

**CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY**

**AIR RESOURCES BOARD**

**STAFF REPORT: INITIAL STATEMENT OF REASONS**

**PROPOSED REGULATIONS AND CERTIFICATION PROCEDURES FOR  
LIGHT-DUTY ENGINE PACKAGES FOR USE IN LIGHT-DUTY SPECIALLY  
CONSTRUCTED VEHICLES FOR 2012 AND SUBSEQUENT MODEL YEARS**



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## EXECUTIVE SUMMARY

The California Air Resources Board (ARB or the Board) staff is proposing optional certification regulations and procedures for new light-duty engines for use in specially constructed vehicles (SPCNSs, such as kit cars). The proposed regulations and procedures would create a path for manufacturers to certify engine packages, that when placed into an SPCNS, would meet new vehicle emission standards, and enable the vehicle to meet Smog Check requirements.

The proposed regulations and procedures would not impose any new mandated requirements on engine manufacturers or hobbyists. Certifying engine packages via the new regulations and procedures would be optional for engine manufacturers, and provide hobbyists an alternative to choose certified low emitting engine packages.

SPCNSs are an integral part of California's car culture. Kit car hobbyists often use uncontrolled crate engines, and register their vehicles by utilizing a provision in the California Health and Safety Code, section 44017.4 (enacted by Senate Bill 100 (SB 100), Johannessen), which allows a hobbyist to choose the model year for their vehicle and thereby exempt their vehicle from Smog Check requirements. Staff believes the proposed certification regulations and procedures would help give hobbyists a low emitting option when choosing an engine for their SPCNS. Staff's proposal will not affect the current registration process for SPCNSs, nor change the 500 vehicle limit or model year assignment process allowed under SB 100. Staff's proposal will, however, allow SPCNS registered after the 500 vehicle limit is exceeded to be legally registered and biennially Smog certified.

The proposed certification regulations and procedures would require certified engine packages to meet current Low Emission Vehicle (LEV II) exhaust and evaporative standards. To receive certification, manufacturers would be required to demonstrate emissions compliance on a worst-case vehicle. The engine package would be required to come with an engine and controller, including software and calibration to ensure the certified engine package remains as low-emitting as possible. Additionally, the package would be required to come with exhaust and evaporative emission components such as intake and exhaust manifolds, engine controller, catalytic converter, an evaporative canister and detailed instructions for the proper installation of the package.

Staff is also proposing to create a system of checks and balances for shops that aid hobbyists in installing these certified engine packages into their vehicles. Hobbyists would not be required to have an installer install their engines. However, if a hobbyist were to choose that route, the installer would be required to warrant the engine's proper installation, and maintain a paper trail on each vehicle.

The proposed optional certification regulations and procedures will likely result in criteria pollutant benefits in California. According to Bureau of Auto Repair (BAR) Smog Check data, on a per mile basis, SPCNSs today can pollute on average 30 times more (oxides of nitrogen and hydrocarbons) than a vehicle meeting current vehicle emission standards. If more kit car hobbyists begin to choose low-emitting certified engine packages as a result of this rulemaking, this could significantly lower SPCNS emissions, on a per mile basis, in the future.

In developing the proposed certification regulations and procedures, staff held two public workshops (May and July, 2011) and worked closely with stakeholders, including General Motors, Specialty Equipment Manufacturers Association (SEMA), Ford, BAR, Department of Motor Vehicles (DMV), the California Highway Patrol (CHP), and various car clubs and their members.

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## Acronyms

ARB	Air Resources Board
ASM	Acceleration Simulation Model
BAR	Bureau of Automotive Repair
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CHP	California Highway Patrol
CO	Carbon Monoxide
DMV	Department of Motor Vehicles
E-ROD	Emissions-compliant hot rod
ECM	Engine Control Module
EGR	Exhaust Gas Recirculation
EMFAC	Emissions Factor – ARB’s emissions model
EO	Executive Order
GVWR	Gross Vehicle Weight Ratio
HC	Hydrocarbons
LEV II	Low Emission Vehicle program (as adopted in 1998)
MIL	Malfunction Indicator Light
N/V	Engine Speed to Vehicle Speed Ratio
NOx	Oxides of Nitrogen
OBD II	On-Board Diagnostics (as adopted in 1996)
ORVR	On-Board Vapor Recovery
PCV	Purge Control Valve
REG 256:	Statement of Facts Application (provided by DMV at the following link: <a href="http://dmv.ca.gov/forms/reg/reg256.pdf">http://dmv.ca.gov/forms/reg/reg256.pdf</a> )
REG 343	Title of Registration Application (provided by DMV at the following link: <a href="http://dmv.ca.gov/forms/reg/reg343.pdf">http://dmv.ca.gov/forms/reg/reg343.pdf</a> )
REG 5036	Statement of Construction Application (provided by DMV at the following link: <a href="http://dmv.ca.gov/forms/reg/reg5036.pdf">http://dmv.ca.gov/forms/reg/reg5036.pdf</a> )
SAE	Society of Automotive Engineers
SB	Senate Bill
SEMA	Specialty Equipment Market Association
SPCNS	Specially Constructed Vehicle
U.S. EPA	United States Environmental Protection Agency
VECI	Vehicle Emission Control Identification
VIN	Vehicle Identification Number

## **I. INTRODUCTION**

This Staff Report: Initial Statement of Reasons for Proposed Rulemaking (Staff Report) provides the basis for the California Air Resources Board (ARB or the Board) staff's proposal to adopt certification requirements for new light-duty vehicle engines for use in specially constructed vehicles (SPCNSs).

ARB currently certifies engines for medium-duty, heavy-duty, motorcycle, and off-road applications. Other than through aftermarket parts exemptions for replacement engines, there is current no certification process for new light-duty engines. Instead, ARB evaluates entire light-duty vehicles for certification. A popular application for light-duty engines (often called crate engines) is in SPCNSs, which include kit cars.

Creating an optional certification path for low-emitting engine packages for use in SPCNSs could result in emission benefits compared to existing SPCNS practices. Creating such a certification path would enable vehicle manufacturers to use an engine from a currently certified vehicle to create a low-emitting engine package for use in SPCNSs, as well as open the possibility for manufacturers to develop engines specifically for SPCNSs.

## **II. BACKGROUND**

According to the California Vehicle Code 580 definition, an SPCNS is a vehicle built for private use, not for resale, and not constructed by a licensed manufacturer or remanufacturer. An SPCNS may be built from (1) a kit; (2) new or used, or a combination of new and used, parts; or (3) a vehicle reported for dismantling, as required by Vehicle Code Section 5500 or 11520, which when reconstructed does not resemble the original make of the vehicle dismantled. An SPCNS is not a vehicle that has been repaired or restored to its original design by replacing parts. An example of an SPCNS is a Factory Five manufactured Ford Shelby Cobra Replica. SPCNSs do not include restorations of actual vintage vehicles, such as an old vehicle rebuilt to its former specifications.

Traditionally, SPCNSs have been a hobby-driven market. Hobbyists who build SPCNSs have passion for their vehicles, and consider the cars they build an art form. There are thousands of SPCNSs registered in California, with many more being built in garages and shops, and they are an integral part of California's car culture.

Because many hobbyists building SPCNSs desire to replicate older vehicles, they may use actual uncontrolled engines removed from old vehicles or new uncontrolled crate

engines intended to be similar to those from older vehicles. In addition, hobbyists also use new uncontrolled crate engines as the powerplant in their SPCNSs for improved performance and reliability over older, used engines. Therefore, SPCNSs are often considered uncontrolled emissions vehicles, or uncontrolled vehicles. An uncontrolled vehicle is a vehicle manufactured before emission control regulations took effect. An uncontrolled vehicle can emit up to 200 times more emissions than a vehicle meeting current emission standards.

Health and Safety Code, section 43102, states all new vehicles must meet emission standards. Vehicle Code, section 4000, requires all vehicles to be registered in California. New SPCNSs present numerous unique issues regarding both of the aforementioned requirements. The following sections describe the unique nature of SPCNSs related to these two requirements.

#### **A. Emission Certification for Light-Duty Vehicles**

In order for any new vehicle to be sold in California, the vehicle must first be certified to ARB's current emission standards.<sup>1</sup> Certification for light-duty vehicles is granted annually to individual engine families and is good for one model year. Light-duty vehicle emission certification is based on the entire vehicle's emissions, including evaporative emissions, not just the vehicle's engine emissions. Engines for medium- and heavy-duty vehicles, as well as engines for off-road vehicle applications, can be certified separately from the vehicle chassis. For light-duty certification, certification is completed through durability and emissions testing of a certification vehicle (a vehicle that represents the planned production vehicle). That is, manufacturers must test certification vehicles that are equipped with specific engines, transmissions, and emission control systems to demonstrate that their vehicles meet applicable certification requirements, including not emitting above specified levels of exhaust and evaporative emissions for the vehicle's useful life, and comply with on-board diagnostic systems and anti-tampering requirements, etc.

Light-duty manufacturers may apply for aftermarket exemptions for engines intended for engine changes and engine replacements if they differ from the originally certified engine configuration. However, the engines obtaining aftermarket exemptions are typically limited to older vehicles. Aftermarket exemption means the part exempted does not make emissions worse, as explained further below.

A vehicle's engine and transmission configuration can have a dramatic effect on a vehicle's emissions. New SPCNSs present unique challenges regarding emissions compliance. Unlike production vehicles, that are equipped with known configurations of engine, transmission, and emission control system, SPCNSs may be equipped with

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<sup>1</sup> Health and Safety Code, section 43102



components from various manufacturers in a multitude of configurations. For example, a hobbyist is allowed, under existing law, to produce an SPCNS that incorporates an engine from a California-certified Ford light-duty truck mated with a Chevrolet transmission in a Chrysler truck chassis. Because this configuration has never been test by any one manufacturer, nor ARB, nor the United States Environmental Protection Agency (U.S. EPA), it is impossible to authoritatively determine the SPCNS's emission levels.

#### *Aftermarket Parts Exemption for New Light-Duty Engines*

In 2009, General Motors approached ARB with a new engine package created from their certified 2010 Camaro, called the emissions compliant hot rod (E-ROD). General Motors requested ARB approve the new engine package for sale in new kit cars. However, there were no provisions in the current new vehicle emission control regulations that would allow ARB to certify the engine package. General Motors moved forward and introduced the E-ROD at the Specialty Equipment Manufacturers Association (SEMA) show in November 2009 with the marketing campaign focusing on emissions compliance and performance. In 2010, General Motors again approached ARB to consider alternatives for E-ROD engine package as an engine change. ARB was able to certify the engine package through an aftermarket parts exemption; however the engine package was limited to installation in 1995 and older model year vehicles, and requires complete removal of the stock engine, including its exhaust and evaporative canister and replacement with the E-ROD engine package.<sup>2</sup>

ARB treats SPCNSs equipped with such engine packages as engine changes. ARB and BAR's engine change policy, consistent with California Vehicle Code section 27156, allows engine changes to occur, as long as the change does not increase pollution from the vehicle. The engine must be from the same or newer model year than the vehicle and from the same type of vehicle based on weight (i.e. passenger car, heavy-duty truck, etc.). All emissions control equipment must remain on the installed engine. After an engine change, vehicles must first be inspected by a state referee station. The vehicle will be inspected to ensure that all the equipment required is in place, and the vehicle will be emissions tested subject to the specifications of the installed engine.

