

UPDATED INFORMATIVE DIGEST

ADOPTION OF THE REGULATION TO REDUCE EMISSIONS FROM DIESEL AUXILIARY ENGINES ON OCEAN-GOING VESSELS WHILE AT BERTH

Sections Affected: Adoption of new section 2299.3, title 13, California Code of Regulations (CCR) and new section 93118.3, title 17, CCR. The following documents are incorporated in the regulation by reference: (1) "Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines," 13 CCR 2700 et seq.; (2) 40 Code of Federal Regulations (CFR) Part 94, "Control of Emissions from Marine Compression-Ignition Engines"; (3) Annex VI of the 1973 International Convention for the Prevention of Pollution from Ships, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78); (4) ARB Method 100 – Procedures for Continuous Gaseous Emission Stack Sampling," 17 CCR 94114; (5) International Standard ISO 8178-1(E):1996, "Reciprocating Internal Combustion Engines – Exhaust Emission Measurement – Part 1: Test-Bed Measurement of Gaseous and Particulate Exhaust Emissions"; (6) International Standard ISO 8178-2(E):1996, "Reciprocating Internal Combustion Engines – Exhaust Emission Measurement – Part 2: Measurement of Gaseous and Particulate Exhaust Emissions at Site"; (7) International Standard ISO 8178-4(E):1996, "Reciprocating Internal Combustion Engines – Exhaust Emission Measurement – Part 4: Test Cycles for Different Engine Applications"; (8) Bay Area Air Quality Management District Source Test Procedure ST-1B, "Ammonia Integrated Sampling," dated January 1982; (9) International Standard ISO 8754:2003(E), "Petroleum Products – Determination of Sulfur Content – Energy-Dispersive X-Ray Fluorescence Spectrometry," Second Edition, 2003-07-15; and (10) International Standard ISO 8217, "Specifications of Marine Fuels Requirements for Marine Residual Fuels" (as revised in 2005).

Background

Over 90 percent of Californians breathe unhealthy air at times. To improve air quality and human health, Air Resources Board (ARB/Board) establishes requirements to reduce emissions from new and in-use on-road and off-road vehicles, engines, and other sources. To reduce emissions from marine vessels, which are considered to be off-road sources,¹ ARB adopted a series of regulations since 2004 that (1) require diesel fuel sold for use in harbor craft to comply with ARB diesel specifications² and, (2) require ocean-going vessels with diesel auxiliary engines to comply with specified diesel fuel and other requirements while operating in Regulated California Waters.³ Although the latter regulation will reduce air pollution from marine auxiliary engines while in port, significant opportunities exist to further reduce emissions from ocean-

¹ The California term "off-road" and the federal term "nonroad" refer to the same sources and are used interchangeably.

² ARB's fuel standards for harbor craft are codified at title 13, CCR, section 2299.

³ ARB's fuel standards and other requirements for diesel auxiliary engines on ocean-going vessels are codified at title 13, CCR, section 2299.1 and title 17, CCR, section 93118.

going vessels docked at California ports. Vessels can be docked at a California port from several hours to several days.

Control of Criteria Air Pollutants

Health and Safety Code (HSC) sections 43013 and 43018 direct ARB to adopt standards and regulations that the Board has found to be necessary, cost-effective, and technologically feasible for various mobile source categories, including off-road diesel engines and equipment, such as marine vessels, through the setting of emission control requirements. Specifically, HSC section 43013(b) directs ARB to adopt such standards and regulations for marine vessels to the extent permitted by federal law.

