



**STAFF REPORT: INITIAL STATEMENT OF REASONS
FOR PROPOSED RULEMAKING**

**ADOPTION OF THE PROPOSED AMENDMENTS TO CALIFORNIA'S
SMALL OFF-ROAD ENGINE AND TIER 4 OFF-ROAD COMPRESSION-IGNITION
ENGINE REGULATIONS AND TEST PROCEDURES; AND, AMENDMENTS TO THE
EXHAUST EMISSION CERTIFICATION TEST FUEL FOR OFF-ROAD
SPARK-IGNITION ENGINES, EQUIPMENT, AND VEHICLES**

Mobile Source Control Division
Emission Research and Regulatory Development Branch

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State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS
FOR PROPOSED RULEMAKING

Public Hearing to Consider

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SMALL OFF-ROAD ENGINE AND TIER 4 OFF-ROAD COMPRESSION-IGNITION
ENGINE REGULATIONS AND TEST PROCEDURES; AND, AMENDMENTS TO THE
EXHAUST EMISSION CERTIFICATION TEST FUEL FOR OFF-ROAD
SPARK-IGNITION ENGINES, EQUIPMENT, AND VEHICLES

To be considered by the Air Resources Board at a two-day meeting of the Board that
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Air Resources Board
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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
I. INTRODUCTION.....	3
A. BACKGROUND.....	3
1. <i>California's Off-Road Categories</i>	<i>3</i>
2. <i>Small Off-Road Engines</i>	<i>4</i>
3. <i>Tier 4 Off-Road Compression-Ignition Engines.....</i>	<i>5</i>
4. <i>Current U.S. Environmental Protection Agency Nonroad Regulations and Test Procedures.....</i>	<i>6</i>
5. <i>California's Off-Road Exhaust Emission Certification Test Fuel.....</i>	<i>7</i>
B. REGULATORY AUTHORITY	8
C. RATIONALE FOR THE PROPOSED AMENDMENTS	8
D. STAKEHOLDER PARTICIPATION	9
1. <i>Small Off-Road Engines</i>	<i>9</i>
2. <i>Tier 4 Off-Road Compression-Ignition Engines.....</i>	<i>9</i>
3. <i>Exhaust Emission Certification Test Fuel.....</i>	<i>10</i>
II. PROPOSED AMENDMENTS TO THE SMALL OFF-ROAD ENGINE TEST PROCEDURES.....	10
A. ALIGNMENT WITH PART 1054	10
B. ALIGNMENT WITH PART 1065	11
1. <i>Allowance for Supplemental Engine Cooling</i>	<i>11</i>
2. <i>Measurement of PM Emissions from Two-Stroke Engines.....</i>	<i>12</i>
3. <i>Exhaust Emission Certification Test Fuel Requirements</i>	<i>12</i>
C. ALIGNMENT WITH PART 1068.....	13
III. PROPOSED AMENDMENTS TO THE TIER 4 OFF-ROAD COMPRESSION-IGNITION ENGINE TEST PROCEDURES	13
A. EMISSION STANDARDS	13
1. <i>Tier 4 ALT NO_x+NMHC standards and FEL Caps.....</i>	<i>14</i>
2. <i>Alternative NO_x FEL Cap Applicability.....</i>	<i>14</i>
B. ENHANCED LABELING REQUIREMENTS	15
C. UPDATED TEST PROCEDURES.....	16
1. <i>Part 1039</i>	<i>16</i>
2. <i>Part 1065</i>	<i>17</i>
3. <i>Part 1068</i>	<i>17</i>
D. STOCKPILING PROHIBITIONS	18

E. OTHER PROPOSED AMENDMENTS	18
F. DIFFERENCES BETWEEN CALIFORNIA AND FEDERAL REGULATIONS.....	19
IV. PROPOSED AMENDMENTS TO THE OFF-ROAD EXHAUST EMISSION CERTIFICATION TEST FUEL	19
V. ENVIRONMENTAL IMPACTS ANALYSIS.....	21
A. BACKGROUND ON ENVIRONMENTAL REVIEW PROCESS	21
B. IMPACTS ANALYSIS	22
C. ENVIRONMENTAL JUSTICE.....	24
VI. ECONOMIC IMPACT.....	25
A. LEGAL REQUIREMENT.....	25
B. EFFECT OF AMENDMENTS TO THE REGULATIONS AND TEST PROCEDURES.....	25
1. <i>Cost and Cost-Effectiveness</i>	25
2. <i>Economic Impact on the Economy of the State</i>	25
VII. ALTERNATIVES CONSIDERED.....	27
A. ALTERNATIVES CONSIDERED TO THE PROPOSED AMENDMENTS.....	27
B. ISSUES OF CONTROVERSY	29
C. SUMMARY OF ALTERNATIVES EVALUATED	30
D. CONCLUSIONS AND RECOMMENDATIONS.....	30
VIII. REFERENCES.....	31

APPENDICES

- A. Proposed Regulation Order – Small Off-Road Engines
- B. Proposed Regulation Order – Tier 4 Off-Road Compression-Ignition Engines
- C. Proposed Regulation Order – Large Spark-Ignition Engines
- D. Proposed Regulation Order – In-Use Compliance Requirements for Retrofits of Large Spark-Ignition Engines
- E. Proposed Regulation Order – New Off-Highway Recreational Vehicles and Engines
- F. Proposed Regulation Order – Recreational Marine Spark-Ignition Engines
- G. Proposed Test Procedures – Small Off-Road Engines, 2005-2012 Model Years
- H. Proposed Test Procedures – Small Off-Road Engines, 2013 and Later Model Years, Part 1054
- I. Proposed Test Procedures – Small Off-Road Engines, 2013 and Later Model Years, Part 1065
- J. Proposed Test Procedures, Part I-C – Tier 4 Off-Road Compression-Ignition Engines, 2008-2010 Model Years, Parts 1039/1065/1068
- K. Proposed Test Procedures, Part I-D – Tier 4 Off-Road Compression-Ignition Engines, 2011 and Later Model Years, Part 1039
- L. Proposed Test Procedures, Part I-E – Tier 4 Off-Road Compression-Ignition Engines, 2011 and Later Model Years, Part 1065
- M. Proposed Test Procedures, Part I-F – Tier 4 Off-Road Compression-Ignition Engines, 2011 and Later Model Years, Part 1068
- N. Proposed Test Procedures – Large Spark-Ignition Engines, 2007 and Later Model Years, Part 1065/1068
- O. Proposed Test Procedures – Large Spark-Ignition Engines, 2010 and Later Model Years, Part 1048
- P. Proposed Test Procedures – New Off-Highway Recreational Vehicles and Engines
- Q. Proposed Test Procedures – Recreational Marine Spark-Ignition Engines
- R. Technical Support Document – For Proposed Amendments Related to Tier 4 Off-Road Compression-Ignition Engine Regulations

- S. Summary & Rationale – Small Off-Road Engine Regulations
- T. Summary & Rationale – Tier 4 Off-Road Compression-Ignition Engine Regulations
- U. Summary & Rationale – New Large Spark-Ignition Engines; and In-Use Large Spark-Ignition Engine Retrofits
- V. Summary & Rationale – Off-Highway Recreational Vehicles
- W. Summary & Rationale – Recreational Marine Spark-Ignition Engines

LIST OF ACRONYMS

ABT	Averaging, Banking, and Trading
ALT	Alternate
ARB	Air Resources Board
BOARD	Air Resources Board
CAA	Clean Air Act
CaRFG2	Phase 2 California Reformulated Gasoline
CaRFG3	Phase 3 California Reformulated Gasoline
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CI	Compression-ignition
CO	Carbon monoxide
Districts	Air Pollution Control and Air Quality Management Districts
E6	Six-percent ethanol blend
E10	Ten-percent ethanol blend
EMA	Truck and Engine Manufacturers Association
FEL	Family emission limit
FR	Federal Register
HC	Hydrocarbons
HSC	Health and Safety Code
ISOR	Initial Statement of Reasons
kW	Kilowatt
LEV III	Low Emission Vehicle III
LSI	Large Spark-Ignition
MAC	Manufacturers' Advisory Correspondence
MTBE	Methyl-tertiary-butyl-ether
NMHC	Non-methane hydrocarbons
NMHC+NO _x	Non-methane hydrocarbons plus oxides of nitrogen
NO _x	Oxides of nitrogen
NO _x +NMHC	Oxides of nitrogen plus non-methane hydrocarbons
OHRV	Off-Highway Recreational Vehicles
OPEI	Outdoor Power Equipment Institute
PM	Particulate matter
REC MARINE	Recreational Marine
SORE	Small Off-Road Engines
STAFF REPORT	Staff Report: Initial Statement of Reasons
SwRI	Southwest Research Institute
TRU	Transport Refrigeration Unit
U.S. EPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

The amendments proposed herein to the California emissions regulations and test procedures for new spark-ignition small off-road engines (SORE) and equipment, and new compression-ignition (CI) engines and equipment, are intended to address issues that have developed since the Air Resources Board (Board or ARB) last considered regulations for these source categories, and to enhance alignment with other ARB and United States Environmental Protection Agency (U.S. EPA) regulations.

