments require certification renewal every four years for evaporative components. This change will not result in additional testing of evaporative components beyond what is required in the current regulations, but it will require component manufacturers to determine whether any changes to the components or raw materials supplies could affect their evaporative emissions, and submit declarations to ARB supporting their determinations. Periodic assessments of evaporative components to confirm they will still meet emission standards may increase future SORE in-use compliance rates with the diurnal emission standards.

B. Emissions Reductions and Enforcement

The primary air quality benefit associated with the regulatory amendment proposal is the reduction of ambient ozone concentrations through the elimination of SORE equipment that does not comply with the diurnal emission standards. The proposed amendments will not achieve new emissions reductions, but will contribute to the achievement of previously committed emissions reductions by elimination of any evaporative families or components that do not meet the existing emissions standards. These emissions reductions are necessary to meet the 8-hour ozone NAAQS in California's two extreme non-attainment areas, namely the South Coast and San Joaquin Valley Air Basins. Enforcement is crucial to realize the benefits of ARB's evaporative emissions standards. Adoption of the proposal will allow ARB to more effectively enforce ARB's emissions standards.

To assess the effectiveness of the proposed amendments and the overall SORE evaporative emissions regulations, ARB will monitor the following metrics: 1) the fraction of SORE sold in California that meet the evaporative emission standards; 2) the evaporative emissions of SORE sold in California relative to the standards; 3) sales of SORE in California; and 4) based on the first three metrics, the emissions reductions that are achieved from SORE relative to the commitments made in the 2003 SIP. This will continue the work that began with the validation studies, which assessed the first two metrics stated above and found that, for model years 2013-2015, 52 percent of the SORE sold in California failed to meet the diurnal emission standards and the average emissions from SORE were 63 percent higher than the diurnal emission standard.

C. Climate Change Considerations

Although the main goals of the proposed amendments center around achieving previously-committed ROG emissions reductions, achieving those emissions reductions will also reduce emissions of climate pollutants in California.

This regulatory proposal is expected to exert small, indirect climate change impacts through its effects on 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., pp.453-476). These indirect impacts are mediated through changes in the concentrations of tropospheric ozone and methane. For example, curtailment of tropospheric ozone associated with ROG emissions reductions is a climate benefit, because tropospheric ozone is currently associated with radiative forcing of approximately 0.39 Watts per square meter (Shindell et al., 2005). Similarly, emissions of ROG can increase the atmospheric lifetime of methane. Since methane is the second most

important of the relatively long-lived greenhouse gases tabulated by the Intergovernmental Panel on Climate Change (Section 2.3.2) in terms of radiative forcing, reducing ROG emissions and the associated impacts on methane's atmospheric lifetime constitute a climate benefit.

D. Reduction of Exposure to Toxic Emissions

One of the expected co-benefits of the proposed amendments is reduced exposure to toxic air pollutants, specifically benzene, which makes up about one percent of current blends of gasoline. Most of the evaporative emissions from the current fleet of SORE in California occur when SORE are stored, often in a garage attached directly to a residential structure. SORE equipped with evaporative emissions controls compliant with the proposed emissions standards will reduce not only ROG emissions, but also the exposure of residential occupants to benzene and other hazardous air pollutants.

IV. ENVIRONMENTAL ANALYSIS

A. Introduction

Staff has determined the proposed SORE regulatory amendments are exempt from the requirements of California Environmental Quality Act (CEQA). An analysis of this determination is provided in section B below. ARB's regulatory program, which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality, has been certified by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of CEQA (Cal. Code Regs., title 14, section 15251(d)). Public agencies with certified regulatory programs are exempt from certain CEQA requirements, including but not limited to, preparing environmental impact reports, negative declarations, and initial studies. ARB, as a lead agency, prepares a substitute environmental document (referred to as an "Environmental Analysis" or "EA") as part of the Staff Report to comply with CEQA (Cal. Code Regs., title 17, sections 60000-60008). If the regulatory amendments are finalized, a Notice of Exemption will be filed with the Office of the Secretary for the Natural Resources Agency and the State Clearinghouse for public inspection.

B. Analysis

Staff determined the proposed regulatory amendments are exempt from CEQA under the "general rule" or "common sense" exemption (Cal. Code Regs., title 14, section 15061(b)(3)). The common sense exemption states a project is exempt from CEQA if "the activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no

possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA." The proposal is also categorically exempt from CEQA under the "Class 8" exemption (14 CCR 15308) because it is an action taken by a regulatory agency for the protection of the environment.

The proposed SORE regulatory amendments increase the robustness of the certification and compliance testing procedures, update the certification test fuel, and require executive order certification renewal for evaporative components every 4 years. As described above in the section on Air Quality, validation studies suggest that more than 50 percent of the SORE equipment sold in California fails to meet ARB's diurnal emission standards. These proposed changes to the SORE regulations will decrease the potential of introducing SORE into commerce that are incapable of meeting ARB diurnal emission standards, resulting in potential decreases in ROG emissions through increased in-use compliance rates.

Requiring executive order renewal at four-year intervals for evaporative families may result in additional testing and report generation, but this increased testing can be completed using current facilities. ARB staff has found no evidence suggesting this additional, periodic testing of a relatively small number of SORE equipment has the potential to cause any significant adverse environmental impacts when compared to the ongoing use and operation of 16 million pieces of equipment.

The proposed SORE regulatory amendments also require certification test fuel to contain 10 percent ethanol, which is reflective of motor vehicle pump fuel currently dispensed at California gasoline stations. Therefore, this proposed change would not result in increased ROG emissions from in-use SORE equipment. Requiring certification test fuel to contain 10 percent ethanol does have the possibility of increasing emissions from certification testing. Staff used a "worst case" scenario to calculate the potential estimated emissions increase. The total potential "worst case" increase in emissions from certification testing due to the change in test fuel was estimated by assuming a 50 percent increase in the emission rate when testing with the updated fuel versus the current fuel. With this increase in emission rate, the total increase in emissions from all of the certification testing that may occur in one year was estimated to be 3.7 pounds per day. Table IV-1 provides the VOC emission thresholds and attainment status for several California air districts. The overall increase in evaporative emissions of 3.7 pounds per day related to the requirement that the updated certification test fuel contain 10 percent ethanol would be below the VOC threshold for air districts in California. As noted above, the proposed fuel change would only affect a small amount of testing units, since manufacturers only need to test one representative piece of equipment from each performance-certified evaporative family or five samples of an evaporative component.

Amending the existing regulations to require test fuel that better reflects motor vehicle fuel in use in California today will better protect air quality and the environment by more accurately quantifying SORE emissions and ensuring SORE introduced into California commerce are emissions compliant.

The amendments that align ARB requirements with U.S. EPA requirements to the extent possible have no adverse environmental impacts because testing laboratories already conduct the tests for certification with U.S. EPA, so there is no need to upgrade facilities.