ARB has issued General Motors aftermarket parts exemptions for two of its engine kits:

1. LC9-5.3L V8 E-ROD Kit (derived from a 2012 federally certified truck engine)<sup>3</sup>
2. LS3-6.2L V8 E-ROD Kit (derived from a 2011 CA certified Camaro LS 3 engine)<sup>4</sup>

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<sup>2</sup> 1996 and new model year vehicles are required to have a full OBD II system. The E-ROD engine package comes with an incomplete OBD II system, and therefore cannot be installed in OBD II compliant vehicles, which would be any 1996 and newer model year vehicles.

<sup>3</sup> ARB, 2011. Executive Order D-126-31. <http://arb.ca.gov/msprog/aftermkt/devices/eo/D-126-31.pdf> Signed July 2011.

Both are complete engine and emission control packages designed to be engine changes for all 1995 and older passenger cars and trucks with up to 6500 lbs. test weight (7200 lbs. gross vehicle weight rating, or GVWR). The kits include modifications to the original engine control module (ECM) calibration, exhaust system, evaporative system, and air intake system. The kit is also equipped with a fully functioning on-board diagnostic (OBD II) system except for the diagnostics related to the evaporative system and transmission. The stock vehicle check engine light is retained or needs to be added for older vehicles that were not originally equipped with a check engine light in the dashboard. The exhaust system, catalytic converters and oxygen sensors must be installed in the location/orientation as prescribed in the installation instructions provided with the kit.

## **B. New Vehicle Registration**

An owner of a new certified light-duty vehicle must register its vehicle with the Department of Motor Vehicles (DMV) in order to drive it legally on the road in California.

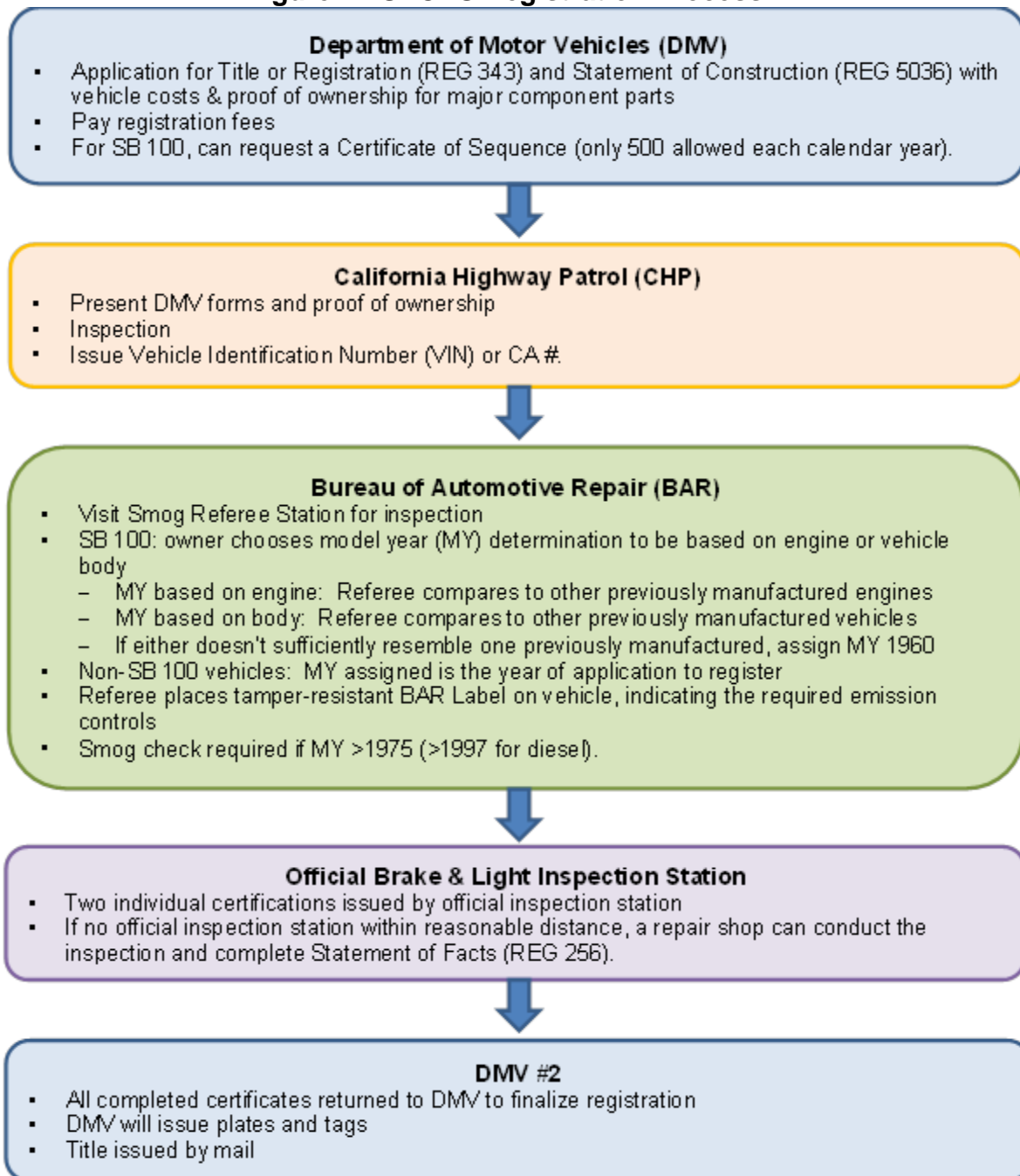
### *SPCNS Registration Process*

SPCNSs are typically homemade, therefore making them difficult to register through California's typical new vehicle registration process. These difficulties include the vehicle lacking a model year and vehicle identification number (VIN), both of which are essential for tracking the vehicle throughout its life and emissions compliance. Due to the unique nature of SPCNS, the DMV, the Bureau of Automotive Repair (BAR), and the California Highway Patrol (CHP) created an SPCNS registration process to address these issues, which greatly differs from typical new vehicle registration. A diagram of the current registration process (simplified) is shown in Figure 1.

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<sup>4</sup> ARB, 2010. Executive Order D-126-30. <http://arb.ca.gov/msprog/aftermkt/devices/eo/D-126-30.pdf> Signed October 2011.

**Figure 1: SPCNS Registration Process<sup>5,6</sup>**



<sup>5</sup> DMV, 2011a. California Department of Motor Vehicles. *Registration Requirements for Home Made Specially Constructed or Kit Vehicles*. <http://www.dmv.ca.gov/vr/spcnsreg.htm>. Accessed August 9, 2011.

<sup>6</sup> BAR, 2009. California Bureau of Automotive Repair. *Questions and Answers: Registration of Specially Constructed Vehicles*. [http://www.smogcheck.ca.gov/01\\_ConsumerActivities/Specially\\_Constructed\\_Vehicles/SPCN\\_Fact\\_Sheet.pdf](http://www.smogcheck.ca.gov/01_ConsumerActivities/Specially_Constructed_Vehicles/SPCN_Fact_Sheet.pdf) July 8, 2009. Accessed August 9, 2011

### *California's Smog Check Program*

California's Smog Check program requires most 1976 and newer model year vehicles to pass an emissions control inspection prior to original registration, transfer of ownership, and every second annual renewal.<sup>7</sup> BAR administers the Smog Check program, which can test for oxides of nitrogen (NOx), carbon monoxide (CO), and hydrocarbon (HC) emissions, the precursor emissions for smog formation. Dependent on region, there are two different types of Smog Check tests: enhanced and basic. For areas requiring basic tests, a two-speed idle test with ignition timing is performed. For areas requiring enhanced tests, acceleration simulation model (ASM) tests are performed, where NOx emissions are also measured. A vehicle must pass all the following elements of a Smog Check inspection:

1. A visual inspection, in which required emissions control components and systems are identified, and must appear connected and functional.
2. A functional inspection which includes, checking the functionality and integrity of the malfunction indicator light (MIL) if so equipped, the ignition timing, the gas cap, and the exhaust gas recirculation (EGR) system. A low-pressure fuel evaporative test is performed on all 1995 and older vehicles. A functional check of a vehicle's OBD II system is also performed on 1996 and newer vehicles.
3. A tailpipe emissions test, which measures exhaust emissions using a probe inserted into the vehicle's tailpipe during testing. Vehicles pass or fail this part of the Smog Check inspection based on established emission cut-points.<sup>8</sup>

New SPCNSs are required to pass Smog Check inspection on initial registration. New SPCNSs are held to the same Smog Check cut-points as current production vehicles. However, as described further below, Senate Bill (SB) 100 allows up to 500 hobbyists each year to register their vehicle regardless of the model year or emissions.

### *Senate Bill 100*

As shown in Figure 1 above, the emission control system requirements for SPCNSs are dependent upon the year the owner applies for registration. Health and Safety Code section 44017.4 (enacted by SB 100 in 2001, Johannessen), provides that the first 500 owners of SPCNSs each year can choose, for purposes of the BAR inspection, whether the inspection will be based on the model year of the engine, or on the vehicle model year (DMV, 2011a).<sup>9</sup> If the inspection is based on the engine model-year, the referee

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<sup>7</sup> DMV, 2011b. California Department of Motor Vehicles. *Specially Constructed Vehicles Emission Control*. <http://dmv.ca.gov/vr/spcns.htm>. Accessed August 10, 2011

<sup>8</sup> BAR, 2011a. California Bureau of Automotive Repair. *Frequently Asked Questions, Part 2*. [http://www.bar.ca.gov/80\\_BARResources/02\\_Smog\\_Check/Frequently\\_asked\\_Questions\\_Part\\_2.html](http://www.bar.ca.gov/80_BARResources/02_Smog_Check/Frequently_asked_Questions_Part_2.html). Accessed August 25, 2011.

<sup>9</sup> SB-100, 2001. Johannessen. [http://www.leginfo.ca.gov/pub/01-02/bill/sen/sb\\_0051-0100/sb\\_100\\_bill\\_20011014\\_chaptered.html](http://www.leginfo.ca.gov/pub/01-02/bill/sen/sb_0051-0100/sb_100_bill_20011014_chaptered.html)

shall require “only those emission control systems that are applicable to the established engine model-year and that the engine reasonably accommodates in its present form.”<sup>10</sup> If the inspection is based on the vehicle model year, the referee shall require “only those emission control systems that are applicable to the established model-year and that the vehicle reasonably accommodates in its present form.”<sup>11</sup> The referee must assign a 1960 model-year to an engine in an SPCNS that does not sufficiently resemble a previously manufactured engine or vehicle.

The demand for the SB 100 Certificate of Sequence has exceeded the 500-vehicle limit per calendar year every year since SB 100 was adopted, with Certificates sometimes running out in January. All subsequent SPCNSs beyond the 500 allowed by SB 100, referred to as “501<sup>st</sup> vehicles”, would be assigned the same model year as the calendar year in which the registration application is submitted (DMV, 2011b). For example, the DMV would assign a 2011 model year to the 501<sup>st</sup> and later SPCNS being initially registered in 2011. The vehicles would then be required to comply with the emission requirements for the year of registration and will be subject to future Smog Check inspections on a biennial basis (BAR, 2009). Hobbyists who find themselves unable to get a number through the Certificate of Sequence process currently must wait until the following year to apply for registration when the 500-vehicle limit count restarts,<sup>12</sup> or meet current year Smog Check requirements, which is in most cases impractical. Hence, the 500-vehicle limit has practically constrained the number of SPCNSs able to be registered each year.