Staff is proposing that the Board modify the SORE test procedures to adopt portions of U.S. EPA's title 40, Code of Federal Regulations, Parts 1054 and 1065 to increase alignment of the certification and exhaust emission testing requirements without any changes in the stringency of the emission standards and associated test procedures, and without any cost impacts. Staff proposes to generally align with the emission testing and certification requirements, while not aligning with the federal production-line testing requirements, and some special compliance and emission credit provisions. The proposed changes would result in a more efficient certification process for engine and equipment manufacturers because they would not need to perform duplicative test procedures for California and federal certifications. In addition, manufacturers of the test equipment and analyzers will eventually phase out support for maintaining older test equipment. Consequently, if ARB does not adopt the proposed emission test requirements, it may become increasingly impractical for manufacturers, private testing facilities, and ARB as well, to perform exhaust emission tests using the current test procedures.

Staff is also proposing that the Board update the off-road CI engine regulation and associated tier 4 test procedures to provide better harmonization with federal requirements for nonroad CI engines, but also to expand upon federal engine labeling requirements in order to facilitate implementation and enforcement of the various ARB in-use programs. Staff's recommendations for alignment do not adversely affect the stringency or the emission benefits of the existing regulation, but do correct clerical errors, standardize measurement specifications, calibrations, and instrumentation, and would remove unnecessarily burdensome reporting requirements currently placed on the engine manufacturers. For the most part, the proposed changes are relatively minor, but are necessary to avoid duplicate State vs. Federal certification testing and the production of 49-state engine families. Additionally, staff is proposing to align with U.S. EPA's anti-stockpiling provisions, which help ensure the realization of projected emission benefits, and a new interim tier 4 combined hydrocarbon plus oxides of nitrogen standard with the potential to provide emission benefits in addition to those of the December 2004 rulemaking.

Finally, staff is proposing modifications to the exhaust emission certification test fuel requirement used by California's off-road spark-ignition, gasoline-fueled categories including large spark-ignition engines, SORE, recreational marine engines, and off-highway recreational vehicles. Off-road engine, equipment, and vehicle exhaust

emission certification test fuel requirements have typically followed those of on-road motor vehicles. Since the requirements of the certification fuel for on-road motor vehicles are also scheduled to be modified to use a ten-percent ethanol-blend of gasoline, staff believes that it is fitting to update the off-road categories' exhaust emission certification test fuel requirements at this time.

Staff recommends that the Board adopt this proposal.

I. INTRODUCTION

This Staff Report: Initial Statement of Reasons (Staff Report) supports the proposed amendments to the following regulations, as well as the associated test procedures, as they are incorporated by reference:

- Regulations and Test Procedures for Small Off-Road Engines (SORE) and Equipment, title 13, California Code of Regulations (CCR), sections 2400-2409;
- Regulations and Test Procedures for Tier 4 Off-Road Compression-Ignition (CI) Engines and Equipment, title 13, CCR, sections 2420-2427;
- Regulations and Test Procedures for Off-Highway Recreational Vehicles (OHRV), title 13, CCR, sections 2410-2415;
- Regulations and Test Procedures for Recreational Marine (Rec Marine) Engines, title 13, CCR, sections 2440-2448;
- Regulations and Test Procedures for Large Spark-Ignition (LSI) Engines, title 13, CCR, sections 2430-2439; and
- Verification Procedure, Warranty, and In-Use Compliance Requirements for Retrofits to Control Emissions from Off-Road LSI Engines, title 13, CCR, sections 2780-2789.

The Staff Report describes the proposed amendments and the rationale for each amendment. It also presents staff's analysis of impacts associated with the implementation of the proposed amendments, including costs, and economic and environmental impacts. The proposed text of the regulations, which generally set forth numerical emission limits and related standards, is attached as Appendices A-F. The proposed test procedures, which generally set forth the manner in which engines are certified to meet the regulatory standards, are attached as Appendices G-Q.

A. Background

1. California's Off-Road Categories

California's off-road categories include SORE, LSI engines, Rec Marine engines, CI engines, and OHRV. Except for the CI category, which consists of engines that operate on diesel fuel, the other categories use spark-ignition engines that mostly operate on gasoline. Some SORE and LSI engines do operate on alternative fuels, such as liquefied petroleum gas or compressed natural gas.

The SORE category includes lawn, garden, and general utility engines that are less than or equal to 19 kilowatts (kW). The LSI engine category includes engines greater than 19 kW that are used in forklifts, portable generators, large turf care equipment, airport ground support equipment, and a wide array of other agricultural, construction, and general industrial equipment. The Rec Marine engine category includes personal watercraft engines, as well as outboard, inboard, and sterndrive recreational boat engines. The OHRV category includes off-road motorcycles and all-terrain vehicles. Off-road CI engines are used in a variety of off-road applications, including tractors, excavators, portable generators, transport refrigeration units (TRUs), irrigation pumps, welders, compressors, scrubber/sweepers, and a wide array of other agricultural, construction, and general industrial equipment.

2. Small Off-Road Engines

In 1990, ARB approved the initial exhaust emission control regulations for new SORE. These regulations included exhaust emission standards, emission test procedures, and provisions for warranty and production compliance programs, which are contained in title 13, CCR, sections 2400-2409, along with the applicable test procedures which are incorporated by reference. Later, the United States Environmental Protection Agency (U.S. EPA) adopted similar but less stringent regulations and test procedures for small “nonroad” spark-ignition engines, which were introduced in title 40, Code of Federal Regulations (CFR), Part 90 (40 CFR Part 90).

In 2003, ARB adopted more stringent SORE exhaust emission standards, and also aligned, with some modifications (ARB 2003), with U.S. EPA’s small nonroad engine test procedures in 40 CFR Part 90.

In November 2008, ARB adopted modifications to the SORE emission credit program, including adding a zero-emission equipment credit program and an option to certify using a 10-percent ethanol-blend¹ (E10) of gasoline, as well as other minor modifications to the regulations (ARB 2008). Immediately before the Board hearing, manufacturers asked ARB to align with U.S. EPA’s recently updated test procedures (i.e., Parts 1054 and 1065; see Section I.A.4 below). However, because the request was both beyond the scope of the noticed proposal for the hearing and staff was uncertain of the possible effects of such an alignment, the request could not be granted. Nevertheless, staff agreed to research the need to align with U.S. EPA’s updated test procedures as the next course of action. Staff then reviewed the possibility of increasing the SORE category’s alignment with U.S. EPA’s current test procedures, and determined that it could be done without affecting the stringency of California’s current emission standards. Accordingly, these proposed modifications for aligning are discussed in detail in Section II of this report.

¹ All percentages related to ethanol are by volume.

3. Tier 4 Off-Road Compression-Ignition Engines

a) Tiers 1, 2 and 3 Emission Standards

There are currently four tiers of increasingly stringent emission standards required for off-road CI engines in California. Particulate matter (PM), oxides of nitrogen (NO_x), non-methane hydrocarbons (NMHC), and carbon monoxide (CO) are the pollutants regulated by these requirements, though not always collectively. In 1990, the Board adopted the very first emission standards for new off-road CI engines for engines less than 19 kW as part of the California requirements for 1995 and later small off-road engines. In 1992, the Board approved standards for off-road CI engines 130 kW and greater, which became known as the tier 1 standards. These standards were implemented beginning in 1996 and resulted in approximately a 50 percent drop in NO_x emissions compared to previously uncontrolled engines.

At the same time in 1992 that the Board adopted tier 1 standards, the Board also adopted a second tier of more stringent emission standards, known as tier 2. These original tier 2 standards were to apply to engines with rated power $130 \leq \text{kW} \leq 560$ beginning in 2000. However, in response to U.S. EPA's 1998 adoption of even more stringent tier 2 emission standards to start in 2001, ARB fully aligned California's standards and implementation schedules with U.S. EPA's requirements in 2000 (ARB 1999). Tier 2 requirements were phased-in from 2001 through 2010, and encompassed the entire power spectrum of engine applications including those above 560 kW and those under 19 kW.

At the 2000 Board hearing, ARB also adopted U.S. EPA's tier 3 standards, which were phased-in from 2006 through 2011 and were applicable to engines with rated power $37 \leq \text{kW} \leq 560$. The new standards have reduced non-methane hydrocarbons plus oxides of nitrogen (NMHC+NO_x) emissions by an additional 40 percent compared to the previous tier 2 standards. However, tier 3 PM standards are the same as tier 2 PM standards.

b) Tier 4 Emission Standards

Tier 4 emission standards are based on the use of advanced aftertreatment technologies (i.e., particulate filters and selective catalyst reduction) and can be up to 95 percent more stringent than the previous tier 3 standards. These standards are phased-in over two stages with the first stage known as tier 4 interim and the second as tier 4 final. Tier 4 interim standards began in 2008 for engines in the $19 \leq \text{kW} \leq 56$ power category and are scheduled to be phased-in through 2014 for engines greater than 560 kW. In general, the tier 4 interim standards require maximum control of PM and NMHC emissions, but only moderate control of NO_x emissions, primarily to allow for the maturation of advanced aftertreatment NO_x control technologies. Tier 4 final standards also began in 2008 for engines less than 19 kW and reduced the PM standard for these engines by 50 percent. Engines in the $56 \leq \text{kW} \leq 560$ power category will be subject to advanced aftertreatment-based standards for NO_x and PM in

the 2014/2015 timeframe, with some generators greater than 560 kW also being required to meet aftertreatment-based standards. Advanced aftertreatment generally requires the use of ultra-low sulfur diesel fuel to function properly, which California mandated for both on-road and off-road use beginning in 2006.