Lastly, the amendments that clarify and streamline SORE certification and test procedures are administrative in nature and have no potential to adversely affect air quality or any other environmental resource areas.

Table IV-1. VOC Thresholds and Attainment Status for California Air Districts.

Air Basin	Air District	VOC or ROC or ROG Threshold	California Ozone Attainment Status	Federal Ozone Attainment Status
North Central Coast	Monterey Bay	137 lbs/day	Nonattainment	Attainment
South Central Coast	Santa Barbara County	55 lbs/day	Nonattainment	Attainment/ Unclassified
	Ventura County	25 lbs/day; 5 lbs/day in the Ojai Planning Area	Attainment	Nonattainment (Serious)
South Coast	South Coast	55 lbs/day	Nonattainment	Nonattainment (extreme)
Sacramento Valley	Butte	25 lbs/day	Nonattainment	Nonattainment (marginal)
	Feather River	25 lbs/day	Nonattainment	Nonattainment (Severe)
	Sacramento	65 lbs/day	Nonattainment	Nonattainment (Severe)
	Tehama	>25 lbs/day w/ feasible mitigation; >137 lbs/day EIR w/ offsite mitigation	Nonattainment	Attainment/ Unclassified
	Yolo-Solano	10 tpy	Nonattainment	Nonattainment (Severe)
San Joaquin Valley	San Joaquin Valley	10 tpy	Nonattainment	Nonattainment (extreme)

Therefore, it can be seen with certainty that there is no possibility that the proposed regulatory amendments may result in a significant adverse impact on the environment. Further, the proposed action is designed to protect the environment and ARB found no substantial evidence indicating the proposal could adversely affect air quality or any other environmental resource area, or that any of the exceptions to the exemption applies (14 CCR 15300.2). Therefore, this activity is exempt from CEQA.

V. ENVIRONMENTAL JUSTICE

State law defines environmental justice as the fair treatment of people of all races,cultures, and incomes with respect to the development, adoption, implementationand enforcement of environmental laws, regulations, and policies. Government Code Section 65040.12, subdivision (c), commits ARB to making environmental justice an integral part of its activities. The Board approved its Environmental Justice Policies and Actions (Policies) on December 13, 2001, to establish a framework for incorporating environmental justice into ARB's programs consistent with the directives of State law (ARB 2001). These Policies apply to all communities in California, but recognize that environmental justice issues have been raised more in the context of low-income and minority communities.

Over the past 25 years ARB, air districts, and federal air pollution control programs have made substantial progress towards improving air quality in California. However, some communities continue to experience higher exposures than others as a result of the cumulative impacts of air pollution from multiple mobile and stationary sources and thus may suffer a disproportionate level of adverse health effects. To address this, the Board has established a framework for incorporating environmental justice into ARB programs. The proposed amendments to SORE evaporative requirements would apply uniformly to SORE equipment used in all regions of the State. The amendments would serve to improve compliance of SORE equipment, thus helping to reduce ROG emissions and improve air quality statewide. All communities, including environmental justice communities, will experience the air quality benefits associated with this proposal. Alternatives to the proposed regulations, discussed in Section VII, would also affect all communities throughout the State.

VI. ECONOMIC IMPACTS ANALYSIS/ASSESSMENT

A. Non-Major Regulations that will Not Have a Significant Adverse Economic Impact on Business

1. Summary

These regulations are not expected to have a significant adverse economic impact on business, as shown by the evidence and analysis discussed in detail below and in the accompanying Fiscal and Economic Impact Analysis. The statewide total cost of the proposed amendments, in 2016 dollars, is approximately $32.7 million over five years. This cost represents a worst-case scenario under which the highest estimated net annual cost to out-of-state Executive Order holders is passed on to California consumers with a

75 percent mark-up on Executive Order holders' net costs. The highest cost in one year, in 2016 dollars, is approximately $8.0 million, also assuming the net cost to out-of-state Executive Order holders is passed on to California consumers with a 75 percent mark-up on Executive Order holders' net costs. The total direct benefits in a model year are expected to be up to $2.4 million. The total direct benefits in five years are expected to be up to $6.4 million. Taking into account the costs and benefits, the proposed amendments would result in a retail price increase of $3.68 per evaporative emission control system. The actual total costs are likely to be spread across all 50 states, since most evaporative families in California are the same ones sold nationwide. The small retail price increase, broad distribution of the costs, and anticipated benefits will together avoid a significant adverse economic impact on business. The fiscal and economic impact analysis of the proposed regulatory changes are described here and in the accompanying Fiscal and Economic Impact Analysis Form 399, and related supporting documents, which are included as part of this Initial Statement of Reasons.

2. Regulatory Costs and Benefits

a. Direct Costs

The incremental cost increase in an evaporative system was estimated by taking into account higher testing and certification costs, limited-term certification, labeling costs, reporting costs, and increased use of certified fuel lines. The highest annual cost resulting from these requirements was used to estimate a maximum price increase per evaporative system, which will be passed on to California consumers.

i. Higher Testing Costs

Changes to TP-901 may result in an increased cost per five-sample certification test. The cost increase will depend on the type of fuel tank and the configuration of the evaporative system in which it is used. Estimates for the cost increase were provided on an anonymous basis by several laboratories that perform SORE fuel tank testing. Some elements of TP-901 may cost applicants less under the proposed amendments than under the current regulations, while others will cost more under the proposed amendments. The average cost increase or savings, as estimated by the test laboratories, for each element of TP-901 that is affected by the amendments is listed in Table VI-1.

For an applicant whose fuel tank experiences pressure changes during operation, there will not likely be any cost increase for the pressure test. However, since the revised TP-901 requires applicants to consider potential pressure changes during storage as well, it was assumed that some applicants who did not have to

perform the pressure test under the current regulations would have to perform the pressure test under the revised TP-901. The cost increase associated with the slosh test is minimal because the revised slosh test is similar to the existing slosh test but will take longer. The costs for the ultraviolet radiation exposure test and the fuel cap installation cycling test are new costs because those tests were added to the durability demonstration. There is a potential cost savings for sealing the fuel tanks because fuel tanks will be sealed with fuel caps instead of fusion welding a coupon over the filler neck. Additional unquantified benefits of sealing fuel tanks with a fuel cap is that applicants will not have to spend time fixing any leaks that occur from improper sealing of coupons on the filler neck or lose time spent preconditioning a tank that subsequently fails testing due to an improperly sealed filler neck coupon.

