

State of California  
AIR RESOURCES BOARD

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

**PROPOSED CALIFORNIA EVALUATION PROCEDURE FOR NEW AFTERMARKET  
DIESEL PARTICULATE FILTERS INTENDED AS MODIFIED PARTS FOR 2007  
THROUGH 2009 MODEL YEAR ON-ROAD HEAVY-DUTY DIESEL ENGINES**

Date of Release: March 1, 2016  
Scheduled for Consideration: April 22, 2016

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**Staff Report: Initial Statement of Reasons  
for Proposed Rulemaking**

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## LIST OF ACRONYMS

ACES	Advanced Collaborative Emissions Study
AECD	Auxiliary Emission Control Device
ARB	[California] Air Resources Board
ASTM	American Society for Testing and Materials
BAT	Bench Aging Time
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CISD	Compliance and Innovative Strategies Division, U.S. Environmental Protection Agency
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
CRC	Coordinating Research Council
CVC	California Vehicle Code
DOC	Diesel oxidation catalyst
DPF	Diesel particulate filter
ECG	Emission Control Group
ECU	engine control unit
EFN	Engine family number
EGR	Exhaust gas recirculation
EMD	Engine manufacturer diagnostic system
EO	Executive order
FMCSA	Federal Motor Carrier Safety Administration ,
FTP	Federal Test Procedure
GDI	Gasoline direct injection
H <sub>2</sub> O	Water
HC	Hydrocarbons
HSC	California Health and Safety Code
MIL	Malfunction indicator light

MPFI	Multi-point fuel injection
N <sub>2</sub>	Nitrogen
NMHC	Non-methane hydrocarbon
NO	Nitric oxide
NO <sub>2</sub>	Nitrogen dioxide
NOx	Oxides of nitrogen
O <sub>2</sub>	Oxygen
OEM	Original equipment manufacturer
PAH	Polycyclic aromatic hydrocarbons
PGMs	Platinum group metal
PM	Particulate matter
QC	Quality control
RPM	Revolutions per minute
SCR	Selective catalytic reduction
SET	Supplemental Emissions Test
SOP	Standard operating procedure
TAC	Toxic air contaminant
TWC	Three-way catalytic converter
U.S. EPA	United States Environmental Protection Agency
VC	Vehicle Code

## EXECUTIVE SUMMARY

### BACKGROUND

Beginning with the 2007 model year, on-road heavy-duty diesel engines (HDDEs) have been equipped with diesel particulate filters (DPFs) to meet increasingly stringent diesel emission standards, particularly with respect to emissions of particulate matter (PM), a toxic air contaminant (TAC). When DPFs are damaged or require replacement (e.g., deteriorate through normal usage) beyond the original equipment manufacturer (OEM) warranty period, end users may replace such DPFs with new OEM DPFs, but have expressed interest in purchasing less expensive aftermarket DPFs. Furthermore, aftermarket part manufacturers, recognizing the growing potential market for aftermarket DPFs for older HDDEs, have requested that ARB staff develop a procedure that would allow them to market and sell aftermarket DPFs in California.

California Vehicle Code section 27156 prohibits the sale, offer for sale, advertisement, or installation of any device that alters the design or performance of any required motor vehicle pollution control device or system, unless that device has been exempted by the Air Resources Board (ARB or Board). Pursuant to this authority, ARB has adopted aftermarket parts regulations, but those regulations are not directly applicable to non-OEM aftermarket emission control devices for on-road heavy-duty diesel engines. The majority of aftermarket parts are categorized as “modified parts”, defined in pertinent part in title 13, California Code of Regulations 1900(b)(17) as aftermarket parts that are intended to replace an original equipment emission-related part and that are not functionally identical to the original equipment part in all respects which in any way affect emissions, excluding a consolidated part.

In developing this proposal, staff reviewed ARB’s existing aftermarket part exemption procedures and concluded that those procedures do not suitably address the issues and considerations applicable to aftermarket DPFs. DPFs on heavy-duty diesel engines and vehicles are significantly different in design, failure modes, and operating environments than the devices used on light-duty vehicles and motorcycles. For example, DPFs function as traps and are not flow-through devices like catalytic converters, and therefore accumulate material (soot), which must be periodically oxidized (“regenerated”), and form ash, which requires occasional cleaning to ensure the DPF operates effectively.

Therefore, a unique evaluation procedure and path for approval of aftermarket DPFs is needed. This proposed DPF evaluation procedure establishes criteria to demonstrate an aftermarket DPF is durable, compatible with the OEM engine such that it does not negatively impact the OEM engine or system operations, and maintains the emissions compliance of the engine while minimizing costs to the manufacturers of aftermarket DPFs so savings could be passed onto the consumer.

## **STAFF PROPOSAL**

Staff worked cooperatively with industry, through public workshops and individual stakeholder meetings, to solicit comments and feedback. Staff believes that the proposed procedure is sufficiently robust to ensure that aftermarket DPFs will meet the exemption requirements of VC section 27156, yet are cost effective in order to balance the interests and concerns of both industry and the end users who would be purchasing these parts.

Staff is therefore proposing to amend the existing aftermarket regulations to establish an evaluation procedure specifically applicable to aftermarket DPFs for 2007 through 2009 model year HDDEs. 2010 and subsequent model year HDDEs are certified with more complex engine and emission control technologies that are not accounted for in the proposed evaluation procedure. Also, the proposed procedure does not address the unique issues presented by other aftertreatment technologies, such as diesel oxidation catalysts (DOC) or selective catalytic reduction (SCR) systems.

In addition to robust durability and emissions testing, the procedure includes protections for the end-users in the form of strict warranty, recall, and audit requirements as well as ensuring, in the form of the engine pre-installation assessment and basic record keeping, that appropriate information is maintained to allow ARB and approved aftermarket DPF manufacturers to take corrective action if necessary.

## **EMISSIONS REDUCTIONS AND COST IMPACTS**

The proposed procedure would add market flexibility by allowing non-OEM companies to sell aftermarket DPFs in California, and allowing end-users to purchase and utilize such aftermarket DPFs as an option to purchasing OEM DPF replacement parts. Aftermarket parts generally are less expensive than OEM parts. Staff estimates that the proposed procedure has a range of potential costs depending on the specifics of the testing and chosen target market segment. Any estimated costs would be offset by sales of aftermarket DPFs.

Participation in the program is voluntary and contingent on the fact the company wishes to sell in California. Manufacturers of aftermarket DPFs will bear most of the responsibilities and costs related to compliance with the proposal, including costs for testing, warranty, and record keeping. In the event that a product is subject to audit a device manufacturer may incur some minor associated costs. The total compliance costs per manufacturer will vary depending on the amount of testing, warranty issues, etc. Installers would bear a smaller portion of the costs associated with warranty and record keeping, but many installers already keep similar records for other programs. Manufacturers and installers would likely not participate unless they expect to realize an economic benefit from the sale and service of the products.

The introduction of aftermarket DPFs into the marketplace is expected to result in a more cost effective product than the average OEM part available today, resulting in total

statewide savings to the end users. This proposal will allow a competitive market place and a possible increase in revenue for companies that elect to participate. OEM engine manufacturers may experience some extent of loss of sales of DPFs, but staff estimates such lost sales are comparatively minor.

### **STAFF RECOMMENDATIONS**

The proposed evaluation and testing procedure, as described herein, would provide a means for ARB to evaluate the emissions reduction capabilities and durability of aftermarket DPFs. The proposal provides sound guidelines for evaluation, while retaining the flexibility needed to reduce the burden on applicants. ARB staff recommends that the Board approve for adoption the proposed new title 13, California Code of Regulations subsection 2222(k) and the incorporated document "California Evaluation Procedure for New Aftermarket Diesel Particulate Filters Intended as Modified Parts for 2007 through 2009 Model Year On-Road Heavy-Duty Diesel Engines."

## **I. INTRODUCTION AND BACKGROUND**

### **A. Introduction**

The Air Resources Board (ARB) has statutory authority to exempt modified parts from the anti-tampering prohibitions in VC section 27156 if it finds that such parts will not reduce the effectiveness of any required pollution control device nor cause vehicle emissions to exceed applicable standards. A modified part is defined (13 CCR 1900(b)(17)) as any aftermarket part intended to replace an original equipment emission-related part and which is not functionally identical to the original equipment part in all respects which in any way affect emissions, excluding a consolidated part. For the purpose of this document a modified part DPF will be referred to as an aftermarket DPF.

ARB has established regulations applicable to aftermarket parts such as new aftermarket catalytic converters for passenger cars, and light- and medium-duty vehicles, and aftermarket critical emission control parts for highway motorcycles. However, ARB's current aftermarket provisions are not applicable to aftermarket DPFs, emissions control components that are widely used to control emissions of diesel particulate matter (PM), a toxic air contaminant, from on-road heavy-duty diesel engines. The evaluation procedures in ARB's existing aftermarket part programs were not designed to address the unique considerations of assessing the compatibility, emissions reductions, safety, and device durability of aftermarket DPFs.

Staff is therefore proposing a new exemption procedure for aftermarket DPFs. Exempted aftermarket DPFs may only be used on 2007 through 2009 model year on-road heavy-duty diesel engines (HDDEs) because 2010 and subsequent model year HDDEs are certified with more complex engine and oxides of nitrogen (NOx) control technologies such as selective catalytic reduction (SCR) systems that are not accounted for in the proposed evaluation procedure.

Because exemption procedures for aftermarket DPFs currently do not exist, end users seeking to replace damaged or nonfunctioning DPFs must currently purchase new DPFs from OEMS. OEM DPFs generally qualify as "replacement parts" that are functionally identical to the original equipment part in all respects which in any way affect emissions (including durability).

The proposed procedure is entitled, "California Evaluation Procedure for New Aftermarket Diesel Particulate Filters Intended as Modified Parts for 2007 through 2009 Model Year On-Road Heavy-Duty Diesel Engines," and includes provisions related to: testing for emissions, durability, and compatibility; product and installation warranties; warranty reporting; labeling requirements; audit testing; quality control checks; pre-installation assessments; and recall procedures. The proposed provisions will help ensure that an exempted aftermarket DPF will have similar durability, integrity, and emissions compliance characteristics as the OEM DPF it replaces.

This staff report describes the proposed evaluation procedure and the rationale for each provision. It also presents staff's analysis of impacts associated with the implementation of the proposed procedure, including costs and economic and environmental impacts. The text of the proposed regulation is set forth in Appendix A and the text of the proposed procedure to be incorporated by reference is set forth in Appendix B. Additional appendices provide supporting documentation.

This staff report, including the attached appendices, constitutes the initial statement of reasons (ISOR) for the proposed rulemaking, as required by the California Administrative Procedure Act (Government Code section 11340 et seq).

## **B. Background**

### **1. Control of Diesel Particulate Matter Emissions from On-Road Heavy-Duty Diesel Engines**

In 1998, ARB identified diesel PM as a toxic air contaminant (TAC) following an extensive ten-year scientific review process. A TAC is an air pollutant that contributes to mortality or serious illness, or poses other potential hazards to human health. Diesel PM is primarily comprised of PM<sub>2.5</sub>, particles that are small enough to carry their toxic chemical substituents through the lungs and into the bloodstream. On-road heavy-duty diesel engines are a major source of these toxic emissions.

DPFs were developed to control diesel PM from heavy-duty engines and, depending on the design, can also reduce hydrocarbons in the exhaust. The filter in a DPF typically consists of a ceramic structure (substrate) that allows exhaust gas to pass through it but filters, or traps, the PM contained in the exhaust gas. The DPF physically captures the diesel PM at high efficiencies (> 90%) and is considered the best available technology for the control of PM. The accumulated PM or soot, which consists of unburned hydrocarbons, must be periodically combusted to ensure continuing smooth operation of the filter, engine, and vehicle. During this combustion, the solid particulates are converted via a high-temperature chemical oxidation reaction to carbon dioxide and water vapor. This process is referred to as regeneration. If regeneration is not periodically performed as a regular procedure, the soot can continue to accumulate to the point where the filter can plug completely (with elevated backpressures preventing gas flow) or an uncontrolled or runaway regeneration occurs because an excessive amount of soot is being burned off all at once. These frequent high-temperature events present technical, operational, and safety challenges which are discussed in detail in the technical support document (TSD) in Appendix D. Additionally, non-combustible material slowly accumulates in the filter as ash, which must be removed with special cleaning equipment.

DPFs are a robust technology that is used and approved worldwide. They are a common and widespread method of controlling PM and are used to meet engine certification requirements as well as a fleet rule compliance option for in-use vehicles (in the form of retrofits). Beginning with the 2007 model year, on-road heavy-duty diesel

engines were certified equipped with DPFs to meet increasingly stringent diesel emission standards including PM. These engines also typically employed aggressive exhaust gas recirculation (EGR) to control oxides of nitrogen (NOx). EGR equipped engines can pose unique challenges when used in conjunction with a DPF. Beginning with model year 2010, heavy-duty diesel vehicles were certified with additional emission control technology, such as SCR to control NOx and more stringent on-board diagnostic (OBD) requirements. 2010 and newer engines have been redesigned to meet emission standards, making these newer engines dissimilar to the earlier 2007 through 2009 model year engines which are the focus of this Procedure.

The 2007 through 2009 model year on-road heavy-duty diesel engines are therefore the focus of this proposed amendment to the aftermarket regulation, and it specifically applies to HDDEs that are no longer within the OEM emission warranty period specified in Title 13, CCR, Section 2036(c).

## 2. Replacement of Failed DPFs

The DPFs on 2007-2009 model year HDDEs have now been in use for a number of years worldwide, and many have likely exceeded the OEM's warranty or OEM's extended warranty. As these engines age, there is an increasing need to replace the OEM DPFs as the parts experience wear. Engine problems such as faulty turbochargers, bad fuel injectors, or malfunctioning EGR valves can negatively impact DPFs in several ways including catalytic poisoning, fouling or overloading the DPF, or causing thermal damage due to more frequent regeneration. Failure to properly maintain the DPF, such as failing to clean the DPF or performing inappropriate cleaning, may also result in damage to the DPF. Vehicles occasionally suffer accidents (flooding, physical impacts etc.) which can also damage DPFs. All of these factors may result in a compromised DPF, although the vehicle itself may still be usable. However, without a functioning DPF the vehicle would have excessive PM emissions necessitating its replacement.

Because exemption procedures for aftermarket DPFs currently do not exist, end users seeking to replace damaged or nonfunctioning DPFs must currently purchase new DPFs from OEMs, which limits end users' options. In addition, the lack of alternatives provides OEMs no incentive to offer competitive pricing to end users. Several companies have approached ARB and have expressed an interest in selling aftermarket DPFs in California. In response, ARB has developed the proposed procedure for evaluating aftermarket DPFs.

## **C. Specific Purpose for the Amendment**

The proposed amendment establishes a path for approval and sale of aftermarket DPFs for 2007 through 2009 model year on-road heavy-duty diesel engines. The proposal amends the aftermarket parts regulation (Title 13, CCR, Section 2222) to:

- Allow the approval and sale in California of aftermarket DPFs that meet the exemption criteria of California VC section 27156 and ARB's evaluation procedure for DPFs.
- Incorporate by reference an evaluation procedure that specifies the criteria ARB will use to evaluate aftermarket DPFs.

More specifically, the proposed evaluation procedure will:

- Specify criteria, based on sound principles of science and engineering, to determine how a proposed aftermarket DPF for 2007-2009 model year heavy-duty diesel engines will be evaluated and approved by ARB;
- Detail any ongoing requirements for manufacturers and installers of approved aftermarket DPFs;
- Provide end-user protections, including warranty, safety, audit, and recall provisions;
- Ensure that the aftermarket part does not reduce the effectiveness of any required pollution control device nor cause vehicle emissions to exceed applicable standards, in compliance with VC 27156;
- Provide flexibility in the marketplace for end users seeking to purchase a replacement for their out-of-OEM-warranty DPFs;

## **II. STATEMENT OF REASONS**

### **A. Description of Problem Proposal is Intended to Address**

Exemption procedures for aftermarket DPFs currently do not exist, and therefore end users seeking to replace damaged or nonfunctioning DPFs must currently purchase new DPFs from OEMS. The average cost of OEM replacement DPFs is \$5,040, although some specialty DPFs can cost \$8,000 or more. Several companies have requested that ARB develop exemption procedures for aftermarket DPFs so that they can legally sell modified part DPFs in California. A modified part is an aftermarket part which is intended to replace an OEM emission-related part and which is not functionally identical to the OEM part in all respects which in any way affect emissions, excluding a consolidated part.<sup>1</sup>

Aftermarket DPF manufacturers may elect to manufacture and sell DPFs that meet the criteria of a replacement part,<sup>2</sup> but this path presents rigorous technical and economic requirements, as manufacturers must demonstrate that their DPFs are functionally

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<sup>1</sup> Title 13, California Code of Regulations (CCR) Section 1900(b)(17).

<sup>2</sup> Defined as "any aftermarket part intended to replace an original equipment emissions-related part and which is functionally identical to the original equipment part in all respects which in any way affect emissions (including durability), or a consolidated part." Title 13, CCR section 1900(b)(22). A consolidated part is defined as "a part which is intended to replace a group of original equipment parts and which is functionally identical of those original equipment parts in all respects which in any way affect emissions, (including durability)." Title 13, CCR section 1900(b)(2).

identical to the OEM DPFs they are designed to replace, and consequently replacement part DPFs will likely be priced at approximately the same costs of OEM DPFs.

ARB has developed exemption procedures that are specifically applicable to aftermarket parts used in light and medium-duty vehicles, and manufacturers have utilized such procedures to market lower-cost alternatives to OEM parts. For example, aftermarket three-way catalytic converters for passenger cars cost on average 60% less than their OEM counterparts. However, due to the extremely different engine and control technologies involved, and the unique considerations presented by HDDEs and DPFs, current exemption procedures are not appropriate for assessing if aftermarket DPFs for HDDEs satisfy the exemption criteria of VC 27156.