Whether or not a specific SPCNS qualifies for registration under SB 100, a BAR referee must conduct a visual inspection to ascertain whether the SPCNS is equipped with the required emission control system.

### **C. Comparable Federal Policy**

The U.S. EPA does not have regulations applicable to motor vehicle engines used in SPCNSs. However, the U.S. EPA’s current kit car policy, issued on July 8, 1994, clarified policy concerning the regulation of imported and domestically produced kit cars and kit car packages.

U.S. EPA’s policy only applies to kits or assembled kit cars. It provides that the engine of a kit car must be used or used and rebuilt, in order for U.S. EPA to consider an assembled kit car or complete kit car package to be a rebuilt vehicle of a previously

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<sup>10</sup> Health and Safety Code § 44017.4(a)(1)

<sup>11</sup> Health and Safety Code § 44017.4(a)(2)

<sup>12</sup> Car and Driver, 2004. Harold Pace, Car and Driver. *Registration Roundup – Varying Rules by State*. [http://www.caranddriver.com/features/04q1/registration\\_roundup-feature/varying\\_rules\\_by\\_state\\_page\\_2](http://www.caranddriver.com/features/04q1/registration_roundup-feature/varying_rules_by_state_page_2). February 2004.

certified configuration that is covered by the certificate of conformity that U.S. EPA issued for that certified configuration.

However, U.S. EPA does not have a mechanism for preventing kit cars not in compliance with their policy from being registered and driven. Hence, kits cars not complying with U.S. EPA's policy are regularly registered in California and other states.

### **III. SUMMARY OF RECOMMENDED ACTIONS**

ARB staff is proposing to establish a certification process for new light-duty motor vehicle engines for use in SPCNSs. The engines that are certified pursuant to the proposed requirements can be purchased by hobbyists and installed and used in SPCNSs.

The proposed certification requirements differ from ARB's well-established new vehicle certification regulations and procedures for passenger cars and light-duty trucks because they would be applicable to engine packages in light-duty vehicles, whereas ARB has traditionally only certified passenger cars and light-duty trucks on a complete vehicle basis. Staff believes an engine certification approach is warranted due to the unique nature of the SPCNSs.

Additionally, hobbyists are building new SPCNSs each year. Such new SPCNSs cannot use engine packages certified via ARB's aftermarket parts exemption process because the only such exemptions have been for 1995 and older vehicles. In order to give hobbyists building new SPCNSs a new way, outside SB100, to register their vehicles and to identify low-emitting engine packages, staff is proposing a certification procedure for engines intended for use in new light-duty SPCNSs.

Section A describes emissions certification for these engine packages, including exhaust and evaporative standards. Section B describes elements that must be included in an engine package when offered for sale. Section C describes requirements for installers who aid hobbyists with engine installation. Section D describes other proposed general regulatory requirements and certification procedures, including applicability and definitions. The applicable proposed regulatory language reference in the California Code of Regulations (CCR) or certification procedure reference is noted next to each requirement. The regulatory language is appended as Appendix A, and the proposed certification procedures are attached as Appendix B.

## **A. Emission Certification**

### **1. Worst Case Vehicle Testing [13 CCR §2212(f)]**

Certification Procedure Reference: Section 3 “Worst Case Vehicle” and Section 4 “Vehicle Testing”, subsection (d) and (e)

Staff proposes compliance with emissions standards be done on an engine installed in a worst case (in terms of emissions) configuration on a slave vehicle. When selecting the worst case vehicle, the manufacturer is to consider the following criteria: engine displacement, vehicle test weight, vehicle road load, vehicle frontal area, calibration, emission control system configuration and calibration, transmission, and engine speed to vehicle speed (N/V) ratio. Typically, the worst case vehicle is the vehicle with the highest vehicle road load within the highest test weight class as a “worst case” vehicle. Worst case vehicle testing is important for certification of these engine packages for SPCNSs, because, as stated previously, of the unique and specialized nature of the vehicles. Worst case vehicle testing ensures that when the certified engine is installed per the manufacturer’s instructions, within the weight limits provided by the manufacturer, that the SPCNS will, in effect, also be in compliance with the standards.

Although the new certification path will open the possibility for manufacturers to develop engines specifically for SPCNS, staff expects many manufacturers to create engine packages from a previously certified vehicle, much like General Motors has done with their E-ROD engine package derived from a 2010 certified Camaro. Manufacturers pursuing this approach may use carry-over data, as long as the engine maintains the same configuration as the previously certified vehicle.

### **2. Exhaust Emission Standards [13 CCR §2212(c)(1) – (5)]**

Certification Procedure Reference: Section 4 “Vehicle Testing”, subsection (a) “Exhaust emissions” (part (1) – (4)), subsection (c)

The Board’s Low Emission Vehicle (LEV) regulation, first adopted in 1990, later amended in 1998 with the standards called LEV II, requires new vehicles to meet stringent exhaust and evaporative emission requirements. Staff proposes that 2012 and subsequent model year engine packages meet the LEV II LEV standards, as described in Title 13, section 1961 with the exception of 1961(a)(5) and as shown in Table 3.1, Table 3.2, Table 3.3 and Table 3.4 below:

**Table 3.1: Exhaust Emission Standards: 2012 and Subsequent Model Year**

<b>Model Years</b>	<b>Standard</b>	<b>NMOG (g/mi)</b>	<b>CO (g/mi)</b>	<b>NOx (g/mi)</b>	<b>HC (mg/mi)</b>	<b>PM (g/mi)</b>
2012 and subsequent	LEV II LEV (120,000 mi Durability)	0.090	4.2	0.07	18	0.01

NMOG: Non-Methane Organic Gases / CO: Carbon Monoxide / NOx: Oxides of Nitrogen / HC: hydrocarbons / PM: Particulate Matter

**Table 3.2: Exhaust Emission Standards: 50° F Exhaust Emission Standards**

<b>Model Years</b>	<b>NMOG (g/mi)</b>	<b>CO (g/mi)</b>	<b>NOx (g/mi)</b>	<b>HC(mg/mi)</b>
2012 and subsequent	0.150	3.4	0.05	30

**Table 3.3: Exhaust Emission Standards: Highway NOx Test**

<b>Model years</b>	<b>NOx (g/mi)</b>
2012 and Subsequent	0.07

**Table 3.4: Exhaust Emission Standards: Supplemental Highway Test**

<b>Model Years</b>	<b>Vehicle Classes</b>	<b>Weight (lbs.)</b>	<b>NOx</b>	<b>NMHC +CO</b>	<b>NMHC +NOx</b>	<b>CO</b>
2012 and subsequent	PC	All	0.14	8.0	0.20	2.7
	LDT	0-3750	0.14	8.0	0.20	2.7
	LDT	3751-5750	0.25	10.5	0.27	3.5
	MDV	3751-5750	0.40	10.5	0.31	3.5
	MDV	5751-8500	0.60	11.8	0.44	4.0

Later this year, the Board will consider further modifications to the LEV criteria pollutant regulations for model year 2015 and subsequent vehicles, known as LEV III. Depending on the outcome of the Board’s ruling, staff will propose in a 15-day post-board hearing modification to include requirements for model year 2015 and subsequent engines.



### **3. Evaporative Emissions Standards [13 CCR §2212(d)]**

Certification Procedure Reference: Section 2 “Emissions Standards”, and Section 4 “Vehicle Testing”, subsections (b) and (c)

The majority of a vehicle’s evaporative emissions results from fuel vapors escaping from the fuel system and permeation of the fuel through components such as the fuel tank and fuel lines. Modern vehicles control these emissions by use of a carbon canister, and fuel tanks and lines made from advanced, non-permeable materials.

Typically, compliance with evaporative standards is demonstrated by measuring the vehicle’s evaporative emissions over simulated real-world conditions. For example, evaporative emissions are measured in an enclosed chamber in which the vehicle is subjected to temperature swings that are intended to simulate exposure to hot days. Evaporative emissions are also measured during simulated driving conditions, and immediately after the engines are shut down. Specifically, compliance is demonstrated using a series of two specific test procedure sequences: 1) Three-Day Diurnal plus High-Temperature Hot Soak and Running Loss and, 2) Supplemental Two-Day Diurnal plus Hot Soak. Both of these procedures involve prescribed methods to suitably condition and stabilize the evaporative emission control system components prior to the actual emission tests. Moreover, certification compliance is also demonstrated by properly aging evaporative emission control system components to the required useful life in advance of any certification tests.

Staff proposes that manufacturers of certified engine packages for SPCNSs must demonstrate emissions compliance with LEV II evaporative standards through testing of a worst case vehicle with the engine package installed per the instructions. Because the engine packages will only be required to include certain evaporative controls like the evaporative canister, but will not include the fuel tank or fuel lines, it is difficult for manufacturers to guarantee in-use evaporative emission compliance. However, manufacturers will be required to provide detailed instructions on the fuel tank size and allowed fuel system materials, Society of Automotive Engineers (SAE) compliant fuel lines, and compliant on-board vapor recovery (ORVR) system. Staff believes requiring engine certification in a worst case configuration will ensure evaporative emissions compliance for any vehicle in which (within the weight and size limits provided by the certifying manufacturer) the engine is installed.

#### **B. Engine Package Requirements**

In addition to meeting the emission test requirements described above, staff proposes that the emissions compliant engine package would be required to include critical emissions components, including an ECM; an OBD II system; be covered by a warranty; be accompanied by a thorough installation guidance manual, which would include an affidavit for the engine installer; and have a vehicle emission control identification (VECI) label.

### **1. Crankcase Emissions [13 CCR §2212(e)]**

On an engine, no piston ring, new or old, can have a perfect seal. Leakage occurs when an engine runs, and emission vapors flow into the engine's crankcase. Staff proposes that each engine sold must be equipped with a closed crankcase system that does not discharge crankcase emissions.

## **2. Critical Emission Control Components [13 CCR §2211(a)(2)]**

Certification Procedure Section Reference: Section 5 "Delivery of Engines", subsection (a)

Emission control components are those that are installed for the primary purpose of controlling emissions. Staff proposes that in addition to an emission compliant engine, manufacturers need to include critical emission components with each engine package. This will include an ECM, catalytic converter(s), exhaust gas recirculation (EGR) valve, intake and exhaust manifolds, oxygen sensors, mass airflow sensors and housing, evaporative emissions canister, purge control valve (PCV), purge logic, and flow diagnostics. The components required are consistent with exhaust emission controls required for new vehicles. Requiring manufacturers to provide the emission control components in the package will help ensure the SPCNS stay low-emitting throughout the life of the vehicle and can pass future Smog Checks.

## **3. On Board Diagnostic System [13 CCR §2212(g)]**

New LEV II compliant vehicles are equipped with OBD II<sup>13</sup> systems consisting of software designed into motor vehicle on-board computers that detects emission control system malfunctions as they occur. The OBD II system monitors virtually every component and system that can cause increases in emissions. When an emission-related malfunction is detected, the system alerts the driver by illuminating the MIL on the instrument panel. By alerting the driver of malfunctions as they occur, repairs can be made promptly, which results in fewer emissions from the vehicle. The OBD II system also stores important information that identifies the faulty component or system and the nature of the fault, which allows technicians to quickly diagnose and properly repair the problem. It also results in less expensive repairs and promotes repairs done correctly the first time, resulting in less costs to the vehicle owners. For 1996 (the year OBD II systems were first required) and newer model year vehicles, the OBD II system is the dominant mechanism used in the Smog Check program to identify vehicles in need of emission repair and thus, properly functioning OBD II systems are critical to maximize emission reductions from in-use vehicles.