4. Current U.S. Environmental Protection Agency Nonroad Regulations and Test Procedures

In 2001, U.S. EPA adopted title 40, CFR, Part 1065, as a “united” test procedure for both “nonroad” engines and equipment and on-highway heavy-duty CI engines. The test procedures in Part 1065 essentially replaced those previously used in Part 90 for nonroad spark-ignition engines and those in Part 89 for nonroad CI engines. Part 1065 is currently the technical part of U.S. EPA’s regulations that promulgates emissions measurement methodologies, criteria for selecting analytical instrumentation, calibration procedures, and specifications for virtually all engine categories. Since its initial adoption, Part 1065 has been amended repeatedly to both improve and expand its applicability for the nonroad engine categories. In addition, U.S. EPA adopted specific “standard-setting” parts for each engine/equipment and vehicle category. Besides the actual emission standards, these standard-setting parts contain other provisions, such as certification protocols, production-line testing requirements, credit-generation allowances, etc. Also adopted was Part 1068, which is the general compliance, special provisions, and defect reporting part of U.S. EPA’s regulations.

Since 2005, U.S. EPA has adopted several amendments to its nonroad CI engine regulations contained in Parts 1039, 1065, and 1068². Federal nonroad CI engines certified to the more stringent “tier 4” emission standards must be tested using Part 1065. Use of Part 1065 is optional for less stringent “tier 3” and earlier model engines. Part 1039 is the standard-setting part of U.S. EPA’s regulations for nonroad CI engines, and also contains provisions regarding certification procedures, labeling, credit generation, emissions averaging, equipment flexibility options, and hardship relief.

In 2008, U.S. EPA adopted exhaust and evaporative emission standards for small nonroad engines, which coincided with some of ARB’s SORE emission standards that were adopted in 2003. At the same time, U.S. EPA divided up the small nonroad engine requirements that were contained in the then-current Part 90, and distributed these requirements into other parts. The applicable small nonroad engine test procedures are now contained in Part 1065; the standard-setting provisions for small nonroad engines are now contained in Part 1054; and, the small nonroad engine general compliance requirements are now contained in Part 1068. Also at that time, U.S. EPA set the requirement that nonroad small engines had to be tested using the Part 1065 test procedures starting with the 2013 model year, although carry-over of engines already certified using the older Part 90 test procedures would still be allowed.

² Ref.: 72 FR 72955 (Dec. 26, 2007); 73 FR 59521 (Oct. 8, 2008); 74 FR 84270 (Feb. 24, 2009); 74 FR 56260, (October 31, 2009); and 76 FR 37977 (June 28, 2011).

5. California's Off-Road Exhaust Emission Certification Test Fuel

In January, 2012, ARB is scheduled to propose adopting an E10 gasoline certification test fuel specification for on-road motor vehicles. Specifically, this proposal will be made in conjunction with the third phase of California's Low-Emission Vehicle (LEV III) rulemaking as part of the Advanced Clean Cars rulemaking package, and will essentially re-establish the consistency between the certification test fuel and the California commercially available gasoline. Staff believes that now is also an appropriate time to propose using the same E10 fuel for exhaust emission certification testing of off-road, gasoline-fueled, spark-ignition engines because this will re-establish the consistency that had existed originally between the off-road categories' certification and commercially available fuels.

Except for OHRVs, gasoline-fueled, spark-ignition engines certified for California's other off-road categories are currently allowed to conduct exhaust emission certification tests using Phase 2 California Reformulated Gasoline (CaRFG2), which is oxygenated with methyl tertiary-butyl ether (MTBE), as an option to the two specified federal test fuels³. For instance, both LSI engines and SORE can conduct testing using CaRFG2, federal Indolene, and federal tier II gasoline. In addition, ARB's 2008 SORE amendment rulemaking allowed these engines, and by an existing reference, LSI engines with displacements less than one liter as well, the option of using an E10 gasoline for certification testing if the associated engines were previously certified federally using an E10 gasoline (ARB 2008). Rec Marine engines can use CaRFG2, federal Indolene, and another type of federal fuel. Lastly, OHRVs are currently required to certify using either federal Indolene or federal tier II gasoline.

In 2007, ARB amended the Phase 3 reformulated gasoline (CaRFG3) regulations by essentially increasing the amount of fuel oxygenates (i.e., ethanol) in California's commercially available gasoline from 5.7 percent⁴ (i.e., E6) to 10 percent (i.e., E10) by December 31, 2009. Staff recognized that there was limited ethanol-based emission test data available from off-road, spark-ignition engines during this rulemaking. Nevertheless, published test data that were available indicated that HC and CO emissions decreased when switching from E6 to E10, while NOx emissions tended to increase proportionally with increasing amounts of ethanol (ARB 2007, Appendix C). This change meant that for open-loop fuel-system-configured engines in particular, manufacturers needed to design fuel metering systems that would be emissions compliant when both certifying with either CaRFG2 or a federal test fuel and when operating in-use with CaRFG3 commercial fuel. Staff's proposal addresses this issue and is explained in further detail in Section IV.

³ One of these federal test fuels, known as "Indolene," is specified in title 40, CFR, Part 86, subpart B, section 86.113-94(a)(1); the other fuel, known as "tier II," is specified in title 40, CFR, Part 86, subpart B, Section 86.113-04(a)(1).

⁴ The 5.7 percent by volume ethanol-blend gasoline is commonly known as E6.

B. Regulatory Authority

ARB has been granted both general and specific authority under the Health and Safety Code (HSC) to adopt the proposed regulation. HSC sections 39600 (General Powers), 39601 (Standards, Definitions, Rules and Measures), and 39602.5 (Adoption of Rules and Regulations) confer on ARB, the general authority and obligation to adopt rules and measures necessary to execute the Board's powers and duties imposed by State law and to attain federal national ambient air quality standards in all areas by applicable attainment dates. HSC sections 43013 and 43018(a) provide broad authority to achieve the maximum feasible and cost-effective emission reductions from all mobile source categories, including both new and in-use on-road and off-road engines used in motor vehicles.

Additionally, California's Air Toxics Program, established under California law by AB 1807 (stats. 1983, ch. 1047, the Tanner Act) and set forth in the HSC sections 39650 through 39675, mandates that ARB identify and control air toxic emissions in California. Following the identification of a substance as a toxic air contaminant, HSC section 39665 requires ARB, with the participation of the local air pollution control and air quality management districts (Districts), and in consultation with affected sources and interested parties, to prepare a report on the need and appropriate degree of regulation for that substance. Based upon the findings of the report, ARB is vested with authority under sections 39666 and 39667 to adopt and enforce airborne toxic control measures that will respectively achieve emission reductions using best available control technology for nonvehicular and vehicular sources.

C. Rationale for the Proposed Amendments

The proposed amendments to both the SORE and tier 4 off-road CI engine regulations are mostly relatively minor and are intended to enhance alignment with the federal versions to make certification compliance less burdensome for the off-road engine and equipment manufacturers. Specifically, they are necessary to avoid imposing either duplicate California vs. federal certification testing or forcing manufacturers to produce separate California and 49-state engine families. Nevertheless, complete harmonization with the federal provisions is not possible because it would compromise the expected future emission reductions required for California. Descriptions and rationale for these more critical "non-alignment" amendments are presented in Section II for the SORE category and in Section III for the tier 4 off-road CI engine category. A description and rationale for the proposed amendment to completely align the off-road exhaust emission certification test fuel with the new E10 certification test fuel for on-road motor vehicles is provided in Section IV.

Requirements and rationale for each provision of the proposed amendments to the regulations and applicable test procedures are provided in Appendix S for the SORE category, in Appendix T for the tier 4 off-road CI engine category, and in Appendices S,

U, V, and W for the proposed off-road exhaust emission certification test fuel amendments.

D. Stakeholder Participation

1. Small Off-Road Engines

On July 11, 2011, staff posted Mail-out #MSC 11-24, which included drafts of the proposed test procedure changes. This posting was announced via email on ARB's *msprog* and *orspark* listserve to all stakeholders, including environmental organizations, engine manufacturers, equipment manufacturers, and trade associations, as well as other interested parties. In addition to the Mail-out, staff held a meeting with several manufacturers and representatives of the Truck and Engine Manufacturers Association (EMA) and the Outdoor Power Equipment Institute (OPEI) on July 12, 2011 to discuss how the test procedure changes would affect their companies' engine and equipment certifications. Subsequently, staff shared draft proposed regulatory language with all stakeholders. Finally, telephone conference calls were held on September 1, 2011, with EMA and OPEI, and on October 12, 2011 with OPEI. to discuss the significant changes that staff made to the proposal as a result of the oral and written comments received, which are reflected in this Staff Report. Public information concerning the development of this proposal was also made available on ARB's website at www.arb.ca.gov/msprog/sore/sore.htm.