## **B. Proposed Solutions to the Problem**

Staff is proposing an amendment to the existing aftermarket part regulations that would create a path allowing manufacturers to market aftermarket DPFs intended for use on 2007 through 2009 model year HDDEs. The amendment primarily consists of an evaluation procedure specific to such aftermarket DPFs that specifies the criteria needed to obtain ARB's approval. The criteria includes requirements to conduct robust emissions and durability testing, and applicants must demonstrate that their products are compatible with the engine, do not adversely impact the emissions compliance of the engine, or negatively impact other engine components. The procedure further includes protections for the end users in the form of strict warranty requirements, pre-installation assessments, record keeping, product quality control requirements, recall provisions, and audit provisions that are similar to provisions in ARB's *Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines*.

## **C. Rationale Supporting the Proposed Solution**

The proposed amendment establishes a new evaluation procedure that allows manufacturers to manufacture and market aftermarket DPFs intended for use on 2007 through 2009 model year HDDEs. DPFs are a primary and widely used emission control device for controlling PM emissions from these engines, and therefore it is important that worn and damaged DPFs are only replaced with DPFs that have been demonstrated to not reduce the effectiveness of any required pollution control device nor cause vehicle emissions to exceed applicable standards.

The proposed amendment provides aftermarket parts manufacturers a legal pathway to market aftermarket DPFs, and provides end users a potentially lower cost option of purchasing and using such DPFs in lieu of purchasing more expensive OEM DPFs. The availability of lower cost DPFs may also result in the more timely replacement of worn and damaged DPFs, which would enhance the compliance of affected HDDEs with their PM emission standards. Therefore, although the direct emissions reductions from the proposed amendment cannot be quantified, staff expects that the emissions benefits of these engines will be maintained until they are retired from service.

The proposed evaluation procedure reflects the unique characteristics of DPFs and incorporates criteria designed to ensure that aftermarket DPFs will be effective emission control devices, including compatibility with the engine; aftermarket DPF durability; safety issues for the end user, engine, and vehicle; and protections for the end-user including warranty requirements, audit actions, recall requirements, and recordkeeping requirements. More detail on each of these issues is presented in Section III, below, and in the technical support document (TSD) in Appendix D.

### **III. SUMMARY OF PROPOSED ACTION**

The proposed amendment to section 2222 of Title 13, CCR would establish a path for exempting aftermarket modified part DPFs intended for 2007 through 2009 on-road heavy-duty diesel engines from the prohibitions of VC 27156. Staff is also proposing to incorporate a new procedure for the evaluation of such DPFs, "California Evaluation Procedure for New Aftermarket Diesel Particulate Filters Intended as Modified Parts for 2007 through 2009 Model Year On-Road Heavy-Duty Diesel Engines" that is set forth in Appendix B. The major aspects of the proposed Section 2222 amendments and the proposed Procedure are summarized below, followed by a detailed discussion of each provision.

#### **A. Proposed Amendments to the Aftermarket Regulation**

The proposed amendment establishes a path for approval and sale of aftermarket DPFs for 2007 through 2009 model year on-road heavy-duty diesel engines. This proposal would amend the aftermarket parts regulation (Title 13, CCR, Section 2222) to: allow the approval and sale in California of aftermarket DPFs that meet the exemption criteria of VC section 27156; incorporate by reference the procedure ARB that will use to evaluate whether aftermarket DPFs meet the exemption criteria of VC section 27156, "California Evaluation Procedure for New Aftermarket Diesel Particulate Filters Intended as Modified Parts for 2007 through 2009 Model Year Heavy-Duty Diesel Engines,"; and clarify the terms under which exempted aftermarket DPFs may be sold.

#### **B. Proposed Evaluation Procedure**

Staff is proposing a new evaluation procedure that specifies the criteria ARB will use to evaluate whether aftermarket DPFs meet the exemption criteria of VC section 27156. A general discussion of each provision in the proposed Procedure and the purpose behind these provisions is provided below. For more detailed information, please see the Procedure and the TSD.

##### **1. Applicability**

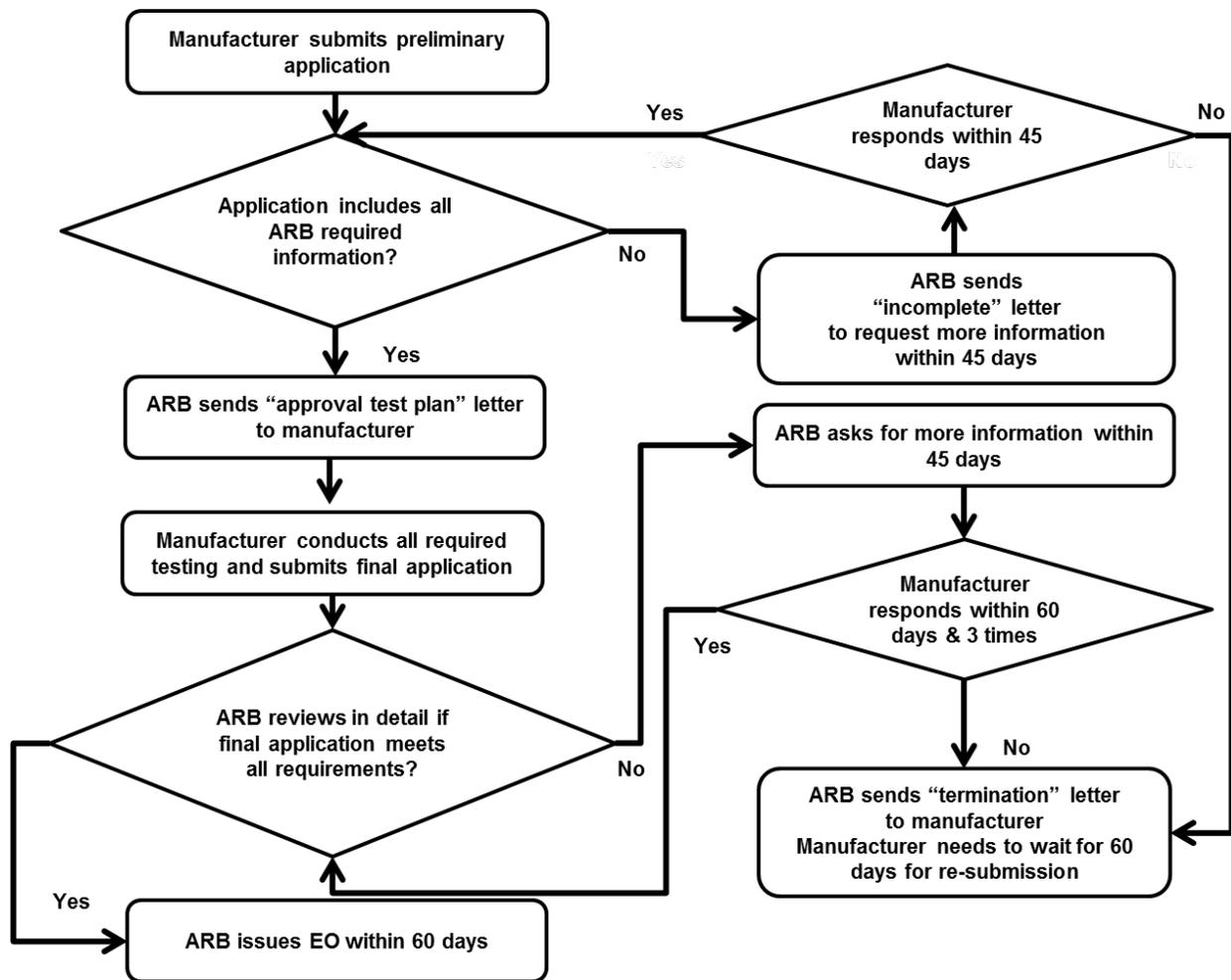
The procedure applies to manufacturers and installers of new aftermarket DPFs that are designed or intended for use on 2007 through 2009 model year on-road heavy-duty diesel engines originally equipped with DPFs.

## 2. Emission Control Group (ECG)

The Procedure specifies that an application must be submitted for only one ECG. An ECG is a group of engines and applications that share similar parameters in terms of how an aftermarket DPF will interact with the engines and how the engines will interact with the aftermarket DPF. The ECGs are grouped by engine manufacturer, as specified in the Procedure. A list of ECGs can be found in Appendix 1 of the proposed Procedure. The Procedure requires a “worst case” engine choice within a single manufacturer for testing as well as field demonstrations of compatibility. Staff selected these seven ECGs to ensure that appropriate, compatible aftermarket DPFs are installed, without creating onerous, cost-prohibitive testing requirements. Additional information relating to ECG structure can be found in Appendix D, the TSD.

## 3. Application Process

Manufacturers must apply for a VC 27156 exemption to obtain ARB approval for the sale of an aftermarket DPF. The application process consists of a preliminary application and a final application that are to be submitted to ARB in the formats specified in the Procedure. A flowchart of the application process is shown in Figure 1. The proposed Procedure specifically lists the information and data that must be included in each application. Through robust testing, the applicant must show that the proposed aftermarket DPF is compatible with the OEM engine and system and that the proposed aftermarket DPF is an effective replacement for the OEM DPF (i.e., can meet the same emission standards without negatively impacting the engine or other components). Additional testing may be required if there are specific product-related considerations such as safety concerns or the potential to emit harmful secondary emissions.



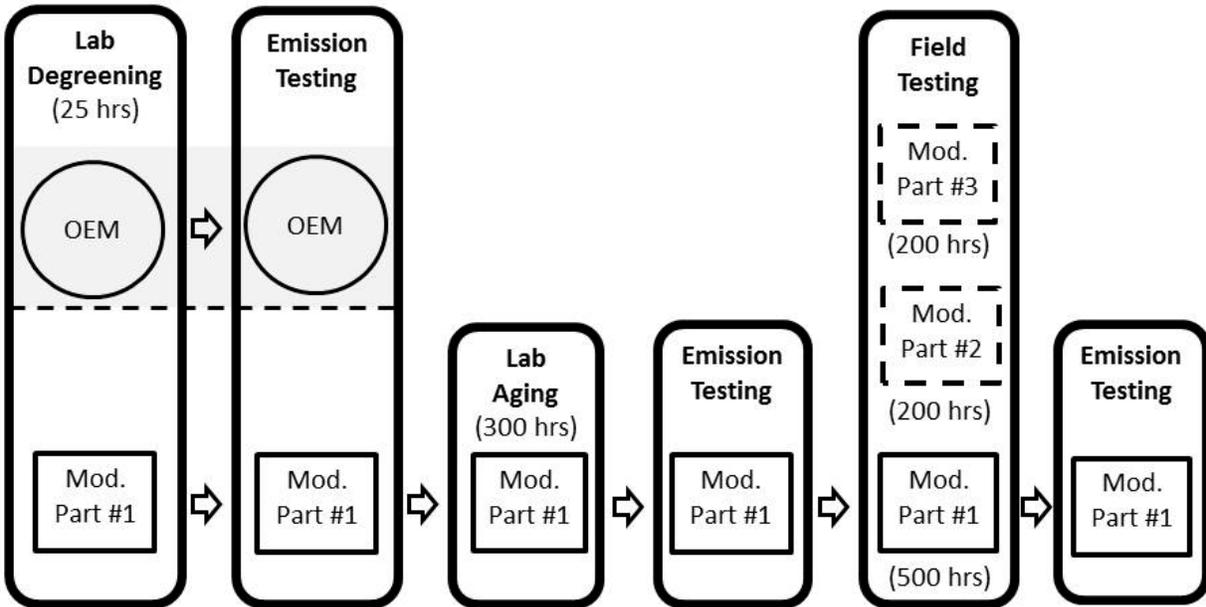
**Figure 1: Application Process Flowchart**

In the preliminary application, the applicant must provide all information related to the proposed aftermarket DPF as well as demonstrate adequate knowledge of the OEM DPFs, engines, and other components to which the aftermarket DPF will be applied. It is important for the aftermarket DPF applicant to show it has thoroughly researched the OEM engines and DPFs in the process of developing their aftermarket DPFs.

The applicant must propose one appropriate ECG for its aftermarket DPF and submit a test plan for ARB approval. The application must include detailed information supporting how the aftermarket DPF is appropriate for all engines and engine configurations within the ECG. It is critical that ARB staff has the information necessary to fully assess the aftermarket DPF in context of the ECG and proposed testing (provided by the application process), and have the ability to ensure the testing includes appropriate engine and vehicle/application choices.

#### 4. Testing Sequence

The Procedure specifies a standard protocol to test all aftermarket DPFs for emissions compliance and durability. All applicants must follow the standardized testing protocol illustrated in Figure 2.



**Figure 2: Sequence for OEM and Aftermarket DPF Testing**

This standardization allows for consistency and repeatability in testing. It prevents different testing for different systems/engines where it would be impossible to translate data, results, and information across systems, test programs, engines, and even applications. Allowing an aftermarket DPF manufacturer to propose its own testing method would still require actual testing and data to allow for the comparison of the two methods to determine if they are as robust, provide equivalent information and data, and address similar issues and concerns. The TSD contains more detailed information about the test sequence and the rationale supporting all of the required elements.

#### 5. Laboratory Aging

To demonstrate the durability and continued emission control effectiveness of the aftermarket DPF, staff developed an accelerated, laboratory aging protocol. It is tailored to DPFs and diesel engines and suitable to be used as a general laboratory aging protocol in the proposed evaluation Procedure. To simulate real-world usage in a repeatable, controlled manner, applicants must perform laboratory aging on the new (degreened) aftermarket DPF for a minimum of 300 hours. This accelerated aging process deteriorates the DPF in a similar manner and to a similar degree as approximately 4,260 hours (or 191,700 miles with a truck running at 45 mph) actual engine/truck operation in the field, but in a much shorter timeframe and under controlled conditions. In addition, it incorporates the effects (i.e., extreme temperature changes) of regular DPF regenerations. Emissions testing of the lab-aged aftermarket DPF ensures

it is still durable and compliant with all requirements in the procedure. Please see the TSD for details regarding the aging process and supporting calculations.

#### 6. Field Service Accumulation

It is essential that the aftermarket DPF demonstrate that it will be compatible with the engines for which it was designed, not just on an engine in a test cell under controlled conditions, but on an actual vehicle. The laboratory-aged, aftermarket DPF must be installed on a representative engine and vehicle and operated in the field for a minimum of 500 hours. This time in field is essential to test that the aged DPF functions well as an integrated part of the entire system in a real-world application (e.g., does not cause engine damage, show inappropriate regeneration behavior, trigger fault or error codes, or experience loss of physical integrity).

At least two (2) additional 200-hour field demonstrations are required on engines from the same proposed ECG, but these engines must be different from the engine used for the 500-hour field service accumulation. This is to ensure that no incompatibilities exist across the range of engine configurations, sizes, horsepower, and duty cycles within the ECG. These aftermarket DPFs are not required to be emission tested afterward, as the primary reason for these tests is to establish compatibility on more than one engine within the designated ECG. Additional information can be found in the TSD.

#### 7. Emission Testing

The proposed Procedure establishes emission testing requirements to support the aftermarket DPF application. The primary goal of emission testing is to ensure that an aftermarket DPF complies with emission standards, is still effective, and does not produce harmful secondary emissions, even after a long durability demonstration. All emission results must comply with the engine's certification emission standards and there must not be any fault codes or warnings during the emission testing.

Emission testing is performed on the OEM DPF (which serves, in part, as the reference) and aftermarket DPF in order to compare results. The procedure specifies criteria for comparing the OEM and aftermarket DPF emissions, as well as comparing the aftermarket DPF emissions before and after the laboratory aging and field service accumulation. Significant differences in performance would indicate that the aftermarket DPF is neither suitable nor compatible with the engine. More detailed discussion of emission testing requirements can be found in the TSD.

#### 8. Warranty

A robust warranty helps to ensure aftermarket DPFs are effective and provides protections to consumers. Defective or broken parts can be replaced at no cost to the consumer and a formal warranty directly allows for tracking of field unit performance. This may also aid in identifying any issues or problems between a product and a specific engine or application. The proposed Procedure requires a two-year warranty on both the device and its installation. The warranty must cover customer service and the full repair and replacement cost, including diagnosis, parts, labor and any damage to the engine caused by the aftermarket DPF. Devices which fail due to outside events

unrelated to the DPF or installation are typically deemed non-warrantable even if the problem occurred during the warranty period.

Staff took into account several factors when determining the appropriate length of the warranty. Diesel particulate filters are standard, ubiquitous technologies that are typically durable. A two-year warranty period for aftermarket DPFs should pose no problems to well designed and maintained systems and would provide end-users enough protection if these expensive parts should require replacement. Information provided by the yearly warranty report can help ARB determine if additional action must be taken regarding the status of the product. A shorter, one-year warranty period, which is typically provided by OEM replacement DPFs, would not be of sufficient length to adequately track and report in-field unit performance of a new product. This tracking can identify important problems with a product, such as safety issues, that would require corrective actions (e.g., a recall).

Staff also considered requiring a longer warranty period, such as the 5-year warranties required for aftermarket catalytic converters and retrofit diesel emission control systems (which include DPFs) for the Verification Program. However, considering that the heavy-duty engines for which these DPFs are intended for replacement are already beyond their warranty periods, staff concluded that the 2-year warranty would be sufficient to prevent aftermarket DPF defects and protect these engines and that any longer warranty would be unnecessarily burdensome on manufacturers or installers.

Both the manufacturer and the installer must submit annual warranty reports of all warranty claims for an aftermarket DPF. Additional reporting is required if the cumulative number of valid warranty claims exceeds four percent. Manufacturers are required to resolve all warranty claims within 30 days to ensure that end-user issues are resolved in a timely manner. The warranty requirements are consistent with other ARB programs including verification and aftermarket parts for highway motorcycles.

## 9. Safety

Safety is an essential consideration for any emission control component or aftermarket part. The aftermarket DPF must meet all applicable safety standards during the design and installation of the part, just as OEMs must account for safety of their DPFs. DPF safety is a concern for end users because of the high temperatures involved in DPF regeneration. This includes meeting the requirements of Federal Motor Carrier Safety Administration, *Parts and Accessories Necessary for Safe Operation, Subpart G, Section 393.83 Exhaust Systems*. In addition, the applicant must provide an analysis of all potential safety and catastrophic failure issues associated with the use of the new aftermarket DPF and give a detailed description of the steps taken to mitigate these issues. Improper design or installation of DPFs can lead to increased emissions of diesel PM, unexpected secondary emissions, unsafe operating conditions, and possible engine or vehicle damage. Therefore, consideration of safety when designing and installing these devices is essential.