Control of Toxic Air Contaminants

The California Toxic Air Contaminant Identification and Control Program (Air Toxics Program), established under California law by Assembly Bill 1807 (Stats. 1983, ch. 1047) and set forth in HSC sections 39650 through 39675, requires ARB to identify and control air toxics in California. The identification phase of the Air Toxics Program requires ARB, with participation of other State agencies such as the Office of Environmental Health Hazard Assessment, to evaluate the health impacts of, and exposure to substances, and to identify those substances that pose the greatest health threat as toxic air contaminants (TACs). ARB's evaluation is made available to the public and is formally reviewed by the Scientific Review Panel (SRP) established under HSC section 39670. Following ARB's evaluation and the SRP's review, the Board may formally identify a TAC at a public hearing. Following identification, HSC sections 39658, 39665, and 39666 require ARB, with participation of the air pollution control and air quality management districts (districts), and in consultation with affected sources and interested parties, to prepare a report on the need and appropriate degree of regulation for that substance (a "needs assessment") and to adopt airborne toxic control measures (ATCMs).

In 1998, the Board identified diesel particulate matter (PM) as a TAC with no Board-specified threshold exposure level. A needs assessment for diesel PM was conducted between 1998 and 2000, which resulted in ARB staff developing and the Board approving a Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Diesel RRP) in 2000. The Diesel RRP presented information that identified the available options for reducing diesel PM and recommended control measures to achieve further reductions. The scope of the Diesel RRP was broad, addressing all categories of engines, both mobile and stationary, and included control measures for off-road diesel engines, such as those covered by this regulation. The ultimate goal of the Diesel RRP is to reduce California's diesel PM emissions and associated cancer risks from 2000 baseline levels by 85 percent by 2020. The regulation will reduce diesel PM emissions and the local health impacts from vessels docked in California's ports and will assist the Board with meeting the 2020 Diesel RRP goal.

Attainment of Ambient Air Quality Standards

The federal Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (U.S. EPA) to establish National Ambient Air Quality Standards (National Standards) for pollutants considered harmful to public health, including fine particulate matter (PM_{2.5}) and ozone. Set to protect public health, the national standards are adopted based on a review of health studies by experts and a public process. Ambient PM_{2.5} is associated with premature mortality, aggravation of respiratory and cardiovascular disease, asthma exacerbation, chronic and acute bronchitis, and reductions in lung function. Ozone is a powerful oxidant. Exposure to ozone can result in reduced lung function, increased respiratory symptoms, increased airway hyper-reactivity, and increased airway inflammation. Exposure to ozone is also associated with premature death, hospitalization for cardiopulmonary causes, and emergency room visits for asthma.

Areas in the State that exceed the National Standards are required by federal law to develop State Implementation Plans (SIPs) describing how they will attain the standards by certain deadlines. The oxides of nitrogen (NO_x) emission reductions are needed because NO_x leads to formation in the atmosphere of both ozone and PM_{2.5}; diesel PM emission reductions are needed because diesel PM contributes to ambient concentrations of PM_{2.5}.

The South Coast Air Quality Management District (SCAQMD) is designated as nonattainment of both the federal 8-hour ozone and federal PM_{2.5} National Standards. In order to demonstrate that the necessary emission control programs are in place, the U.S. EPA requires that all necessary emission reductions be achieved by 2014 for PM_{2.5} and 2023 for ozone.

In the South Coast Air Basin, air quality modeling indicates that significant reductions of NO_x are crucial to help meet the federal standards. For example, at this time, the strategy to achieve attainment of the PM_{2.5} standards in the South Coast Air Basin includes staff estimates that a 55 percent reduction in NO_x emissions from 2006 levels (i.e., a total reduction of hundreds of tons per day) and a 15 percent reduction in direct PM_{2.5} emissions from 2006 baseline levels will be necessary for attainment of the PM_{2.5} standards in the South Coast Air Basin. The NO_x emission reductions from the adopted regulation will play an essential role in assisting the South Coast Air Basin with meeting its 2014 PM_{2.5} deadline as well as its future ozone deadlines.

The federal CAA permits states to adopt more protective air quality standards if needed, and California has set standards for particulate matter and ozone that are more protective of public health than respective federal standards. The Bay Area, South Coast, and San Diego areas are nonattainment for the State standards for ozone and PM_{2.5}. Health and Safety Code section 40911 requires the local air districts to submit plans to the Board for attaining the State ambient air quality standards, and HSC section 40924 requires triennial updates of those plans. The NO_x and PM_{2.5} emission

reductions from the regulation will assist the local air districts in achieving attainment of the State ambient air quality standards.