Table VI-1. Fuel Tank Testing Cost Increase

Test Element	Potential Cost Savings	Potential Cost Increase
Pressure Test		$4,700
Slosh Test		$100
UV Test		$1,400
Fuel Cap Test		$1,200
Sealing	$100	
Permeation Test	$4,100	

There is a large potential cost savings for the permeation test due to addition of the option to stop testing after 10 days if the measured permeation rate is less than 50 percent of the emission standard and the upper limit of the 95 percent confidence interval is below the emission standard. The current permeation test in TP-901 requires the test to continue until the coefficient of determination is 0.95 or greater. An applicant whose fuel tanks have measured permeation emissions less than half the emission standard and meet the confidence interval requirement after ten days could stop the test under the revised TP-901, but would have to continue under the current TP-901. It was assumed that an applicant might test up to 20 days under either version of TP-901. The cost savings was estimated based on an applicant who would have tested for 20 days under the current TP-901 but could stop testing after 10 days under the revised TP-901.

The slosh test and fuel cap installation cycle requirements will increase the cost of any test, so the total potential savings for a whole test will be less than the savings for sealing and permeation testing. The total savings could be $2,900 per 5-sample test. The total potential cost increase could be $7,300 per 5-sample test. For the years 2011 through 2015, an average of eight fuel tank

certification applications have been received by ARB. Assuming a similar rate upon implementation of the proposed amendments, the total cost would range from a savings of $23,200 to a cost of $58,400 in a model year.

Changes to TP-902 will likely result in increased costs for diurnal emission testing. As with fuel tank testing, the amount of the cost increase will depend on the configuration of the evaporative system of the test unit. The average cost increase, estimated by the same test laboratories who provided information for fuel tank testing, for each affected element of TP-902 is provided in Table VI-2.

Table VI-2. Diurnal Emission Testing Cost Increase

Test Element	Potential Cost Increase
Pressure Test	$1,100
UV Test	$1,100
Fuel Cap Test	$200
Ethanol measurement	$200

As with fuel tank testing, for an applicant whose fuel tank experiences pressure changes during operation, there will not likely be any cost increase for the pressure test. However, since the revised TP-902 requires applicants to consider potential pressure changes during storage as well, it was assumed that some applicants who did not have to perform the pressure test under the current regulations would have to perform the pressure test under the revised TP-902. The cost increase associated with the slosh test is minimal because the revised slosh test is similar to the existing slosh test but will take longer. The costs for the ultraviolet radiation exposure test and the fuel cap installation cycling test are new costs because those tests were added to the durability demonstration. It is not necessary for an applicant to measure ethanol separately, because a correction factor of 1.08 can be applied to the mass reported by the flame ionization detector to account for the weaker response to ethanol. However, a potential cost increase associated with ethanol measurements is included because an applicant may choose to measure it separately. The total potential cost increase could be $2,600 per diurnal emission test under the revised TP-902. Assuming 10 evaporative families are tested in one model year because they are new or have been modified, the total cost would be up to $26,000 due to the higher per-test cost.

ii. Additional Testing Costs

The proposed amendments will result in additional direct costs to Holders through additional testing. Table VI-3 summarizes the

additional testing that may occur as a result of the proposed amendments and the associated cost.

Elimination of Small Production-Volume Tank Exemption

The costs presented in Table VI-3 were estimated based on the number of certified evaporative families and evaporative components for model year 2015, since certification is ongoing for model year 2016. It was estimated that elimination of the small production volume tank exemption could result in the need for 26 fuel tanks to be tested for certification. This is the number of evaporative families using the exemption that are not using certified fuel tanks.

Table VI-3. Additional Testing Costs Under the Proposed Amendments

Test	Reason for Additional Testing	Potential Cost Savings	Potential Cost Increase
TP-901	Elimination of small production volume tank exemption		$691,600
	Elimination of low permeation tank exemption		$478,800
	Certification with E10 fuel		$1,330,000
	Combining ≤ 80 cc by fuel tank type	$3,059,000	
TP-902	EMEL testing for multiple fuel tank volumes		$202,800
	Elimination of equivalent fuel tank replacement		$84,500
Fuel Line	Permeation standard for ≤ 80 cc		$168,000
	Certification with E10 fuel		$244,800

Elimination of Low Permeation Tank Exemption

Elimination of the low permeation tank exemption for ≤ 80 cc evaporative families could result in 18 fuel tanks needed to be certified. While there are 95 evaporative families using this exemption, many of those 95 are certified by the same manufacturers and use the same type of fuel tank. They could be grouped into 18 evaporative families if each manufacturer grouped fuel tanks of the same type into one evaporative family. If the use of the current data carry across provision is any indication, Holders will group their models into as few evaporative families as possible to minimize testing and certification costs. The new provision to include all models using the same fuel tank type in one evaporative family for ≤ 80 cc evaporative systems could result in 115 fewer fuel tank tests in a model year. This assumes that Holders will group their models into as few evaporative families as possible, and does not count any

of the evaporative families previously exempt under the low permeation tank exemption.

Four-Year Evaporative Component Certification Renewal

The current requirements in CP-901 allow for data carryover at the Executive Officer's discretion, and the economic analysis in the 2003 Initial Statement of Reasons for the SORE exhaust and evaporative emissions regulations assumed that changes to product designs would require manufacturers to measure permeation emissions every three years. New testing would be required under the current regulations if a change that could affect evaporative emissions were made to an evaporative component. Therefore, requiring certification renewal does not impose new testing costs for evaporative components.

Certification of Fuel Tanks with E10 Fuel

Certification with the updated certification test fuel (E10) will require additional fuel tank testing for some currently certified fuel tanks, since those fuel tanks would have continued to be used on SORE beyond model year 2019 if the proposed amendments did not update the certification test fuel. It was estimated that 50 of the currently-certified fuel tanks would have to be tested for certification with E10 fuel. The total cost of this additional testing is $1,330,000.

EMEL Testing

Requiring an EMEL to be declared for each model in an evaporative family will not necessitate additional diurnal emission testing. Holders will likely continue to determine which model in the evaporative family is expected to exhibit the highest diurnal emissions relative to the applicable diurnal emission standard by considering such factors as fuel tank volume and fuel line length if all other evaporative system components are shared throughout the evaporative family. However, some Holders may choose to test more than one model in an evaporative family to set EMELs and determine which model must be used to calculate the EFELD for the purpose of calculating diurnal emission credits. There are 12 performance-certified evaporative families in 2015 that have set an EMEL and also have more than one fuel tank volume. It was conservatively estimated that the Holder for each of these 12 evaporative families would test a second model for the purpose of setting EMELs in a given model year, resulting in an additional cost of $202,800.

Elimination of Equivalent Fuel Tank Provision

Eliminating the provision in the current section 2753(c) to replace a "nominal fuel tank" with an "equivalent fuel tank" may result in additional diurnal emission testing costs. A Holder could simply notify the Executive Officer of the replacement of a "nominal fuel tank" with an "equivalent fuel tank" under the current requirements. However, this provision has rarely been used, likely because Holders do not need to replace the fuel tank on their products during a model year. Replacing a fuel tank under the proposed requirements would be a change that would require diurnal emission testing to ensure the evaporative family still meets the applicable diurnal emission standard. It was conservatively estimated that the Holders for five evaporative families might have to conduct additional diurnal emission testing due to replacing a fuel tank in a given model year, resulting in an additional cost of $84,500.