The Procedure specifies a number of safety-related aspects of aftermarket DPFs, including: manufacturer-authorized installers; in-kind substitution (not allowing an aftermarket DPF to use a different type of core material than the core material used in an OEM DPF); laboratory accelerated aging protocol; field testing with dataloggers; emissions testing during regenerations; the option to require additional testing for secondary emissions; warranty; labeling; audit, and recall.

#### 10. Labeling

Proper labeling of aftermarket DPFs is essential to facilitate identification that the DPFs are legal for use in California. The proposed Procedure establishes labeling requirements consistent with other aftermarket procedures. Identical labels that are legible, visible (before and after installation), and durable for the entire time the DPF is on the engine/vehicle must be affixed in a tamper-resistant manner to both the engine and the aftermarket DPF. Proper labeling also helps installers to determine an appropriate replacement, if the DPF fails. For DPFs that are not unidirectional, it is also essential to have the direction of flow marked with an arrow to ensure proper installation.

#### 11. Installation Requirements

Ensuring that engines/vehicles are properly fitted with approved, aftermarket DPFs is critical for realizing the full emissions benefits of such DPFs and ensuring their safe use. Therefore, the Procedure also sets forth specific installation requirements that must be met, and are consistent with other ARB aftermarket part programs.

The installer is required to perform a pre-installation compatibility assessment. An older aftermarket ARB program, Verification, saw numerous instances of avoidable device failure when verified technologies were installed incorrectly, on inappropriate engines, or on engines in an improper state of maintenance. The required assessment ensures the aftermarket DPF is not installed on an engine for which it was never approved (e.g., outside of the ECG) or an engine which may have caused the OEM DPF to fail by being improperly maintained. DPFs that are improperly installed or are installed on engines with which they are incompatible can produce increased emissions of toxic diesel PM and, potentially, uncontrolled regenerations that can damage other engine parts and/or present a safety hazard. Another reason for this requirement is to ensure that components are replaced with similar, approved parts as failure to do so could potentially lead to hazardous secondary emissions or failure modes which staff would not have had the opportunity to investigate, since the device would not have been approved for that use. By requiring certain checks and conditions, including training, to occur prior to installing a device, these types of issues can be avoided and potentially mostly eliminated.

The proposed Procedure further requires that the installer be authorized by the manufacturer to perform the installation. This requirement ensures that DPF installation is performed by a party trained to properly perform the installation and is consistent with the authorized installer requirements of other ARB aftermarket programs (e.g., the Verification Program). If this requirement did not exist, installers with no or improper

training may incorrectly install aftermarket DPFs. Authorized installers would therefore be much more likely to properly install aftermarket DPFs and to provide appropriate service and support to the consumer, thus potentially avoiding unnecessary disputes with respect to product or installation issues. This also holds the installer accountable for providing appropriate warranty information to the device manufacturer and ARB. Without this accountability it may be difficult or impossible to obtain accurate warranty reports, conduct audits, and undertake recalls.

#### 12. Quality Control Procedures

Quality control is an essential part of any manufacturing process and ensures that the resultant parts are consistent, effective, and pose no safety issues to the end user. The proposed procedure would require manufacturers to monitor the aftermarket DPF production process to ensure that production components actually meet the specifications upon which ARB approval is based. It is similar to requirements that manufacturers of aftermarket catalytic converters must follow. At a minimum, manufacturers would check for adequate precious metal content, base metal content, and washcoat loading. Inspections to ensure proper application of the washcoat, proper installation of matting materials, and the absence of leaks after the canning process would also be required. The procedure does not require quarterly reporting as with catalytic converters, but, upon ARB request, manufacturers of DPFs must submit their quality control reports for inspection.

#### 13. Audit Testing

Audit testing is an extension of the quality control process, in that a party other than the device manufacturer tests the product to ensure that it is functioning as expected. The proposed procedure would allow staff to select up to five parts per applicant per year for audit testing. These parts may be new parts or parts that have been used in the field. Audit testing may range from a more superficial inspection of the devices up through independent testing of the device. ARB may request associated documentation and records necessary to support the audit. Audit testing ensures that these emission-critical parts are identical in all material respects to the approved part, and that they comply with all requirements of the proposed procedure for which the part was approved.

End users would be assured that the parts they purchase meet the same specifications as the parts approved by ARB. This provision is particularly important because there is no heavy-duty in-use inspection program analogous to the light-duty Smog Check program, nor does this procedure have an in-use compliance aspect similar to that found in the Verification Program.

#### 14. Recall

Recall is a possible option for all aftermarket programs (Title 13, CCR, Section 2225(a)). The proposed Procedure establishes recall provisions, similar to the aftermarket critical emission control parts for highway motorcycles and the Verification program, that specify the conditions for triggering and completing a recall. This recall provision is necessary to protect the end user from faulty or unsafe equipment or installations and to

protect the public health by ensuring that failed DPFs are replaced with those that function properly and reduce toxic diesel PM emissions.

A recall may be initiated under conditions specified in the Procedure. A recall plan must be submitted by the applicant or installer to the ARB for approval and all sales, leases, and installations of the part must cease. These provisions ensure the end user is promptly notified of any issues regarding an aftermarket DPF and that such issues are resolved in a timely manner.

#### 15. Recordkeeping

The proposed Procedure requires that both the applicant and authorized installer maintain records for six years beyond the warranty period of a specific aftermarket DPF. Proper recordkeeping is critical to monitoring and resolving warranty claims, tracking in-field units, and contacting end users in case of recalls and is therefore essential to protecting the end user. It would be difficult, if not impossible, to conduct a recall without records of the vehicles on which the DPFs were installed and to whom they belong. It is a standard provision in the other aftermarket programs as well as the Verification program. The time span of six years beyond the warranty is consistent with heavy-duty diesel engine certification requirements. Diesel engines last for an average of ten years and DPFs have been documented to last for up to that long. Therefore, staff concludes that the same recordkeeping period as that of the engine is appropriate.

### **IV. AIR QUALITY**

The proposed amendment establishes an evaluation procedure for aftermarket DPFs to be exempted from the prohibitions of Vehicle Code 27156 that require such aftermarket DPFs to not reduce the effectiveness of any required pollution control device nor cause vehicle emissions to exceed applicable standards. Manufacturers are not required to manufacture aftermarket DPFs and end users are not required to purchase or use such DPFs. Therefore, no direct emissions benefits are associated with staff's proposal and consequently no cost effectiveness analysis could be performed.

However, to the extent that aftermarket DPFs are manufactured and used, the proposed evaluation procedure will help ensure that 2007 through 2009 model year HDDEs comply with applicable PM emission standards. Staff believes that the availability of aftermarket DPFs will increase competition among manufacturers, thereby potentially lowering the cost to the consumer. The aftermarket DPFs are also required to have a longer warranty (2 years) than the typical OEM warranty (1 year). The availability of lower-cost, longer-warranted alternatives may make it more likely that a malfunctioning DPF would be replaced.

## **V. ENVIRONMENTAL ANALYSIS**

### **A. Introduction**

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

### **B. Analysis**

ARB has determined that the proposed amendment is exempt from CEQA under the "general rule" or "common sense" exemption (14 CCR 15061(b)(3)). The common sense exemption states a project is exempt from CEQA if "the activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA." The proposed amendment, which is administrative in nature, establishes a path for approval and sale of aftermarket DPFs for on-road heavy-duty diesel engines model year 2007 through 2009. This proposal amends the aftermarket regulation to: allow the approval and sale in California of these aftermarket DPFs as modified parts, if they meet the exemption criteria of VC section 27156; establishes an evaluation procedure for aftermarket DPFs that would be exempt from the provisions of VC 27156; and clarifies the terms under which a modified DPF may be sold. VC 27156 requires that exempted devices not reduce the effectiveness of any required pollution control device or cause vehicle emissions to exceed applicable standards. Therefore, any device approved under this evaluation procedure will meet these requirements of "do no harm." Based on ARB's review, it can be seen with certainty that there is no possibility that the proposed amendment may result in a significant adverse impact on the environment; therefore, this activity is exempt from CEQA.

## **VI. 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>3</sup> ARB is committed to making environmental justice an integral part of its activities. The Board approved its Environmental Justice Policies and Actions (Policies) on December 13, 2001, to establish a framework for incorporating environmental justice into ARB's programs consistent with the directives of State law (ARB 2001). These policies apply to all communities in California, but recognize that environmental justice issues have been raised more in the context of low-income and minority communities.

Staff's proposal has no direct environmental impact on any California residents, regardless of their location, income level or race, as the aftermarket DPF is an in-kind, optional substitution for the OEM DPF currently in use. The proposed Procedure will ensure that the aftermarket DPF meets the applicable emission standards and will not reduce the effectiveness of a required motor vehicle pollution control device. While staff's proposed changes do not directly affect low-income and minority communities, there is a potential, non-quantifiable benefit of reduced diesel PM exposure to some residents who live or work in areas that are in or near industrial areas or freeways. Many of these areas tend, on average, to be lower income than those neighborhoods farther away from industrial areas and freeways. Staff anticipates that the introduction of lower-cost, longer-warranted aftermarket DPFs into the marketplace will make replacement of a failed DPF more economically viable for the end user. This will aid the end user in timely replacement of the DPF, thus ensuring continued emission benefits. These continued emission benefits would then be non-quantifiable, potential environmental benefits for low-income and minority communities which may have more incidental exposure to heavy-duty diesel vehicles.

## **VII. ECONOMIC IMPACTS ASSESSMENT**

### **A. Summary**

The proposed amendment establishes a procedure for evaluation of aftermarket DPFs. Participation in this program is optional and presumably a business would choose to pursue an aftermarket DPF exemption only if the business believes it will be financially advantageous for it to do so. Thus, there are no mandated costs to any potentially affected businesses. Costs to these parties are incurred only if they choose to participate in the program. If no companies elect to participate, the regulation would have no cost.

The proposed amendment would affect businesses that voluntarily choose to manufacture, sell, and install aftermarket DPFs in California. The procedure includes

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<sup>3</sup> *Office of Planning and Research. Government Code (GC) Section 65040.12(c) (July 1, 2013)*

multiple provisions the manufacturer must comply with that could incur costs to the company. These costs include testing, warranty, audit testing, quality control, installation, and recordkeeping. Installers who choose to install aftermarket DPFs would have warranty and recordkeeping costs. Costs to installers include only warranty and record keeping. The proposed amendment may create some jobs as businesses expand to support the aftermarket DPF business. OEM manufacturers and installers may lose some market share to aftermarket companies; however, DPF sales and installation would be a small percentage of their total business so no job loss is anticipated. Staff expects on balance that there would be an overall net gain in jobs. The added market flexibility from introducing aftermarket competition may result in lower DPF prices for end users. Any estimated costs to companies would be offset from sales and installation of aftermarket DPFs. Companies would participate only if they expect to benefit economically from this aftermarket program. Appendix C, "Cost Methodology," contains detailed explanations of the costs and benefits summarized, below.

It must be noted that the program does not levy any requirements on end users. Staff expects that end users will benefit from the availability of lower cost aftermarket DPFs, which will in turn lead to more timely replacement of failed DPFs. This will assist owners in maintaining emissions compliance, benefitting the environment and public health.

## **B. Legal Requirements**

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 a consideration of the impact of 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.

## **C. Cost of Proposed Requirements**

The proposed amendment has a range of potential costs depending on the number of companies that voluntarily participate in the aftermarket program. Participation in this aftermarket program is voluntary in that there is no requirement for a company to participate. Only companies that anticipate economic benefits from aftermarket DPF sales are expected to ultimately join in. This would depend on many factors specific to each company. Therefore, staff can provide a range of cost estimates based only on the number of companies that may participate in the program.

Companies that choose to sell aftermarket DPFs in California will have to follow the proposed Procedure to receive approval. The Procedure includes multiple required provisions that could incur costs to a company. These costs include the costs of testing, warranty, quality control, recordkeeping and may include some minimal peripheral audit compliance costs. Installers that decide to participate would have warranty and recordkeeping costs. In assembling these cost estimates, staff gathered information from public sources, manufacturers, and businesses, and reviewed Verification program data. Companies that opt not to participate in the aftermarket DPF program would not incur costs.

Table 1 summarizes the estimated costs to manufacturers and installers who choose to participate.

**Table 1. Estimated Costs**

<b>Category</b>	<b>Initial Cost per Company (Average)</b>	<b>Annual Cost per Company (Average)</b>	<b>Total Costs Over Lifetime of Regulation (NPV)*</b>
DPF Testing - Manufacturer	\$150,000	N/A	\$1,050,000
Warranty – Manufacturer (2 Years)	N/A	\$52,800	\$ 688,000
Warranty – Installer (2 Years)	N/A	\$ 1,900	\$ 155,000
Record Keeping – Manufacturer (8 Years)	N/A	\$ 600	\$ 27,000
Record Keeping - Installer (8 Years)	N/A	\$ 600	\$ 167,000
<b>Total Costs</b>	<b>\$150,000</b>	<b>\$55,900</b>	<b>\$2,087,000</b>

\* For an estimated seven manufactures, 43 installers, and 12,750 DPFs replaced

The initial cost of applying for an exemption for an average ECG is approximately \$150,000. Annual costs to the manufacturer and installer include warranty and recording, which totals about \$53,400 per year for the manufacturer and about \$2,500 per year for the installer. Costs to a manufacturer for a potential audit are extremely variable, given that an audit is not mandated by the Procedure, but is an action that ARB may elect to take to ensure compliance with the Procedure and also ensure that the products do not deviate from the approved version. Audit testing costs are not included as these are not direct costs to companies, only costs that may be incurred in exceptional circumstances.

#### **D. Benefits**

This proposed amendment is emissions neutral, in that a DPF is being replaced by a DPF. However, staff expects that there will be cost benefits as a result of this proposed Procedure, which will in turn lead to environmental and public health benefits that cannot be directly quantified.

By far, the greatest anticipated benefit is to the end user by increasing their option to choose among a greater number of DPF products. Increased competition is likely to lower DPF prices, yielding a total end-user benefit of approximately \$15 million over the lifetime of the regulation (see Table 2).

**Table 2. Benefits of Proposed Regulation**

DPF Retail Price* (Estimated Average Retail Cost)		Cost Savings	
OEM	Aftermarket	per Unit	Total Statewide Benefits**
\$5,040	\$3,867	\$1,173	\$14,955,750

\* Based on industry information provided by manufacturers and/or installers

\*\* For an estimated 12,750 DPFs replaced over the lifetime of the regulation

Manufacturers and installers of aftermarket DPFs will have the option to participate in a new market for aftermarket DPFs in California, thus expanding their sales base. It is not possible to quantify the benefits to these companies, as business models may vary and other costs, such as advertising and training, are unknown.

Staff also expects that the availability of cost-effective aftermarket DPFs will provide an incentive for the end-user to replace damaged or non-functional DPFs in a more timely manner. This ensures that California continues to meet its air quality goals, as a damaged DPF essentially equates to an uncontrolled engine with respect to emissions of particulate matter. The proposed amendment also has the added benefit of allowing heavy-duty diesel vehicle fleets to purchase aftermarket DPFs of a known quality.

By creating this legal path for aftermarket DPF sales in California, with its incorporated evaluation procedure, ARB is better assured that the aftermarket DPFs will not increase vehicle emissions as compared to the OEM DPFs. In addition, the lower cost and longer warranty will assist owners in maintaining emissions compliance, benefitting the environment and public health.

### **E. Cost Effectiveness**

No direct emissions benefits are associated with staff's proposal. Therefore, no cost effectiveness analysis could be performed.

### **F. Affected Businesses**

Staff estimates that there are approximately 189 businesses that are potentially affected by the proposed amendment. They include: manufacturers or installers of aftermarket DPFs; and manufacturers and installers of OEM DPFs. Indirectly affected are the

approximately 22,000 owners of trucks and buses with 2007-2009 model year engines, who will have the choice of purchasing aftermarket DPFs, which staff anticipates will be sold at a lower cost than OEM DPFs.

### **G. Potential Impacts on Jobs**

This procedure is not expected to eliminate any jobs in the state of California. While the OEM engine manufacturer and distribution network may realize a decrease in OEM and DPF replacement part sales and service, this is a small fraction of the total business and sales with which these entities are involved. Therefore, no job loss is expected. Staff does expect some minor level of job creation for aftermarket manufacturers and installers who may need to expand as more aftermarket DPFs are sold.

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

This procedure is not expected to create or eliminate any businesses in California. Existing businesses that manufacture, sell, and install verified devices (retrofit DPFs) for older engines may expand to accommodate aftermarket DPFs. In addition, OEM installers that do not have exclusive agreements with OEMs may expand to accommodate aftermarket DPFs.

The OEM engine manufacturer and distribution network may realize a decrease in OEM DPF replacement part sales and service if the end-users elect to purchase aftermarket DPFs, but this is difficult to quantify as it is contingent on end-user preferences when choosing a DPF. Additionally, replacement DPF sales and service are only a small fraction of the total business and sales these entities are involved with and should not result in the elimination of business. This allows for a new category of product to be sold in California so it is possible it will benefit businesses involved with aftermarket part sales, but it is not expected to create new businesses.

### **I. Potential Impact on Small Businesses**

This is a voluntary program. Staff estimates that 23 percent of the DPF manufacturers and installers who are potentially impacted by this proposal are small businesses. These businesses include some of the aftermarket DPF manufacturers, aftermarket DPF installers, and OEM installers.

The aftermarket DPF manufacturers and installers would incur direct costs if they choose to participate. Small business manufacturers would incur an initial cost of about \$150,000 to do the performance testing necessary to receive an exemption, as well as annual costs of about \$53,400 for warranty and record keeping. Small business installers would have no initial cost, but would have annual costs of about \$2,500 for warranty and record keeping. However, since this is a voluntary program, companies would participate only if they expected to realize a profit, i.e., that their anticipated sales revenue would exceed their initial costs to receive product exemption(s) and their

ongoing, annual costs. Therefore, staff predicts no adverse impact on small businesses.

