

Updated Informative Digest

Proposed Hearing to Consider the Proposed Heavy-Duty Engine and Vehicle Omnibus Regulation and Associated Amendments:

Proposed Amendments to the Exhaust Emissions Standards and Test Procedures for 2024 and Subsequent Model Year Heavy-Duty Engines and Vehicles, Heavy-Duty On-Board Diagnostic System Requirements, Heavy-Duty In-Use Testing Program, Emissions Warranty Period and Useful Life Requirements, Emissions Warranty Information and Reporting Requirements, and Corrective Action Procedures, In-Use Emissions Data Reporting Requirements, and Phase 2 Heavy-Duty Greenhouse Gas Regulations, and Powertrain Test Procedures

Sections Affected:

Proposed amendments to sections 1900, 1956.8, 1961.2, 1965, 1968.2, 1971.1, 1971.5, 2035, 2036, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2121, 2123, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2133, 2137, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2166, 2166.1, 2167, 2168, 2169, 2423, and 2485, title 13, California Code of Regulations (CCR); proposed adoption of sections 2139.5, 2169.1, 2169.2, 2169.3, 2169.4, 2169.5, 2169.6, 2169.7, 2169.8, and 2170, title 13, CCR; and proposed amendments to sections 95662 and 95663, title 17, CCR.

Documents Incorporated by Reference (Cal. Code Regs., tit. 1, § 20, subd. (c)(3)):

The following documents are incorporated by reference in the regulations:

- California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," as amended on September 9, 2021, incorporated by reference in 13 CCR 1956.8 and 2139;
- "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy Duty Otto Cycle Engines," as amended on September 9, 2021, incorporated by reference in 13 CCR 1956.8 and 2139;
- "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty

Trucks, and Medium-Duty Vehicles," as amended on September 9, 2021, incorporated by reference in 13 CCR 1961.2;

- "California Environmental Performance Label Specifications for 2021 and Subsequent Model Year Medium-Duty Vehicles, Except Medium-Duty Passenger Vehicles," as amended on September 9, 2021, incorporated by reference in 13 CCR 1965;
- "California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-D," as amended on September 9, 2021, incorporated by reference in 13 CCR 2423; and
- "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," as amended on September 9, 2021, incorporated by reference in 17 CCR 95663;
- "40 CFR § 86.007-11 Emission standards and supplemental requirements for 2007 and later model year diesel heavy-duty engines and vehicles," as amended on October 25, 2016, incorporated by reference in 13 CCR 1956.8;
- "40 CFR § 86.007-30 Certification," as amended on October 25, 2016, incorporated by reference in 13 CCR 1956.8;
- "40 CFR § 86.008-10 Emission standards for 2008 and later model year Otto-cycle heavy-duty engines and vehicles," as amended on October 25, 2016, incorporated by reference in 13 CCR 1956.8;
- "40 CFR § 86.091-2 Definitions," as amended July 26, 1990, incorporated by reference in 13 CCR 1956.8;
- "40 CFR § 86.1360 Supplemental emission test; test cycle and procedures," as amended on October 25, 2016, incorporated by reference in 13 CCR 1956.8;
- "40 CFR § 1037.630 Special purpose tractors," as amended on October 25, 2016, incorporated by reference in 13 CCR 1956.8;
- "40 CFR § 1037.801 Definitions," as amended on October 25, 2016, incorporated by reference in 13 CCR 1956.8;
- "40 CFR § 1037.120 Emission-related warranty requirements," as amended July 26, 1990, incorporated by reference in 13 CCR 2035, 2036, and 2112; and.
- "40 CFR §1065.510 Engine mapping," as amended on March 10, 2021 (Pre-publication), incorporated by reference in 13 CCR 1956.8.

Background and Effect of the Proposed Regulatory Action

Exposure to ozone and particulate matter (PM) emissions has serious health effects and is associated with increased risk of premature deaths, emergency room visits, and hospital stays. A range of respiratory effects are linked to these pollutants such as asthma, respiratory inflammation, and decreased lung function and growth. In particular, ultrafine particles or PM_{2.5} poses the greatest health risk as the fine particles can get deep into the lungs and possibly into the bloodstream, causing irregular heartbeat, heart attacks, as well as increased risk of lung cancer.

California faces particularly extreme ozone attainment challenges in the South Coast and San Joaquin Valley air basins. Oxides of nitrogen emissions or NO_x is a precursor to ozone and secondary PM formation. Thus, further reduction in NO_x emissions is critical for attaining federal ozone and PM_{2.5} standards. In order for the South Coast to meet the federal ozone standards, overall NO_x emissions need to be reduced from today's levels by approximately 80 percent by 2031. In 2037, a lower federal ambient ozone standard will take effect at 70 ppb, driving the need for even greater reductions in NO_x emissions from all sources including heavy-duty engines.

On-road heavy-duty vehicles comprise the largest NO_x emission source category in the state, contributing approximately 31 percent of the total statewide NO_x emissions inventory as well as 26 percent of total statewide diesel PM emissions.