Control of Emissions from Goods Movement-related Activities

In April 2006, the Board approved the *Emission Reduction Plan for the Ports and Goods Movement in California* (GMERP). The GMERP identifies strategies for reducing emissions created from the movement of goods through California ports and into other regions of the State. The GMERP is part of the broader Goods Movement Action Plan (GMAP) being jointly carried out by the California Environmental Protection Agency and the Business, Transportation, and Housing Agency. Phase I of the GMAP was released in September 2005 and highlighted the air pollution impacts of goods movement and the urgent need to mitigate localized health risk in affected communities. The final GMAP was released in January 2007 and includes a framework that identifies the key contributors to goods movement-related emissions.

The GMERP identifies numerous strategies for reducing emissions from all significant emission sources involved in goods movement, including ocean-going vessels, harbor craft, cargo handling equipment, locomotives, and trucks. The GMERP identifies several strategies for reducing emissions from ocean-going vessels. Specific to hotelling emissions, the GMERP establishes a goal of utilizing shore power for 20 percent of the vessel visits to California ports by 2010, 60 percent of visits by 2015, and 80 percent of visits by 2020. The regulation will represent a significant first step toward satisfying the GMERP goals by requiring specific vessel types to use shore power for 50 percent of a fleet's visits to a port by 2014 and 80 percent of visits by 2020. Furthermore, emission reductions will begin in 2010 for vessel owners or operators choosing the equivalent emission reduction option to comply with the regulation.

The California Global Warming Solutions Act of 2006

In June 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, which established targets for reducing greenhouse gas (GHG) emissions in California: roll back GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and finally to 80 percent below 1990 levels by 2050. In 2006, the Governor signed Assembly Bill (AB) 32 (Stats. 2006, ch. 488), which established the 2020 GHG emission reduction goal in State law (set forth in HSC §38500 et seq.) and made the ARB responsible for monitoring and reducing GHG emissions. AB 32 requires the Board, by January 1, 2009, to design and adopt an overall plan to reduce GHG emissions to 1990 levels by 2020. The Board has until January 1, 2011, to adopt the necessary regulations to implement that plan. Implementation begins no later than January 1, 2012, and the emission reduction target must be fully achieved by January 1, 2020. AB 32 also required the Board to identify a list of discrete early action GHG reduction measures by June 30, 2007. AB 32 defines discrete early action measures as regulations that are to be adopted by the Board and be enforceable by January 1, 2010.

In April 2007, ARB staff released a report identifying 37 proposed early action items the Board could undertake to mitigate GHG emissions in California. Port electrification was identified as a GHG emission reduction measure in this report. In September 2007, the Board approved reclassifying port electrification (now called Green Ports) from an early action measure to a discrete early action measure. The regulation, while reducing diesel PM and NOx emissions, will also result in significant reductions of carbon dioxide (CO₂) (a GHG) emissions as a co-benefit of requiring cleaner grid-supplied electrical generation for ocean-going vessels while docked. These CO₂ emission reductions will help California meet its 2020 GHG emission reduction goal.

Authority

The ARB has authority under California law to adopt the regulation. Health and Safety Code sections 43013(b) and 43018 provide broad authority for ARB to adopt emission standards and other regulations to reduce emissions from new and in-use vehicular, nonvehicular and other mobile sources. Under HSC sections 43013(b) and 43018, ARB is directly authorized to adopt emission standards and other regulations for marine vessels, as expeditiously as possible and to the extent permitted by federal law, to meet State standards. The ARB is further mandated by California law under HSC section 39666 to adopt ATCMs for new and in-use nonvehicular sources, including marine vessels such as ocean-going vessels, for identified TACs such as diesel PM. As noted, ARB is also mandated under HSC section 38500 et seq. to reduce greenhouse gas emissions, which are emitted at significant levels by vessels hotelling at California ports.