In addition, there are benefits to the end user—owners of trucks and buses with 2007-2009 model year on-road heavy-duty diesel engines. Aftermarket DPFs will be available at a lower cost than OEM DPFs, with the price difference estimated to be \$1,137 per unit. There are approximately 51,000 vehicles in California owned by about 22,000 companies. Ninety percent of these companies are small fleets (three trucks or less), which can be considered as surrogates for end-user small businesses. Therefore, there is a benefit to each of these small businesses of up to \$3,411, depending on the number of DPFs replaced. Assuming 50% of DPFs will be replaced over the lifetime of the regulation and that an aftermarket DPF is selected 50% of the time, the total small business benefit would be approximately \$7 million.

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

The proposal is not expected to have a net effect on the ability of California businesses to compete with businesses in other states. The proposal would apply to all aftermarket DPFs sold, leased, offered for sale, offered for lease, installed, or advertised in California, irrespective of where they are produced. In addition, the majority of the installers would not compete with out-of-state business.

#### **K. Fiscal Impact to State and Local Agencies**

The only cost is to ARB to support the Procedure. Based on an analysis of provisions required by the proposal, ARB estimates that two additional staff would be needed to review exemption applications submitted by part manufacturers, provide oversight of audit testing, monitor recalls, review annual warranty reports and implement enforcement actions. Application review is labor intensive as it involves review of complicated technical documents, large complex datasets, and warranty information. The Procedure has administrative deadlines which dictate timelines for staff reviews and responses to manufacturers. The additional staff would be needed beginning with fiscal year 2016/2017. The cost of the additional staff and resources would be \$580,000 for fiscal years 2016/2017 and 2017/2018. The proposal would not affect other state or local agencies nor does it affect federal funding of state programs.

#### **L. Major Regulations**

For a major regulation proposed on or after November 1, 2013, a standardized regulatory impact analysis is required. A major regulation is one “that will have an economic impact on California business enterprises and individuals in an amount exceeding fifty million dollars (\$50,000,000) in any 12-month period between the date the major regulation is filed with the Secretary of State through 12 months after the major regulation is estimated to be fully implemented, as estimated by the agency.” (Govt. Code Section 11342.548). The economic impacts of these amendments do not exceed \$50 million.

For purposes of Health and Safety Code Section 57005(b), “major regulation” means any regulation that will have an economic impact (compliance cost) on the state’s business enterprises in an amount exceeding ten million dollars (\$10,000,000) in any year, as estimated by the board, department, or office within the agency proposing to adopt the regulation in the assessment. This proposal does not impose compliance costs in excess of \$10 million in any year on affected businesses and individuals.

## **M. Regulatory Alternatives**

### **1. Reasonable Alternatives to the Proposed Regulation and Reasons for Rejecting the Alternatives**

ARB currently does not have evaluation procedures that are directly applicable to the exemption and sale of aftermarket DPFs as modified parts for 2007-2009 model year on-road heavy-duty engines. Given the absence of such procedures, staff considered only two alternatives.

#### **a. Leave Existing Aftermarket Part Requirements Unchanged**

The first alternative is to leave California’s requirements for aftermarket parts unchanged. This alternative was rejected because it would not provide market flexibility or a pathway for non-OEMs to sell their aftermarket DPFs in California. While aftermarket DPF companies could, in theory, do certification-style testing to prove that their parts are functionally identical to OEM DPFs, this path is onerous and expensive. This alternative would mean that less expensive aftermarket DPFs would not be available, and therefore, there is no cost or benefit to the status quo.

#### **b. Require Applications for Exemption for Each OEM DPF Part Number**

ARB considered requiring aftermarket manufacturers to prove out the technology on each unique part number within an OEM’s engine portfolio. The assumption is that the OEM would not issue a new part number without cause and that these parts could be functionally different and non-compatible with all engines within an OEM requiring independent testing. ARB staff made a conservative estimate of 40 part numbers across all OEMs. For the OEM with the largest market share (approximately 50%), this would be seven ECGs. If all required testing and record keeping per this Procedure were performed for these seven part numbers, the total cost over the lifetime of the regulation would be \$1.2 million per aftermarket DPF manufacturer, or \$8.1 million for all seven companies. Our proposed Procedure would require only one application, with one set of testing and one set of annual warranty reports, for a given company’s entire DPF product line. The proposed Procedure would have a total cost benefit of \$6.1 million over testing each part number.

Staff has therefore determined that no feasible alternative considered would be more effective in carrying out the purpose of the proposed regulation. No other alternative

would be as effective as or less burdensome to affected businesses and private persons than the proposed regulatory action.

## 2. Small Business Alternative

Twenty-eight percent of the potential aftermarket installers are small businesses. Those who choose to participate in the aftermarket DPF market would incur installation warranty costs and record keeping costs, which are estimated to be up approximately \$2,500 per year. Staff considered the alternative of not requiring installation warranties and the associated annual reporting. However, it is essential that DPFs be installed properly to avoid damage not only to the DPF, but to other engine parts as well. Proper installation includes ensuring that the aftermarket DPF is appropriate for the engine and vehicle. Improper DPF installation can lead to increased emissions and, potentially, to safety hazards caused by uncontrolled regeneration. Therefore, staff determined that an installer warranty was necessary for the end user to operate a vehicle in a safe manner and that meets emission standards. Staff determined the cost per unit to be \$39 for the warranty and reporting combined. Staff believes that this cost will be offset by the installation charge to the customer and the potential increase in business volume due to the availability of aftermarket DPFs.

Since this is a voluntary program, businesses would participate only if they expect to benefit economically. Therefore, staff does not believe this proposed regulation will have a net adverse impact on small businesses.

## **VIII. SUMMARY AND RATIONALE FOR EACH REGULATORY PROVISION**

VC section 27156 contains provisions to ensure that modifications to certified vehicles do not increase emissions, and provides that no device, apparatus, or mechanism that alters or modifies the original design or performance of a required motor vehicle emission control system can be advertised, sold, or installed unless that device, apparatus or mechanism has been exempted by ARB. ARB is authorized to exempt only modifications to a certified configuration if it finds the modifications will neither reduce the effectiveness of any required motor vehicle pollution control device nor cause emissions from the modified vehicle to exceed applicable standards.

To ensure that the emissions from engines that are equipped with aftermarket DPFs do not exceed the emissions from the original, or unmodified, engine, ARB developed this evaluation procedure that requires manufacturers to demonstrate that their aftermarket DPF will not reduce the effectiveness of any required motor vehicle pollution control device and will not cause emissions from the modified vehicle to exceed applicable standards.

This section discusses the requirements and rationale for each provision of the proposed regulation.

(A) § 2222. Add-On Parts and Modified Parts.

(a)- (j) [No Change]

Summary of section (k)(1)

This section is added to permit the Executive Officer to exempt aftermarket DPFs for heavy-duty diesel engines from the prohibitions of California Vehicle Code section 27156 based on an evaluation conducted in accordance with the Procedure, "Evaluation Procedure for New Aftermarket Diesel Particulate Filters Intended as Modified Parts For 2007 Through 2009 Model Year Heavy-Duty Diesel Engines," (Appendix B). This section also incorporates the Procedure by reference.

Rationale for section (k)(1)

No path currently exists for exempting aftermarket DPFs in California. This added section is to provide a path for aftermarket DPF sales in California.

Summary of section (k)(2)

This section is added to prohibit the installation, sale, offer for sale, or advertisement of any new aftermarket DPF in California unless it has been exempted by the Executive Officer.

Rationale for section (k)(2)

This provision is necessary to specify that the proposed Procedure for evaluation and testing of aftermarket DPFs is the only legal path for these DPFs.

Summary of section (k)(3)

This section is added to define a new aftermarket DPF.

Rationale for section (k)(3)

This definition is necessary to distinguish a modified, or aftermarket part from an original equipment manufacturer (OEM) replacement part and to define the specific categories of new aftermarket DPFs that are subject to the specified evaluation Procedure.

Summary of section (k)(4)

This section is added to define an OEM DPF.

Rationale for section (k)(4)

This definition is necessary to distinguish an OEM DPF from an aftermarket DPF.

Summary of section (k)(5)

This section is added to prohibit the installation, sale, offer for sale, or advertisement of any used, remanufactured, refurbished, recycled, or salvaged DPF in California.

Rationale for section (k)(5)

This section is necessary to explicitly state that these products are not legal in California, to differentiate them from new OEM replacement DPFs and the proposed new aftermarket DPFs. Staff's proposal would prohibit the offering for sale or installation of used DPFs.

When a used DPF is removed from a vehicle for the purposes of reselling it, the emission performance and remaining useful life of the DPF is unknown. The used DPF may be able to achieve high conversion efficiencies, or it may have experienced in-use operating conditions that have caused it to be severely deteriorated. Additionally, how long an individual used DPF may continue to meet these requirements and survive may be specific to each DPF; no overall conclusions about durability could be drawn regarding a used DPF. Therefore, the process of certifying these DPFs for resale requires that the condition of each individual unit be evaluated for its ability to reduce emissions and the question of how long it would maintain this ability cannot be predicted.

Because the emission performance of any individual used DPF from the field is unknown, every used DPF must be tested to determine if it performs satisfactorily, not only for emission compliance but also for compatibility and durability. The test procedure used for screening must be robust to prove the used DPF is emission compliant, durable, and compatible with the engine and application. Other less robust forms of testing (e.g., X-rays, ultrasound, backpressure checks, etc.) may not detect a DPF that is seriously compromised, nor will these tests determine if catalyst deterioration has occurred and, as such, cannot be used to prove the used DPF maintains its emissions and durability compliance, and compatibility with the engine over the warranty period. It is technically and economically infeasible to test each individual used DPF according to the evaluation Procedure and, as such, this is not a practical path for this category (used) of DPFs. Therefore, the testing costs would drive up the price of used DPFs beyond what the market would permit.

In light of these circumstances, staff believes that adding new provisions prohibiting the use and sale of used OEM DPFs and aftermarket DPFs is the best available course of action. This provides consistence among ARB's aftermarket regulations and a fair playing field for both OEM and aftermarket manufacturers.

Summary of section (k)(6)

This section is added to define a used DPF.

Rationale for section (k)(6)

This definition is necessary to distinguish a used DPF from new OEM and aftermarket DPFs.

B. " Evaluation Procedures for New Aftermarket Diesel Particulate Filters Intended as Aftermarket DPFs for 2007 through 2009 Model Year Heavy-Duty Diesel Engines"

Section (a) Applicability

Summary of section (a)

This section of the proposed procedures states that the evaluation Procedure applies only to market-ready, new aftermarket DPFs that are intended as substitutes for OEM DPFs on 2007 through 2009 on-road, heavy-duty diesel engines and that the Procedure

does not apply to DPFs approved through the verification program, DPFs that are considered replacement parts, used DPFs, or to aftermarket DPFs intended to replace OEM configurations which use metal substrates for the DPF.

#### Rationale for section (a)

This section is necessary to identify the specific vehicles and DPFs to which this procedure does and does not apply.

#### Section (b) Definitions

##### Summary of section (b)

This section provides definitions of the terms used in the proposed Procedure.

##### Rationale for section (b)

It is necessary for ARB to define its terms as they apply to the proposed Procedure. Most of these terms are used in other articles and titles in the California Code of Regulations, Government Code sections, or statutes. It is necessary for ARB to be consistent with existing definitions to the extent that they apply to this proposed regulation.

#### Section (c) Requirements for Exemption

##### Summary of section (c)

This section states that an applicant must submit sufficient information to substantiate that its DPFs comply with the emissions performance, durability, and other requirements set forth in the Procedure.

##### Rationale for section (c)

It is necessary to clarify that that purpose of the Procedure is to ensure that certain requirements are met and that applicants must submit sufficient information to make evaluation possible. This is standard language from pre-existing procedures like the aftermarket three-way catalytic converter and highway motorcycles catalytic converter evaluation procedures.

#### Section (d) Application Process

##### Summary of section (d)(1)

This subsection provides an overview of general requirements to be met by the aftermarket DPF and describes the overall approval process.

##### Rationale for section (d)(1)

This subsection is necessary to clearly define at the beginning of the application process the criteria the aftermarket DPF must meet and the process for obtaining aftermarket DPF approval so that the applicant clearly understands ARB's requirements.

#### Summary of section (d)(1)(A)

This subsection requires that any aftermarket DPF exemption application to be based on sound principles of science and engineering

#### Rationale for section (d)(1)(A)

This subsection is necessary to ensure that products are well designed so that they will likely pass the performance and durability testing required by the Procedure.

Additionally, if a product cannot be explained or if the way it works and the principles of operation are unknown staff cannot correctly assess the product. For example, the potential for secondary emissions would be unclear, any possible safety issues may not be identified, and other major issues may be overlooked or missed if the basic product is ill described or based on unsubstantiated principles of science and engineering.

#### Summary of section (d)(1)(B)

This subsection requires that aftermarket DPFs must not result in potentially harmful secondary emissions and not pose a safety risk.

#### Rationale for section (d)(1)(B)

This subsection is necessary to ensure that the aftermarket DPF does not pose health or safety hazards in substituting it for the OEM DPF. Some forms of catalysts used in DPFs and some fuel borne catalysts used with DPFs have been shown to significantly increase toxic component emissions. In addition, some DPFs can cause safety-related issues if not degreened properly.

#### Summary of section (d)(1)(C)

This subsection is requiring that the aftermarket DPF must be of the same materials and possess equivalent physical dimensions, segmentation, and shape as the OEM DPF.

#### Rationale for section (d)(1)(C)

This subsection is necessary to ensure that the aftermarket DPF is an in-kind substitute for the OEM DPF. Although the aftermarket DPF is not an exact replacement part (which would require it to be identical in all functional aspects to the OEM DPF), the requirement that the aftermarket DPF use the same material and equivalent physical dimensions, segmentation, and shape as the OEM DPF is necessary to ensure that the DPF will function in conjunction with the engine in a manner similar to the OEM DPF.

#### Summary of section (d)(1)(D)

This subsection requires the aftermarket DPF must have similar cells per square inch, wall thickness, segmentation pattern, and porosity as OEM DPF.

#### Rationale for section (d)(1)(D)

It is necessary that the aftermarket DPF and the OEM DPF have similar properties so that the aftermarket DPF will not dramatically alter the back pressure profiles, structural integrity, thermal tolerances, thermal shock parameters and filtration efficiency.

#### Summary of section (d)(1)(E)

This subsection is to require that the new aftermarket DPF not allow exhaust emissions to bypass or circumvent the DPF or other OEM certified emission control device.

#### Rationale for section (d)(1)(E)

This subsection is necessary to ensure that the aftermarket DPF equipped on 2007-2009 model heavy-duty diesel engines reduce diesel particulate matter emissions as intended. Allowing exhaust emissions to bypass or circumvent the DPF or other OEM certified emission control device would result in increased emissions.

#### Summary of section (d)(1)(F)

This subsection is to clarify that an additional independent engine control unit (ECU) or datalogger, additional sensors, wiring and the ECU components may be allowed, provided that they do not adversely affect the OEM engine's ECU function.

#### Rationale for section (d)(1)(F)

This subsection is necessary to provide aftermarket DPF applicants flexibility in the design of their DPF so that it functions well with the engine, provided that these additions not adversely affect the OEM engine's ECU function.

#### Summary of section (d)(1)(G)

This subsection requires the aftermarket DPF applicant to obtain an approved test plan and specifies the conditions under which test data will be accepted.

#### Rationale for section (d)(1)(G)

This requirement is necessary to ensure that the testing conducted will provide sufficient data for a complete evaluation of the aftermarket DPF as a replacement for an OEM DPF. The test plan approval is also necessary to protect the applicant from doing unnecessary testing, saving resources of both ARB staff and aftermarket DPF applicants.

#### Summary of section (d)(1)(H)

This subsection requires that the aftermarket DPF applicant must submit all test results along with comments and other information in a final exemption application to the ARB's Executive Officer. Submitted data must include all files recorded in its raw format as well as compiled and analyzed in a manner specified by the Procedure.

#### Rationale for section (d)(1)(H)

This requirement is necessary for staff to perform a complete evaluation of the aftermarket DPF as a replacement for an OEM DPF. ARB's Executive Officer shall review the data in order to approve the aftermarket DPF exemption application. In order to reduce staff's review time, the data shall be compiled and analyzed in a manner specified by the Procedure.

#### Summary of section (d)(1)(I)

This subsection describes the legal form and path for aftermarket DPF exemption. If the Executive Officer exempts a new aftermarket DPF from the prohibitions of Vehicle Code 27156, the Executive Officer will issue an Executive Order for the device and identify any terms and conditions that are necessary to support the exemption.

#### Rationale for section (d)(1)(I)

This subsection is necessary to inform the applicant of the form the application approval will take, i.e., an Executive Order issued to exempt a new aftermarket DPF from the prohibitions of Vehicle Code 27156, with specific terms and conditions as applicable.

#### Summary of section (d)(1)(J)

This subsection is to prohibit applicants from changing part numbers for the same product or product components after obtaining an exemption. In the event that an applicant wishes to change a part number, it must provide a part change request to ARB.

#### Rationale for section (d)(1)(J)

This requirement is necessary to ensure that applicants have a mechanism by which to change part numbers and that part number changes are not modifications to the exempted, aftermarket DPF. This is a common legal requirement of other aftermarket programs.

#### Summary of section (d)(2)

This subsection describes how to determine the ECG and what information is required for supporting this determination. An application is restricted to a single ECG.

#### Rationale for section (d)(2)

This subsection is necessary because the ECG is the basis for all testing that will be performed and is also the basis upon which the Executive Order will be issued for an approved aftermarket DPF.

#### Summary of section (d)(2)(A)

This subsection is to clarify that the ECG for any aftermarket DPF may only consist of engines from a single engine manufacturer and follow ARB defined ECGs in Appendix 1 of the evaluation Procedure.

#### Rationale for section (d)(2)(A)

This subsection is necessary to provide a guideline for applicants to determine the ECG.

#### Summary of section (d)(2)(B)

This subsection is to clarify that a single ECG shall not have multiple designs.

#### Rationale for section (d)(2)(B)

This subsection is necessary to exclude multiple DPF designs for a single ECG . The aftermarket DPF is intended to be of a design that will work across the spectrum of engines within each ECG.

#### Summary of section (d)(2)(C)

This subsection is to clarify that, under certain conditions, specific engines within the designated ECG may be excluded from the EO.