Fuel Line Permeation Emission Standard

The proposed fuel line permeation emission standard for ≤ 80 cc evaporative families may necessitate additional testing. Low permeation fuel lines are already required for U.S. EPA certification of ≤ 80 cc evaporative systems, and many ≤ 80 cc evaporative families sold in California use ARB-certified fuel lines for the lines that carry liquid fuel from the fuel tank to the carburetor. However, there may be some evaporative families that would have to certify fuel lines to comply with the emission standard. It was assumed that each of the 35 Holders of Executive Orders for ≤ 80 evaporative families might have to certify a fuel line family. This would result in $168,000 in additional testing costs.

Certification of Fuel Lines with E10 Fuel

Although currently-certified fuel lines may have been tested with one of the fuels required for certification under the proposed amendments, they have been tested according to an older version the SAE J1737 test procedure. It is estimated that 51 currently-certified fuel lines (in addition to the 35 that may be newly certified, discussed in the previous paragraph) will be tested for certification with E10 fuel, for a total cost of $244,800.

iii. Additional Certification Costs

The proposed amendments may result in increased costs for certification through the need to submit additional certification applications, posting bonds, and the possibility of the Executive

Officer requiring an applicant to submit a sample evaporative system installed on an engine for inspection as part of the certification application. Table VI-4 summarizes the additional certification costs that may be incurred as a result of the proposed amendments.

Allowing ≤ 80 cc models with the same fuel tank type to be included in the same evaporative family could result in a decrease in the number of evaporative families, with as few as one evaporative family per Holder for each fuel tank type. This would reduce the number of ≤ 80 cc evaporative families, and consequently certification applications, by 192 compared to 2015. Assuming it costs $2,000 for an applicant to prepare a certification application or pay a third party to prepare the application, this would result in $384,000 in cost savings. Certification renewal every four years for fuel tanks, fuel lines, and carbon canisters will also necessitate additional certification applications for these components. Between the currently certified components that were used in 2015 and the additional components that are expected to be certified as a result of the proposed amendments, it was estimated that up to 253 evaporative components might have to be certified every four years, for an added cost of $506,000.

Table VI-4. Additional Certification Costs Under the Proposed Amendments

Category	Reason for Additional Cost	Potential Cost Savings	Potential Cost Increase
Certification Application	Combining ≤ 80 cc by fuel tank type	$384,000	
	4-year certification renewal for evaporative components		$506,000
	Elimination of equivalent fuel tank replacement		$10,000
Equipment and Shipping	Sample submission with certification application		$420,000
Bonds	Cost to Secure a Bond		$2,702,300

A Holder who replaces a fuel tank during a model year would have to submit a revised certification application after conducting testing with the new fuel tank. It was assumed this might affect five evaporative families in a given model year, for an additional cost of $10,000. Sending a sample evaporative system installed on an engine or equipment unit to ARB for inspection would be an added cost for Holders, because they would have to pay for shipping of the sample. Although the sample could be returned, it was assumed that it might not be sold to a consumer. The price of an assembled engine or equipment unit varies widely, from about $70 for a low-end handheld product or generator to several thousand dollars for some riding lawn

mowers or specialty vehicles. It was estimated that, on average, it would cost $1,000 or less for shipping and the equipment to send samples to ARB for inspection during the application process. With an estimated 420 evaporative families after implementation of the proposed amendments, the added cost would be up to $420,000.

Executive Order holders who do not have long-term U.S. assets meeting the applicable threshold of $3 million or $10 million in section 2774 will be required to post a bond to cover potential compliance- or enforcement-related obligations. It was determined that those Executive Order holders who are required to post a bond to meet the requirements of 40 CFR Part 1054.690 would also have to post a bond to meet the requirements of section 2774. To estimate the total value of the required bonds, projected sales as reported by the affected Executive Order holders for model year 2015 used, subject to the minimum values and thresholds in section 2774. A total of $90,075,000 was calculated. It was estimated that an Executive Order holder would pay three percent of the bond value annually to maintain the bond, based on the assumption that Executive Order holders' credit would range from excellent to average. Therefore, the total annual cost for all affected Executive Order holders to maintain bonds required by section 2774 would be $2,702,300. Affected Executive Order holders will be required to post bonds beginning with model year 2020, so there is no cost for model year 2018 or 2019. The total cost for affected Executive Order holders to maintain bonds over five years will be three times the annual cost, or $8,106,900.

iv. Other Direct Costs

The proposed amendments may result in direct costs other than the testing and certification costs. These costs may include labeling, reporting, compliance testing, and fuel lines, and they are summarized in Table VI-5.

<u>Emission Labels</u>

Most certified evaporative components already are labeled with the Executive Order number, manufacturer name or trademark, and model or part number. However, it was assumed that up to 253 evaporative component labels would have to be modified under the proposed amendments, for a total cost of $25,300. It may also be necessary for some Holders to make small changes to the way their evaporative systems are assembled to ensure the evaporative component labels are readily visible. For example, ARB staff has observed that fuel lines are often installed with the labeled side

facing toward a nearby engine part, out of the line of sight of an observer. Rotating these fuel lines by 90° would make the writing readily visible so ARB staff could confirm the same fuel lines that are on the Executive Order are installed on the sample being inspected. The cost of this change would be negligible. Similarly, where parts of a fuel tank are covered by the body or engine of a unit, the label or marking could be placed in a location that is readily visible. There may be other changes, however, that would be more significant. A Holder may have to use fasteners that can be removed without the use of tools rather than ones that require the use of a screwdriver, for example. The total cost estimated for these changes, assuming it would cost an average of $1,000 per evaporative family, is $420,000.

Table VI-5. Other Direct Costs Under the Proposed Amendments

Category	Reason for Additional Cost	Potential Cost Savings	Potential Cost Increase
Emission Labels	Label content requirements for components		$25,300
	Ensuring visibility		$420,000
Sales Reports	Required for all evaporative families		$782,000
Compliance Testing	Alignment with certification requirements	$1,392,000	
Fuel Lines	Using certified lines for ≤ 80 cc, vapor, and return; secure connections		$887,200
Fuel Caps	Modifications to reduce fuel cap permeation emissions		$506,200

Sales Reports

The current regulations require Holders participating in the averaging and banking program to submit sales reports for the relevant evaporative families. There were 29 participating evaporative families in 2015. The proposed amendments will require Holders to submit sales reports for all evaporative families. The estimated cost for the other 391 evaporative families is $782,000.