OBD II systems consist of a complex set of software routines in the engine control computer that run in the background while the vehicle is being operated and verify that each and every component related to emission control is performing correctly. While some diagnostic routines are fairly straightforward (e.g., detecting a sensor that has a broken or disconnected wire), others are extremely complex and must take into account many parameters about how the vehicle is configured and how it is being driven while the diagnostic is attempting to complete. An example of a complex diagnostic is the evaporative system leak check. This diagnostic, on current production vehicles, is

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<sup>13</sup> OBD requirements were first adopted in 1986. The second generation of OBD (OBD II) was adopted in 1996.

capable of detecting a leak as small as a hole with a diameter of 0.020 of an inch anywhere in the evaporative system from the gas cap, filler neck, gas tank, vapor lines, canister, or purge valve. To be able to robustly detect such a small leak in such a large vapor space, the system must make corrections for everything from the level of fuel in the tank, the amount of slosh currently happening in the tank, the cumulative volume of vapor space, the volatility of the fuel in terms of how much vapor it is currently generating, ambient temperature, fuel temperature, and even barometric pressure (to sense elevation changes that would affect pressure measurements).

In a new vehicle certification, a vehicle manufacturer has control over many of these elements as they are fixed by design, and can modify an appropriate amount of calibration and development work to account for these factors. For SPCNSs, however, the variances from vehicle to vehicle in things as simple as shape, size, and location of the gas tank are quite vast and cannot be accounted for ahead of time by a manufacturer of a certified engine package.

In several instances, such interactions between vehicle configuration and the OBD II system have necessitated less stringent requirements to make it feasible to design and certify an engine package that can accommodate a reasonable range of SPCNS configurations. Accordingly, staff proposes to modify the existing OBD II requirements specifically for engines certified through these regulations and procedures. However, the proposed modifications are limited to those which staff and engine manufacturers have identified as technically necessary to accommodate an SPCNS, while the majority of the OBD II requirements for new production vehicles remain unchanged. Below, in Table 3.3, are staff’s proposed OBD II modifications for engine packages certified for use in SPCNSs:

**Table 3.5: Proposed OBD II Modifications**

<b>Proposed OBD II Relief</b>	<b>Rationale</b>
Allow flexible location of the malfunction indicator light (MIL) (§2212(g)(1))	While in production vehicles, location of the MIL is tightly constrained, the uniqueness of SPCNSs warrants extra flexibility in location of MIL, as long as the MIL can be reasonably identified and located by inspectors
Reduce in-use monitoring frequency (1/3 reduction) (§2212(g)(2))	In production vehicles, a minimum in-use frequency is defined and required to be met to ensure that malfunctions that occur are detected within a reasonable amount of time. SPCNSs are expected to be used in a significantly different manner than most production vehicles and are expected to be used substantially less per year.

<b>Proposed OBD II Relief</b>	<b>Rationale</b>
	According to BAR data, SPCNSs travel on average less than 1000 miles per year. <sup>14</sup>
<p>Raise the emission threshold for the misfire monitor, the cylinder air-fuel imbalance monitor, and the cold start emission reduction strategy monitor. Allow manufacturers to disable monitoring at light loads to ensure more robust detection of actual misfires. (§2212(g)(3), (5) &amp; (6))</p>	<p>Several OBD II system diagnostics are calibrated to detect a fault before tailpipe emissions exceed specific values and this requires iterative development and emission testing by vehicle manufacturers prior to production. However, SPCNSs vary in the weight, size, and function of the vehicles that such a precise calibration is unrealistic for some monitors.</p>
<p>Exempt systems from all evaporative system monitoring, and require vehicles to be capable of off-board low pressure evaporative test during Smog Check (§2212(g)(4))</p>	<p>Evaporative system monitoring is an extremely complex OBD II that is very dependent on vehicle configuration. However, SPCNSs vary greatly in size and design and do not include a fuel system, and it is infeasible to replace such design restrictions on these vehicles.</p>
<p>Exempt systems from transmission related malfunctions. To the extent that the engine diagnostics require and rely on any transmission signals (e.g., the use of a vehicle speed sensor) for other diagnostics, the OBD II system would still be responsible for diagnosing that signal. (§2212(g)(7))</p>	<p>SPCNSs vary in transmission configurations, and staff does not require the manufacturer to include or specify a transmission with the engine package. Requiring monitoring of several different transmissions is unrealistic.</p>
<p>Allow flexibility in location of the diagnostic connector (§2212(g)(8))</p>	<p>SPCNSs vary greatly in size and design, and the driver interior foot-well may not always be a feasible location for the diagnostic connector.</p>
<p>Require a manufacturer descriptor (to identify the certified engine package manufacturer) and the engine serial number in lieu of the VIN. (§2212(g)(9))</p>	<p>To guarantee the correct vehicle required to pass Smog Check inspection is present, manufacturers are required to program the VIN into the OBD II system. Because SPCNS VINs are assigned through CHP, the certified engine package cannot come pre-programmed with the correct VIN</p>

<sup>14</sup>BAR, 2011c. California Bureau of Automotive Repair. SPCNS Smog Check Data-All Vehicles With VMT Data. Excel Worksheet. September 6, 2011.

**a) Miscellaneous OBD II Certification Requirements  
[§2212(g)(10) – (14)]**

Various elements of the OBD II regulation require the manufacturer to submit data prior to and after certification. These demonstration data and production vehicle evaluation data allow staff to verify that the OBD II system performs as represented by the manufacturer in the certification application. As such, these data will still be required. However, in cases where the certified engine package is identical or similar to that used in an actual production vehicle, provisions have been made to allow the manufacturer to request the use of carry over existing data from the production vehicle to meet these requirements.

Lastly, there is a dedicated regulation for OBD II enforcement that was structured to be used for actual production vehicles, not certified engine packages. Accordingly, staff is proposing a few modifications to account for the fact that an engine package is being certified, in lieu of a complete vehicle, and to provide revised enforcement consistent with the revisions provided above for various monitors.

**4. Manufacturer Warranty**

The proposed regulations include warranty and recall provisions for the engine and emission control systems included in the package that are similar to those for new cars. These provisions are meant to protect the ultimate purchaser in cases of defects or performance failures, and to ensure the SPCNS, equipped with the new certified engine package, will pass Smog Check inspection. Staff proposes to require an emissions warranty from both manufacturers selling engine packages, and installers who install the certified engine packages into an SPCNS. The warranty provisions are included in proposed Sections 2214 through 2217 and are discussed below.

**a) General Manufacturer Warranty Coverage and Requirements [13 CCR §2214(a)-(i) and §2215(a)-(m)]**

All manufacturers are required to provide warranties with new vehicles sold in California. Warranties required by ARB pertain to emissions. When a defective part reduces the emissions performance of a vehicle, a manufacturer is liable for 3 years or 50,000 miles, or 7 years or 70,000 miles for high priced emission-related parts. Because staff proposes these engines meet the same emission standards as new vehicles, staff believes it is also appropriate to require the engine manufacturer to provide warranty coverage for all the parts included in the engine package that affect emissions.

Staff proposes the defects and performance warranties for manufacturers would begin on either the date of vehicle registration or 2 years after the engine purchase date, whichever occurs first, and would be valid for 3 years or 50,000 miles (7 years or 70,000 miles for high-priced emission-related parts). This would allow SPCNS owners additional time to install an engine after purchase, which is particularly important for

these home-built vehicles that often take several years to complete. As an alternative to this approach, manufacturers will be allowed to begin the warranty period when the certified engine package is purchased if the manufacturer extends the warranty period from 3 years or 50,000 miles to 5 years or 50,000 miles. The warranties would be issued by the engine manufacturer and would ensure that the engine and emission control systems provided in the package are free from defects, and that the vehicle would be able to pass Smog Check inspection.

The defects and performance warranty requirements applicable to certified engine packages for SPCNSs have been established to essentially mirror the requirements applicable to 1990 and newer passenger cars, light-duty trucks, and medium-duty vehicles. If warranted repairs are necessary due to failure of a warranted part or other emissions-related failures, staff proposes that the repairs (parts, labor and applicable taxes) must be made free of charge to the engine owner, at a facility authorized by the engine manufacturer to perform the repairs, otherwise known as a warranty station. Failures determined to be caused by abuse, neglect, or improper maintenance would not be covered under warranty. Diagnostic labor that leads to the determination of a warrantable condition would be required to be provided free of charge to the engine owner, and the manufacturer would be responsible for any damages that occur to other vehicle components as a result of warranted failures.

***b) Certified Engine Package Owner Obligations [13 CCR §2214(j) and §2215 (n)]***

Staff proposes to include a requirement that the owner of the certified engine be responsible for performance of all required scheduled maintenance specified in the manufacturer's written instructions. As with the other provisions in this section, this requirement is consistent with those for new passenger cars.

***c) Warranty Card [13 CCR §2214(k)]***

Certification Procedure Reference: Section 11 "Warranty Card"

Warranty cards are an important tool in tracking warranty claims and providing the ultimate purchaser (owner) details regarding the warranty coverage.

Staff proposes to require the engine manufacturer to include a warranty card with each engine package. The warranty card would be completed by the owner in triplicate: one to be returned to the engine manufacturer, one to be provided to the engine installer (if applicable), and one for the owner to keep. The manufacturer would include general terms of warranty on the card, a place for the owner to sign in acknowledgement of those terms, and mailing address. The owner would then supply pertinent information: VIN, odometer reading, engine serial number, date of engine purchase and installation, date of vehicle registration, and information on the person or facility that installed the

engine. Additional instructions regarding the warranty card are included in the proposed certification procedures for the proposed regulations.

**d) Emissions Control Warranty Statement [13 CCR §2214(l)]**

Certification Procedure Reference: Section 10 “Emissions Control System Warranty Statement”

ARB requires manufacturers to provide an emissions control warranty statement which clarifies the owner’s rights and responsibilities, as well as a description of the warranty coverage and terms. In addition to supplying a warranty card to the owners, staff proposes that the manufacturer would also be required to include the ARB emissions control warranty statement. The ARB warranty statement explains the owner’s rights and responsibilities, as well as a layman’s description of the emissions warranty coverage and terms. The specific statement required is included in the proposed certification procedures for the proposed regulations. The manufacturer shall also provide its warranty language to the owner. Copies of the manufacturer’s warranty language shall be provided to staff for review and approval.

**e) Mediation; Finding of Warrantable Condition [13 CCR §2214(m) and §2215(o)]**

This provision provides a mechanism for engine owners to request that the Executive Officer mediate a warranty claim when there is an unresolved emissions warranty dispute between the owner and the manufacturer. The Executive Officer would examine the facts submitted by the parties concerned and determine if a warrantable condition exists. A finding of a warrantable condition would result in eligibility for warranty coverage as required by this section.