2. Tier 4 Off-Road Compression-Ignition Engines

In May 2009, tier 4 off-road CI engine manufacturers formally asked ARB to maintain full alignment and harmonization with the federal regulations. On July 8, 2009, staff met (via a telephone conference call) with representatives of EMA and several manufacturers to initiate discussions for such an alignment. Since that time, staff has worked cooperatively with these manufacturers in developing harmonizing amendments to the California tier 4 off-road CI engine regulations and test procedures, without affecting the stringency of California's current emission standards. Specifically, staff held subsequent meetings in El Monte, California, with EMA and manufacturers on June 7, 2011, and July 26, 2011, and via telephone conference calls on June 30, 2011, and July 7, 2011. On August 26, 2011, staff posted Mail-out #MSC 11-28, which included drafts of the proposed regulatory and test procedure changes. This posting was announced via email on ARB's *ms-mailings*, *ag*, *arber*, *diesel-retrofit*, *ordiesel*, *cert*, *tru*, *portable*, and *misc* listserve to all stakeholders, including environmental organizations, engine manufacturers, equipment manufacturers, and trade associations, as well as other interested parties.

3. Exhaust Emission Certification Test Fuel

On August 12, 2011, staff posted Mail-out #MSC 11-26 which stated ARB's intent to propose, at the December 2011 Board hearing, adoption of a new E10 certification test fuel for the LSI engine, SORE, OHRV, and Rec Marine spark-ignition engine categories for demonstrating compliance with the applicable exhaust and evaporative emission standards. The posting announced this intent via email to ARB's *fuels*, *ms-mailings*, *orrec*, *orspark*, and *recmarine* listserve listings, to all stakeholders, including environmental organizations, engine manufacturers, equipment manufacturers, and trade associations, as well as other interested parties. Later, staff decided to change the applicability of the proposal to only exhaust emission testing. Then on August 30, 2011, staff met, via a telephone conference call, with representatives of EMA and OPEI to discuss the latest proposal. Representatives of the OHRV and Rec Marine engine categories were also apprised during development of the proposal by telephone or email correspondence.

II. PROPOSED AMENDMENTS TO THE SMALL OFF-ROAD ENGINE TEST PROCEDURES

In general, staff proposes that 40 CFR, Parts 1054 and 1065 be adopted by reference and incorporation, with applicable modifications, into the SORE test procedures, effective for the 2013 and later model years. To this end, staff proposes to retire the existing test procedures and rename them the "...2005 - 2012 Test Procedures," and create replacement test procedures to be known collectively as the "...2013 and Later Test Procedures." In addition, staff proposes amending the corresponding citations of these test procedures that are contained in sections 2403 and 2407 of 13 CCR, to indicate these changes. The proposed alignment of the SORE test procedures does not affect the stringency of the current emission standards or test procedures.

A. Alignment with Part 1054

Part 1054, which is commonly referred to as the "standard-setting" part of the federal small nonroad engine category, also contains certification protocols, production-line testing requirements, credit-generation allowances, and other related provisions. However, California has its own unique versions of these emission standards and other provisions, which are already contained in 13 CCR, sections 2400 through 2409. Thus, in aligning with the federal Part 1054, staff is proposing adopting the entire Part 1054, but with modifications that then reference and include these California-specific sections from 13 CCR in place of the similar federal provisions. Accordingly, staff proposes that the current federal Part 1054, as of November 8, 2010, be adopted and incorporated with the appropriate modifications that include the California-specific emission standards, production-line testing requirements and credit-generation allowances.

The new test procedure will be titled the “California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines, Engine-Testing Procedures (Part 1054).

B. Alignment with Part 1065

The material contained in Part 1065 is complex and technical in nature. It involves specific information about “state-of-the-art” testing equipment, systems, and processes that are necessary for properly conducting the emission testing of the applicable engines in order to achieve the required accuracy while minimizing variability of the test data generated using the current test procedures specified in 40 CFR, Part 90.

California’s alignment with Part 1065 is appropriate because it will prevent a duplication of effort that would arise if manufacturers were required to conduct two separate emission test procedures (i.e., one federal procedure and another California procedure). Such a scenario is undesirable because of the extra costs that would be required in performing two separate test procedures. Further, the majority of manufacturers have already upgraded their own test equipment in order to be compliant with Part 1065 under current federal requirements. Alignment is also warranted due to the fact that the test equipment manufacturers intend to eventually cease to maintain existing older test equipment. Thus, failure to align with the current federal Part 1065 would mean that the use of the existing test procedures will become increasingly impractical, or even impossible over time, for manufacturers and independent testing facilities, including ARB.

Accordingly, staff proposes that the current federal Part 1065, as of June 28, 2011, be adopted into the SORE test procedures, which are incorporated by reference into 13 CCR, except for modifications as described below. The new test procedure will be titled the “California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines, Engine-Testing Procedures (Part 1065).

1. Allowance for Supplemental Engine Cooling

The federal version of Part 1065 includes section 1065.122, which allows supplemental cooling of an engine for simulating in-use conditions when conducting exhaust emission testing. However, staff believes that the current California allowance for supplemental cooling, as stated in sections 90.118(f) and 90.307, of the current SORE test procedures, is more representative of in-use conditions and its continued use will maintain the stringency of the current test procedures. Specifically, the current allowance requires manufacturers to justify the need and use of any auxiliary fans that would be used for providing supplemental cooling, as well as requiring that manufacturers also demonstrate that the supplemental cooling resulting from the use of these fans is representative of in-use engine operation. Accordingly, staff proposes adopting Part 1065, with modifications that add the current California requirements.

2. Measurement of PM Emissions from Two-Stroke Engines

Unlike U. S. EPA's small nonroad engine regulations, California's SORE emission standards include a PM emission standard for two-stroke engines. Thus, for this particular engine category, the PM emission measurement provisions contained in Part 1065 would be applicable to only California. Further, California has always allowed manufacturers the option of demonstrating compliance with this standard using the measured HC emissions as a surrogate in determining PM emission levels (see section 90.404 (e), of the current test procedures). Therefore, staff believes that continuing this option is reasonable because it provides manufacturers with flexibility in conducting the testing required for demonstrating emissions compliance, without affecting the stringency of the current PM emission standards. Accordingly, staff proposes that the language in section 1065.650(i) of Part 1065 be adopted and modified to retain this existing option.

3. Exhaust Emission Certification Test Fuel Requirements

The federal Part 1065 provides engine test fuel and lubricant information in subpart H. While staff is proposing adopting this subpart, certain changes are necessary in order to address specific California requirements. In particular, section 1065.701 needs to be modified to include the test fuels currently allowed to be used by California for SORE exhaust emission certification testing. Further, because staff is also proposing to align the off-road categories' certification exhaust emission test fuel requirement with the E10 gasoline certification test fuel that will be proposed in January 2012 for on-road motor vehicles, section 1065.701 needs to be modified to indicate this intent (see Section IV for more discussion on this E10 test fuel). This proposal will allow the use of an E10 test fuel as an option for conducting exhaust emission certification for the 2013 through 2018 model years. Use of the E10 test fuel will become mandatory beginning with the 2019 model year.

Staff is proposing that an existing option, in section 90.308(b)(1)(i)(B) of the SORE test procedures, which allows using an E10 test fuel provided the same fuel was approved for federal certification testing, be retired as part of the proposed retirement of the current SORE test procedures at the end of the 2012 model year. Retaining this option beyond the 2012 model year will become unnecessary for two reasons. First, the use of the on-road E10 certification test fuel as an off-road testing option for 2013 through 2018 model year certifications will make the current option unnecessary. Second, another E10 test fuel option is in the current federal provisions (i.e., Parts 1054.501(b)(2)(i) and 1054.501(b)(2)(iii)). Thus, the proposed alignment with Part 1054 effectively maintains this currently allowed test fuel option.

C. Alignment with Part 1068

Part 1068 establishes general compliance requirements. Much of the California SORE compliance requirements are currently addressed in 13 CCR. In addition, some portions of Part 1068 concern selective enforcement authority, imports, and bonds, none of which California has the authority to implement. Because most of the requirements that are found in Part 1068 are either addressed in the 13 CCR or California does not have the authority to implement the requirements, staff does not find it necessary to include Part 1068 in the alignment process.