Compliance Testing

The current regulations require an Executive Order holder to make available five units for compliance testing at the Executive Officer's request, but an Executive Order holder tests only one unit for certification of evaporative systems. The proposed amendments will align these requirements, with one unit required for certification testing and one for compliance testing. This change could result in cost savings up to $1,392,000 for Executive Order holders, assuming the same average cost of $1,000 per unit for the equipment and shipping that was used for calculating the cost of submitting a sample evaporative system during the certification process.

Fuel Lines

There may be additional costs due to the requirement to use certified fuel lines for ≤ 80 cc evaporative families and for fuel lines such as those used to connect fuel tanks to carbon canisters or those used to return unused fuel from the carburetor to the fuel tank. Many ≤ 80 cc evaporative families already use certified fuel lines at least for the fuel lines that carry liquid fuel from the fuel tank to the carburetor. Some evaporative families also use certified fuel lines to connect the fuel tank to the carbon canister, but there are some evaporative families that will have to use certified fuel lines where uncertified fuel lines have been used previously. It was estimated that the cost per evaporative system could be up to $0.50 to use certified fuel lines, for a total cost of $887,200 in a given model year.

Fuel Caps

The revised TP-901 requires fuel tanks to be tested with fuel caps in place, which may increase overall permeation emissions during the test. The average permeation rate measured in certification testing for the certified fuel tanks that were used on model year 2015 SORE is 0.66 $g \cdot m^{-2} \cdot day^{-1}$, with the fuel tanks sealed without the fuel cap. This is only 44 percent of the fuel tank permeation emission standard for fuel tanks on engines with displacement greater than 80 cc, and 33 percent of the fuel tank permeation emission standard for fuel tanks on engines with displacement less than or equal to 80 cc. Some fuel tanks, especially those with more surface area and therefore a higher permeation emission standard, will not need to be modified in any way to meet the permeation emission standard when tested with LEV III fuel and a fuel cap in place.

However, other Executive Order holders with small fuel tanks use fuel caps whose permeation rates are as high as 50 $g \cdot m^{-2} \cdot day^{-1}$. As

a result, some fuel caps may need to be modified to enable the fuel tanks on which they are used to meet the permeation emission standards. It was estimated that all fuel caps for fuel tanks on engines with displacement less than or equal to 80 cc would have to be modified at an average cost of $1.00 per fuel cap. This is estimated to cover the cost of changing from a nitrile rubber gasket to a fluoropolymer gasket to reduce permeation through the gasket, treating the fuel cap (e.g., through fluorination) to make it more resistant to permeation, or changing to a lower-permeation fuel cap where a compatible substitute exists. Approximately 506,200 engines of this size were sold in California in model year 2014, as reported by Executive Order holders, so the total annual cost to address this new requirement is estimated to be $506,200.

v. Total Direct Costs

The total direct costs that may result from the proposed amendments are summarized in Table VI-6. Not all of the costs presented in Tables VI-1 through VI-5 are incorporated into Table VI-6 because doing so would count some costs more than once. All of the costs in Table VI-6 are assumed to be equal in each year except the emission labeling costs, which are assumed to be a one-time cost that would occur in one model year.

Table VI-6. Total Direct Costs from the Proposed Amendments

Category of Additional Cost	Potential Cost Increase in One Year	Potential Cost Increase Over Five Years
Diurnal Emission Testing (TP-902)	$313,300	$1,566,500
Fuel Tank Testing (TP-901)	$957,500	$2,792,500
Fuel Line Testing	$206,400	$412,800
Component Certification Applications	$126,500	$632,500
Certification Application Revisions	$10,000	$50,000
Sample Evaporative System Submission	$420,000	$2,100,000
Emission Labels	$445,300	$445,300
Sales Reports	$391,000	$1,955,000
Bonds	$2,702,300	$8,106,900
Fuel Lines	$887,200	$4,436,000
Fuel Caps	$506,200	$2,531,000
Total Cost	**$6,965,700**	**$25,028,500**

The diurnal emission testing cost includes the incremental cost increase for 10 evaporative families in one model year due to the

changes proposed for TP-902 and the full cost of tests for 17 evaporative families for additional testing under the proposed amendments. Up to five additional tests are expected in a model year as a result of fuel tank replacement and 12 are expected for testing associated with setting EMELs. The expected cost is $16,893 per test, or $287,300 in a model year for 17 additional diurnal emission tests. The total cost increase for diurnal emission testing is $313,300 in one year, and $1,566,500 in five years. The fuel tank testing cost includes the incremental cost increase for 8 fuel tanks to be certified in a model year and the additional testing costs for fuel tanks as a result of eliminating the small production volume tank exemption and low permeation tank exemption. It is expected that 26 fuel tanks would be certified as a result of eliminating the small production volume tank exemption, and 18 would be certified as a result of eliminating the low permeation tank exemption, for a total of 44. The expected cost is $26,600 per test, for a total of $1,170,500 for additional testing over five years. The total cost increase for fuel tank testing is expected to be $957,500 in one year, and $2,792,500 in five years.

It was estimated that Holders may have to submit five additional certification applications when replacing fuel tanks during a model year and 253 certification applications for evaporative component recertification every four years. The estimated cost is $2,000 per application. The total cost increase in one model year is expected to be $126,500 for components and $10,000 for evaporative families, since the applications for evaporative components are expected to be spread over four model years. Some evaporative components will have to be certified a second time in a five year period, so the total cost increase for evaporative component certification in five years is five times the cost in one year, or $632,500. The total cost increase in five years for evaporative families as a result of fuel tank replacement is $50,000. The expected cost for submitting sample evaporative systems is $420,000 in a model year, and $2,100,000 in five years. Additional labeling costs are expected to total $445,300 in one year; the cost for five years is expected to be the same, since this will be a one-time cost. Sales reporting costs are expected to total $391,000 in a model year, and $1,955,000 in five years. Costs for all affected Executive Order holders to maintain bonds required by section 2774 are expected to be up to $2,702,300 per year, or up to $8,106,900 in five years (because bonds will be required starting in 2020). The cost of installing certified fuel lines where they haven’t been used previously is expected to be $887,200 in a model year, and $4,436,000 in five years.

Based on the analysis above, the total direct cost to Executive Order holders in a model year could be up to $6,965,700. The total cost to Executive Order holders in five years could be up to $25,028,500.

b. Direct Benefits

The proposed amendments do not provide any new direct emissions reduction benefits. However, cost savings will occur as a result of the proposed amendments. The direct benefits from expected cost savings are summarized in Table VI-7. Allowing all of a Holder's models with displacement ≤ 80 cc using the same fuel tank type to be included in one evaporative family will result in up to 192 fewer fuel tank tests and fewer certification applications. The fuel tanks would potentially have been tested every model year under the current regulations, but most likely would only be tested once in a five year period if they were not allowed to be grouped by fuel tank type. The expected savings is up to $26,600 per test, for a total of $3,059,000 or $611,800 in one year. The certification applications would otherwise have to be submitted every year. The expected savings is $2,000 per application, or $384,000 in one year and $1,920,000 in five years. It is also possible that testing fuel tanks in a SHED according to section 12 of the revised TP-901 would result in cost savings, but it is not known whether any applicants will choose this method rather than the gravimetric permeation test in section 11 of TP-901. Only the costs for the gravimetric permeation test are considered here, and any cost savings associated with testing fuel tanks in a SHED are not considered in this analysis.