**f) Manufacturer Warranty Reporting Requirements [13 CCR §2216]**

Staff proposes requiring engine manufacturers to retain and review warranty claims for each engine family on a production year basis for three years and to submit warranty information reports to ARB quarterly when the warranty claim rate for a specific part exceeds one percent or 25 parts, whichever is larger. This is important for recall purposes, and establishes a system of checks and balances between ARB and the certifying manufacturer. The report would contain the following: engine manufacturer’s name; an identification of the engine family; model year and description of the class or category of certified engine package; information on the number of warranty claims and percentage of total engines they represent; and the number of each type of certified engine package produced by the manufacturer for sale in California. A manufacturer may elect to use an alternative procedure to that described above, as long as the

Executive Officer determines the alternative procedure will produce substantially equivalent results. Staff proposes that corrective action may be taken when the warranty claims for exhaust and/or evaporative emission control components used in the manufacturer's regular production California-certified vehicles as well as engines certified through this proposed test procedure exceed four percent or 50 parts, as required in section 2143, title 13, CCR. Such corrective action may include an ordered recall, discussed below.

**g) Recall Procedures [13 CCR §2217]**

Staff proposes to include the same recall procedures as for new light-duty vehicles.<sup>15</sup> A recall may be required if the Executive Officer has determined that the warranty claim thresholds described above have been reached. The thresholds are based on the engines certified through this proposed test procedure covered under a single Executive Order as well as the manufacturer's regular production California-certified engine systems with the same components. Since the engines certified through this proposed test procedure are expected to be smaller in number than those for regular production vehicles, and since typically the same or very similar engines are also certified for a much larger number of regular vehicles, it is appropriate for any recall that affects regular production vehicles to also apply to the same or similar SPCNS engines.

**5. Engine Installation Guidance and Engine Owner's Manual [13 CCR §2212(h)(1), (2), (5) & (6)]**

Certification Procedure Reference: Section 5 "Delivery of Engines", subsection (b)(1)

Staff proposes that the engine manufacturer provide written instructions to the ultimate purchaser and/or installer with the engine package. The written instructions must adhere to Federal requirement for engine installation manuals.<sup>16</sup> In addition to Federal requirements, manufacturers must provide a statement to the purchaser that the engine may only be installed in an SPCNS, and also provide in the written instructions parameters for the SPCNSs on which the certified engine is to be installed. This is important because emissions testing will have been proven on a worst case vehicle, and a vehicle outside of the manufacturer's parameters could result in greater emissions than expected and allowed by the certification. Below in Table 3.4 are the vehicle parameters required to be specified:

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<sup>15</sup> "Procedures for Reporting Failure of Emission-Related Components," Article 2.4, title 13, CCR

<sup>16</sup> Section 1051.130, Title 40, Code of Federal Regulations (CFR)



**Table 3.6: Vehicle Parameters**

Required Parameter	Reason
Highest allowed vehicle weight	The weight of a vehicle has a significant effect on the vehicle's emissions. Typically passenger cars are not produced with truck engines, and trucks are not produced with passenger car engines. Engines produce an amount of power which highly correlates with the vehicle's weight.
Highest allowed engine speed to vehicle speed (N/V) ratio	Engines are designed with a vehicle and drive load in mind. Placing an engine into a vehicle with a higher N/V ratio than recommended by the manufacturer will cause an increase in emissions.

To limit in-use evaporative emissions, staff proposes manufacturers must provide fuel tank specifications, e.g., tank material, maximum capacity, minimum distance from the engine, gas cap seals, filler neck, pressure/vacuum relief settings, as well as any other pertinent installation instructions affecting the vehicle's evaporative emissions. Manufacturers also must include language in the installation manual that specifies that the certified engine package should be installed so that the final vehicle is able to be tested via a Smog Check test. This will help ensure a future Smog Check test may be performed.

When a manufacturer applies for certification, staff proposes that the installation manual must also be submitted to the Executive Officer for approval. Staff believes most engines purchasers will also be the engine installer, so it is important that the installation instructions are clear, detailed, and concise.

In addition to the installation guidance, staff proposes that the manufacturer would also include an owner's manual for proper use and maintenance over the life of the engine. The owner's manual must comply with Federal owner's manual requirements.<sup>17</sup>

**6. Affidavit [13 CCR §2212(h)(7)]**

Certification Procedure Reference: Section 5 "Delivery of Engines", subsection (8)

With each engine package, staff proposes that the manufacturer must provide an affidavit, a sworn statement of fact, (in triplicate form) to the ultimate purchaser that states under penalty of perjury that the engine has been installed according to the

<sup>17</sup> The owner's manual must adhere to Section 86.411-78 and 86.412-78, title 40, CFR.

manufacturer's instructions. This will help to ensure the engine manufacturer that the engine has been installed correctly, and provide a paper trail for any potential warranty disputes.

**7. Engine Vehicle Emissions Control Information Label [13 CCR §2213]**

Certification Procedure Reference: Section 5 "Delivery of Engines", subsection 5

ARB recognizes that certain emissions-related parts must be properly identified and maintained in order for certified engine packages to comply with the applicable emissions standards. All new production vehicles in California are required to place a label on each vehicle with pertinent information for vehicle owners and service mechanics for the proper maintenance of the vehicle.

Staff proposes that the engine manufacturer must provide a label with each certified engine package to the ultimate purchaser to be affixed to a fully assembled vehicle. The label must meet the emissions labeling requirements as new passenger vehicles.<sup>18</sup> In addition to those requirements, staff proposes that the label clearly state that the engine is intended only for installation in an SPCNS. Manufacturers must also provide instructions to the ultimate purchaser to affix the label in such a manner that it cannot be removed without destroying or defacing the label, can be easily identified, and shall not be affixed to any part that is likely to be replaced during the vehicle's useful life.

**8. Other Information to be with the Engine Package [13 CCR §2212(h)]**

Certification Procedure Reference: Section 5 "Delivery of Engines", subsection (2), (3), and (7)

Along with the requirements mentioned above, staff proposes that the manufacturer must provide the following statements with the engine package:

1. A statement that no changes may be made to the certified engine package and evaporative ECS, including, but not limited to: changes to the fuel metering system; changes to the ignition system, changes to the camshaft; and modifying, recalibrating, removing, or failing to properly install any other specified component. This statement may be included in the engine installation instructions.

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<sup>18</sup> The label must adhere to the guidelines in the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles", part 1, subpart C, section 3, which incorporates by reference and amends 40 CFR 86.1807-01 "Vehicle Labeling."

2. A statement that failure to follow the vehicle parameters, installation guidelines, or changes made to the engine and components provided in the engine package will cause the vehicle to violate ARB's certification requirements for which monetary fines and other penalties can be applied. This statement may be included in the engine installation instructions.
3. A notice, printed on a separate sheet of paper explaining the documentation, record keeping, notification, access to records requirements for installers of certified engine packages in the state of California, explained further below.

#### **9. Manufacturer Reporting Requirements [13 CCR §2212(i)]**

Certification Procedures Reference: Section 6 "Manufacturer Production Reporting"

Staff also proposes that manufacturers must report to ARB the number of certified engine packages produced each year, along with the engine serial number for each vehicle.

#### **C. Installer Requirements [13 CCR §2218]**

In public workshops, hobbyists have indicated that many times an SPCNS is built by the hobbyists themselves. Others use professional installers when building their SPCNS for certain components such as the transmission and engine. Because installers are paid for services, staff proposes shops that help install these certified engine packages be required to maintain records and provide an installation warranty.

##### **1. Automotive Repair Dealer [13 CCR §2211(a)(7)]**

Staff proposes that an installer must be registered with BAR as an automotive repair dealer<sup>19</sup>. Requiring installers to be registered automotive repair dealers gives BAR authority to pursue legal action against individuals engaged in unlicensed activities and it grants the authority to BAR to ensure that stations provide written invoices specifying parts and labor costs, whether or not used parts are being used, etc.

##### **2. Installation and Affidavit [13 CCR §2218(a), (b)(1)]**

Certification Procedures Reference: Section 9 "Installer Requirements", subsection (a),(b), and (h)

Staff proposes that an installer be required to install the engine per the manufacturer's written instructions, and to place the provided label in a readily accessible location. Additionally, to ensure this proper installation to the engine manufacturer, staff proposes that the installers must sign the affidavit provided by the engine manufacturer (explained above) that states under penalty of perjury that the engine has been installed per the engine manufacturer's given instructions. The installer must mail the signed affidavit to the engine manufacturer, and provide a copy of the signed affidavit to the vehicle owner.

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<sup>19</sup>California Business and Professions Code, Section 9880 through 9884.

### **3. Reporting and Record Keeping [13 CCR §2218(b)(2)]**

Certification Procedure Reference: Section 9 “Installer Requirements”, subsection (c), (d), (e), and (f)

Reporting and record keeping are essential for enforcement and in-use compliance purposes. Though there will be no in-use testing required, staff proposes that installers report to ARB the number of engines installed into SPCNSs each year, as well as the vehicles’ make, model, and engine serial numbers. In addition to reporting, staff proposes installers must maintain photographic and written records, as well as each signed affidavit for each SPCNS built with a certified engine package for no less than two years.

### **4. Installation Warranty [13 CCR §2218(c)]**

Certification Procedure Reference: Section 9 “Installer Requirements”, subsection (g)

Staff proposes to require an installation warranty, to be covered by the engine installer, and to be effective for one year after engine installation or 12,000 miles, whichever occurs first. This would cover installation as it affects the SPCNS’s emissions, and help guarantee that the SPCNS will be able to successfully pass Smog Check.

## **D. Other Regulation and Certification Procedure Sections**

Regulations

§ 2210. Applicability.

Summary: This section describes the overall scope of the regulations, the entities these regulations apply to, allowed severability of each section of the regulation, and explains what is included in the requirements of the regulations.

§ 2211: Definitions

Summary: This section helps to define words that are used throughout section 2010 through section 2218 and provides clarity regarding which entities are regulated and what requirements apply to each said entity. Definitions in this section are consistent with other ARB mobile source regulations and definitions found in the California Vehicle Code and Health and Safety Code.

§ 2212(a)

Summary: This subsection describes the scope of the section 2212.

§ 2212(b)

Summary: This subsection describes the penalties as a result of non-compliance with § 2212 requirements.

## Certification Procedures

### Section 1. “Applicability”

This section describes the overall scope of the certification procedures, the entities the certification procedures apply to, and the definition of an SPCNS.

### Section 4. “Vehicle Testing”, subsection (f) “Confirmatory Testing”

This section allows ARB to conduct testing on vehicles to “confirm” the engine is meeting the standards in staff’s proposed certification procedure.

### Section 7. “Application”

When an engine manufacturer seeks to certify an engine, it must submit a certification application to ARB which includes all the necessary information needed to demonstrate compliance with the standards. This section explains the “Letter of Intent” which notifies ARB of a manufacturer’s intent to apply for certification, and where to mail the Letter of Intent and certification application. This section also explains how to submit correspondence, and certification and reporting documents.

### Section 8. “Issuance of Executive Orders (EO)”

When ARB approves a manufacturer’s certification application, ARB issues an Executive Order, which contains all the necessary information detailing the emissions standards the vehicle was certified to, and the models that obtained certification within the engine family. This section details the Executive Order that would be issued under staff’s proposed certification procedures.

### Section 12. “Violations and Penalties”

This section states that ARB retains the authority to seek penalties if violations occur.

## **IV. ECONOMIC IMPACT**

This regulation does not mandate any actions by engine manufacturers or hobbyists, but instead provides a new optional certification path. Engine manufacturers are not obliged to build and certify engine packages per the new regulations and procedures, nor are end-users compelled to purchase or install certified engine packages.