III. PROPOSED AMENDMENTS TO THE TIER 4 OFF-ROAD COMPRESSION-IGNITION ENGINE TEST PROCEDURES

The staff recommends that the Board amend sections 2421, 2423, 2424, 2425, 2425.1, 2426, and 2427, title 13, CCR, as set forth in Appendix B: “Proposed Amendments to the California Regulations for 2011 and Later Off-Road Compression-Ignition Engines and Equipment” and Appendices K-M: “Proposed Amendments to the California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines and Equipment, Part I-D, Part I-E, and Part I-F” of this Staff Report. The proposed regulatory language is intended to further harmonize portions of ARB’s exhaust emission requirements for new off-road CI engines, as appropriate, with those of 40 CFR Parts 1039, 1065, and 1068, as most recently amended by U.S. EPA in the Federal Register (FR) on June 28, 2011 (76 FR 37977). Although the California and federal programs for CI engines will be similar upon adoption of this proposal, ARB will retain its authority to further regulate off-road mobile sources in the future and its ability to enforce the regulations in California.

In sum, the proposed amendments correct clerical errors, clarify existing requirements, standardize measurement specifications, calibrations, and instrumentation, and provide additional compliance flexibility options without sacrificing air quality benefits. The following subsections discuss the major provisions of the staff proposal in further detail. The critical amendments proposed are as follows:

A. Emission Standards

Staff proposes to align with the federal alternate combined oxides of nitrogen and non-methane hydrocarbons (ALT NO_x+NMHC) standards and the corresponding family emission limit (FEL) caps for tier 4 engines ranging from 56 kW through 560 kW. Staff is also proposing to correct clerical errors that unintentionally limited the years of applicability for several alternative FEL caps erroneously identified in the regulations and test procedures.

1. Tier 4 ALT NOx+NMHC standards and FEL Caps

Both ARB (ARB 2004) and U.S. EPA (U.S. EPA 2004) intended that the tier 4 regulation would allow engine manufacturers to continue producing a small number of tier 3 off-road CI engines using emission credits after the tier 4 standards began. The purpose of this allowance was to increase the cost-effectiveness of the regulation. However, the original U.S. EPA regulations and current California regulation inadvertently hinder manufacturers from using this certification allowance because the tier 4 averaging programs do not allow manufacturers to show compliance with the existing 0.19 g/kW-hr NMHC standard using credits. To fix this oversight, staff is proposing to amend the California regulations and test procedures by aligning with the revised U.S. EPA regulation, which allows manufacturers the option to use credits to show compliance with new ALT NOx+NMHC standards for engines ranging from 56 kW through 560 kW. The new ALT NOx+NMHC standards for each power category in this range would be equal to the numerical value of the applicable alternate oxides of nitrogen (ALT NOx) standard plus 0.10 g/kW-hr. Because the new combined ALT NOx+NMHC standards would be more stringent than the sum of the otherwise separately applicable ALT NOx and NMHC standards, a small environmental benefit is likely to occur when manufacturers choose to certify to the new ALT NOx+NMHC standards. However, engines certified to these ALT NOx+NMHC standards would themselves not be allowed to generate emission credits. Table R - II.A, in Appendix R, shows how the ALT NOx+NMHC standards would compare to other existing certification options.

The proposed FEL caps corresponding to the new ALT NOx+NMHC standards described above are shown in Table R - II.B, in Appendix R. FEL caps are the maximum emissions level to which an engine family may be certified using averaging, and are typically set at the previous tier emission standards, which in this case are the tier 3 NMHC+NOx standards for the power categories affected.

Table R - II.B, in Appendix R, also identifies proposed revisions to the dates of applicability for several of the existing FEL caps. These proposed changes are provided only to clarify the existing regulations and do not affect the stringency of existing requirements.

2. Alternative NOx FEL Cap Applicability

The proposed revision to the start dates for the ALT 20% NOx FEL caps are intended to correct an inconsistency between the provisions in section 1039.104 of the 2008 and Later Test Procedures and a table in the existing regulation (i.e., Table 2b). Specifically, section 1039.104(g)(1) states that the period of applicability for certifying engines to the ALT NOx FEL caps should extend over a four-year period, but the existing regulations inadvertently specify the period of applicability as either only one or two years for engines ranging in power from 56 kW through 560 kW, beginning at least two years after the commencement of the tier 4 interim standards. This exclusion of applicability during the initial years of tier 4 interim standards would have effectively

negated the allowance of any tier 3 engines to be averaged in compliance with the ALT NOx standards for the power categories affected. This is because the errors in Table 2b, of Part 1039.104, would have established a more stringent ALT NOx FEL Cap for engines certified to the ALT NOx standard at the onset of tier 4 interim implementation in 2011, then permit a less stringent ALT 20% NOx FEL Cap for engines that later certified to the ALT NOx standard, and then once again require a more stringent ALT NOx FEL Cap when tier 4 final standards became effective. This is clearly inconsistent with the intent of section 1039.104 to ease the transition to the final tier 4 standards.

This matter was addressed by ARB in the form of a Manufacturers' Advisory Correspondence (MAC) 2010-002, dated December 21, 2010 (MAC 2010-002). Staff's proposal would codify the provisions of that MAC and would address the duration of ALT 20% NOx FEL Caps for other affected power categories not covered by the MAC.

B. Enhanced Labeling Requirements

Staff is proposing that additional information, beyond that required by U.S. EPA, be included on off-road CI engine emission control labels to aid in the implementation, compliance, and enforcement of ARB's off-road diesel in-use regulations (e.g., TRU, Off-Road Fleets, Ports, etc.). These California-specific programs require fleets to comply with an averaged target emissions level based on the model year, the certification tier, and/or the power of the engines/equipment in the fleet. End users (i.e., fleet owners) are responsible for calculating their fleet averages and target emission levels per the provisions of the applicable in-use regulation.

However, current emission control labels for replacement engines are not required to include the certification power category or an explicit designation of the emissions tier to which the engine conforms. The lack of this information makes equipment registration, which is the responsibility of end-users, error prone, which in turn makes tracking off-road CI engine in-use fleet emissions by ARB staff more complicated. Enforcement efforts in the field can also be compromised as a result of insufficient information on the emission control label with which to confirm compliance. For example, a field inspector may have difficulty confirming that the power information submitted by an end-user, when registering an engine in one of ARB's in-use programs, is accurate unless the power information is readily available to the inspector (i.e., on the label) at the time of inspection. Without engine power being explicitly stated on the label, end-users would have to resort to some other possibly less-than-accurate means for determining engine power, perhaps even guessing at a value, when submitting this information during the registration process. Consequently, incorrect power submissions have the ability to significantly alter the calculation of emission targets and adversely affect the perceived emission benefits of the in-use requirement. Similarly, confirming that the correct emissions factors have been registered for an engine would be impossible without accurate model year or emissions tier information being readily available to the inspector.

To address these concerns, staff is proposing that, in addition to existing labeling requirements, all emission control labels for new and replacement off-road CI engines include the following information beginning January 1, 2013:

ENGINE POWER:	{insert the certified power of the specific engine configuration, if available, otherwise insert advertised power in kilowatts}
REFERENCE FAMILY NAME:	{insert the engine family name of the replacement engine as recorded in the Executive Order for the engine family to which the replacement engine was originally certified}
DATE OF MANUFACTURE:	{insert the engine build date}

Staff believes that these proposed amendments provide the correct balance between the optimal implementation and enforcement of ARB's in-use programs vs. the level of commitment that would be required of industry to comply with the amendments in the short-term.

C. Updated Test Procedures

Staff is proposing to amend the existing tier 4 off-road CI test procedures to incorporate additional California-appropriate revisions made by U.S. EPA since 2005. The existing 2008 and Later Test Procedures incorporate the majority of the sections contained in 40 CFR, Parts 1039, 1065, and 1068 related to off-road CI engines and equipment. Staff proposes to retire the existing test procedures and rename them the "...2008 - 2010 Test Procedures," and create replacement test procedures to be known collectively as the "...2011 and Later Test Procedures." The 2011 and Later Test Procedures will still contain the incorporated sections of 40 CFR, Parts 1039, 1065, and 1068, as revised by staff and included as appendices to this Staff Report, but instead of a single document containing all three parts, the 2011 and Later Test Procedures will be a collection of three separate documents. Having three separate documents makes it easier to make any future amendments to each individual test procedure, as necessary.

1. Part 1039

Part 1039 was originally adopted by the Board in 2004 as part of the "California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-C." Staff is proposing to update this portion of the existing California test procedures with California-appropriate modifications of the latest revision of 40 CFR Part 1039, rather than to incorporate the latest revision of the federal regulation in its entirety into a new document. The new test procedure will be titled the

“California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression Ignition Engines, Part I-D.” The key alignments of off-road CI being proposed to Part 1039, many of which parallel similar changes for SORE as described in Section II above, are:

- The adoption of a new tier 4 interim NO_x+NMHC standard for engines ranging in power from 56 kW through 560 kW – section 1039.102(e)(3)
- Correction of clerical errors that unintentionally limited the dates of applicability for several ALT NO_x FEL Caps – section 1039.104
- Modification of the criterion for selecting engine families regarding engine cylinder arrangement – section 1039.230(b)(7)
- Removal of unnecessary and/or redundant labeling and notification instructions regarding the equipment manufacturer flexibility program – section 1039.625
- Correction of clerical errors that inadvertently elevated the minimum standard for equipment flexibility engines beyond that originally intended – section 1039.625(e)(3)
- Clarification regarding the rounding of Averaging, Banking, and Trading (ABT) credits – section 1039.705(b)

2. Part 1065

The Board originally adopted the sections of Part 1065 relevant to off-road CI engines in 2004 as part of the “California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off Road Compression-Ignition Engines, Part I-C.” So much has changed regarding emission measurement technologies and techniques since ARB adopted Part 1065 in 2004, as evidenced by the sheer number of amendments to the federal requirements. Accordingly, staff is proposing to incorporate the latest revision of 40 CFR, Part 1065, with staff’s California-specific revisions, as a new test procedure document to be titled “California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off Road Compression Ignition Engines, Part I-E,” rather than updating this portion of the existing California test procedures. Noteworthy among the changes to the test procedures are provisions for using and calculating an optional declared speed value in section 1065.510(f)(3)(i), and for the standardization of calculating exhaust restriction setpoints in section 1065.130(h).