Table VI-7. Direct Benefits from the Proposed Amendments

Category of Benefit	Reason for Benefit	Potential Cost Savings in One Year	Potential Cost Savings in Five Years
Fuel Tank Testing (TP-901)	Combining ≤ 80 cc by fuel tank type	$610,949	$3,054,745
Certification Applications	Combining ≤ 80 cc by fuel tank type	$384,000	$1,920,000
Compliance Testing	Alignment with certification requirements	$1,392,000	$1,392,000
Total Cost Savings		**$2,386,949**	**$6,366,745**

The current regulations require a Holder to make available five units for compliance testing at the Executive Officer's request, but a Holder tests only one unit for certification of evaporative systems. The proposed amendments will align these requirements, with one unit required for certification testing and one for compliance testing. This change could result in cost savings up to $1,392,000 for Holders, assuming the same

average cost of $1,000 per unit for the equipment and shipping that was used for calculating the cost of submitting a sample evaporative system during the certification process. This also assumes that each evaporative family for engines with displacement greater than 80 cc would be subjected to compliance testing once in a five year period. The total direct benefits in a model year are expected to be up to $2,387,800. The total direct benefits in five years are expected to be up to $6,371,000.

The overall cost of the proposed amendments is the total direct cost to Executive Order holders minus the total direct benefit. Assuming that mark-ups from Executive Order holders, other manufacturers, distributors, and retail stores total 75%, as was done when the 2003 SORE evaporative emissions regulations were adopted, the total cost over five years that would be passed on to consumers would be ($25,028,500 – $6,366,745) × 175% = $32,650,600. Annual sales of SORE in California were estimated from reports submitted to ARB by SORE engine manufacturers to be about 1.77 million units in 2014. Assuming similar sales when the proposed amendments are implemented, the maximum average retail price increase per unit would be $3.68 based on the five-year costs passed on to consumers.

In terms of the percentage of retail price, the increase could range from approximately $3.68 ÷ $70 = 5.3 percent for a low-end string trimmer to $3.68 ÷ $5,000 = 0.1 percent for a commercial zero-turn riding mower. However, many Executive Order holders produce engines or equipment at a variety of price points, so the actual retail price increase, if there is any, will likely be proportional to the current retail price, with a smaller price increase for a $70 string trimmer than for a $5,000 commercial zero-turn riding mower.

c. Cost-Effectiveness

The proposed amendments do not allow for a cost-effectiveness calculation, since there are no direct quantifiable emissions reductions. The proposed amendments are intended to increase the compliance rate of SORE with the existing evaporative emission standards and prevent the introduction into California of evaporative systems that do not comply with those emission standards. The fuel used for certification testing will also be updated to match what is commercially available, so measured evaporative emissions rates from SORE will more accurately reflect real-world emissions.

d. Affected Businesses (in California)

The proposed regulatory amendments are not likely to affect the creation, expansion, or elimination of any California businesses. The types of businesses that would potentially be affected include SORE engine, equipment, and component manufacturers, retailers, and testing laboratories. The costs associated with the proposed amendments are small compared to the price of SORE equipment, and they will likely be passed on to consumers.

3. Economic Impact Analysis

a. Impact on Jobs

The proposed amendments are not expected to create or eliminate jobs in California. Most SORE manufacturing facilities are located outside of California, and most testing laboratories are also located outside of California. Those manufacturing facilities that are in California are not expected to be affected significantly because costs are expected to be passed on to consumers in the form of a modest retail price increase. Testing laboratories may have increased demand for their services, but it is not expected to necessitate additional testing personnel. The potential increase in retail price is not expected to affect the retail sales of SORE equipment.

b. Impact on Businesses

The impact on California businesses is expected to be minimal, as discussed above in section VI.A.3.a. The proposed amendments will not create, expand, or eliminate businesses in California.

c. Impact on Small Businesses

The impact on small businesses in California is also expected to be minimal. Retail sales are not expected to change as a result of the proposed amendments.

d. Impact to Health and Welfare of California Residents

The proposed amendments do not directly reduce criteria pollutant emissions. They will, however, help to ensure previously claimed emissions reductions are realized by increasing compliance with the existing emission standards. There are no direct impacts, either negative or positive, on health or welfare of California residents, worker safety, or California's environment associated with the proposed amendments.

4. Information Relied Upon for Economic Assessment

Information relied upon for this economic assessment includes price quotes for testing services provided in May 2016 by test laboratories. These quotes were provided on a confidential basis, and the costs used in the economic assessment were averages from the quotes. Data submitted by applicants and Holders to ARB as required by the SORE regulations were also used to estimate the number of affected evaporative families and evaporative components for some of the costs and benefits of the proposed amendments. Annual sales of SORE in California were estimated using production line testing reports submitted by engine manufacturers to ARB as required in the SORE exhaust emissions regulations. Projected sales figures reported by Executive Order holders in certification applications were used to estimate bond amounts for affected Executive Order holders.

B. Major Regulations

For purposes of this section, “Major Regulation” means any proposed adoption, amendment, or repeal of a regulation that will have an economic impact on the state’s business enterprises and individuals in an amount exceeding fifty million dollars ($50,000,000), as estimated by the board, department, or office within the agency proposing to adopt the regulation. As previously shown in section VI.A.2.v, the proposed regulatory amendments do not cost more than $7.0 million in any one year of implementation or compliance, and therefore the proposed regulatory amendments do not meet the major regulation threshold of $50 million as specified in California Government Code section 11342.548.

VII. EVALUATION OF REGULATORY ALTERNATIVES

California Government Code section 11346.2 requires ARB to consider and evaluate reasonable alternatives to the proposed regulatory action and provide reasons for rejecting those alternatives. This section discusses alternatives evaluated and provides reasons why these alternatives were not included in the proposal. ARB staff did not find any of the alternatives considered to be more effective in carrying out the purpose for which the proposed regulatory action is proposed or to be as effective as or less burdensome to affected businesses than the proposal.

An analysis of the alternatives to the proposed SORE regulation amendments is presented below. Staff analyzed three alternatives to ARB’s existing SORE regulations:

A. No Action

The first alternative evaluated was to take no action. Under this alternative, there would be the continued potential of introducing SORE into commerce that are incapable of meeting ARB's SORE diurnal emission standards, leading to increased emissions above the expected level in the statewide emissions inventory and potentially adverse health impacts. The current regulations do not give ARB the ability to enforce the diurnal emission standards for design-certified equipment. Although the diurnal emission standards can be enforced for performance-certified equipment, the effort to do so for one evaporative family is so large that very few evaporative families can be tested in any given model year. Under this alternative, emissions would likely be greater than those estimated in the SIP, although it is not possible to quantify the difference. There would not be direct costs for taking no action, but there would be unquantified costs to human health and the environment. Therefore, staff rejected this alternative.