The current 2010 NO_x emission standard for heavy-duty engines established a limit of 0.2 gram per brake horsepower-hour (g/bhp-hr), which represents a 90 percent reduction from the previous standard of 2.0 g/bhp-hr. Nevertheless, it is projected that even in 2023 when almost the entire on road fleet of heavy-duty vehicles operating in California are certified to the 2010 standard, the 2031 and the more stringent 2037 National Ambient Air Quality Standards (NAAQS) for ambient ozone will not be attained in California without further reductions. Thus, significant NO_x emissions reductions from on-road heavy-duty vehicles are needed in order to meet federal ambient air quality standards for ozone and PM_{2.5}.

The Proposed Heavy-Duty Engine and Vehicle Omnibus Regulation and Associated Amendments (Proposed Amendments or Heavy-Duty Omnibus Regulation) would implement two measures previously included within California Air Resources Board's (CARB) Revised Proposed 2016 State Strategy for the State Implementation Plan (2016 State SIP Strategy), "Low-NO_x Engine Standard" which aims at significantly reducing NO_x emissions from new engines during certification and a "Lower In-Use Emission Performance Level," which aims at ensuring in-use heavy-duty vehicles continue to control emissions throughout their useful lives.

The Proposed Amendments would modify a number of the existing on-road heavy-duty program elements including:

- New exhaust emission standards and test procedures for 2024 and subsequent model year (MY) engines, including new standards to be met over a new low load cycle (LLC);
- Amendments to the on-board diagnostic (OBD) system requirements
- Amendments to the Heavy-duty In-use Testing (HDIUT) program;
- Amendments to the emissions warranty period and useful life requirements;
- Amendments to the Emissions Warranty Information and Reporting (EWIR) requirements and corrective action procedures;
- Amendments to California's missions Averaging, Banking, and Trading (CA-ABT) program;
- Amendments to durability demonstration requirements and new in-use emissions data reporting requirements;
- New powertrain test procedures for heavy-duty hybrid vehicles;
- Amendments to better align California Heavy-duty Vehicle Greenhouse Gas (California Phase 2 GHG) program's tractor auxiliary power unit certification requirements with California's off-road test procedures;
- Amendments to California Phase 2 GHG provisions; and
- Clarifications to medium-duty engine requirements.

As mentioned above, the South Coast needs significant reductions in NO_x emissions by 2024, and thus several elements of the proposed rulemaking are aimed at incentivizing early emission reductions. For example, the Proposed Amendments include a mechanism to provide incentives for manufacturers to comply earlier with future emission standards, and a new credit program, effective for introduction of 2024 through 2026 MY zero emission powertrains, for manufacturers that produce zero-emission heavy-duty vehicles as early as MY 2022.

Changes to these program elements are needed because (1) it is cost-effective and technically feasible to reduce the standards significantly below today's levels to achieve needed NO_x reductions, (2) some elements of the programs are falling short of program expectations, and (3) some provisions would benefit from additional clarification of the requirements.

Objectives and Benefits of the Proposed Regulatory Action:

The primary objective of the Heavy-Duty Omnibus Regulation is to achieve the maximum technologically feasible and cost-effective reductions in real-world NO_x from medium- and heavy-duty engines and vehicles, both when engines and vehicles are new and as they are used throughout their actual service lives. This is critical for California to attain the NAAQS for ozone in 2031 in the South Coast and San Joaquin Valley air basins, as well as PM_{2.5} standards in the next decade.

In 2031, the target SIP date to meet the 2008 ozone ambient air quality standards, NO_x emission benefits relative to the baseline are estimated to be approximately 17.4 tons per day (tpd) statewide, 5.2 tpd in the South Coast Air Basin and 4.3 tpd in the San Joaquin Valley Air Basin. The Proposed Amendments are projected to reduce

NOx emissions by approximately 225,763 tons statewide between the years 2022 through 2050.

As mentioned above, NOx is a precursor to ozone and secondary PM formation. Exposure to ozone and PM2.5 is associated with increases in premature death, hospitalizations, visits to doctors, use of medication, and emergency room visits due to exacerbation of chronic heart and lung diseases and other adverse health conditions. Thus, reductions in NOx emissions from heavy-duty vehicles would provide significant regional health benefits to California residents by reducing exposure to ozone and PM2.5. Since heavy-duty engines typically operate in transportation corridors, it is expected that the Proposed Amendments would provide the greatest benefit to disadvantaged communities that are typically located near these transportation corridors. It is estimated that from 2024 through 2050, the Proposed Amendments would result in a statewide total of approximately 2,480 avoided premature deaths and approximately 2,010 avoided hospitalizations and emergency room visits. In monetary terms, this translates to a total statewide health benefit of approximately \$23.4 billion for 2024 through 2050.

The proposed PM standard of 0.005 g/bhp-hr is intended to prevent “backsliding” by encouraging manufacturers to continue using current robust diesel particulate filters (DPF) capable of reducing PM emissions down to 0.001 g/bhp-hr levels. Manufacturers would likely continue to use the same DPFs that they are currently using and thus no additional PM benefits are expected from this requirement.