Emission Reductions and Public Health Benefits Projected

The regulation is expected to significantly reduce emissions of diesel PM from at-berth ocean-going vessels. Diesel PM emission reductions are needed to reduce premature mortality, cancer risk, and other adverse impacts from exposure to this TAC. The proposal would help achieve the 2020 goal set forth in the 2000 Diesel RRP of reducing diesel PM by 85 percent from 2000 baseline levels and the 2015 and 2020 goals of the GMERP. In December 2005, the Board adopted an auxiliary engine fuel regulation that will provide significant emission reductions from auxiliary engines on ocean-going vessels. The regulation is expected to provide additional significant emission reduction benefits. Staff projects that, by 2020, the regulation will reduce hotelling diesel PM and NOx emissions from container vessels, passenger vessels, and refrigerated cargo vessels by nearly 75 percent relative to levels expected to be emitted. These emission reductions will occur in areas at and near ports where environmental justice concerns are especially prevalent. In addition, hotelling CO₂ emissions will be reduced by 136,000 to 269,000 metric tons in 2020, which will assist the State with meeting the AB 32 mandates for GHG reductions.

The regulation will also reduce diesel PM and NOx emissions that contribute to exceedances throughout the State of ambient air quality standards for both PM_{2.5} and

ozone. These reductions will assist California in its goal of achieving State and federal air quality standards.

The emission reductions from the regulation will reduce the number of people exposed to a cancer risk of 10 in a million by 70 percent by 2020. Statewide, the emission reductions due specifically to the regulation will prevent approximately 990 premature deaths by the year 2030, as well as result in other health benefits. The economic benefit for the avoided premature deaths and other related health effects is estimated to be \$3.1 to \$5.7 billion.

Description of the Regulatory Action

The Board adopted a regulation, pursuant to its authority under HSC sections 38500 et seq., 43013 and 43018, which applies to the emissions from diesel engines on ocean-going vessels while docked at a California port. The Board also approved the adoption of essentially identical provisions as an ATCM, pursuant to its authority under HSC section 39666, which complemented the regulation and provide maximum notice to the regulated community of the regulatory requirements on ocean-going vessels. These measures will hereinafter sometimes be referred to collectively as “the regulation.”

Applicability

The regulation apply to any person who owns, operates, charters, rents, or leases any container vessel, passenger vessel, or refrigerated cargo vessel that visits a California port, or any person who owns or operates a port or terminal located at a port where container, passenger, or refrigerated cargo (reefer) vessels visit. These ports include Los Angeles, Long Beach, Oakland, San Diego, San Francisco, and Hueneme.

The regulation applies to both U.S.-flagged vessels and foreign-flagged vessels. Foreign-flagged vessels are vessels registered under the flag of a country other than the United States.

Exemptions

The regulation contains general and specific exemptions. Under the general exemptions, vessels in “innocent passage”; vessels owned or operated by local, state, federal or foreign governments in government non-commercial service; steamships; auxiliary engines using natural gas; and container vessel, refrigerated cargo vessel, and passenger vessel fleets making less than a de minimis number of vessel visits to a port are exempt from the regulation in their entirety. A steamship is an ocean-going vessel whose primary propulsion and electrical power are provided by steam boilers. The de minimis number is fewer than 25 total annual visits for a container vessel fleet or reefer vessel fleet to a port, and less than five annual visits for passenger vessel fleet to a port. Further, there are particular exemptions from specified portions of the regulation for emergency events and delays caused by federal agency inspections.

Options to Reduce Emissions from Auxiliary Diesel Engines at Berth

The regulation allows for two options to reduce hotelling emissions: vessel operators can either reduce the use of auxiliary engines in the fleet to specified levels, or they can reduce the emissions from those auxiliary engines by specified degrees while docked.