B. Eliminate Design Certification Option

The next alternative would be to eliminate the design certification option altogether. Under this alternative, only the performance certification option would be available. This would potentially be the simplest alternative and is justified based on the data collected during the two validation studies. It would likely increase compliance with the diurnal emission standards, since all engines with displacement greater than 80 cc would have evaporative emission control systems whose emissions were demonstrated to meet the diurnal emission standards by testing in a SHED. In addition, less ARB staff time would be spent on certification, since evaporative components would not have to be certified. However, this alternative may impose a cost burden on equipment manufacturers and consumers as it would require SHED testing for all evaporative families for each manufacturer. It was assumed that ten additional SHEDs would be needed at test laboratories to meet the demand for additional testing. In addition, this alternative would penalize the equipment manufacturers who are already complying with the current design standard. Despite the low compliance rate observed in the validation studies, some of the equipment had emissions well below the diurnal emission standards, demonstrating that both performance and design certification can work well if proper quality controls are in place. The statewide total cost, in 2016 dollars, of this alternative would be $67,375,200 over five years. The cost and decreased flexibility associated with this alternative are unnecessary given other regulatory alternatives. Therefore, staff rejected this alternative.

C. Industry Alternative

SORE industry representatives proposed an alternative to the proposal in this staff report. This alternative would not subject design-certified evaporative

families to the diurnal emission standards, but would allow for a preliminary compliance determination via a diurnal emission test. If a design-certified evaporative family failed this test, the Executive Order holder would have to test the fuel lines, fuel tank, and carbon canister to demonstrate that they met their respective emission standards; if all three did meet their respective emission standards, the Executive Order holder would not be required to bring the evaporative family into compliance with the diurnal emission standard. Compliance testing of design-certified equipment under this alternative would therefore be purely informational. The diurnal emission rates observed could be used to validate or modify the assumptions in the emissions inventory, but ARB would have no ability to enforce the diurnal emission standards for design-certified evaporative families.

The industry alternative also included testing fuel tanks with fuel caps, pressure testing of production fuel tanks, secure connections for liquid-containing fuel lines, and installation of carbon canisters in a way that would prevent exposure of the carbon to liquid fuel or water. These four requirements were all incorporated into the ARB staff proposal.

Other elements of the industry alternative include relaxing the emission standards to account for the increased emissions from SORE due to testing with the updated certification test fuel, requiring Executive Order holders to submit product quality plans to ARB for the evaporative components used in design-certified evaporative families, and retaining the fuel tank as the only component of the evaporative emission control system for engines with displacement less than or equal to 80 cc. Relaxing the emission standards would cause an increase in the emissions inventory for SORE at a time when a high non-compliance rate may have prevented previously committed emissions reductions from being achieved and major emissions reductions are needed in the near future to help attain the 8-hour ozone NAAQS. It would be inconsistent with the commitment to reduce SORE ROG emissions in the SIP, and it would be unprecedented for ARB to relax evaporative emissions standards as a result of a fuel change.

It is good practice to have established quality assurance and quality control plans, but each Executive Order holder should already have these plans. The product quality plans as laid out in the industry alternative did not have discreet content requirements. These plans would presumably be reviewed by ARB, but it was unclear what criteria would be used for that review. Without clear requirements or criteria for evaluation, review of these product quality plans would likely become a large resource drain on ARB staff, and a concomitant burden on taxpayers, with little benefit.

ARB’s current SORE evaporative emissions regulations specify that the fuel tank is the only component of the evaporative emission control system for engines with displacement less than or equal to 80 cc. This was specified in

2003 to reduce the requirements for handheld equipment Executive Order holders. More recently, U.S. EPA adopted its evaporative emissions regulations for SORE, which requires control of permeation emissions from both fuel tanks and fuel lines on handheld engines. The U.S. EPA regulations also include all parts whose failure would increase evaporative emissions in the warranty. Maintaining the difference between the ARB and U.S. EPA regulations would be inconsistent with aligning ARB's requirements with U.S. EPA's for SORE, and it would make ARB's regulations less stringent than U.S. EPA's with respect to handheld equipment.

As previously stated, some elements of the industry alternative were incorporated into ARB staff's proposal, but the industry alternative was largely rejected because it would not give ARB the ability to enforce the diurnal emission standards effectively, it would represent a step in the wrong direction in terms of emissions reductions needed to meet existing as well as anticipated air quality planning needs, and it would potentially create more work for ARB staff with little or no benefit.

Based on the analysis above, all alternatives considered by the agency would not be more effective, or less burdensome, than the proposed amendments.

D. Small Business Alternative

Government Code Section 11346.2, subdivision (b)(4)(B), requires a description of reasonable alternatives to the regulations that would lessen any adverse impact on small business and the agency's reasons for rejecting those alternatives. The Board has not identified any alternatives that would lessen any adverse impact on small business.

E. California Health and Safety Code Major Regulation

The proposed regulations do not meet the major regulation threshold as specified in California Health and Safety Code Section 57005.

F. California Health and Safety Code Peer Review

The proposed regulations will subject design-certified SORE to previously-established emission standards, change the fuel used to test engines and equipment for compliance to conform to available fuel used in the equipment, change the number of engines tested, frequency of testing, and other procedural requirements to conform to federal requirements, and impose requirements on manufacturers to obtain a bond to ensure compliance and remedy violations. None of these proposed regulatory changes have scientific portions that are required to undergo scientific peer review, within the scope of Health and Safety Code section 57004.

VIII. JUSTIFICATION FOR ADOPTION OF REGULATIONS DIFFERENT FROM FEDERAL REGULATIONS CONTAINED IN THE CODE OF FEDERAL REGULATIONS

When California's SORE evaporative emission standards were adopted in September 2003, no comparable federal rules existed. In 2008, the U.S. EPA adopted Title 40, Part 1060, to control evaporative emissions from new and in-use nonroad and stationary equipment. The federal rules laid out evaporative emissions standards for SORE equipment, including fuel tanks and lines, which were similar to existing California requirements for design certification. While federal and California evaporative component emissions standards are similar, there are some differences between California and federal certification and test procedures. The proposed amendments described in this staff report will help to align California's fuel tank test procedures with federal requirements, but differences will still exist between the two regulations. Staff's proposal would deviate from, and be more stringent than federal requirements as follows:

- Current requirements for California include diurnal emission standards that control all sources of emissions from SORE, whereas the federal requirements only control fuel tank permeation, fuel line permeation, and running loss emissions.
- The California fuel tank permeation emission standards at 40 °C are 1.5 g $TOG \cdot m^{-2} \cdot day^{-1}$ for engines with displacement greater than 80 cc and 2.0 g $TOG \cdot m^{-2} \cdot day^{-1}$ for engines with displacement less than or equal to 80 cc, whereas the federal fuel tank permeation emission standard at 40 °C is 2.5 g $TOG \cdot m^{-2} \cdot day^{-1}$. The more stringent fuel tank standards are necessary to achieve the greater level of control of evaporative emissions needed in California.
- Proposed requirements for California would continue to require testing five fuel tanks for certification, whereas comparable federal requirements would only require testing between one and three fuel tanks. By requiring testing of more fuel tanks for certification, staff expects that manufacturers will place a greater emphasis on quality control and consistently producing compliant products.
- Proposed requirements for California would require manufacturers to maintain a bond of $500 per engine, whereas comparable federal requirements specify a bond amount of $25 – $200 per engine. This bond requirement was chosen as a means of ensuring that manufacturers would have sufficient funds to pay the maximum penalty for one violation allowed under California statutes in the event that equipment is found to be out of compliance. Violations are determined on a per-engine or component basis, and each day in which there is a violation is a separate violation.
- Preconditioning temperature profiles differ between the proposed California requirements and existing federal requirements, although staff's proposal provides a pathway to allow a common preconditioning process to be used

for both. The preconditioning temperature profile was chosen in order to accurately reflect the temperature profile that SORE equipment will be exposed to over its useful operating life in California.

- Fuel specification differs between the proposed California requirements and existing federal requirements, although staff's proposal provides a pathway to allow a single fuel to be used for both. The test fuel was chosen in order to accurately reflect the fuel formulation that SORE equipment will be exposed to over its useful operating life in California.

Although staff has made an effort to align California requirements with federal requirements as much as possible, some additional stringency is justified in light of California's unique air quality concerns and the findings of low in-use compliance during recent validation studies. The differences between the proposed California requirements and existing federal requirements are intended to help ensure that SORE equipment sold and used in California will comply with the evaporative emissions standards over its useful life. The cost of these regulations is justified by their benefit to human health and the environment from ensuring the emission standards are met.

These differences are also authorized by State and federal law. The ARB may regulate emissions from these kinds of engines under the authority granted to it by the Health and Safety Code, and under the provisions of the federal Clean Air Act that direct EPA to authorize California to regulate emissions from these kinds of engines.

IX. PUBLIC PROCESS FOR DEVELOPMENT OF PROPOSED ACTION (PRE-REGULATORY INFORMATION)

A. Public Process

ARB staff made a considerable effort to inform, involve, and update the public and stakeholders of its progress during development of the proposed SORE evaporative emissions regulation amendments, as required by Government Code, section 11346.45. ARB conducted public workshops, formed a joint government/industry working group, and held stakeholder meetings to discuss issues and seek comment. This section presents a list of these efforts, meetings, and teleconferences and also describes the issues raised during ARB's outreach efforts along with staff's responses.

Throughout the rulemaking process, access to ARB information was made available on the internet at http://www.arb.ca.gov/msprog/offroad/sore/sore.htm. Staff posted draft materials for review and comment during development of the regulation amendments. Interested parties could browse the SORE web page and find the latest draft regulatory language, draft test procedure(s), workshop presentations and contact information.

Staff considered all comments received in the workshops, working group meetings, and meetings with manufacturers and industry representatives. Revisions were made to the ARB staff proposal as a result of comments received. Issues on which stakeholders disagree with the ARB staff proposal include subjecting design-certified equipment to the diurnal emission standards, the approach that should be taken for compliance testing, and the need to relax emission standards as a result of the certification test fuel update. For additional information on ARB's public process to develop these proposed amendments see Appendix F.

B. Workshops

Staff conducted two public workshops, each in two locations, to present the proposed amendments and seek comment and response to the proposed amendments to the SORE evaporative emissions regulations. Workshop notices were sent to more than 4,000 potentially affected stakeholders comprised of SORE manufacturers, evaporative emissions control component manufacturers, environmental organizations, and trade associations, as well as other interested parties.

The first workshop was held on November 2, 2015, in Sacramento, California and on November 4, 2015, in Diamond Bar, California. Ten stakeholders attended the Sacramento workshop and thirteen stakeholders attended the workshop in Diamond Bar. The second workshop was held on May 24, 2016, in Sacramento, California and on May 25, 2016, in Diamond Bar, California. Seven stakeholders attended the Sacramento workshop and forty-seven stakeholders attended the workshop in Diamond Bar. Both Workshops were broadcast via webcast to accommodate stakeholders not able to attend in person.

C. Working Group Meetings

Staff also formed a working group with approximately 100 stakeholders to discuss the validation study results and emissions mitigation opportunities. Working group meetings were held via conference call on September 2, 2015, December 2, 2015, March 15, 2016, and July 12, 2016. Staff coordinated the dates and times of the working group meetings by surveying stakeholders to determine their availability. Fifty-five stakeholders participated in the September 2, 2015 conference call, forty-two stakeholders participated in the December 2, 2015 conference call, forty-eight stakeholders participated in the March 15, 2016 conference call, and forty-three stakeholders participated in the July 12, 2016 conference call.

D. Stakeholder Meetings and Conferences

As listed in Table IX-1, ARB staff held numerous meetings and teleconferences with trade associations, individual manufacturers, and groups of industry representatives to receive comments on the proposed SORE regulation amendments. The trade associations represented at some of the meetings and conferences were the Outdoor Power Equipment Institute (OPEI), the Truck and Engine Manufacturers Association (EMA), and the Portable Generator Manufacturers' Association (PGMA).

Table IX-1. Pre-Hearing Meetings and Teleconferences

Participants	Date
OPEI, PGMA, EMA, (and member companies)	5/21/2015
PGMA (and member companies)	6/16/2015
Walbro	9/1/2015
Stihl, Inc.	3/10/2016
OPEI, EMA (and member companies)	2/16/2016, 3/8/2016, 5/25/2016, 7/5/2016, 7/20/2016, 7/28/2016

X. REFERENCES

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17. U.S. EPA, Control of Emissions from New, Small Nonroad Spark-Ignition Engines and Equipment (2015), 40 CFR Part 1054 (February 19, 2015).

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APPENDICES

A. **Proposed Regulations Order**

B. **Proposed Amendments to CP-901, Certification and Approval Procedure for Small Off-Road Engine Fuel Tanks**

C. **Proposed Amendments to CP-902, Certification and Approval Procedure for Evaporative Emission Control Systems**

D. **Proposed Amendments to TP-901, Test Procedure for Determining Permeation Emissions from Small Off-Road Engine and Equipment Fuel Tanks**

E. **Proposed Amendments to TP-902, Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines and Equipment**

F. **Public Process Notices**