Manufacturers would incur additional costs resulting from this regulation only if they choose to utilize the new certification path. Similarly, hobbyists would face costs only if they choose to purchase certified engine packages, and installers would face costs only if they choose to install such certified engine packages.

Below in section B, however, we provide a discussion of how costs would be expected to change for manufacturers that choose to certify engine packages, hobbyists that choose to use certified engine packages, and installers paid to install them.

### **A. Legal Requirement**

Sections 11346.3 and 11346.5 of the Government Code require state agencies to assess the potential for adverse economic impacts on California business enterprises and individuals when proposing to adopt or amend any administrative regulation. The assessment shall include consideration of the impact to the proposed regulation on California jobs, business expansion, elimination, or creation, and the ability of California businesses to compete.

State agencies are also required to estimate the cost or savings to any state or local agency and school districts in accordance with instruction adopted by the Department of Finance. This estimate is to include any nondiscretionary costs or savings to local agencies and the costs or savings in federal funding to the state.

### **B. Potential Impacts**

For each certified engine package, the potential costs can be separated into three portions: 1. Costs for the manufacturer of the certified engine package; 2. Costs for the hobbyists (ultimate purchaser), and; 3. Costs for the installer of the certified engine package (if applicable). See Appendix C “Cost Spreadsheet” for more information related to the potential economic impacts associated with the proposed regulations and certification procedures.

#### *Potential Costs Impacts to the Manufacturer of the Certified Engine Package*

Potential cost impacts on manufacturers that choose to certify engine packages per the proposed regulation are discussed further below and include costs to develop the engine package, to conduct the necessary emissions testing for certification, to do necessary record keeping and reporting, and to pay for repairs under warranty.

As described earlier in section III, an engine package that would be certified to meet this regulation could be derived from a production engine used in a new motor vehicle that was certified to meet California’s new vehicle standards. It is also possible that a certified engine package could be derived from a vehicle not certified to be sold in California, or developed from a new design. However, staff believes the most common and likely situation will be engine packages derived from already certified vehicle engines, because the other two scenarios would be much more expensive.

As discussed earlier in this Staff Report, California’s new motor vehicle emissions certification is very stringent. The exhaust and evaporative standards require very low-emitting engines, and it takes significant research and engineering to develop systems to meet stringent requirements, and maintain the low levels for over 100,000 miles. Even if a certified engine package is significantly similar to an engine used in a certified

new motor vehicle, there are changes required so that engine package can be used as “stand-alone”. Throughout the development of the engine package, testing will be needed in order to assist with the engineering process and verify the changes are performing as designed. The technical development time can run into hundreds or thousands of hours, with costs of \$25,000 not unrealistic even for engine packages derived from production engines used in new motor vehicles<sup>20</sup>.

After the manufacturer has completed the design, the engine package will need to go through certification testing, which is a series of five tests. The laboratory needed to conduct these tests must be quite sophisticated and have advanced instrumentation and highly trained technicians. To have the gamut of testing done and provide to the ARB with sufficient laboratory testing results in order to pursue certification could cost \$50,000 (Witherspoon and Harvey, 2011).

However, in cases where the certified engine package is a similar configuration to an engine used in a production vehicle, it is possible that the manufacturer could carry over existing data from the production vehicle to meet these requirements. This would significantly reduce or eliminate certification testing of the engine package and the associated costs.

The manufacturer of the certified engine package will be required to keep records of every engine sold and report that information annually to the ARB. In addition, consistent with procedures for new production motor vehicles, there are provisions proposed for emissions warranty claims quarterly reporting, warranty repairs, retaining warranty claims, and recall procedures. Since it is probable that the sales volume of these engine packages will be small, and manufacturers will handle this in conjunction with their currently established procedures for motor vehicle reporting, staff assumes it would take a half a day to submit sales information to the ARB annually. If the employee doing this work is paid \$40 per hour<sup>21</sup>, this would cost the manufacturer \$160 annually.

For compiling and reporting warranty claims, if there are any, the procedures for these engine packages will also likely be handled along with manufacturers currently established procedures for motor vehicles, and staff assumes it could take a half a day per quarter for retaining and quarterly reporting emissions warranty claims. If the employee doing this work is paid \$40 per hour<sup>21</sup>, this would cost the manufacturer \$160 per quarter.

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<sup>20</sup> Witherspoon and Harvey, 2011. Personal communication between Jim Witherspoon and Randy Harvey of General Motors, and Michael Baker, ARB. August 30, 2011.

<sup>21</sup> Hourly rates include overhead.

Manufacturers would be required to pay for warranty repairs due to engine defects. For engine packages based on production motor vehicles, staff assumes that emissions warranty repairs that would be the responsibility of the manufacturer of the engine package would be minimal. The diagnosis and repair of part failures would be similar to that for production motor vehicles and therefore generally documented. Staff assumes emissions-related failures for the engine package would occur five percent of the time, and diagnostic and repair would take less than two hours (at a rate of \$120 per hour<sup>21</sup>), which would result in a warranty charge for the manufacturer of \$240, or an average \$12 per engine package sold.

The proposed regulation requires the manufacturer of the certified engine package to include written instructions for installing the certified engine package into an SPCNS. Staff assumes this would take 40 hours; half for a technician (\$120 per hour<sup>21</sup>) and half for office personnel for (\$40 per hour<sup>21</sup>), which would be a one-time of \$3,200.

If 100 certified engine packages were sold annually by each of the three crate engine manufacturers that are the most frequently used in kit cars (Chevrolet, Ford, Chrysler), with each producing 1/3 of the total units sold annually, then each manufacturer would incur one-time costs (within major development cycles) of approximately \$30,000, and annual costs of approximately \$50,000.

#### *Potential Costs Impacts to the Ultimate Purchaser of the Certified Engine Package*

For hobbyists choosing an engine certified according to staff's proposed procedures, purchase and installation costs are expected to increase versus the costs they would face if they chose an average uncertified engine. As described further below, purchase costs could be approximately \$3,000 more, and installation costs could be approximately a few hundred to two thousand dollars more than if they chose an average uncertified engine.

From Statements of Construction ARB obtained from the DMV<sup>22</sup>, the average cost of an engine used in a kit car is \$4,789, and the median (half of the values above this value, and half below) is \$1,704. However, the values of the engines vary widely; from free (had in possession or given), to over \$40,000. Engines in kit cars generally come from three sources: a wrecked vehicle (junk yard, or owned) and often kept stock or slightly modified; a new crate engine from a major manufacturer (typically General Motors, Ford, and Chrysler); and custom or semi-custom built. Both carbureted and fuel

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<sup>22</sup> DMV, 2011c. California Department of Motor Vehicles, data from Statements of Construction obtained from DMV transposed into an electronic file. July, 2011



injected (manufacturer, or aftermarket fuel injection systems) engines are used in kit cars. General Motors sells the majority of crate motors in the United States<sup>23,24</sup>.

As mentioned above, the General Motors E-ROD engine package is currently being sold and installed (approved by ARB for 1995 and older vehicle engine changes), and would likely qualify for certification through staff's proposed process. From cost data staff has collected, the E-ROD engine package, for comparison, is on the higher end of the cost typical engines used in kit cars<sup>25</sup> (roughly \$3,000 more than the average), however well within the range of engine costs. To put the cost of an engine in perspective, completed kit cars can be built for \$30,000<sup>26</sup>, with an average cost closer to \$50,000, but may cost more than \$80,000<sup>27,28</sup> (as mentioned above, the engine alone can be \$40,000).

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<sup>23</sup> Proformance Unlimited, 2011. <http://www.proformanceunlimited.com/chevytrucks.html>. Accessed August 23, 2011.

<sup>24</sup> General Motors, 2011a. Press Release. August 18, 2011. [http://media.gm.com/content/media/us/en/chevrolet/news.detail.print.html/content/Pages/news/us/en/2011/Aug/0818\\_chevysmallblock](http://media.gm.com/content/media/us/en/chevrolet/news.detail.print.html/content/Pages/news/us/en/2011/Aug/0818_chevysmallblock). Accessed September 1, 2011

<sup>25</sup> Superior Chevrolet Performance Center, 2011. [http://www.superchevyperformance.com/Crate\\_Engines\\_s/5.htm](http://www.superchevyperformance.com/Crate_Engines_s/5.htm) (with appropriate pages combined into one document.) Accessed September 1, 2011.

<sup>26</sup> Ehow.com, 2011. [http://www.ehow.com/about\\_5554147\\_cost-build-kit-car.html](http://www.ehow.com/about_5554147_cost-build-kit-car.html). Accessed August 23, 2011

<sup>27</sup> Kitcars.com, 2011. Posted May 23, 2011. [http://www.kitcars.com/Classifieds/AdDetails.asp?classified\\_id=22906](http://www.kitcars.com/Classifieds/AdDetails.asp?classified_id=22906). Accessed August 23, 2011.

<sup>28</sup> Barrett-Jackson.com, 2011. <http://www.barrett-jackson.com/application/onlinesubmission/lotdetails.aspx?In=1349&aid=403&pop=0>. Accessed August 23, 2011.

**Table 4.1: Approximate Cost of Chevrolet Complete “Turn-Key”  
Crate Motors/Engine Packages  
(Not Including Shipping, Tax, or Installation)\*\***

<b>Name</b>	<b>Carbureted or Fuel Injected</b>	<b>Horsepower</b>	<b>Cost</b>
350	Carbureted	290	\$4,600
ZZ4	Carbureted	330	\$5,000
385	Carbureted	386	\$5,700
LS376	Fuel Injection	515	\$7,200
<b>E-ROD LS3</b>	<b>Fuel Injection</b>	<b>430</b>	<b>\$7,600</b>
ZZ427*	Carbureted	480	\$8,100
ZZ502*	Carbureted	502	\$8,400
Ram Jet 502*	Fuel Injection	502	\$10,400
ZZ572*	Carbureted	620	\$13,300
427*	Carbureted	430	\$17,500
LS9 ZR1	Fuel Injection	638	\$21,000

\* Near-complete - does not come with relatively low cost parts such as alternator, power steering pump, drive belts, pulleys, air cleaner, starter, and fuel pump

\*\*Costs are from Superior Chevrolet Performance Center, 2011.

Although many engines put into kit cars are simple engines (carbureted, no electronics), a number do have electronic fuel injection (with accompanying ECM), and a few also use oxygen sensors. Staff expects many of the extra installation steps required for an engine certified through the proposed regulations and procedures, as opposed to a non-electronic engine, also apply to the installation of an engine with electronic fuel injection.

Some hobbyists completely build the kit car, and some have certain steps taken care of professionally, such as paint, or building or installing the engine. The following would likely be additional steps when installing an engine compliant with staff’s proposed requirements<sup>29</sup>, as opposed to a simpler carbureted engine. If the certified engine package was installed into the vehicle by an installer this would impose additional costs to the ultimate user:

1. Install the evaporative canister and the lines,
2. Extra effort to install the exhaust system including catalyst placement and oxygen sensors,

<sup>29</sup>General Motors, 2011b. GM Performance Parts Catalog 2011  
[http://www.gmperformanceparts.com/res/pdf/GMPP\\_Catalog\\_2011.pdf](http://www.gmperformanceparts.com/res/pdf/GMPP_Catalog_2011.pdf) (only parts pertaining to E-ROD) Accessed August 26, 2011.