3. Part 1068

The portion of Part 1039 pertaining to off-road CI engines was originally adopted by the Board in 2004 as part of the “California Exhaust Emission Standards and Test Procedures for New 2008 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-C.” Staff is proposing to update this portion of the existing California test procedures with California-appropriate modifications from the latest revision of 40 CFR, Part 1068 rather than to incorporate the latest revision of the federal regulation in its entirety into a new document. The new test procedure will be titled the “California

Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression Ignition Engines, Part I-E.” The key provisions being proposed are:

- Allowance for distributors to replace incorrect labels prior to sale of the engine to an ultimate purchaser – section 1068.101(b)(7)(i)(D)
- Incorporation of provisions related to the duration and applicability of Executive Orders – section 1068.103(c)
- Incorporation and clarification of anti-stockpiling provisions – section 1068.103/105
- Revisions to the label content for replacement engines – section 1068.240
- Clarification of the provisions for shipping engines independently of required aftertreatment and for delegated final assembly – section 1068.260/261
- Clarification that defect reporting applies only to regulated pollutants and revision of thresholds for filing reports – section 1068.501
- Incorporation of the federal definition for “Date of Manufacture” – section 1068.801

D. Stockpiling Prohibitions

Staff proposes to align with recently added federal provisions in 40 CFR, section 1068.103, and amendments to section 1068.105, concerning the intentional over-production (i.e., stockpiling) of engines prior to a year in which a change in the standards occurs. The proposed language makes clear that manufacturers cannot deviate from normal production and inventory practices to circumvent the regulations. A new section 2423(m), in 13 CCR, is proposed for inclusion in the California regulations.

E. Other Proposed Amendments

In addition to the above proposed amendments, staff is proposing several key terms for either incorporation or modification into the regulations and test procedures, including: a new standardized abbreviation method, as an aid to readers, for readily identifying references to the test procedures; aligning with the federal definition of “constant speed engine/operation” to more accurately describe the normal operation of a constant speed engine; aligning with the federal definition of “date of manufacture” to standardize the assignment of engine build dates; and, aligning with the federal definition of “carryover” to ensure uniform criteria for the application of data from previous model-year engine families. More detailed descriptions of these proposed key term definitions are in Appendix R.

Lastly, staff proposes other miscellaneous amendments, including: amending section 2426(a), in 13 CCR, to extend the requirement for manufacturers to include a copy of the California Emission Control Warranty Statement to all off-road CI engines;

harmonizing with the federal provisions for extending some limited-scope inspection authorization applicability of certain test procedure provisions to equipment manufacturers in California; and, for fixing grammatical and formatting errors recently discovered throughout the regulation and test procedures.

F. Differences Between California and Federal Regulations

Staff has endeavored to harmonize California's off-road CI proposal with the provisions of 40 CFR, Parts 1039, 1065, 1068, and incorporated parts. However, staff's proposal differs from the federal program in some relatively minor, but important ways that are necessary to support California's unique air quality programs. These differences are primarily documentary in nature and do not present any technical obstacles for the off-road industry to overcome. These major new differences between ARB off-road and U.S. EPA nonroad CI programs are: replacement engine labeling requirements, preliminary certification approvals, untracked replacement engine provisions, partially completed engine requirements, and definition of an engine. Existing differences from the tier 4 2004 rulemaking which have been retained are: flexibility engine labeling provisions, flexibility engine Executive Orders, rebuild labeling prohibition and supplemental label requirements, extension of replacement engine reporting requirements, and in-use compliance/recall program provisions. More detailed descriptions of these differences are in Appendix R.

The differing state regulations are authorized by the Authorities cited in Appendix B of this Staff Report. The proposed amendments are intended to minimize costs of separate state and federal regulations. Although there are no net aggregate costs associated with staff's proposal, any remaining individual cost differential is essential for effective enforcement to ensure emissions reductions in California benefiting human health, public welfare, and the environment.

IV. PROPOSED AMENDMENTS TO THE OFF-ROAD EXHAUST EMISSION CERTIFICATION TEST FUEL

Staff is proposing to align the exhaust emission certification test fuel for off-road spark-ignition, gasoline-fueled engines with the E10 gasoline specifications that are planned for proposal in December 2011 for approval in January 2012 for on-road motor vehicle certification emission testing under the third rulemaking phase of California's LEV standards. Specifically, the new E10 test fuel would be required for exhaust emission certification testing of new gasoline-fueled, LSI, SORE, OHRV, and Rec Marine off-road categories. Staff is proposing that the use of E10 gasoline be made an option for exhaust emission testing for the 2013 through 2018 model years. Under a similar mandatory implementation schedule expected to be proposed for on-road motor vehicles, use of the E10 test fuel would become mandatory for exhaust emission testing of these off-road categories beginning with the 2019 model year. At this time, staff is proposing that this amendment apply to only the off-road exhaust emission certification

test fuel. Amendments for changing the evaporative emission certification test fuel to an E10 fuel would be best handled separately under future rulemakings that can specifically focus on those particular emission characteristics with respect to each off-road category.

This proposed test fuel change is appropriate because doing so maintains the current test fuel consistency between on-road motor vehicles and most of the off-road categories (OHRVs are the exception because they currently certify using only federal gasolines test fuels). The proposed change is also appropriate because it establishes a complete consistency between the off-road categories' certification and commercially available fuels. Specifically, except for OHRVs, the off-road categories' certification and commercially available fuels have been consistent with respect to using CaRFG2 beginning with the SORE category in 1995. However, that consistency was upset on December 31, 2003, when the MTBE oxygenate in California's commercially available gasoline was replaced with another oxygenate having a 5.7-percent ethanol blend. Although both fuels have similar oxygenating characteristics, this replacement introduced an inconsistency between the particular oxygenate specifications of the required certification test fuel (i.e., CaRFG2 with MTBE) and the commercially available fuel (i.e., CaRFG3 with ethanol). Further, this proposed test fuel amendment is appropriate because the 2007 CaRFG3 amendments essentially required that the only commercially available gasoline allowed to be produced and dispensed in California on and after December 31, 2009 must have 10-percent ethanol as the oxygenate. Accordingly, all new off-road, spark-ignition engines sold and operated in California since that time have been designed to be emissions compliant when they are certified with either a lower oxygenated MTBE CaRFG2 or a non-oxygenated federal test fuel, yet they operate in-use with a higher oxygenated CaRFG3. In addition, since December 31, 2009, all new engines used by OHRVs have been designed to be emissions compliant when they are certified with a non-oxygenated federal gasoline, yet also operate in-use with an oxygenated CaRFG3.

Staff believes that the emissions increase/decrease differences exhibited by engines when switching from an E6 to an E10 test fuel (or a non-oxygenated fuel to an E10 test fuel, in the specific case of OHRVs), particularly engines with open-loop systems, could be reduced to zero by making the proper adjustments to the engines' fuel metering systems. Consequently, with such proper adjustments, an E10 gasoline could now be used as a certification test fuel, without affecting the stringency of the existing exhaust emission standards. This is because these adjustments would allow the engines' fuel metering systems to be fully optimized for emissions compliance both when certifying and when operating in-use on only an E10 type of gasoline. In addition, certain adjustments to off-set the increase in the E10 gasoline's emissions due to increased oxygenation could also be advantageous, and therefore, likely to be employed. Such adjustments might improve engine durability by providing additional engine cooling as a byproduct of any extra fuel metering.

Therefore, because the proposed amendment both maintains the general current test fuel consistency between on-road motor vehicles and most of the off-road categories

and establishes a complete consistency between the off-road categories' certification and commercially available fuels, staff proposes that the appropriate sections of the LSI engine, SORE, OHRV, and Rec Marine engine test procedures be amended to require using the E10 certification test fuel that is specified in the "California Exhaust Emission Standards and Test Procedures for 2015 and Subsequent Model Passenger Cars, Light Duty Trucks, and Medium Duty Vehicles," which are planned for proposal in December 2011 for approval in January 2012, for off-road spark-ignition engine certification exhaust emission testing. This new test fuel would be allowed as an option, for the 2013 through 2018 model years, to the test fuels that are currently allowed. Staff is proposing this option, and over this range of model years, because it affords manufacturers ample flexibility in deciding when to switch over to certifying engines using an E10 test fuel, based on their own requirements. In 2019 and later model years, using the E10 fuel would become mandatory as the sole exhaust emission certification test fuel. Staff also proposes that the applicable sections in 13 CCR for these off-road engine categories be amended to reference and incorporate the revised on-road motor vehicle test procedures. In addition, the test fuel requirements under the in-use compliance requirements for retrofits for controlling emissions from off-road LSI engines, contained in 13 CCR sections 2783(d) and 2784(c), should be modified to optionally allow this E10 certification test fuel for engines tested during the 2013 through 2018 calendar years, and requiring this E10 test fuel for such engines tested during 2019 and later calendar years.