Reduced Onboard Power Generation Option

The “reduced onboard power generation option” in the regulation requires that the operators of container vessels, passenger vessels, and reefers that visit California ports shut down their auxiliary engines for most of their stay while hotelling. Specifically, for each affected fleet in 2014, the auxiliary engines must be shut down (not including three or five permissible hours of total operation, as specified in the regulation) for at least 50 percent of a fleet’s total visits, and the fleet’s onboard power generation must be reduced by at least 50 percent. Starting in 2017, for each affected fleet, the auxiliary engines must be shut down for at least 70 percent of a fleet’s total visits, and the fleet’s onboard power generation must be reduced by at least 70 percent. Finally, for each affected fleet in 2020, the auxiliary engines must be shut down for at least 80 percent of a fleet’s total visits, and the fleet’s onboard power generation must be reduced by at least 80 percent. While auxiliary engines are shut down, the vessel’s onboard electrical requirements would need to be satisfied by some other source of power. The source of electrical power used in lieu of the auxiliary engines must be provided either by the grid or by another power source with specific emissions standards.

The regulation requires a vessel to use shore power if it is equipped to do so and it visits a berth equipped to provide compatible shore power.

As noted, to provide for sufficient time to connect and disconnect electrical lines for shore power, the regulation allows the auxiliary engines to operate for up to three hours during a visit, or five hours during a visit for vessels that lose power during the process of switching power from the vessel’s auxiliary engines to shore power. This time period may be extended due to circumstances beyond the control of the vessel operators, such as emergency events or delays resulting from obligations imposed by federal agencies (for example, the Department of Homeland Security or the U.S. Coast Guard).

Equivalent Emission Reduction Option

An alternative to the “reduced onboard power generation option” is the “equivalent emissions reduction option”; operators choosing this option are required to reduce their auxiliary engine emissions at a port by specific amounts and by specific dates. The emission reduction techniques that could be applied to a fleet include: 1) using grid-based shore power; 2) using distributed generation equipment to provide power to a vessel; 3) using alternative emission controls onboard a vessel or at the berth; and 4) using a combination of these techniques.

For this option in which alternative control technologies are implemented, the NO_x and PM emissions from the fleet's auxiliary engines at a port must be reduced from the baseline fleet emissions by at least:

- 10 percent from January 1, 2010, to December 31, 2011
- 25 percent from January 1, 2012, to December 31, 2013
- 50 percent from January 1, 2014, to December 31, 2016
- 70 percent from January 1, 2017, to December 31, 2019; and
- 80 percent beginning January 1, 2020.

For this option, the regulation provides for fleet emission credits. Fleet emission credits are reductions that are either emission reductions achieved prior to January 1, 2010 or are reductions in excess of the regulation's requirements. These reductions can be used to comply with the applicable emission reduction requirements of 2010, 2012, and 2017.

The regulation provides default values for making the emission reduction calculation, including default values for emission factors and power requirements, in lieu of more specific values. In addition, the regulation provides procedures for determining control factors and applicable emission testing procedures.

Sources of electrical power other than the grid that are used to comply with the emission reduction option would be subject to additional requirements. Before January 1, 2014, distributed generation equipment must satisfy the emission standards applicable to a newly manufactured spark-ignited off-road engine. By January 1, 2014, all distributed generation must satisfy a more stringent emission standard that is equivalent to a spark-ignited engine using Best Available Control Technology (BACT). Finally, the source of electrical power must emit no more CO₂ emissions than a combined-cycle gas turbine—the emissions level that the California Public Utilities Commission recommended for unspecified sources of power.

Recordkeeping and Reporting Requirements

The regulation has reporting and recordkeeping requirements affecting the vessel owners and operators, terminals, and ports.

The reporting and recordkeeping requirements for vessel owners or operators depend upon the compliance option selected by the vessel owner or operator and terminal. The regulation requires a vessel fleet plan to be submitted to the Executive Officer of the ARB in the year prior to the fleet's regulatory compliance dates.

In addition to the vessel fleet plans, the regulation requires an annual statement of compliance to be submitted to the Executive Officer of the ARB certifying compliance with the regulatory requirements for the previous calendar year. As with the vessel fleet plans, the dates for the initial submittals depend upon the compliance option selected by the vessel owner or operator.