#### Rationale for section (d)(2)(C)

This subsection is necessary to allow for the exclusion of engines which may be too dissimilar to the rest of the engines within a single ECG to be able to function properly with the same aftermarket DPF design.

#### Summary of section (d)(3)

This subsection specifies that a preliminary aftermarket DPF exemption application must be filed and specifies what must be included in it and the appropriate format.

#### Rationale for section (d)(3)

This subsection is necessary to inform applicants of all the information that must be submitted in the preliminary application step in order to be considered a complete application.

#### Summary of section (d)(3)(A)

This subsection specifies that a preliminary aftermarket DPF exemption application must be filed before any final application.

#### Rationale for section (d)(3)(A)

This subsection is necessary to require the applicant to submit a preliminary aftermarket DPF exemption application prior to any final application. This requirement is necessary to avoid inappropriate testing which otherwise could be conducted by the DPF applicant.

#### Summary of section (d)(3)(B)

This subsection specifies that ARB reserves the right to require the applicant to submit a fully-functional sample of the aftermarket DPF. This subsection also specifies the timeframe for such DPF sample submission and other requirements.

#### Rationale for section (d)(3)(B)

This requirement is necessary to make sure that the aftermarket DPF is a market-ready product, not prototype, and that the description in the application accurately represents the product.

#### Summary of section (d)(3)(C)

This subsection specifies the requirement for applicants to describe the aftermarket DPF and all of its associated components.

#### Rationale for section (d)(3)(C)

This requirement is necessary to specify the product for which the applicant seeks an exemption and to allow staff to appropriately evaluate the aftermarket DPF design.

#### Summary of section (d)(3)(D)

This subsection requires that there be no changes to the design of the aftermarket DPF after submission of the preliminary aftermarket DPF exemption application.

#### Rationale for section (d)(3)(D)

This subsection is necessary to make sure that the product for which the preliminary application is submitted is same product that is tested and subsequently approved or rejected. In the event that changes are made which result in a product which is no longer representative of the description in the preliminary application for exemption, the applicant shall submit a new preliminary aftermarket DPF exemption application.

#### Summary of section (d)(3)(E)

This subsection requires the Executive Officer to use the information in the preliminary application to determine whether the new aftermarket DPF meets the requirements specified in these procedures and the need for additional analyses.

#### Rationale for section (d)(3)(E)

The purpose of this subsection is to clarify that the information provided in the preliminary application must meet specified requirements and may provide evidence for requiring additional analyses.

#### Summary of section (d)(3)(F)

This subsection specifies the preliminary application must be in the ARB required format.

#### Rationale for section (d)(3)(F)

The standardized format requirement in this subsection will reduce time and cost for both the applicant and ARB staff, as well as ensure that all applications are evaluated in the same manner.

#### Summary of section (d)(3)(G)

This subsection specifies that a test plan must be filed and specifies what must be included in it and the appropriate format. This subsection describes the test plan that must be submitted as part of the preliminary application. A test plan must be submitted for ARB approval.

#### Rationale for section (d)(3)(G)

The purpose of this subsection is to provide guidelines for the applicant regarding the test plan, a key component of the application. This subsection is necessary to detail the requirements of the test plan to obtain ARB approval. Testing done without ARB approval may be inadequate or inappropriate for supporting the application. Requiring

an approved test plan also ensures that all applicants are following the same testing protocol.

#### Summary of section (d)(4)

This subsection describes the signed statement of compliance that must accompany an application. The applicant must attest to following all applicable testing and quality control requirements during the testing and data collection. Further, this subsection states that misrepresentation of the device during the application process will result in termination of the application. The applicant must also agree to comply with warranty, recordkeeping, quality control, audit, and recall provisions and provide maintenance information to the owner as required by the procedure.

#### Rationale for section (d)(4)

This subsection is necessary to verify the applicant has performed all testing according to the approved test plan, submitted all required data, and is aware of and agrees to comply with all post-certification obligations.

#### Summary of section (d)(5)

This subsection provides the mailing address to which all applications, correspondence and reports must be submitted.

#### Rationale for section (d)(5)

This subsection is necessary because only documents submitted in writing and received by mail are considered to be acceptable application formats.

#### Summary of section (d)(6)

This subsection describes the policy staff follows in the treatment of confidential information.

#### Rationale for section (d)(6)

This subsection is necessary as confidential information may be submitted during the application process and it must be handled appropriately and in accordance with CCR requirements.

#### Summary of section (d)(7)

This subsection details the application format that must be followed.

#### Rationale for section (d)(7)

This requirement is necessary to specify all of the information that must be submitted for a complete aftermarket DPF application. The standardized application format will also save preparation time for applicant, as well as ensuring that all applicants follow the same process.

#### Summary of section (d)(8)(A-C)

These subsections describe the preliminary application review and approval process and corresponding time table. The Executive Officer shall notify the applicant in writing

within 45 days if the application has deficiencies. The applicant has 60 days to respond or the application will be terminated. A new application can be submitted no less than 60 days after application termination.

#### Rationale for section (d)(8)(A-C)

These subsections are necessary to establish the responsibilities of both ARB and the applicant in providing responses in a timely manner.

#### Summary of section (d)(9)(A-C)

These subsections describe the final application review and approval process. Final applications will not be reviewed until the applicant has conducted testing according to the approved test plan. The Executive Officer has 45 days to determine if the application is complete. Applicants have 60 days to respond if an application is determined to be incomplete. If, after requesting missing or additional information three times, the application is still found to be incomplete, the entire application will be terminated. Once an application has been determined to be complete, the Executive Officer will issue an EO within 60 days if the application and aftermarket DPF performance comply with all requirements of the Procedure.

#### Rationale for section (d)(9)(A-C)

These subsections are necessary to establish the responsibilities of both ARB and the applicant in providing responses to an application in a timely manner and to clarify the conditions under which the EO will be issued.

#### Summary of section (d)(10)

This subsection states that after an application is terminated, the applicant must wait 60 days before submitting a revised application to ARB.

#### Rationale for section (d)(10)

This requirement is necessary to give applicants sufficient time to adequately address concerns which led to the application termination, and avoid unnecessary and insufficient submittals, which would consume applicant resources.

#### Summary of section (d)(11)(A-D)

These subsections detail the recordkeeping obligations for applicants and installers and the length of time these records must be maintained. These subsections also specify the timeframe for applicants and installers to submit information requested by ARB.

#### Rationale for section (d)(11)(A-D)

These requirements are necessary to specify the information applicants and installers must maintain and the length of time they must maintain these records. This information allows for tracking and reporting of warranty claims and in-field issues and is important for protecting the end user from potential problems with the aftermarket DPF. These subsections also require the reasonable timeframe of 30 days for the applicant to submit any records requested by ARB.

#### Summary of section (d)(12)

This subsection states that applicants must demonstrate sales or the active pursuit of sales for their aftermarket DPFs after receiving certification or the EO may be revoked.

#### Rationale for section (d)(12)

This subsection is necessary to ensure that only market-ready aftermarket DPFs are submitted for application approval. This aftermarket part exemption is only for aftermarket DPFs that are intended for sale. If the applicant is not ready to offer the aftermarket DPF for sale, the DPF may never enter the marketplace, or key part suppliers may change which could require product change. This is consistent with other ARB regulations.

#### Summary of section (d)(13)

This subsection states that applicants must submit a written application if they wish to change a part number. Major differences in a part may require a new EO.

#### Rationale for section (d)(13)

This subsection is necessary to provide a mechanism for part number changes, so that applicants do not change part numbers without ARB approval, and to clarify the conditions under which the applicant might be required to submit a new application for exemption.

#### Summary of section (d)(14)

This subsection states the conditions that may cause the application to be suspended or terminated or for an existing exemption to be revoked.

#### Rationale for section (d)(14)

This subsection is necessary to inform applicants of the conditions that would trigger termination or suspension of the application or revocation of the exemption.

### Section (e) Testing Specifications

#### Summary of section (e)(1)(A-C)

These subsections describe the types of test fuel and lubricant oil that must be used for each type of testing.

The fuel used in emission testing must meet California's diesel fuel specifications described in Title 13, CCR, Sections 2280-2283, and must be used throughout the emission testing, including degreening.

The fuel used in the laboratory aging, field service accumulation and field demonstrations must meet either California's diesel fuel specifications or U.S. EPA diesel fuel specifications compliant with standards set forth in Title 40, Code of Federal Regulations (CFR), Part 80, Subpart I.

In addition, the fuels used for emission testing, laboratory aging, and field service accumulation must be analyzed using ARB's fuel analysis methods specified in the Procedure. At a minimum, the fuel's content of sulfur, aromatics, polycyclic aromatic hydrocarbons, nitrogen, and the cetane number must be measured and reported. ARB reserves the right to ask for measurement of additional properties of the test fuel if evidence suggests those properties may affect functioning or emission compliance of the OEM or aftermarket DPF, or may influence potential formation of secondary emissions and/or air toxics.

The lubricant oil used in the laboratory aging period must meet OEM engine lubricant oil specifications and this lubricant oil is to be used through the whole testing period.

#### Rationale for section (e)(1)(A-C)

These subsections are needed to ensure there is no negative effect of fuel or oil used for proposed tests. Use of inappropriate fuels or oils would affect test results and would not allow for accurate comparison of test results.

Emission testing fuel has stricter requirements per certification emission testing than laboratory aging or field service accumulation and additional field demonstrations. This includes staff's consideration of the applicant's convenience in using any commercial available fuel which meeting either CCR or CFR requirements for laboratory aging, field service accumulation and field demonstrations.

Staff proposal of one standardized testing protocol for each test fuel property will reduce the applicant's cost and staff's review time. Staff believes that it is necessary to conduct additional fuel properties analysis if evidence suggests that these properties may decrease the PM emission control effectiveness of the device or have the potential to affect the public health.

The lubricant oil specifications requirement is necessary because the accelerated lubricant oil consumption during the laboratory aging period is to simulate real field conditions.

#### Summary of section (e)(2)(A and B)

These subsections specify the criteria for performing visual inspection and photographic documentation of the aftermarket DPF after laboratory aging and field trials. The requirements include:

- 1) Inspection and photographic documentation of the front and back faces of the aftermarket DPF;
- 2) Photographic documentation of the engine before and after the DPF installation;
- 3) Photographic documentation of the vehicle, engine and aftermarket DPF prior to and after each test period; and
- 3) Any information about compromised DPFs or DPF canning during each test period.

#### Rationale for section (e)(2)( A and B)

These subsections are necessary to clearly specify what needs to be visually checked in order to support the aftermarket DPF application and to ensure the aftermarket DPF is an appropriate substitute for the OEM part.

#### Section (f) Emission Testing Requirements

##### Summary of section (f)(1)(A-E)

These subsections specify that testing must be done on an ECG basis and describes how to select and identify the test engine from the ECG.

The test engine must be the worst case engine for each ECG. The applicant must provide detailed information of testing engines and vehicles in the application and the detailed applications for such engine and vehicles, which include duty cycles, fuel requirement, and purpose of vehicles, etc. In addition, the applicant must disclose any potential to generate secondary emissions and/or air toxics.

##### Rationale for section (f)(1)(A-E)

These requirements are necessary because there are some differences for OEM engines/DPFs within an ECG which actually could impact the DPF/engine. Staff's proposal requires the worst case engine testing in order to minimize this impact. In addition, the aftermarket DPF must not result in potentially harmful secondary emissions and must not pose a safety risk. Because some forms of catalysts used in DPFs and some fuel borne catalysts used with DPFs have been shown to significantly increase toxic component emissions, ARB staff deems it essential that additional analyses be required as necessary. The proposed Procedure reserves the right for ARB to investigate any secondary emissions of concern from the aftermarket DPF.

##### Summary of section (f)(2)(A-H)

These subsections specify the sequence of tests that must be performed and which testing shall be performed on the OEM part and on the aftermarket DPF.

The testing sequence shall be as follows: degreen a new OEM DPF and a new aftermarket DPF; conduct a DPF catalytic activity check through either nitrogen dioxide (NO<sub>2</sub>) emission testing or a soot accumulation test for both the degreened OEM DPF and the degreened aftermarket DPF; conduct emission testing including regeneration emission testing for both the degreened OEM DPF and the degreened aftermarket DPF; perform laboratory aging (engine dynamometer) on the degreened, aftermarket DPF for a minimum of 300 hours; conduct emission testing of the laboratory-aged aftermarket DPF; remove the laboratory-aged aftermarket DPF from the lab and install it on an appropriate vehicle for a field service accumulation period for a minimum of 500 hours; remove the field-aged aftermarket DPF and conduct emission testing; and conduct two additional field demonstrations, for a minimum 200 hours each, on different engines and applications from within the same ECG. (The DPFs used for the additional field demonstrations do not require emission testing.)

In addition, these subsections describe conditions the selected test engines (for all stages) must meet, such as being in a proper state of maintenance and being in the original OEM configuration. The same engine must be used for all emission testing steps, including engine qualification testing, degreening processes, OEM part emission testing, and aftermarket DPF emission testing after degreening, after laboratory aging, and after the field durability demonstration.

#### Rationale for section (f)(2)(A-H)

The purpose of these subsections is to specify the correct sequence of tests that must be followed to properly test and evaluate the aftermarket DPF. This standardized testing sequence results in consistency and repeatability in testing. It prevents different testing for different systems/engines where it would be impossible to translate data, results, and information across systems, test programs, engines, and even applications. Utilizing a different sequence would not provide the same robust testing of the aftermarket DPF and might yield more variable and, hence less useful results.

In addition, these subsections are necessary so that inappropriate engines are not used for the testing, which would not allow for proper comparison to certification testing done by the OEM, and that different engines are not used during emission testing, which would not allow for proper comparisons.

The proposed testing sequence streamlines comparisons between the degreened OEM and aftermarket DPF performance, durability and compatibility of the laboratory aged aftermarket DPF through emission testing, and durability and compatibility of the aftermarket DPF following field service accumulation. This sequence is well-designed and streamlined in order to be cost effective and make efficient use of the applicant's time.

#### Summary of section (f)(3)(A-F)

These subsections describe conditions the selected test engines (for all stages) must meet, such as being in a proper state of maintenance and being in the original OEM configuration. No EMD fault codes shall exist prior to conducting the engine qualification testing. The same engine must be used for all emission testing steps including engine qualification testing, degreening processes, OEM part emission testing, aftermarket DPF emission testing after laboratory aging, and after field durability.

#### Rationale for section (f)(3)(A-F)

These requirements are necessary so that inappropriate engines are not used for the testing, which would not allow for proper comparison to certification testing done by the OEM, and that different engines are not used during emission testing, which would not allow for proper comparisons between tests.

#### Summary of section (f)(4)(A-G)

These subsections specify the emission testing engine qualification. The emission test engine must be a heavy-duty diesel engine certified by either ARB or U.S. EPA, and

must meet its certified emission levels, be in its original certified configuration, and be flashed with the newest engine calibration.

These subsections detail the test cycles and emission testing requirement including crankcase emissions. In addition, the engine must not display any illuminated MIL or have any EMD fault codes during the engine qualification testing.

#### Rationale for section (f)(4)(A-G)

The purpose of these subsections is to provide guidelines for the emission test engine. These guidelines are necessary to ensure that the engine is appropriate before beginning aftermarket DPF testing. In order to save time and cost, and to evaluate each applicant in the same manner, staff developed a standardized test protocol.

#### Summary of section (f)(5)

This subsection details the procedure for performing the first stage testing (emission testing of the laboratory degreened OEM and aftermarket DPFs, which includes accounting for emissions during DPF regeneration).

#### Rationale for section (f)(5)

The purpose of this requirement is to have a standardized protocol to ensure consistency and repeatability in testing, so that the results can be used to support the aftermarket DPF application.

#### Summary of section (f)(5)(A)

This subsection details the installation steps and considerations for selecting the emission test engine and DPF prior to performing the degreening processes and subsequent emission testing of the OEM and aftermarket DPFs.

#### Rationale for section (f)(5)(A)

The purpose of this subsection is to specify a standardized protocol for the exact same degreening/emission testing process for the OEM and aftermarket DPF. This standardization results in consistency and repeatability in testing, will reduce time and cost for both applicant and ARB staff, and ensures that all applicants are evaluated in a consistent manner.

#### Summary of section (f)(5)(B)

This subsection details steps and requirements for performing emission testing of the degreened OEM and aftermarket DPFs. The steps and requirements include: perform a complete regeneration prior any emission testing; perform 1 cold and 3 hot starts FTP transient cycles emission testing; measure and record certain parameters (i.e., exhaust temperature and backpressure) at a certain frequency; report emission testing results, including raw data according to requirements in Title 40, CFR, Part 86; include regeneration emissions according to requirements in Title 40, CFR, Part 86 and U.S. EPA's guidance documents; conduct NO<sub>x</sub>/NO<sub>2</sub> measurement requirement including sampling, instrumentation and methods.

#### Rationale for section (f)(5)(B)

The purpose of this subsection is to require a standardized protocol for emission testing for the OEM and aftermarket DPF. Many requirements are not only incorporated from CFR regulations and U.S. EPA's guidance documents for new engine certification emission testing, but also based upon ARB's staff's experience and good engineering judgment. The NO<sub>2</sub> emission test employed here is solely for the purpose of performing the DPF catalytic activity check. This standardization allows for consistency and repeatability in testing, will reduce time and cost for both the applicant and ARB staff, and will ensure that all applicants are evaluated in a consistent manner.

#### Summary of section (f)(5)(C)

This subsection details steps and requirements to perform the soot accumulation test, which is the alternative DPF catalytic activity check method. The steps and requirements include: weigh the DPF at 2 hours, 4 hours and 6 hours throughout a continuously performed FTP heavy-duty transient cycle; weighing the DPF must be at elevated temperature (e.g., 200 Celsius); weighing the DPF must use an instrument and method to detect the soot accumulation mass within the tolerances specified in the Procedure; determine the soot accumulation rate by performing a linear regression of the mass data obtained at 0, 2, 4 and 6 hours of the aforementioned soot accumulation test.

#### Rationale for section (f)(5)(C)

The purpose of this subsection is to provide an alternative method to the NO<sub>2</sub> measurement method for the applicant to perform the DPF catalytic activity check. Weighing the DPF must be at elevated temperature in order to avoid the water in ambient air absorbed by the DPF and soot. The soot accumulation rate obtained by linear regression of the mass data obtained at 0, 2, 4 and 6 hours during the soot accumulation test will be used for comparison of OEM and aftermarket DPF catalytic activity.