In the event that sometime in the future, U.S. EPA adopts a greater-than-ten-percent ethanol-blend certification test fuel, ARB and U.S. EPA would likely join in a technical evaluation, analysis, and review process to seek to establish an equivalency factor between their respective ethanol test fuels prior to the required mandatory use of the fuels (i.e., an off-road category "reciprocity" agreement).

V. ENVIRONMENTAL IMPACTS ANALYSIS

A. Background on Environmental Review Process

ARB is the lead agency for the proposed regulation and has prepared this environmental analysis pursuant to its certified regulatory program. The California Environmental Quality Act (CEQA) at Public Resources Code section 21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report or negative declaration once the Secretary of the Resources Agency has certified the regulatory program. ARB's regulatory program has been certified by the Secretary of the Resources Agency.⁵ As required by ARB's certified regulatory program, and the policy and substantive requirements of the California Environmental Quality Act (CEQA), ARB has prepared this environmental analysis to assess the potential for significant long or short term adverse environmental

⁵ State CEQA Guidelines section 15251 (d); CCR, title 17, sections 60005-60008.)

impacts associated with the proposed action and a succinct analysis of those impacts.⁶ In accordance with ARB's regulations, the assessment also describes any beneficial impacts.⁷ The resource areas from the state CEQA Guidelines environmental checklist were used as a framework for assessing potentially significant impacts.⁸ In accordance with ARB's certified regulatory program, for proposed regulations the environmental analysis is included in this Staff Report: Initial Statement of Reasons (ISOR) for the proposed regulatory action.⁹

If comments ARB receives during the public review period raise significant environmental issues, staff will summarize and respond to the comments in writing. The written responses will be included in the Final Statement of Reasons (FSOR) for the regulation. In accordance with ARB certified regulatory program, prior to taking final action on the proposed regulation, the decision maker will approve the written responses.¹⁰ If the regulation is adopted, a Notice of Decision will be posted on ARB's website and filed with the Secretary of the Natural Resources Agency for public inspection.¹¹

B. Impacts Analysis

Based on ARB's review of the proposed regulatory action, staff has concluded that the amendments to the SORE, tier 4 off-road CI engine, and off-road spark-ignition engine regulations and test procedures (including the certification test fuel changes), would not have a significant adverse effect on the environment. No discussion of alternatives or mitigation measures is necessary because there are no significant adverse environmental impacts identified. The basis for this conclusion is provided below.

1. Potential Air Quality Benefits

The proposed amendments to the SORE, tier 4 off-road CI engine, and off-road spark-ignition engine regulations and test procedures do not affect the stringency of the current emission standards or the effectiveness of the test procedures. Accordingly, there are no quantifiable air quality benefits due to the proposed amendments. While all test procedures are designed to ensure that engines produced for sale in California meet California's emissions standards, the test procedures themselves, typically and here, do not generate additional emission reductions but rather seek to ensure reductions occur as planned.

⁶ CCR section 60005, subd (b).

⁷ CCR 60005, subd. (d).

⁸ State CEQA Guidelines, Appendix G.

⁹ CCR section 60005.

¹⁰ CCR 60007, subd (a).

¹¹ CCR 60007, subd. (b).

2. Other Potential Impacts

These proposed actions [e.g. aligning test procedures] do not change the stringency of the current emission standards or any impacts from conducting engine testing under the current test procedures and will not cause any change in compliance responses by the affected manufacturers. Because nothing in the amended test procedures can conceivably cause a change to the types, attributes, or number of engines they produce, no potential adverse impacts are at issue as explained below.

The proposed amendments will modify both the California SORE and tier 4 off-road CI engine regulations and test procedures, contained in title 13, CCR, to enhance the alignment with the current federal versions of these regulations and test procedures contained in title 40, CFR. The proposed amendments for alignment do not affect the stringency of the current emission standards or effectiveness of the test procedures. For the most part, the proposed amendments are relatively minor and improve the efficiency of the emission certification process, but a few are necessary to avoid imposing unreasonable compliance cost burdens on manufacturers, such as requiring duplicate California vs. federal emission certification testing and separate production of California vs. 49-state engines. In addition, some of proposed amendments to the tier 4 off-road CI engine labeling regulations expand upon the corresponding federal provisions in order to facilitate implementation and enforcement of the various ARB in-use fleet programs, and thereby ensure their expected emission benefits.

The proposed amendments to the regulations and test procedures, in 13 CCR, for California's off-road spark-ignition engine categories (i.e., SORE, LSI engines, Rec Marine engines, and OHRV) are for performing exhaust emission testing using the same 10-percent ethanol certification test fuel that ARB plans to adopt for on-road motor vehicle certification emission testing. The intent of this proposal is to maintain the current consistency between California's on- and off-road categories' certification test fuels and the commercial gasoline sold in California. It does not affect the stringency of the current off-road categories' exhaust emission standards or the likelihood that a given engine family is meeting those standards.

Furthermore, the proposed amendments to the SORE, tier 4 off-road CI engine, and off-road spark-ignition engine regulations and test procedures do not require or result in any new development or require modifications to buildings or other structures, affect operations at existing facilities, or cause any new land use designation. Therefore, the proposed amendments are not expected to result in any adverse impacts that would result from development including aesthetics, air quality, agricultural and forestry resources, biological resources, cultural resources, geology and soils, greenhouse gases, land use planning, mineral resources, population and housing, public services, recreation, or traffic and transportation. Further, the proposed amendments to the SORE, tier 4 off-road CI engine, and off-road spark-ignition engine regulations and test procedures do not involve any activity that would involve or affect hazardous material, hydrology and water quality, noise, or population and housing. This is because these

regulations and test procedures are already in existence and are an on-going part of the applicable certification process for the related engines and the proposed amendments do not mandate any action that could affect these resources.

C. Environmental Justice

The objectives of ARB's statewide regulatory programs are better air quality and reduced health risk for all residents throughout California. The Board has a policy that community health and environmental justice concerns be addressed in all of ARB's regulatory programs. This is consistent with the ARB's environmental justice policy of reducing exposure to air pollutants and reducing the adverse impacts from toxic air contaminants in all communities, including low-income and minority communities.

State law defines environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Senate Bill 115, Solis; Stats 1999, Ch. 690; Government Code section 65040.12(c)). The Board has established a framework for incorporating environmental justice into the ARB's programs consistent with the directives of State law. The policies developed 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, which sometimes experience higher exposures to some pollutants as a result of the cumulative impacts of air pollution from multiple mobile, commercial, industrial, area wide, and other sources. For over twenty-five years, ARB, local air districts, and federal air pollution control programs have made substantial progress towards improving the 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.

This proposal does not make changes to the stringency of the current exhaust emission standards so there is no emissions impact associated with the amendments. Thus, it is consistent with the ARB's environmental justice policy of reducing exposure to air pollutants and reducing the adverse impacts from toxic air contaminants in all communities, including low-income and minority communities. However, California will continue to evaluate improving technologies and will review the off-road emission standards as additional relevant scientific evidence becomes available to make certain that the health of the public is protected with an adequate margin of safety.

To ensure that everyone has an opportunity to stay informed and participate fully in the development of the proposal, staff has distributed information through the internet, as described in section I.D. of this report.

VI. ECONOMIC IMPACT

A. Legal Requirement

Section 11346.3 of the Government Code requires State agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulations. The assessment shall include a consideration of the impact of the proposed regulations on California jobs, business expansion, elimination or creation, and the ability of California business to compete.

Also, section 11346.5 of the Government Code requires State agencies to estimate the cost or savings to any state, local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate shall include any non-discretionary cost or savings to local agencies and the cost or savings in federal funding to the state.

B. Effect of Amendments to the Regulations and Test Procedures

1. Cost and Cost-Effectiveness

The proposed amendments to both the SORE and tier 4 off-road CI engine regulations and test procedures, incorporated by reference, would not increase the cost of complying with the current regulations. In fact, the modifications in this proposal are expected to avoid extra cost burdens, mainly by avoiding duplicative emission testing requirements and by standardizing test equipment measurement specifications, calibrations, and instrumentation. The proposed changes to the off-road exhaust emission certification test fuel would not increase the cost of compliance with the current regulations because manufacturers already need to procure certification test fuels in order to conduct certification.