3. Purchase correct (specified) fuel lines (if not supplied with the engine package or with the kit car ),
4. Purchase correct (specified) fuel tank and installation (if not supplied with the engine package or with the kit car,
5. Possible minor fabrication of custom supports for air filter and mass air flow sensor, and
6. Installation of wiring harness, ECM and other minor additional electrical components.

The above items are generally within the expertise of someone building a kit car. Installing the correct fuel tank may require some fabrication of supports. Or if the correct fuel tank is supplied with the kit car, then the frame and body were designed to fit with that supplied fuel tank and no modifications would be needed. As stated above, staff proposes to require a detailed installation manual to be included in each certified engine package, which would include step by step instructions on the aforementioned steps. Staff estimates that this additional effort would increase the installation costs of a certified engine package by approximately \$2,000, if the certified engine package was installed by an installer.

#### *Potential Costs Impacts to Installer of the Certified Engine Package*

If an installer is hired to install the engine package, the shop must fill out some paperwork, take photographs, report annually to the ARB, and maintain records for two years. As part of this, the installer will be required to fill out an affidavit and return it to the engine manufacturer. These steps might take a technician (\$120 per hour<sup>21</sup>) or office personnel (\$40 per hour<sup>21</sup>) approximately 30 minutes per vehicle. Therefore these tasks might add \$20 to \$60 per installation, which are of nearly insignificant cost when compared to the cost of installing an engine into a vehicle, whether that be a certified engine or a standard crate engine. Annual reporting costs are estimated at \$40 per installation.

This proposed regulation contains a provision that would require a professional installer to provide an installation warranty for emissions purposes.

As mentioned above, the emissions warranty would apply to both the engine package as well as the installation. Therefore, emissions warranty issues could be the responsibility of the engine package manufacturer, the engine package installer (hobbyist or professional), or some combination. It is likely that emissions warranty repairs due to installation would be minimal. Staff assumes that repairs for installation would occur in five percent of the installations, and would take two hours including

diagnosis (at a rate of \$120 per hour<sup>21</sup>). This would result in an installation warranty claim of \$240, or an average \$12 per engine package installed.

It is likely that installer problems should be minimal. In fact, once the vehicle has the engine assembly installed, any test drives or engine operation could well result in a MIL illumination if something is disconnected, not installed properly, defective, etc. In this case, the problem could be corrected before the vehicle even leaves the shop (or shortly thereafter). Additionally, since the first Smog Check will be performed by a BAR referee station, any existing problems should be detected.

If twelve automotive repair shops throughout the state performed installations and each installer installed four engine packages per year, then installers would incur installation record keeping costs of \$240 annually, and costs of \$88 for annual reporting and warranty related costs. It is likely that installer businesses would include these costs in the price of the installation; therefore these costs would be borne by the end user.

### **C. Potential Impact on Business Competitiveness**

The proposed certification regulations and procedures would have no adverse impact on business competitiveness. Manufacturers expected to apply for engine package certification are outside of California. Installers impacted by warranty and reporting requirements would likely experience no adverse impact on the ability to compete with business in other states, because their market is only in California.

### **D. Potential Impact on Employment**

It is unlikely to expect any noticeable change in California employment because there is a very small share of motor vehicle and parts manufacturing employment in California. Additionally, staff does not expect an increase of hobbyists building SPCNSs due to the proposed regulations. Therefore, the number of installers hired by hobbyists would not likely increase or decrease due to the proposed regulations.

### **E. Potential Impact on Business Creation, Elimination, or Expansion**

There is a potential for business to be created or expanded in response to the proposed certification regulations and procedures. Staff does not expect the proposed regulations to affect business elimination.

### **F. Potential Costs to Local and State Agencies**

The proposed regulations affect manufacturers, hobbyists, and installers. Staff expects BAR to initiate a rulemaking or expand an existing rulemaking (see section 6 below) to address issues surrounding the initial visual inspection, and biennial Smog Checks for these vehicles. BAR will evaluate fiscal impacts in their rulemaking process. Although

additional SPCNSs will go to referee stations, their number will be small; therefore it is anticipated the existing referee network has capacity to accept them.

## **V. ENVIRONMENTAL IMPACTS ANALYSIS**

### **A. Legal Requirements**

ARB is the lead agency for the proposed regulation and has prepared this environmental analysis pursuant to its Certified Regulatory Program. California Public Resources Code §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 was certified by the Secretary of the Resources Agency in 1978 and is codified as CCR, title 17, sections 60005-60008. 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 anticipated significant long or short term adverse and beneficial environmental impacts associated with the proposed action and a succinct analysis of those impacts (CCR section 60005 (b)). The resource areas from the CEQA Guidelines environmental checklist (CCR, title 14, section 15000 *et seq.* Appendix G) were used as a framework for assessing potentially significant impacts. In accordance with ARB's certified regulatory program, for proposed regulations the environmental analysis is included in the Staff Report: Initial Statement of Reasons (ISOR) for the rulemaking (CCR section 60005).

If comments are received during the public review period that raise significant environmental issues, staff will summarize and respond to the comments. The written responses will be included in the Final Statement of Reasons (FSOR) for the regulation. Prior to taking final action on the proposed regulation, the decision maker will approve the written responses (CCR 60007 (a)). 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.

### **B. Impacts Analysis**

Based on ARB's review of the proposed regulation, staff has concluded that the regulation would not have a significant adverse effect on the environment and that it may provide air emissions benefits as compared to current practices. This analysis does not include a discussion of alternatives or mitigation measures that could reduce adverse environmental impacts because there are no significant adverse environmental impacts identified.

The proposed regulation is an optional certification procedure for new light-duty engine packages for use in SPCNSs. There will be no requirement for manufacturers to certify engines per the procedure or for hobbyists to purchase these certified engines. The proposed regulation does not require any action that could, either directly or indirectly, cause any adverse impacts on the environment. The optional certification procedure does 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 regulation is 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 regulation does not involve any activity that would involve or affect hazardous material, hydrology and water quality, noise, or population and housing because it is an optional certification procedure for engines and does not mandate any action that could affect these resources. The potential air quality benefits are discussed in more detail below.

#### 1. Potential Air Quality Benefits

Engines certified through the proposed procedure are expected to provide an air quality benefit in terms of reduced emissions as compared with current practices to the extent that they result in hobbyists building SPCNSs to use certified engines instead of uncontrolled engines.

Overall, staff estimates that a typical SPCNS today emits 1.3 to 3.4 times the amount of NOx and HC emissions per year as an average new model year 2010 passenger car. As described further below, this estimate takes into account that SPCNSs are driven relatively infrequently but that SPCNSs have over 30 times higher emission rates on a per mile basis than new passenger cars.

The proposed regulation will enable manufacturers to certify engine packages to be essentially as low-emitting as new passenger cars. Hence, hobbyists who choose to buy such certified engine packages will have the potential to drastically (by a factor of more than 30 on a per mile basis) reduce their emissions below what they otherwise would have been, had they chosen an uncontrolled engine that emits like the engine found in a typical SPCNS today.

Staff first examined emissions data in the EMFAC model<sup>30</sup> and found that an uncontrolled crate engine emitting like a 1967 or older vehicle would be expected to have 60 to 200 times the per mile HC and NOx emissions as a modern, low-emitting engine.

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<sup>30</sup> ARB, 2007. EMFAC, November 2006. [http://www.arb.ca.gov/msei/onroad/latest\\_version.htm](http://www.arb.ca.gov/msei/onroad/latest_version.htm)

To get a more accurate estimate of how emissions from SPCNSs on the road in California today compare to those from new cars, staff obtained BAR's 2001 through 2010 Smog Check data.<sup>31</sup> Staff examined test results for all SPCNSs tested using the ASM during years 2001 to 2010 and compared it to the ASM test results for model year 2010 vehicles tested during that same period. To remove potentially invalid data, staff removed any SPCNSs from the data set with ASM acceleration violations, any vehicles with erroneous data (zeroed out readings for hydrocarbons or oxides of nitrogen), and duplicate entries. Because the proposed regulation and certification procedures apply only to vehicles under 8,500 pounds GVWR, staff also removed any vehicles with GVWR of 8,500 pounds or higher (heavy duty vehicles, trucks, and buses).

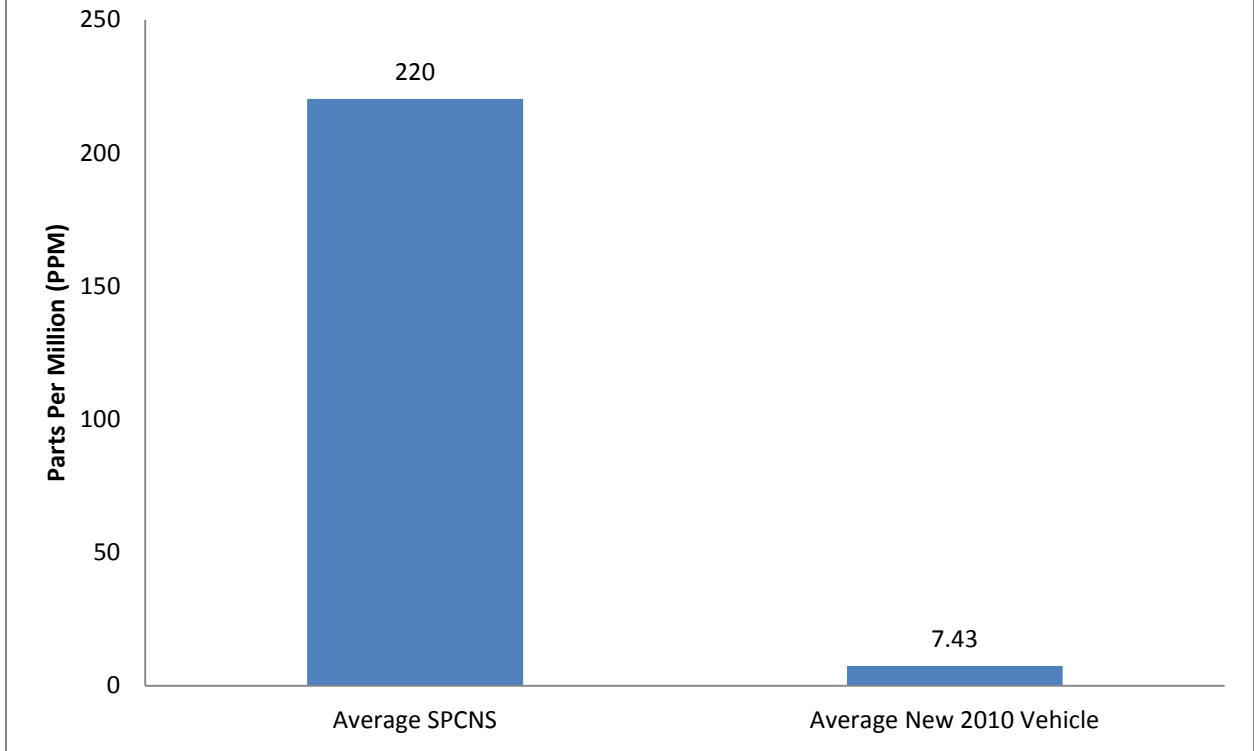
The results are summarized below in Table 5.1 and show concentrations of pollutants in SPCNS emissions are much higher than in model year 2010 vehicle emissions. This is likely due to SPCNSs currently being equipped with uncontrolled engines. As shown in Table 5.1 and illustrated in Figures 2 and 3 below, the Smog Check data indicates pollutant concentrations in SPCNS emissions are on average 30 times higher for HC and 38 times higher for NOx than model year 2010 vehicle emissions. This means that SPCNSs emit approximately 30 times the HC and 38 times the NOx as new vehicles meeting the LEV II standard for each mile they drive.