#### Summary of section (f)(6)

This subsection details the procedure for performing the second stage emission testing of the laboratory aged aftermarket DPF which includes accounting for emissions during DPF regeneration.

#### Rationale for section (f)(6)

The purpose of this requirement is to have a standardized protocol to ensure consistency and repeatability in testing.

#### Summary of section (f)(6)(A)

This subsection details the installation and pre-condition steps prior to performing emission testing for the laboratory-aged aftermarket DPF.

#### Rationale for section (f)(6)(A)

The purpose of this requirement is to have a standardized protocol to ensure consistency and repeatability in testing.

#### Summary of section (f)(6)(B)

This subsection details steps and requirements for performing emission testing of the laboratory-aged aftermarket DPF. The steps and requirements include: perform a complete regeneration prior to any emission testing; perform 1 cold and 3 hot starts FTP transient cycles emission testing; measure and record certain parameters (i.e., exhaust temperature and backpressure) at a certain frequency; report emission testing results, including raw data according to the requirements in Title 40, CFR, Part 86; include regeneration emissions according to the requirements in Title 40, CFR, Part 86 and U.S. EPA's guidance documents; conduct NO<sub>x</sub>/NO<sub>2</sub> measurement requirement including sampling, instrumentation and methods.

#### Rationale for section (f)(6)(B)

The purpose of this subsection is to specify a standardized protocol for emission testing of the laboratory aged aftermarket DPF. Many requirements are not only incorporated from CFR regulation and U.S. EPA's guidance documents for new engine certification emission testing, but also based ARB's staff's experience and good engineering judgment. This standardization ensures consistency and repeatability in testing, will reduce time and cost for both the applicant and ARB staff, and ensures that all applicants are evaluated in the same manner.

#### Summary of section (f)(7)

This subsection details the procedure for performing emission testing of the laboratory aged aftermarket DPF after it has been operated in the field for 500 hours, which includes accounting for emissions during DPF regeneration.

#### Rationale for section (f)(7)

This subsection is necessary to specify the appropriate, standardized protocol for performing the emission testing so that the results are valid and consistent, so that they can be used to support the aftermarket DPF application.

#### Summary of section (f)(7)(A)

This subsection details the installation and pre-condition steps prior to performing emission testing for the laboratory-aged, field-tested aftermarket DPF.

#### Rationale for section (f)(7)(A)

The purpose of this subsection is to specify the standardized protocol for installation and pre-conditioning, to yield consistency and repeatability in testing.

#### Summary of section (f)(7)(B)

This subsection details steps and requirements for performing emission testing of the laboratory-aged aftermarket DPF after it has been operated in the field for 500 hours. The steps and requirements include: perform a complete regeneration prior to any emission testing; perform 1 cold and 3 hot starts FTP transient cycles emission testing; measure and record certain parameters (i.e., exhaust temperature and backpressure) at a certain frequency; report emission testing results, including raw data according to requirements in Title 40, CFR, Part 86; include the regeneration emission according

requirements in Title 40, CFR, Part 86 and U.S. EPA's guidance documents; conduct NOx/NO<sub>2</sub> measurement requirement including sampling, instrumentation and methods.

#### Rationale for section (f)(7)(B)

The purpose of this subsection is to specify the standardized protocol for emission testing of the laboratory-aged aftermarket DPF after it has been operated in the field for 500 hours. Many requirements are not only incorporated from CFR regulation and U.S. EPA's guidance documents for new engine certification emission testing, but also based ARB's staff's experience and good engineering judgment. This standardization ensures consistency and repeatability in testing, will reduce time and cost for both the applicant and ARB staff, and will ensure that all applicants are evaluated in the same manner.

#### Summary of sections (f)(8)(A-C)

This subsection specifies that the Federal Test Procedure (FTP) heavy-duty transient cycle and additional regeneration emission test is to be used for all emission testing as well as the Supplemental Emission Test (SET) for engine qualification testing.

#### Rationale for section (f)(8)(A-C)

This subsection is necessary to specify that the test cycles to be used for emission testing must be the same as those used by state and federal regulations for new engine certification emission testing.

#### Summary of sections (f)(9)

This subsection specifies the number of tests to perform.

#### Rationale for section (f)(9)

This requirement is necessary to fully evaluate the aftermarket DPF and to standardize the testing that all applicants perform.

#### Summary of section (f)(10)

This subsection specifies the results that are to be submitted and the criteria with which ARB will evaluate them.

#### Rationale for section (f)(10)

This subsection is necessary to inform the applicant of all required data submittals and the criteria with which ARB will evaluate them. Using the same criteria to evaluate all applications ensures that all applicants will be evaluated in the same manner.

#### Summary of section (f)(10)(A)

This subsection specifies that the emission testing results must include PM, NMHC, NOx, NO<sub>2</sub>, CO, CO<sub>2</sub> and all secondary emission specified in the approved test plan.

#### Rationale for section (f)(10)(A)

This requirement to specify emission testing results is necessary to ensure that the aftermarket DPF complies with emission standards, with additional criteria set forth in the Procedure, and with the approved test plan.

#### Summary of section (f)(10)(B-D)

These subsections specify the criteria for evaluating the emission test results, including all three stages (the degreened OEM and aftermarket DPFs, laboratory-aged DPF, and the laboratory-aged aftermarket DPF after it has been operated in field for 500 hours).

For the first stage of emission testing (comparison of degreened OEM and aftermarket DPFs), the average backpressure and exhaust temperatures of the aftermarket DPF are required to be within 10 percent of OEM values and emissions of CO, NMOH, NO<sub>x</sub> (or NO<sub>x</sub> plus NMHC), and PM from both the OEM DPF and the degreened aftermarket DPF must not exceed the applicable new engine certification standards.

For the second and third stage, emission testing is conducted at the conclusion of the laboratory aging period and at the conclusion of the field service accumulation period and compared to the initial emission testing of the degreened aftermarket DPF. Average exhaust temperatures shall be within 10 percent of the average value from the previous emission test and average backpressure shall be within 10 percent for the second stage and 20 percent for the third stage, respectively.

There is also a catalytic activity test comparison, which is comprised of either NO<sub>2</sub> measurement or a soot accumulation test. For the NO<sub>2</sub> option, emissions of NO<sub>2</sub> from the degreened aftermarket DPF must be within 15 percent of the OEM, emissions from the lab-aged aftermarket DPF following must be no more than 15 percent below the degreened aftermarket DPF, and emissions from the field-aged aftermarket DPF must be no more than 20 percent below the lab-aged aftermarket DPF. For the soot accumulation option, the accumulation rate of the degreened aftermarket DPF shall not be greater than 20 percent below the OEM DPF rate.

#### Rationale for section (f)(10)(B-D)

These sections are necessary to ensure that appropriate, objective criteria are used to evaluate the aftermarket DPF emissions, durability, and compatibility. This ensures that the aftermarket DPF meets emission standards, is an appropriate substitute for the OEM part (e.g., remains within acceptable tolerances for backpressure and temperature, does not cause fault codes or warnings), and can still meet these criteria after laboratory aging and field trials. Significant differences in performance would indicate that the aftermarket DPF is neither suitable nor compatible with the engine. If the aftermarket DPF deviates significantly from the OEM, it not only might exceed emission standards, it could cause issues with proper DPF regeneration and negatively impact engine behavior and operation.

#### Summary of section (f)(11)

These subsections specify additional analyses that would need to be performed if staff determine that an aftermarket DPF might cause an increase in TACs or other harmful compounds, or might cause a change in the nature of the emitted particulate matter. In addition, these subsections also require the applicant conducting the additional analyses to use the test methods specified in either the Procedure or in the test plan approval letter.

#### Rationale for section (f)(11)

These subsections are necessary to detail the additional tests that would need to be performed in order to protect the end user from potential emissions of harmful secondary emissions. Some forms of catalysts used in DPFs and some fuel borne catalysts used with DPFs have already been shown to significantly increase toxic component emissions. Therefore, ARB staff deems it essential that additional analyses be required when determined to be appropriate. The sampling and testing methods are specified in the Procedure. Because the testing for these additional analyses might be costly, any testing done without an approved test plan will be at the applicant's own risk, as the results may not be accepted or reviewed for exemption purposes. In order to avoid unnecessary effort and cost for these additional analyses, an approved test plan which includes all information about the additional analyses is mandatory and necessary.

#### Section (g) Laboratory Degreening and Aging Protocol and Field Service Accumulation Requirements

##### Summary of section (g)(1)

This subsection specifies laboratory degreening protocol for new OEM and aftermarket DPFs.

##### Rationale for section (g)(1)

This subsection requires a standardized degreening protocol, which is necessary to provide the exact same degreening conditions for the OEM and aftermarket DPFs and allow a fair comparison of the emissions of the two DPFs.

##### Summary of section (g)(1)(A)

This subsection specifies that the emission test engine must be used for the laboratory degreening step.

##### Rationale for section (g)(1)(A)

This requirement is necessary to ensure valid emission test results.

##### Summary of section (g)(1)(B)

This subsection specifies the test cycles for the laboratory degreening protocol. The test cycles are either hot start FTP transient cycles or 13-mode SET cycles.

##### Rationale for section (g)(1)(B)

This subsection is necessary to provide standardized test cycles for the laboratory degreening protocol. These test cycles were used for 2007-2009 model year new engine certification testing, so they are the appropriate test cycles to demonstrate that both the OEM and aftermarket DPFs are in compliance with emission standards.

##### Summary of section (g)(1)(C)

This subsection specifies testing steps and testing requirements including: multi-point temperature measurement; engine exhaust backpressure requirements; engine

temperature and engine speed measurement and recording; the positions for aforementioned parameters; DPF regeneration and regeneration intervals; no EMD fault codes and MILs; and the appropriate format for data submission.

#### Rationale for section (g)(1)(C)

The purpose of this subsection provides detailed guidance relating to the testing protocol. All requirements are based on literature review, consulting with testing facilities, and engineering judgment. For instance, the requirement of multi-point temperature measurement in the proposed accelerated aging protocol is to address the temperature variations within the DPF (e.g. DPFs can have different temperatures throughout the core and can heat differently between products). This section provides basic guidance to the applicant on how to comply with these requirements.

#### Summary of section (g)(2)

This subsection specifies the laboratory aging protocol for the aftermarket DPF.

#### Rationale for section (g)(2)

Laboratory accelerated aging allows various aftermarket DPFs to experience the same conditions under controlled, repeatable conditions. Field trials can be extremely variable and different products may not see exactly the same conditions resulting in potentially unequal aging trials. As such, ARB is proposing a repeatable, controlled aging protocol that all devices will undergo allowing for consistent aging for all products which participate in the program. Several factors can cause a DPF to lose efficacy over time including temperature and chemical events. This can result in the DPF behaving differently as an aged part than it did as a new part. The proposed aging protocol accounts for these by incorporating these factors. This subsection explains the basic aging requirements.

#### Summary of section (g)(2)(A)

This subsection specifies the procedure for selecting an appropriate engine for the laboratory accelerated aging step.

#### Rationale for section (g)(2)(A)

This subsection is necessary so that only engines appropriate for the laboratory accelerated aging step are used. Inappropriate engine choice could result in aftermarket DPF aging which is not representative of field conditions or which represents the range of engines and applications within the ECG. During this rulemaking process, staff incorporated manufacturer suggestions to allow use of a surrogate or “mule” engine for aging purposes. Because this is an aging process, not emission testing, it is reasonable to achieve target temperatures under certain conditions by using a surrogate or “mule” engine. This allows compliance flexibility for the applicants and potentially reduces testing costs.

#### Summary of section (g)(2)(B)

This subsection specifies testing requirements specific for engines which are originally certified with a DOC plus DPF relative to complying with the active DPF regeneration requirement which is part of the aging cycle.

#### Rationale for section (g)(2)(B)

This subsection is necessary to explain how to perform the active regenerations required as part of the aging cycle for engines originally certified with a DOC plus DPF configuration. This configuration is different enough from other engine configurations that it requires separate consideration. The DOC component can alter DPF behavior and aging and, as such, should not be grouped with engines which do not have a DOC. Regeneration can represent a potential failure mode and/or severe aging condition due to the high temperature conditions during the process and is critical to incorporate this in a robust aging cycle. Regular regeneration places significant stress on the DPF and the aftermarket DPF must be durable enough to withstand it.

#### Summary of section (g)(2)(C)

This subsection specifies the aging cycle's active regeneration requirements for engines which were not originally certified with a DOC plus DPF configuration. These engines are different enough from a DOC plus DPF configuration that they represent unique requirements.

#### Rationale for section (g)(2)(C)

This subsection is necessary to explain how to perform the active regenerations required as part of the aging cycle for engines which are not certified as a DOC plus DPF configuration. Regeneration can represent a potential failure mode and/or severe aging condition due to the high temperature conditions and is critical to incorporate in a robust aging cycle. Regular regeneration places significant stress on the DPF and the aftermarket DPF must be durable enough to withstand it.

#### Summary of section (g)(2)(D)

This subsection details the test cycles and required information/conditions (e.g. DPF bed temperature measurement, calculations, and accelerated lubricant oil exposure) that must be performed during the 300 hours aging period.

#### Rationale for section (g)(2)(D)

This subsection is necessary to stipulate the test cycle and all key requirements which must be met (e.g. time and temperature targets), and additional calculations that are needed to appropriately age the DPF. This ensures applicants have the basic information necessary to comply with the Procedure's aging requirements.

#### Summary of section (g)(2)(E)

This subsection specifies how the exhaust temperature, backpressure, and fault and error codes are to be measured and reported during the laboratory aging.

#### Rationale for section (g)(2)(E)

This subsection is necessary to ensure all key parameters are monitored, recorded and reported during the aging process.

#### Summary of section (g)(3)(A)

This subsection specifies the procedure for selecting an appropriate engine for the field service accumulation.

#### Rationale for section (g)(3)(A)

This subsection is necessary so that only engines appropriate for the field service accumulation test are used for valid test results.

#### Summary of section (g)(3)(B)

This subsection specifies the minimum amount of time for performing the field service accumulation (500 hours) and how to determine the starting and ending point of the field service accumulation.

#### Rationale for section (g)(3)(B)

This subsection is necessary to specify the minimum amount of time for the field service accumulation in order to provide sufficient time to test for part compatibility with the engine and vehicle.

#### Summary of section (g)(3)(C)

This subsection specifies how compatibility of the aftermarket DPF during the field service accumulation will be evaluated.

#### Rationale for section (g)(3)(C)

This subsection is necessary to specify the criteria that must be met in order for the aftermarket DPF to adequately demonstrate it is compatible with the OEM engine, vehicle and application in field.

#### Summary of section (g)(3)(D)

This subsection specifies how the exhaust temperature, backpressure, engine speed, regeneration intervals, and fault and error codes are to be measured during the field service accumulation.

#### Rationale for section (g)(3)(D)

This subsection is necessary to ensure all key parameters are monitored and recorded correctly during the field service accumulation.

#### Summary of section (g)(3)(E)

This subsection specifies the information required to substantiate the performance of the aftermarket DPF when it was installed on the in-use vehicles.

#### Rationale for section (g)(3)(E)

This subsection is necessary to clearly explain what information, and data, and in what format, must be obtained and provided for the field service devices.

#### Summary of section (g)(3)(F)

This subsection requires the applicant to follow the detailed documentation protocol of section (g)(3)(D) of the procedures.

#### Rationale for section (g)(3)(F)

This subsection is necessary to inform applicants what is required to be measured and recorded to successfully complete the field testing requirements.

#### Summary of section (g)(3)(G)

This subsection specifies that maintenance during the field service period is strictly prohibited.

#### Rationale for section (g)(3)(G)

This subsection ensures that the engine and vehicle must be in excellent condition prior to starting the field service accumulation and that the aftermarket DPF does not require maintenance when deployed into the field. The point of the field demonstration is to show the device is durable and causes no issues with the engine. An in-field problem would be difficult to determine if the device was the cause or the engine, or that the device causes another part on the engine to fail. As such the device must be able to demonstrate no issues during the field trials.

#### Summary of section (g)(3)(H)

This subsection specifies that emission testing shall be performed on the aftermarket DPF after field service accumulation.

#### Rationale for section (g)(3)(H)

This subsection is necessary to inform applicants that emission testing needs to be performed again after the field service accumulation. An emission test is necessary to demonstrate the device is still working.

#### Summary of section (g)(3)(I)

This subsection specifies how performance of the aftermarket DPF during the field service accumulation will be evaluated.

#### Rationale for section (g)(3)(I)

This subsection is necessary to specify the criteria that must be met in order for the aftermarket DPF to adequately demonstrate its performance with the OEM engine, vehicle and application in field.

#### Section (h) Additional Field Demonstration Requirements

#### Summary of section (h)

This section specifies the requirements (i.e., duration, measurements, evaluation) to be followed for the two additional 200-hour field units. This is necessary to evaluate for the aftermarket DPF compatibility in field on a range of engines and applications.

#### Rationale for section (h)

This section is necessary to specify the requirements for the additional field units. These requirements are similar, but not identical, to the requirements for the primary field service accumulation unit. These demonstrations are shorter than the field service accumulation and do not require follow-up emission testing but do require that the additional engines selected also come from the proposed ECG. This demonstrates the device can work on a range of engines and applications within the ECG.

#### Section (i) Approval Criteria for Testing

##### Summary of section (i)

This section specifies the testing requirements that must be met by the aftermarket DPF and applicant for approval. This includes passing all emission and field testing evaluation criteria and submitting results for all tests even those that were incomplete, voided, invalid, or failed.

##### Rationale for section (i)

This section is necessary to specify the requirements for acceptance of the aftermarket DPF by ARB. It addresses all of the testing requirements (e.g. emission compliance, durability and compatibility). Meeting these criteria ensures that the aftermarket DPF not only is compliant with VC 27156 exemption, but also shows it is durable and compatible with engines in the ECG.

#### Section (j) Other Requirements

##### Summary of section (j)(1)(A-F)

These subsections summarize the labeling requirements for the aftermarket DPF and the engine on which the aftermarket DPF is installed.