The recordkeeping and reporting requirements are similar for both options. The equivalent emission reduction option may have additional emission measurements and monitoring requirements that are not required for the reduced onboard power generation option.

A terminal that receives more than 50 vessel visits in 2008 is required to submit a plan to ARB's Executive Officer by July 1, 2009, that identifies how the terminal will be upgraded to allow vessels to satisfy either the reduced onboard power generation option or the equivalent emissions reduction option. The terminal is also required to submit plan updates at a frequency dependant upon the control strategy selected by the vessel fleet owner or operator and the terminal.

The port is required to submit wharfinger data annually to ARB's Executive Officer, documenting when each vessel visits the port, the berth that the vessel visited, and the dates and times that the vessel was initially tied to the berth and subsequently released from the berth. In addition, the terminal operator is required to keep records of electricity usage for shore power and equipment breakdowns that affect a vessel's ability to comply with the limited auxiliary engine operation option or the emission reduction option.

Test Methods and Other Incorporated Documents

The regulation will incorporate by reference Parts 1, 2, and 4 of International Standard ISO 8178, as revised in 1996 by the International Organization for Standardization (ISO). This standard includes test methods for reciprocating internal combustion engines. The regulation will also incorporate by reference International Standard ISO 8217, as revised in 2005, for the specifications and testing of marine fuels. Further, the regulation will incorporate by reference ISO 8754 (as adopted in 2003) for measuring the sulfur content of fuels used in auxiliary engines. The regulation will also incorporate by reference ARB's verification procedure requirements for diesel engine control measures as set forth in 13 CCR 2700 et seq. (June 2003), ARB's test method for NO_x and CO₂ emissions as set forth in 17 CCR 94114 (July 1997), and the Bay Area Air Quality Management District's source test procedure for ammonia slip, ST-1B, dated January 1982. The regulation will also incorporate U.S. EPA's regulations for compression-ignition engines (40 CFR 94) and Annex VI of the 1973 International Convention for the Prevention of Pollution from Ships (as amended in 1978, also known as the MARPOL 73/78 Protocol); these will be incorporated to permit operators to submit engine test data measured pursuant to the federal regulation and international treaty, respectively.

Violations

The regulation provides a procedure for determining the number of violations based on the level of compliance with the appropriate compliance criteria. For the reduced onboard power generation option, the number of violations is based upon the shortfall in satisfying the visits criteria and/or the onboard power generation criteria. For the

equivalent emission reduction option, the number of violations is based upon the shortfall in providing the necessary emission reductions. The exception to this would be for violations of the recordkeeping and reporting requirements; a violation of those provisions would constitute a single, separate violation for each day that the violation occurs.

Severability

The regulation states that if any part of the regulation is held to be invalid, the remainder of the regulations shall continue to be effective.

COMPARABLE FEDERAL REGULATIONS

No federal standards or control requirements have been promulgated addressing emission reductions from at-berth ocean-going vessel auxiliary engines. Under CAA section 213, U.S. EPA is without authority to adopt in-use standards for nonroad engines, including marine engines.

California is the only governmental entity in the United States authorized by the CAA, in the first instance, to adopt emission requirements for in-use off-road engines. See *Engine Manufacturers Association v. U.S. EPA* (D.C. Cir. 1996) 88 F.3d 1075, 1089-1091. Under CAA section 209(e)(2), California may adopt and enforce emission standards and other requirements for off-road engines and equipment not conclusively preempted by section 209(e)(1), so long as California applies for and receives authorization from the Administrator of U.S. EPA. To obtain authorization, the Board must make a finding that the California adopted requirements will be, in the aggregate, at least as protective of public health and welfare as applicable federal standards. [CAA section 209(e)(2)(A).] The Administrator must grant a request for authorization from California unless he finds that ARB's protectiveness finding is arbitrary and capricious, that California does not need the standards to meet compelling and extraordinary conditions, or that the standards and accompanying enforcement procedures are not consistent with CAA section 209. (*Ibid.*)

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs see our Website at www.arb.ca.gov.