**Table 5.1: HC and NOx Emission Levels from ASM Testing for 2001-2010 SPCNSs vs. 2010 Vehicles**

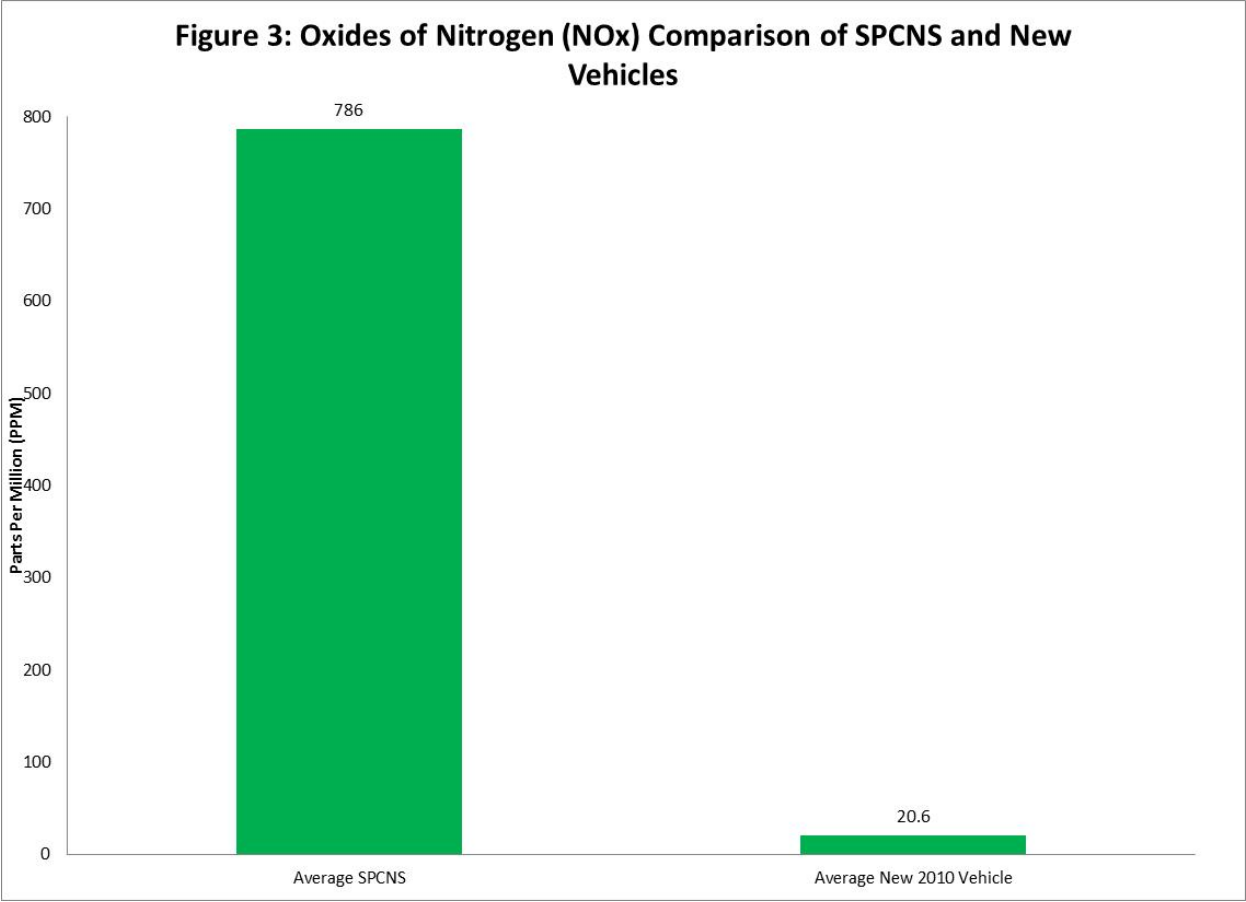
	Number in Sample	HC (parts per million)	NOx (parts per million)
Average SPCNS	1510	220	786
Average New Vehicle	3922	7.43	20.6
Ratio of Average SPCN to Average New Vehicle Emission Concentrations		29.6	38.2

<sup>31</sup> BAR, 2011b. California Bureau of Automotive Repair. BAR 2010 and SPCNS Smog Check Data. Excel Worksheet. September 6, 2011.

**Figure 2: HC Comparison of SPCNS and New Vehicles**







Even though each SPCNS typically drives much less than a new car, because its emission rates are so much higher, the emissions from each SPCNS is significantly greater than for each 2010 model year passenger car. According to BAR data, an SPCNS travels on average only 900 miles per year (BAR, 2011c). This compares to a typical passenger car which drives between 10,000 and 20,000 miles per year, depending on its age and where it operates.<sup>30</sup> Table 5.2 below shows how SPCNS emissions compare to emissions for a model year 2010 vehicle, with a typical SPCNS today emitting 1.3 to 3.4 times the amount of NO<sub>x</sub> and HC emissions per year as an average new model year 2010 passenger car.

**Table 5.2: Emissions Comparison for a Typical SPCNS versus a New Passenger Vehicle**

<b>Annual Mileage of New Passenger Vehicle Assumed</b>	<b>Ratio of SPCNS to New Vehicle HC Emissions</b>	<b>Ratio of SPCNS to New Vehicle NOx Emissions</b>
10,000	2.7	3.4
20,000	1.3	1.7

Overall, to the degree that engine manufacturers pursue certification and hobbyists who otherwise would have purchased uncontrolled engines purchase certified engine packages instead, there will be an air quality benefit due to the regulation in that emissions will be reduced.

## **VI. IMPACTS TO OTHER STATE AGENCIES**

ARB staff has worked with the affected agencies to ensure that any potential impacts are appropriately addressed. Staff met multiple times with DMV, CHP, and BAR to ensure the proposed procedure would work with current process to actually benefit consumers. Descriptions of any impacts identified are described below.

### *Department of Motor Vehicles*

The DMV may experience a slight increase in the number of SPCNSs registered outside of the SB 100 program if SPCNS owners elect to install an engine that has been certified under the proposed regulations. However, the proposal does not affect how those vehicle registrations are currently processed by the DMV, and therefore, the DMV is not expected to be adversely affected.

### *California Highway Patrol*

An important part of the SPCNS registration process involves a visible inspection of the vehicle and its parts by the CHP, as indicated in Figure 1.<sup>32</sup> SPCNSs equipped with an engine certified under the proposed regulations will be labeled accordingly. While those engines will not be treated differently in CHP’s inspection process, the proper identification of the engines will assist CHP in their procedures to trace the engine’s origin.

<sup>32</sup> CHP, 2011. California Highway Patrol. Meeting with Sergeant Troy Rivers, Vehicle Theft Unit. June 14, 2011.

### Bureau of Automotive Repair

Each SPCNS registration application requires an initial inspection at a BAR Referee Station to determine the model year for Smog Check inspection purposes (if the vehicle qualifies for the SB 100 program), to determine Smog Check requirements (if any), to inspect the vehicle to ensure the appropriate emission control systems have been installed as required, and if required, to conduct a Smog Check inspection of the vehicle (BAR, 2011a).

The proposed regulations would affect the BAR Referee Station in that the technician would need to locate and interpret the engine label or engine Executive Order in order to properly identify the engine as one that is certified under the proposed program, and to inspect the engine and emission control systems for compliance with the Smog Check requirements for the engine model year. ARB staff is continuing to work with BAR staff to determine the appropriate methodology for verifying the emission control requirements. For example, the BAR technician may either confirm the required emission controls directly from the engine label or by cross-referencing the Executive Order on ARB's website.

Staff intends engine packages certified through the proposed regulations and procedures would also qualify for an engine change in existing (previously registered) SPCNSs. Staff will continue to work with BAR on their engine change policy to ensure certified engine packages would be allowed for engine changes as well as for new vehicles.

BAR will need to initiate a separate rulemaking process to amend their current practices, and determine if hobbyists will be required to go to a referee station for all future Smog Check inspections. ARB will continue to work with BAR on rulemaking efforts connected with these engine packages.

## **VII. 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, implementation, and enforcement of environmental laws, regulations, and policies<sup>33</sup>. 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

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<sup>33</sup> SB-115, 1999. Solis. [http://www.leginfo.ca.gov/pub/99-00/bill/sen/sb\\_0101-0150/sb\\_115\\_bill\\_19991010\\_chaptered.html](http://www.leginfo.ca.gov/pub/99-00/bill/sen/sb_0101-0150/sb_115_bill_19991010_chaptered.html)

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.

Over the past twenty years, the 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.

The emission reductions resulting from adoption of the proposed regulations will affect a small subset of on-road vehicles statewide. To the extent that communities have a disproportionate population of SPCNSs that choose certified engine packages, the benefits of the proposed regulations may provide relatively greater air quality benefit to these communities.

## **VIII. REGULATORY ALTERNATIVES**

The main alternative considered by staff was to take no action, i.e., not to establish a new certification procedure for engine packages. As discussed further below, staff believes the recommended proposal is superior to this alternative because it will encourage more manufacturers to build and more hobbyists to choose low-emitting engine packages.

As discussed in section 5, on a per mile basis, SPCNSs today emit on average over 30 times more emissions than average 2010 vehicles meeting current emission standards. Hence, ARB staff believes it will be beneficial for clean air to encourage more kit car hobbyists to choose lower-emitting engines. Allowing manufacturers to certify light duty engine packages for use in SPCNSs to new vehicle emission standards will guarantee on a per mile basis the SPCNSs built with such engines are nearly as low-emitting as other new vehicles. Additionally, certified engine packages would be required to meet current evaporative emission standards, meaning less evaporative emissions released to the environment and less fumes in hobbyist garages.

Under the no action alternative, ARB would have no way to evaluate the emissions of light-duty engine packages, and manufacturers would have no way of certifying such engine packages as low-emitting. Under the no action alternative, kit car hobbyists would have no way beyond reading manufacturer literature to differentiate low-emitting engines from dirty ones and no guarantee of being able to purchase an engine that had

demonstrated emission compliance to a regulatory agency. In addition, under the no action alternative, those hobbyists that did choose lower emitting engines would receive no registration benefit for doing so; they would have to compete for Certificate of Sequence numbers with all the hobbyists choosing cheaper, higher-emitting engines.

## **IX. SUMMARY AND CONCLUSION**

Staff's proposed certification regulations and procedures will allow manufacturers to certify engines for use in light-duty SPCNSs and provide hobbyists low-emission options when it comes to choosing an engine. The proposed regulations and procedures provide the necessary flexibility needed for the unique characteristics of SPCNSs, while ensuring new SPCNSs are as low-emitting as new production vehicles. Staff recommends the Board adopt the following, which incorporate the proposal:

1. Title 13, Division 3, Chapter 1, Article 1.5: Light-Duty Engine Packages for Use in Light-Duty Specially Constructed Vehicles, and
2. California Certification Procedures for Light-Duty Engine Packages for Use in Light-Duty Specially Constructed Vehicles for 2012 and Subsequent Model Years

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