The labeling requirements include: labels must be identical, legible, visible, and durable; labels must be constructed and affixed so that they cannot be easily removed and resist tampering and remain legible, visible, and durable for the entire time the aftermarket DPF is on the vehicle; labels must identify aftermarket DPF exemption EO number issued by ARB, name, address, and phone number of the applicant, product part number and unique serial number, date of manufacture, directional flow arrow, and other information such as "birth weight" to help the end user clean their filter; and labels must be in ARB's specified format.

##### Rationale for section (j)(1)(A-F)

These subsections are necessary to ensure that the aftermarket DPF and the engine on which the part is installed on are properly labeled to identify that the part is approved by

ARB for identification and potential enforcement purposes. In addition, such labeling requirements also help end-users contact the appropriate aftermarket DPF manufacturer for assistance if it is needed. These requirements are consistent with other ARB certification and aftermarket programs.

#### Summary of section (j)(2)(A-G)

These subsections specify the assessment that must be performed prior to installation of the aftermarket DPF by an authorized installer. This includes confirming that the OEM emission warranty period has expired and that the engine is appropriate for the part and in a proper state of maintenance. In addition, pre-installation records must be provided by installer to the end user and device manufacturer at time of installation.

#### Rationale for section (j)(2) (A-G)

These subsections are necessary to specify the requirements that must be followed prior to installation of an aftermarket DPF. These requirements will reduce the number of in-field issues encountered by end users by ensuring that the engine is appropriate for the aftermarket DPF and that a knowledgeable installer properly installs the aftermarket DPF.

#### Summary of section (j)(3)(A-D)

These subsections specify the requirements for performing quality control during the manufacturing process and maintaining the appropriate records.

#### Rationale for section (j)(3)(A-D)

These subsections are necessary to specify the minimum process to be followed for performing quality control checks of aftermarket DPFs during manufacturing. This ensures that production parts released for sale meet minimum standards and do not deviate beyond normal production tolerances from the aftermarket DPF that was tested and approved during the application process. These quality control requirements are standard procedures for other aftermarket parts programs including catalytic convertors.

#### Summary of section (j)(4)(A-D)

These subsections specify the requirements for audit testing on either new or in-use aftermarket DPFs. The Executive Officer may require a manufacturer to submit up to five parts for testing/inspection a year. This confirmatory testing is used to check aftermarket DPFs for compliance with the requirements of the procedures.

#### Rationale for section (j)(4)(A-D)

These subsections are necessary to confirm that aftermarket DPFs exempted according to the procedures also comply with the requirements after production commences (e.g., meet the emission standards, still durable and compatible).

#### Summary of sections (j)(5) (A-G)

These subsections specify what triggers may initiate a recall and how the applicant must respond to a recall. A recall may be initiated as a result of an enforcement case, for failures in quality control or audit testing, for safety issues, valid warranty claims

exceeding 4 percent, a failure to resolve warranty claims within 30 days, or for parts that have caused engine issues. A recall plan must be submitted for approval. The applicant must then follow through with this plan and submit regular reports on the progress of the recall.

#### Rationale for section (j)(5)(A-G)

These subsections are necessary to notify the applicant of the conditions that may trigger a recall and the requirements for performing a recall if one is initiated. This ensures that the end user is notified of issues and adequately protected in case they purchased a part that is later recalled. These recall requirements are standard procedures for many other ARB's mobile sources control programs including in-use engines/vehicles programs, aftermarket parts programs and the diesel retrofit program.

#### Summary of section (j)(6)(A-N)

These subsections specify the requirements for the owner's manual which must be submitted to the Executive Officer and given to the end user upon delivery of the aftermarket DPF. This must include information on warranty, installation, and maintenance, contact information for end-users seeking helps and assistance, and safety and must include a parts list and fuel and oil requirements.

#### Rationale for section (j)(6)(A-N)

These subsections are necessary to specify the minimum amount of information that must be included in the owner's manual that is given to the end user. These requirements ensure that the end user is made aware of all information pertaining to the aftermarket DPF. These requirements are consistent with other ARB programs.

#### Summary of section (j)(7)

This section specifies the requirements for the installation manual which must be submitted as part of the application. It must include enough information to enable the installer to properly install the part and warrant such installation. It must also include the criteria the applicant uses to authorize an entity to install their aftermarket DPF.

#### Rationale for section (j)(7)

This section is necessary to specify the minimum requirements for an installation manual so that authorized installers can properly install and warrant the aftermarket DPF. This is consistent with other ARB programs.

#### Summary of section (j)(8)

This section specifies that technical service bulletins, installation criteria, other service-related information, or any other documentation that affects proper operation and maintenance of the aftermarket DPF, which is provided to either end users or authorized installers, must be submitted to ARB concurrently and must not contradict any information supplied or approved during certification.

#### Rationale for section (j)(8)

This section is necessary to ensure that any technical documentation sent to end users or authorized installers relating to the aftermarket DPF are also submitted to ARB at the same time and cannot contradict information supplied during certification.

#### Summary of section (j)(9)(A-B)

These subsections describe the maintenance information that must be provided for the aftermarket DPF for normal maintenance procedures.

#### Rationale for section (j)(9)(A-B)

These subsections are necessary to specify the appropriate maintenance procedures for the aftermarket DPF to ensure the filter is properly maintained. This is critical as in many cases, common issues for engines and DPFs can be resolved with proper maintenance.

#### Summary of section (j)(10)(A-B)

These subsections describe the aftermarket DPF component swapping practices and the requirements for allowing it. This swapping is allowed with ARB approval under the following conditions: swapping must be within a commonly owned fleet; swapping is only allowed for same size/model and same flange type/muffler as original aftermarket DPF; and fleets maintain other information like installation instruction, warranty issues, and recordkeeping.

#### Rationale for section (j)(10)(A-B)

These subsections are necessary to ensure successful and trackable swapping practices in the field. Staff proposed this swapping policy to reduce truck downtime. Not allowing aftermarket DPFs to be swapped between engines puts a burden on truck owners as otherwise the truck must be removed from service while a filter core is cleaned.

#### Summary of section (j)(11)

This section requires the aftermarket DPF to provide the same level of exhaust noise attenuation as the OEM DPF it is replacing as well as comply with applicable noise limit regulations.

#### Rationale for section (j)(11)

This section is necessary to ensure the aftermarket DPF meets the same level of noise control as the OEM DPF it is replacing.

#### Summary of section (j)(12)

This section specifies that use of fuel additives or alternative diesel fuels with an aftermarket DPF is not allowed.

#### Rationale for section (j)(12)

This section is necessary to ensure that an aftermarket DPF is not utilized beyond what is permitted by its certification Executive Order. The proposed certification procedure is

not intended for evaluation of fuel additives or alternative diesel fuels in conjunction with an aftermarket DPF. Additives can have profound effects on emissions, including contributing to air toxics, and impact DPF functionality and durability.

#### Summary of section (j)(13)

This section states that any fuel and oil requirements needed for proper functioning of the aftermarket DPF must be specified by the applicant along with consequences for not complying with the requirements and procedures for reversing negative consequences.

#### Rationale for section (j)(13)

This section is necessary to ensure that the correct fuel and oil requirements are followed for a properly functioning aftermarket DPF.

#### Summary of section (j)(14)

This section states that no person or entity shall advertise, sell, offer for sale, or install any device, apparatus, or mechanism as an aftermarket DPF for or on any engine, vehicle, or equipment that does not meet the terms and conditions of the aftermarket DPF's Executive Order.

#### Rationale for section (j)(14)

This section is necessary to ensure an aftermarket DPF is not used in a manner that is inconsistent with the terms and conditions of its Executive Order and identify the appropriate products for sale in California (Title 13, CCR, Section 2222(K)).

#### Summary of section (j)(15)

This section specifies that an aftermarket DPF must offered for sale must meet the terms of the Executive Order.

#### Rationale for section (j)(15)

This section is necessary to ensure the aftermarket DPF is deployed correctly. Failure to do so could result in problems with its use and may cause engine issues. .

#### Summary of section (j)(16)

This section states that certification of an aftermarket DPF does not release the applicant or their aftermarket DPF from complying with all other applicable legal regulations or requirements.

#### Rationale for section (j)(16)

This section is necessary to ensure that the aftermarket DPF complies with all other applicable regulations. This is a standard regulatory language for many other ARB mobile sources control programs.

#### Section (k) Safety

#### Summary of section (k)(1)

This section describes safety requirements the applicant and installer must meet. This subsection states that installation and operation of the aftermarket DPF shall conform to all applicable safety standards and that it shall be installed in a safe location on the vehicle.

#### Rationale for section (k)(1)

This subsection is necessary to ensure the safety of the end user.

#### Summary of section (k)(2)(A-C)

These subsections describe how safety and product failure must be considered in the design of the aftermarket DPF. These subsections specify that the applicant must provide an analysis of all potential safety and failure issues associated with the use of the new aftermarket DPF and give a detailed description of the steps taken to mitigate these issues. In addition, the Executive Officer may require additional safety testing and design modifications, as deemed necessary.

#### Rationale for section (k)(2)(A-C)

These subsections are necessary to ensure safe design and operation of the aftermarket DPF. Improper design can lead to increased emissions of diesel PM, to secondary emissions, or to unsafe operating conditions. Unsafe operating conditions include temperatures above that for which the DPF was designed and/or uncontrolled regenerations. These high-temperature events can damage not only the DPF, but other engine parts and can potentially present personal safety hazards to the vehicle operator. Therefore, consideration of safety in design, installation and operation is essential.

#### Section (l) Warranty

##### Summary of sections (l)(1)(A-B)

These subsections specify that the aftermarket DPF must be warranted to be free of defects in design, materials, workmanship, or operation for a period of 2 years from the date of installation. This warranty must cover customer service and the full repair and replacement cost, including diagnosis, parts, and labor and any damage to the engine caused by the aftermarket DPF.

##### Rationale for sections (l)(1)(A-B)

These subsections are necessary to describe the product warranty length and coverage. Warranty coverage helps ensure aftermarket DPF effectiveness throughout the warranty period.

##### Summary of section (l)(1)(C)

This subsection states that the warranty must cover the full repair or replacement cost of returning the engine to the condition the engine was in prior to the failure or, optionally, pay the fair market value of the engine.

#### Rationale for section (I)(1)(C)

This subsection is necessary to protect the end user from repair or replacement costs in the event that the aftermarket DPF has caused the engine to fail.

#### Summary of section (I)(1)(D)

This subsection specifies that the manufacturer must resolve all warranty claims within 30 days of notification of an issue and must provide a replacement within 5 business days of determining a part has failed or malfunctioned.

#### Rationale for section (I)(1)(D)

This subsection is necessary to ensure warranty claims are promptly resolved and, if applicable, a replacement is quickly provided to the end user in order to minimize any downtime for the engine and vehicle.

#### Summary of section (I)(1)(E)

This subsection specifies that a "Grounds for Denial" letter or document must be sent to the end user within 15 days of denying a claim and must include information on the part and why the claim was denied. Any denied warranty claim must have a written "Grounds for Denial" letter for the end-user and the reason for denial must be detailed in this letter. This denied warranty claim letter must be issued within 15 days of denying a claim. Applicant must provide this information to ARB with 15 days of written request.

#### Rationale for section (I)(1)(E)

This subsection is necessary for keeping track of denied warranty claims and the reasons for the denial.

#### Summary of section (I)(1)(F)

This subsection describes the information required for the warranty card and the procedure for completing one. Warranty cards include information on the aftermarket DPF, the vehicle it was installed on, and the installation performed. Copies of the warranty card are retained by the end user, installer, and manufacturer.

#### Rationale for section (I)(1)(F)

This subsection is necessary to specify the warranty card requirements. A warranty card facilitates aftermarket DPF tracking after installation and helps with resolution of warranty claims.

#### Summary of section (I)(1)(G)

This subsection specifies that the ultimate purchaser of an aftermarket DPF must be given a copy of the Executive Order, parts list, and owner's manual.

#### Rationale for section (I)(1)(G)

This subsection is necessary to ensure the ultimate purchaser of an aftermarket DPF has been provided with all the information they need to properly use their aftermarket DPF.

#### Summary of section (I)(1)(H)

This subsection describes the warranty reporting requirements. Annual warranty reports must be submitted each calendar year. All claims, even those that were denied, must be included and no prescreening is allowed. An additional report is required to be submitted if cumulative valid claims exceed 4 percent. The warranty report must include aftermarket DPF's sales/leases, description of the nature of the claims, part number, reason for the failure, repair, or replacement, information on the engine and vehicle, time to resolve the claim, and whether the claim was deemed valid, "good faith", or denied.

#### Rationale for section (I)(1)(H)

This subsection is necessary for specifying the requirements for warranty reporting to ensure all warranty claims made by the end user are appropriately tracked and documented. This reporting is necessary for protecting the end user through identification of potential issues with an aftermarket DPF.

#### Summary of section (I)(1)(I)

This subsection specifies the product warranty language that must be included in the owner's manual.

#### Rationale for section (I)(1)(I)

This subsection is necessary to describe the warranty and the owner's responsibilities when a defect exists within the warranty period. It is necessary to ensure that end users can obtain warranty coverage for defective aftermarket DPFs. This language is included in many other ARB mobile source control programs.

#### Summary of sections (I)(2)(A-B)

These subsections specify that the aftermarket DPF installation must be warranted to be free of defects in design, materials, workmanship, and the authorized installer must provide an installation warranty for 2 years from the date of installation.

#### Rationale for sections (I)(2)(A-B)

These subsections are necessary to describe the installation warranty length and coverage. Warranty coverage helps ensure aftermarket DPF installation effectiveness throughout the warranty period.

#### Summary of section (I)(2)(C)

This subsection specifies that the installation warranty coverage shall meet the same requirements as the product warranty and have the same exclusions, and installation related claims must be resolved within 30 days of notification.

#### Rationale for section (I)(2)(C)

This subsection is necessary to provide consistency in the product and installation warranty coverage and ensure installation warranty claims are promptly resolved in order to minimize any downtime for the engine and vehicle.

#### Summary of section (l)(2)(D)

This subsection states that the installer must be able to maintain the appropriate information on installations and warranty claims and provide this information in support of the warranty reporting requirements.

#### Rationale for section (l)(2)(D)

This subsection is necessary to ensure installers are maintaining all records needed to support the warranty reporting requirements.

#### Summary of section (l)(2)(E)

This subsection states that aftermarket DPFs must be properly tracked and reported by the installer, including when warranty rates exceed the 4 percent trigger.

#### Rationale for section (l)(2)(E)

This subsection is necessary to ensure that installation related warranty issues with aftermarket DPFs are properly tracked and reported by the installer, leading to more timely correction of installation related defects.

#### Summary of section (l)(2)(F)

This subsection states that installers must follow manufacturer requirements in providing information on installation and service events.

#### Rationale for section (l)(2)(F)

This subsection is necessary to ensure that installers provide installation and warranty information to the manufacturer in a timely manner such that the manufacturer can comply with their warranty reporting requirements.

#### Summary of section (l)(2)(G)

This subsection states that the engine ECU must not be altered or changed from its certified configuration by installation of the aftermarket DPF.

#### Rationale for section (l)(2)(G)

This subsection is necessary to ensure that installation of the part does not alter or change the engine ECU and interfere with normal engine operation.

#### Summary of section (l)(2)(H)

This subsection states that the installer must be able to provide appropriate technical support for an installation related warranty claim.

#### Rationale for section (l)(2)(H)

This subsection is necessary to ensure the installer is qualified to correctly assess issues with the aftermarket DPF.

#### Summary of section (l)(2)(I)

This subsection specifies that a "Grounds for Denial" letter or document must be sent to the end user within 15 days of denying an installation related warranty claim and must include information on the part and why the claim was denied.

#### Rationale for section (l)(2)(I)

This subsection is necessary for keeping track of denied installation warranty claims and the reasons for the denial.

#### Summary of section (l)(2)(J)

This subsection requires that a copy of the “Grounds for Denial” letter be submitted to the manufacturer at the same time it is sent to the end user.

#### Rationale for section (l)(2)(J)

This subsection is necessary to ensure the manufacturer is notified of denied installation related warranty claims.

#### Summary of section (l)(2)(K)

This subsection describes the annual installation warranty reporting requirements. Reports must be submitted to both ARB and the manufacturer and shall include all claims, even those that were denied. An additional report is required if the rate of installation related claims exceed 4 percent of total installations performed by the installer or 4 percent of total installations performed within the same warranty period. The warranty report must include a description of the nature of the claims, part number, reason for the failure, repair, or replacement, information on the engine and vehicle, time to resolve the claim, and whether the claim was deemed valid, “good faith, or denied.

#### Rationale for section (l)(2)(K)

This subsection is necessary for specifying the requirements for installation warranty reporting to ensure all installation warranty claims made by the end user are appropriately tracked and documented. This reporting is necessary for protecting the end user through identification of potential installation issues with an aftermarket DPF.

#### Summary of section (l)(2)(L)

This subsection specifies the installation warranty language that must be included in the owner’s manual.

#### Rationale for section (l)(2)(L)

This subsection is necessary to describe the installation warranty and the owner’s responsibilities when a defect exists within the warranty period. It is necessary to ensure that end users can obtain warranty coverage for defective part installations.

### Section (m) Compliance

#### Summary of section (m)(1)(A-E)

These subsections specify criteria for potentially modifying or revoking an existing aftermarket DPF exemption. These include any violation of the conditions governing aftermarket DPF Executive Order or the evaluation procedures.

#### Rationale for section (m)(1)(A-E)

These subsections are necessary to ensure compliance with the aftermarket DPF exemption's Executive Order or the evaluation procedures.

#### Summary of section (m)(2)

This subsection emphasizes the prohibition of the installation, sale, offer for sale, or advertisement of any new aftermarket DPF in California unless it has been exempted by the ARB's Executive Officer.

#### Rationale for section (m)(2)

This provision is necessary to clarify that a product which is not approved by ARB cannot be sold in California as a modified part. This is consistent with other ARB aftermarket regulations.

#### Summary of section (m)(3)

This subsection is to prohibit the installation, sale, offer for sale, or advertisement of any used, remanufactured, refurbished, recycled, or salvaged DPF in California.

#### Rationale for section (m)(3)

It is necessary to explicitly state that these products are not allowed under this Procedure to differentiate them from the approved new aftermarket DPFs.