Description of Regulatory Action

On June 23, 2020, CARB released the Notice of Public Hearing (60-Day Notice) and Staff Report: Initial Statement of Reasons for Rulemaking (Staff Report), titled “Public Hearing to Consider the Proposed Heavy-Duty Engine and Vehicle Omnibus Regulation and Associated Amendments,” for public review. The Staff Report contains a description of the rationale for the proposed amendments. On June 23, 2020, all references relied upon and identified in the Staff Report were made available to the public. On July 10, 2020, CARB posted an Errata to the Staff Report. CARB received written comments from 58 stakeholders during the 60-Day Notice comment period. Comments that raised significant environmental issues were received during this period. CARB staff prepared written responses to such comments that were set forth in Attachment B to Resolution 20-23 entitled “Response to Comments on the Environmental Analysis for the Proposed Heavy-Duty Engine and Vehicle Omnibus Regulation and Associated Amendments.” In addition, based on comments received during this comment period, CARB staff prepared proposed modifications to the original proposal that were set forth in Attachment A of the Resolution 20-23.

On August 27, 2020, CARB conducted a public hearing. CARB staff informed the Board of the proposed amendments of the Heavy-Duty Omnibus Regulation and the Board received written and oral comments from the public. The Board reviewed and considered the oral and written comments and both the environmental analysis in the

Staff Report and the "Response to Comments on the Environmental Analysis Prepared for the Response to Comments on the Environmental Analysis for the Proposed Heavy-Duty Engine and Vehicle Omnibus Regulation and Associated Amendments". At the conclusion of the hearing, the Board approved Resolution 20-23 for adoption of the proposed regulation.

In accordance with Government Code section 11346.8, the Board directed the Executive Officer to adopt the proposed amendments after making any appropriate conforming modifications, as well as any additional supporting documents and information, available to the public for a period of at least 15 days. The Board further provided that the Executive Officer shall consider such written comments as may be submitted during this period, shall make such modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if warranted.

Subsequent to the hearing, CARB staff proposed modifications including those directed by the Board at the hearing. These modifications were made available in the first Notice of Public Availability of Modified Text and Availability of Additional Documents and Information (30-Day Notice) for a 30-day comment period from May 5, 2021 through June 4, 2021. The 30-Day Notice was posted on CARB's website at <https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox>, accessible to all stakeholders and interested parties. The 30-Day Notice proposed modifications included:

- Limited exemption for 2024 through 2026 MY heavy-duty engines rated at or above 525 bhp maximum power;
- Revisions to the cycle-validation criteria for operation over the LLC for alternative-fueled engines;
- Additional options to the mileage and service accumulation procedures for engine durability demonstration;
- Modifications to CA-ABT program;
- Modifications to the HDIUT program;
- Modifications to the EWIR and scheduled maintenance requirements;
- Modifications to the OBD requirements for 2022 to 2023 MY gasoline-fueled heavy-duty engines;
- Modifications to correct the tractor sub-category in the California Phase 2 GHG test procedures;
- Other definitions and clarifications of various elements in the regulation;
- Cost scenarios for optional elements in the Heavy-Duty Omnibus Regulation such as the optional 50-state-directed engine emission standards program, optional low NOx standards, and optional powertrain certification procedures in the Initial Statement of Reasons, provided for informational purposes;
- Modifications to remove the optional 50-state-directed engine emission standards, and

- Developing a process to allow qualifying transit agencies to request compliance flexibility or assistance to operate buses that are exempt to the Proposed Amendments.

On June 18, 2021, CARB staff proposed additional modifications via a second Notice of Public Availability of Modified Text and Availability of Additional Documents and Information (2nd 15-Day Notice). The 2nd 15-Day Notice was made available for a 15-day comment period from June 18, 2021, through July 6, 2021. These amendments were intended to provide additional flexibilities for a set of engines for which market availability may be limited in early years. As set out in more detail in the 2nd 15-Day notice, the flexibilities ensure continued availability, while providing mechanisms to avoid any air pollution impacts, primarily by channeling further compensatory investments towards zero emission vehicles.

Comparable Federal Regulations:

There are currently no federal regulations that are comparable to the Proposed Amendments, although the U.S. Environmental Protection Agency (U.S. EPA) is currently in the process of developing its own package of lower heavy-duty NOx emission standards called the Cleaner Trucks Initiative (CTI). Due to the federal Clean Air Act lead time requirements and because U.S. EPA began their effort after CARB began work on the Proposed Amendments, the CTI will likely take effect a few years later than the Proposed Amendments, most likely beginning with 2027 MY engines.

California has been developing its Proposed Amendments for many years, and its air quality needs require significant emission reductions as soon as possible. California cannot wait for the federal government to act. However, to maintain a future harmonized national heavy-duty program, CARB staff encourages U.S. EPA to align with the Proposed Amendments described in the Staff Report as much as possible in the CTI.

An Evaluation of Inconsistency or Incompatibility with Existing State Regulations (Gov. Code, § 11346.5, subd. (a)(3)(D)):

During the process of developing the proposed regulatory action, CARB conducted a search of any similar regulations on this topic and concluded these regulations are neither inconsistent nor incompatible with existing state regulations.