2. Economic Impact on the Economy of the State

The proposed amendments to both the SORE and tier 4 off-road CI engine regulations are not expected to impose a cost burden to engine or equipment manufacturers. As noted in Sections II-IV of this Staff Report, the amendments would not increase the compliance cost burden on the applicable manufacturers. Based on the above assumptions, staff expects the proposed regulations to impose no adverse impact on California competitiveness and employment. In addition, staff expects that the proposed E10 test fuel amendment will not impose any adverse impact on California competitiveness and employment. The following subsections are intended to fulfill ARB's legal requirements related to economic analysis and economic impact for stakeholders affected by these proposed regulations.

a) Businesses Affected

The proposed amendments are not expected to impose any additional cost burden to off-road engine or equipment manufacturers because these amendments, in the aggregate, would reduce manufacturers' certification-related testing and compliance burdens by avoiding duplicate State vs. Federal certification testing and the production of 49-state engine families. In addition, any businesses that buy and sell test equipment, such as analyzers used in emission testing, as well as businesses that perform certification emission tests for applicable engine and equipment manufacturers would not be impacted by the proposed amendments because any required test equipment upgrades have already occurred as a result of complying with current federal requirements. Finally, the proposed amendments to the exhaust emission certification test fuel would not affect any independent emission testing facilities because there is not any expected cost differential between the proposed and existing test fuels. Accordingly, there is not any expectation that the proposed amendments will cause any creation or loss of business and cause any creation or elimination of jobs.

b) Engine Manufacturers

(1) Small Off-Road Engines

There are currently 59 SORE manufacturers that market certified engines in California. None of the manufacturers is located in California although some have small repair and distribution operations in California. Some manufacturers of the evaporative emission components are located in California, but these would not be affected by the proposed amendments because the amendments do not apply to either the evaporative emission regulations or test procedures.

(2) Tier 4 Off-Road Compression-Ignition Engines

On a nationwide basis, there are approximately 600 off-road CI equipment manufacturers, and 50 off-road CI engine manufacturers, based on a U.S. EPA estimate. These manufacturers would not be affected by the proposed amendments because these amendments do not affect the stringency of the current emission standards, but rather would, in the aggregate, reduce manufacturers' certification-related testing and compliance burdens. Thus, there would not be any increases in the cost of compliance for these manufacturers. Businesses that operate or service diesel engines would not be affected by the proposal because the proposal is related to test procedures for demonstrating emission compliance of new engines.

c) Impact on Small Businesses

The concerns of small businesses are the same concerns that exist for large businesses. As discussed above, the proposed amendments are not expected to

impose any additional cost burden. Accordingly, there is not any expectation that the proposed amendments will cause any creation or loss of business and cause any creation or elimination of jobs

d) Potential Impact on Distributors and Dealers

The proposed amendments are not expected to impose any cost impacts on distributors or dealers.

e) Potential Impact on Business Competitiveness

The proposed amendments would have no impact on the ability of California engine and equipment manufacturers to compete with manufacturers of similar products in other states. This is because all manufacturers that produce these engines and equipment for sale in California are subject to the proposed amendments regardless of their location. Furthermore, all of the engine manufacturers, and most of the equipment manufacturers, are located outside of California.

f) Potential Impact on Employment

The proposed amendments to both the SORE and tier 4 off-road CI engine regulations, as well as the proposed E10 test fuel amendments, are not expected to cause a reduction in California employment because, as previously noted, there is no expected economic impact of the proposal.

VII. ALTERNATIVES CONSIDERED

A. Alternatives Considered to the Proposed Amendments

Staff evaluated the four alternatives listed below as substitutes to the amendments that are proposed for both the SORE and tier 4 off-road CI engine regulations, as well as the “No Action” alternative for the proposed E10 test fuel amendment. These included:

- Take “No Action”
- Harmonize Completely with the Federal Regulations
- Prospective Incorporation of Federal Regulations by Reference
- Harmonize Through Executive Officer Discretion

These alternatives are discussed below.

No Action

The first alternative evaluated was to take no action to modify either of the existing California SORE or tier 4 off-road CI engine regulations and test procedures. The existing regulations and test procedures for both categories now differ significantly in several key areas from the current federal requirements for nonroad engines. Consequently, many of the engine and equipment manufacturers would be required to perform two different exhaust emission tests during the certification process or perform extra tests to prove the equivalency of the emission tests. Such separate testing is expensive and would unnecessarily increase the costs of compliance to the manufacturer, which would be passed down to the consumer, without any resulting emission benefit. Another consideration, with respect to the SORE test procedures, is that test equipment manufacturers have indicated their intent to phase-out support of test equipment specified by the current test procedures. Thus, continued use of these test procedures would become impractical due to the eventual breakdown and unavailability of the test equipment. Additionally, with respect to the tier 4 CI engine regulations, the federal provisions contain additional compliance flexibility options lacking in the California regulation (i.e., a new HC+NO_x standard and longer FEL durations) that could result in certain product lines no longer being made available in California. With regard to the proposed E10 test fuel amendment, a “No Action” alternative is not practical because it would create an inconsistency with the on-road motor vehicle test fuel that is scheduled to be proposed in January 2012, as well as maintain the current inconsistency between the off-road categories’ test fuel and commercially available fuel. Therefore, staff rejected this alternative as both impractical and substantially more costly.

Harmonize Completely with U.S. EPA’s Regulations

Another alternative would be to adopt completely the U.S. EPA’s Parts 1054 and 1065, in the case of the SORE category, and Parts 1039, 1065, and 1068, in the case of the tier 4 off-road CI engine category.

A complete adoption of the federal regulations and test procedures differs from the proposal in that it creates a complete alignment while the proposal creates a less-than-complete alignment in order to preserve current California-specific provisions. This less-than-complete alignment is necessary because California has unique needs in controlling the off-road categories’ emissions and has established provisions in response to those needs that are not reflected in the federal provisions. For example, the tier 4 off-road CI engine regulations differ from federal provisions in the flexibility engine Executive Order and labeling requirements, engine replacement reporting and labeling requirements, and in-use compliance and engine recall programs, because these California-specific provisions better support California’s emission reduction objectives. In addition, California’s current SORE regulations and test procedures include provisions for two-stroke PM emissions and more representative supplemental engine cooling. Thus, a complete adoption of the federal regulations and test

procedures would eliminate these provisions and likely compromise the level of stringency of the emission standards that is required by California in order to achieve the expected level of future emission reductions. Accordingly, staff rejected this alternative.

Prospective Incorporation of Federal Regulations by Reference

This alternative would allow ARB to dynamically incorporate federal regulations by reference, in part or as a whole, into California law without a date of publication. The benefits of such an alternative would be to ensure full regulatory harmonization with U.S. EPA revisions now and in the future, and to minimize the staff resources required in developing an alignment rulemaking in response to any future federal regulatory amendments. The downside of this alternative is that it would limit ARB's ability to independently implement or enforce its regulations should U.S. EPA make a change that is not in California's best interests. Also, title 1, CCR, section 20(c)(3), generally prohibits the incorporation by reference of material into California regulations without a date of publication or issuance. Therefore, staff rejected this alternative.

Harmonization Through Executive Officer Discretion

This alternative would allow ARB's Executive Officer to approve requests, from off-road engine/equipment manufacturers and on a case-by-case basis, for permission to comply with specific federal provisions instead of provisions required by California regulations. This would give ARB the ability to harmonize with any federal requirements with which it agreed, providing timely relief to the off-road industry when necessary. Any changes allowed by the Executive Officer would then be formally codified into the applicable regulations at a future, more convenient date. While this option does have merits, such as the ability to address compliance issues more efficiently, less Board time devoted to harmonization issues, and more staff time and resources to devote to other projects, it is generally necessary that such changes undergo a public process with the opportunity for affected stakeholders to provide comment, and the Board to review and render judgment. Therefore, staff rejected this alternative.

B. Issues of Controversy

Industry initiated the request for ARB to harmonize its regulations and test procedures with the applicable federal provisions. During the development of the proposed amendments, staff worked collaboratively with manufacturers in addressing their request, while always emphasizing that harmonizing completely in every instance was not possible because of the need to preserve the integrity of existing California-specific measures. Manufacturers both recognized and understood this condition. Accordingly, staff is not proposing complete harmonization because staff believes that the proposed amendments to the SORE and tier 4 off-road CI engine regulations and test procedures preserve the expected emission benefits and, thereby, the best interests of California.

C. Summary of Alternatives Evaluated

After carefully considering the remaining issues and the suggested alternatives, staff believes its proposal is the best option.

D. Conclusions and Recommendations

In developing the proposed regulations, staff's goal has been to preserve the current stringency of the emission standards and effectiveness of the associated test procedures in order to continue achieving the greatest possible emissions reductions in a technologically feasible and cost-effective manner. Meeting the requirements of the current emission standards continues to be achievable using existing technologies and manufacturing processes. The proposed amendments are not expected to add to previously estimated costs, and may reduce compliance costs associated with the existing provisions.

No alternatives considered would be more effective in achieving the purpose for which the regulations are proposed or would be as effective as or less burdensome to affected private persons than the proposed regulations.

Staff recommends that the Board adopt this proposal.

VIII. REFERENCES

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