#### Summary of section (m)(4)

This subsection specifies that ARB has the right of entry to any facility owned, operated, used, leased or rented by an applicant or installer in order to inspect or verify compliance with the provisions of these Procedures.

#### Rationale for section (m)(4)

This subsection is necessary to provide the legal right to ARB to conduct any inspections or related actions consistent with the provisions of aftermarket DPF regulation and these evaluation Procedures. This could include warranty investigations and follow up on complaints and/or audits.

#### Summary of section (m)(5)

This subsection states that approval of this evaluation procedure does not exempt new aftermarket DPFs from compliance with other applicable federal and state statutes and regulations such as noise requirements, safety codes, and other safety regulations, nor will ARB necessarily test for or determine compliance with such other statutes or regulations.

#### Rationale for section (m)(5)

The purpose of this subsection is to ensure aftermarket DPF compliance with other applicable federal and state statutes and regulations.

#### Section (n) Penalties

#### Summary of section (n)

This section states that penalties may be assessed under Part 5, Division 26 of the Health and Safety Code for violations of the procedures.

#### Rationale for section (n)

This section is necessary to inform the applicant about penalties for noncompliance and to direct the applicant to the appropriate statutes to determine the penalties.

#### Appendix 1 – Emission Control Groups

##### Summary of Appendix 1

This appendix details ARB proposed ECGs for the evaluation procedures.

##### Rationale of Appendix 1

This appendix is necessary to provide the clear guidelines and details of ECGs for applicants.

#### Appendix 2 - DPF Aging Protocol Multi-point Temperature Measurement Requirements

##### Summary of Appendix 2

This appendix details ARB proposed multi-point temperature measurement requirements for the laboratory aging component of the evaluation Procedures.

##### Rationale of Appendix 2

This appendix is necessary to provide the clear guidelines and steps necessary to successfully conduct testing using multi-point temperature measurements.

#### Appendix 3 - Method to Determine Effective Active Regeneration Aging Time

##### Summary of Appendix 3

This appendix explains how to determine effective active regeneration aging time.

##### Rationale of Appendix 3

This appendix is necessary to provide the clear guidance and information on how to correctly calculate the aging time and comply with the proposed Procedure.

#### Appendix 4: “Drain and Weigh” Method for Engine Oil Consumption during Laboratory Aging

##### Summary of Appendix 4

This appendix explains how to account for oil use (“Drain and Weigh”) during the aging test protocol.

##### Rationale of Appendix 4

This appendix is necessary to provide the clear guidance and information on how to successfully comply with this testing requirement.

## **IX. JUSTIFICATION FOR ADOPTION OF REGULATIONS DIFFERENT FROM FEDERAL REGULATIONS CONTAINED IN THE CODE OF FEDERAL REGULATIONS**

The United States Environmental Protection Agency (U.S. EPA) has adopted regulations applicable to aftermarket parts in the Code of Federal Regulations, title 40, part 85. However, these regulations establish only a voluntary self-certification program. In contrast, ARB's aftermarket parts regulations require aftermarket part manufacturers to receive and obtain an exemption before they can sell parts in California.

Any aftermarket emission control device is covered under U.S. EPA's 1974 "Interim Tampering Enforcement Policy" (Memo 1A). Aftermarket catalytic converters are legal for sale federally under an enforcement policy established by U.S. EPA in 1986, but the policy does not constitute a regulation. Moreover, this policy was established to address issues regarding aftermarket converters for light-duty vehicles and light-duty trucks, not aftermarket emission control devices for diesel engines such as diesel particulate filters.

State law (VC 27156) prohibits the installation, sale, offer for sale, or advertisement of emission-related parts for motor vehicles that are not functionally identical to those installed by the OEM. An exemption to the anti-tampering provisions of the Vehicle Code is allowed, if the part has been approved by ARB, via an Executive Order, as not reducing the effectiveness of any required pollution control device or causing vehicle emissions to exceed applicable standards. Pursuant to this authority, ARB has adopted regulations that establish criteria for exempting aftermarket parts from the anti-tampering prohibitions, so they can be sold and used in California.

This proposal amends the aftermarket regulations to allow the sale of aftermarket DPFs. Without this amendment, aftermarket DPFs will not be sold in California and OEMs will continue to have the entire market share, leaving consumers with limited choices in replacing aging DPFs.

## **X. PUBLIC PROCESS FOR DEVELOPMENT OF PROPOSED ACTION (PRE-REGULATORY INFORMATION)**

Air Resources Board staff developed the proposed evaluation procedure through an extensive public process. Staff made a considerable effort to inform, involve, and update the public and stakeholders of its progress during development of the aftermarket DPF regulations. ARB held stakeholder meetings, conducted public workshops, and met with interested parties to discuss issues and seek comments. This section presents a list of these efforts, meetings, and teleconferences and also describes the major issues raised during ARB's outreach efforts along with staff's responses.

Throughout the rulemaking process, access to ARB information was made available on

the internet at <http://www.arb.ca.gov/diesel/mod-part/mod-part.htm>. Interested parties could browse the aftermarket DPF web page and find the latest test plan; draft test procedure(s); draft regulations; workshop notices and presentations; a survey distributed to stakeholders; and contact information. Staff posted draft materials for review and comment during regulation development.

## A. Public Workshops

ARB conducted three public workshops, as noted in Table 3, below, to discuss issues and seek comments. Interested stakeholders participated in the workshop in person or via webinar. The workshop notices were posted on the modified part website at: (<http://www.arb.ca.gov/diesel/mod-part/mod-part.htm>). The workshop announcement was distributed to subscribers of the *ms-mailings* and *diesel-retrofit* listservs, which as of November 2015 numbered approximately 14,000 subscribers. Additionally, the draft Procedure was sent to members of the Manufacturers of Emission Controls Association and the Engine Manufacturers Association, which represent the main stakeholders affected by the proposed rulemaking, as well as individual manufacturers who had expressed interest.

**Table 3. Public Workshops**

<b>Date</b>	<b>Number of Participants</b>
December 4, 2014	24
April 7, 2015	24
August 10, 2015	52

## B. Stakeholder Meetings

### 1. Manufacturers of Emission Controls Association (MECA)

Staff met with MECA representatives on June 23, 2015 to present proposed changes to the Procedure and solicit feedback. Nineteen people representing twelve companies signed in as attending the meeting. Additional meetings with MECA representatives were held on February 20, February 24, October 18, and December 1 of 2015.

### 2. Engine Manufacturers Association (EMA)

Staff met with EMA representatives on June 18, 2015 to discuss the Procedure and solicit feedback.

### 3. Meetings with Individual Manufacturers and Other Interested Parties

ARB staff also held numerous meetings and teleconferences with stakeholders to discuss individual feedback and comments on the proposed procedure. Discussions were held both before and after each workshop to solicit feedback and address specific stakeholder concerns. Staff reached out to 17 manufacturers, organizations, and other interested parties throughout the rulemaking process, meeting with them a total of 41 times.

## **C. Other Outreach Efforts**

### **1. Stakeholder Survey**

A stakeholder survey was also distributed to stakeholders to identify potential costs and level of stakeholder participation. Only one reply was received and it was submitted anonymously. The survey is presented on the website.

### **2. Survey of Installers**

ARB staff contacted installers to obtain information regarding the products they sell, pricing, and/or if they met the criteria of being a small business. Staff telephoned 85 retrofit DPF installers and 104 OEM service providers (24 of which are also retrofit DPF installers). Responses were obtained from 72 retrofit installers and 33 OEM distributors/service providers.

### **3. Survey of OEM Business Practices**

Staff also contacted one (1) OEM and three (3) OEM distributors/service providers to gather information regarding their business practices on replacing DPFs.

## **D. Major Issues**

ARB received numerous comments from various stakeholders throughout the development of this proposed Procedure. ARB considered all comments and made changes to the Procedure as appropriate.

### **Major Issues Resolved**

Based on feedback from various stakeholders, the following issues were of major concern and were resolved by changes to the Procedure.

#### **1. Test Data Submission**

Staff broadened the concept of the ECG based on stakeholder input. However, doing so meant that it was critical that appropriate engines and compatibility vehicles are chosen. Given this can vary with ECG and individual company products, staff needs to work with applicants to ensure that appropriate engines are chosen. The application process is designed to facilitate this. Testing done on an inappropriate engine would be useless to support the application and a potential waste of company time and resources. Stakeholders also commented that preexisting data should be accepted. ARB changed the proposal to allow for this, provided that these data did not comprise the core of applicants' submittals and that they were not used to address any secondary emission concerns. Applicants must obtain an approved test plan and all data must satisfy all the conditions of the test plan and Procedure. As part of the application process staff will work with applications to ensure that the engines and applications chosen are representative and worse case for the ECG.

## 2. Aging Engine

Staff initially proposed to require an engine within the ECG. Stakeholders stated that for the purpose of simply aging a device any engine may work and allowing more flexibility in the choice of this engine could potentially provide a more cost effective path. Staff determined that no information would be compromised or lost by allowing an engine outside of the ECG to be used for aging purposes.

## 3. DPF Swapping

Swapping can introduce uncertainty in the ability to have a complete picture of the history of the device which can add levels of complexity to the warranty process, such as the ability to track where the device was, find the device (in the case of a recall), etc. This could also hamper ARB's ability to assess the robustness of this proposed Procedure. The aftermarket industry urged ARB to allow for a more flexible swapping policy. Initially ARB did not allow for swapping of DPFs from vehicle to vehicle except temporarily for cleaning purposes. However, based on industry feedback, ARB will allow for an aftermarket DPF to be swapped as needed within the same common ownership fleet. To ensure complete and detailed information is kept for swapped devices ARB modified the record keeping aspects of the Procedure.

## **Major Issues Unresolved**

Based on feedback from various OEM and/or aftermarket DPF manufacturers received through workshops, meetings and submitted comments, the following issues were of major concern and were not completely resolved during the development process.

### 1. Emission Control Groups

The scope of the ECG defines the testing and is critical to determining the aftermarket DPF is compatible with the engine and application and achieves emissions compliance. Failure to correctly identify the ECG could result in negative impacts to the consumer (loss of use of the vehicle, vehicle damage, safety considerations) and loss of emissions benefits to ARB. Staff proposed an emission control group based on unique part number (about 40) but aftermarket part manufacturers argued that a restrictive ECG, based on this, is unnecessary and potentially cost prohibitive. Staff therefore did an exhaustive investigation of the DPF parameters (precious metal loading, porosity, etc.) for 2007 through 2009 on-road diesel engines and developed ECGs based on OEM engine manufacturer. Staff determined that the DPFs across each engine manufacturer were very similar but differences between OEMs, including engine configurations and control logic, prohibit larger, more encompassing ECGs. Staff's current seven-category ECG proposal reflects this compromise.

In response to this engine OEM manufacturers stated that the categories were too broad. Engine OEMs maintained that the engines within those model years had significant differences in engine design and DPF design necessitating a part by part approval of any aftermarket substitute DPF. Staff requested specific information and data supporting this but received limited information and as such could not conclude that there were enough differences between engines and applications within the

proposed ECGs that would pose a problem based on the testing structure. Staff's proposal ensures applicants must work with ARB to identify appropriate test engines and vehicles which will represent the scope of the desired ECG. Additionally, staff's proposal allows for modifications (a more narrow focus) to ECG scope if major differences exist for certain engine families within an OEM.

## 2. Testing

### a. Emissions Testing

Currently the Procedure requires emission testing of the laboratory-aged system prior to field deployment. Stakeholders argued that this should be an optional requirement as it is an additional expense. ARB believes that this step should not be waived as it provides the first data of the aged system after known, controlled testing conditions. This not only gives ARB direct information on how the DPF handled the laboratory aging, but is protective of the applicant by ensuring a suboptimal part is not deployed to the field.

### b. Aging

This is an important step because it helps determine if the part will maintain its physical and chemical performance after many hours of use in a harsh environment. OEM engine manufacturers indicated that 300 hours was not equivalent to what they had proved out with original certification testing and therefore was inadequate. ARB believes 300 hours of aging, in conjunction with other Procedure requirements, is sufficient to determine that the device is robust. Additionally, the Procedure includes a longer warranty period than the OEMs offer for a replacement DPF. ARB believes this provides additional protections to the end-users should a potential problem arise.

### c. Engine

Aftermarket DPF manufacturers stated that the requirement for using a "worst case" engine for testing was not reasonable. The Procedure must use a "worst case" scenario to ensure that the device works well across the broader spectrum of engines allowed by the proposed ECG concept. Not all engines are expected to be the same within an ECG. To ensure that there are no problems with some engines within an ECG, the test engine must be representative of the most challenging engine the device may encounter. Although the "worst case" can vary, the application process requires the device manufacturer to work with ARB to identify appropriate test engines. This process will allow for the determination of which factors are most likely to challenge the DPF and select candidate engines accordingly.

### d. Fuel Testing

Staff received comments from aftermarket DPF manufacturers that the fuel testing requirement is too expensive and unnecessary given that most laboratory testing is done using ultra-low sulfur diesel. ARB believes the fuel testing is necessary to confirm that the emission testing and field service accumulation use fuel that meets the proscribed diesel fuel specifications. There may be variability in the marketplace and changes in fuel can have profound effect on emissions testing results as well as device

performance and durability. Additionally, many other ARB programs require fuel specifications be provided and it is common to have specifications for various fuels available from the supplier.

#### e. Catalytic Activity Assessment

The purpose of this test is to show that the filter is designed so that it will regenerate in a similar manner as the OEM part. The proposed Procedure has two paths open to applicants to demonstrate the aftermarket product is roughly similar to the OEM part as far as catalytic activity. Similar catalytic activity is critical for emissions compliance, compatibility with the engine, durability and potential safety issues. Staff allow for two ways to demonstrate this, via NO<sub>2</sub> measurement as a surrogate for activity or by a soot accumulation test. Platinum catalyzed DPFs produce NO<sub>2</sub>, which can oxidize accumulated soot. Measuring NO<sub>2</sub> emissions under controlled conditions can aid in the assessment that two DPFs may behave in a similar manner. If an aftermarket DPF regenerated in a manner different from the OEM DPF, the engine may behave differently, have additional wear of parts, have excess emissions via changes in regeneration events or frequency, or exhibit other incompatibilities with the engine. The aftermarket industry expressed concern that the NO<sub>2</sub> test path was too lax and would allow an unlevel playing field and potential cheating as NO<sub>2</sub> can be biased by test conditions. Based on 15 years of experience with the Verification programs staff is comfortable with understanding factors which can influence NO<sub>2</sub> production and believe the requirement to work with ARB to obtain an approved test plan minimizes any issues relating to these concerns. Staff also believes that allowing flexibility in demonstrating catalytic activity benefits applicants by allowing the applicant to choose the path it is most comfortable with from a technical and financial position.

### 3. Warranty

Staff received comments from industry that the two-year warranty was too long and added unnecessary cost to the manufacturer and installer. ARB is sensitive to the fact that the OEMs stated that these engines are designed for a specific engine DPF combination. It is possible that the aftermarket DPF may experience an issue sometime after installation. Additionally, by allowing a broader ECG, ARB is allowing for the potential on rare occasion that select engines may behave differently with some engines within the ECG than anticipated. The two-year warranty is the base minimum time to determine if a device is robust and compatible with all engines in the ECG. The OEM replacement part warranty is not a reasonable comparison given the OEM is attesting to the fact that the replacement DPF is functionally identical to the original DPF which was an integrated component of the overall engine design supported by research, development, and testing far in excess of what this Procedure requires. Lastly, given the OEMs designed the engine, they have proprietary knowledge of the engine and OEM DPF which an aftermarket manufacturer does not have.

## Overall

### a. Cost

Aftermarket DPF manufacturers have commented that the cost of the Procedure is too expensive. Staff considered industry comments and reduced the potential testing costs to a given company by grouping engines into ECGs, as explained above. Regarding the cost per ECG application, staff also eliminated the requirement to laboratory age the OEM DPF and reduced the number of hours the aftermarket DPF must be aged. Staff also allowed for the use of a “mule” engine. Staff believes the rest of the testing requirements are necessary to fully demonstrate the emissions reduction and durability of the aftermarket DPF, and that there are no more costs that can be reduced while still ensuring that the aftermarket DPF is durable, effective, and produces no safety hazards. ARB allows flexibility in complying with testing by allowing the use of any test laboratory capable of conducting testing per the Procedures requirements. Costs for testing will vary among laboratories.

### b. Comparison to OEM Requirements

Aftermarket part manufacturers indicated that the requirements of the Procedure, such as assessing the vehicle prior to installation, having authorized installers, and recordkeeping, should be reduced as they are inconsistent with what the OEM manufacturers and their supply and support chain are required to do. ARB considered these comments but determined that loosening these requirements would provide insufficient end-user protection by making it virtually impossible to have effective warranty protection or audit practices, and would seriously hamper recalls. Additionally, the aftermarket DPFs are going onto in-use vehicles which may be in various stages of disrepair. Other engine components can fail, and, in theory the DPF is not being replaced if it is not necessary which would imply there was some sort of underlying problem which could potentially include engine problems. As such the installer must understand what to look for to ensure the engine is appropriate for the device. An uneducated installer may inadvertently allow a potential safety issue to arise due to an improper installation. Additionally, the installers must have some basic requirements to ensure the end-users have direct protections (in the form of warranty) and that the installers are also obligated to maintain some basic, standard information about the installations such that the device manufacturers and ARB can relay and utilize this to investigate issues and warranty claims, and to institute effective recalls.

## **XI. REFERENCES, TECHNICAL, THEORETICAL, AND/OR EMPIRICAL STUDY, REPORTS, OR DOCUMENTS RELIED UPON**

*Office of Planning and Research. Government Code (GC) Section 65040.12(c) (July 1, 2013)*

United States Environmental Protection Agency (U.S. EPA), *Interim Tampering Enforcement Policy*. Memorandum No. 1A (June 25, 1974)  
U.S. EPA, 2013. *Heavy-Duty Highway Compression-Ignition Engines and Urban Buses—Exhaust Emission Standards*. (March 6, 2013)

U.S. EPA, *Aftermarket Parts*. CFR, Title 40, Part 85, Subpart V, Section 85.2105,  
(As existed on February 12, 2016)