

August 24, 2020

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Miles Keogh

Ms. Cristina Davis  
Clerk of the Board  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

Dear Ms. Davis:

The National Association of Clean Air Agencies (NACAA) is pleased to provide comments (below and attached) on the California Air Resources Board's (CARB) proposed "Heavy-Duty Engine and Vehicle Omnibus Regulation and Associated Amendments" (HD Omnibus Regulation) announced on June 26, 2020 in the *California Regulatory Notice Register 2020*, Volume Number 26-Z (p. 930).<sup>1</sup> NACAA is the national, non-partisan, non-profit association of air pollution control agencies in 41 states, including 115 local air agencies, the District of Columbia and four territories. The air quality professionals in our member agencies have vast experience dedicated to improving air quality in the U.S. These comments are based upon that experience. The views expressed in these comments do not represent the positions of every state and local air pollution control agency in the country.

The nitrogen oxide (NO<sub>x</sub>) emission standards and related requirements for highway heavy-duty trucks and engines currently in effect nationwide were set nearly 20 years ago. The need for timely and meaningful action to update these standards and requirements and achieve significant NO<sub>x</sub> reductions across the entire country is profound and clear. According to EPA, more than one third of the U.S. population (nearly 130 million people) lives in areas of the country designated nonattainment for the health-based National Ambient Air Quality Standards (NAAQS) for ozone, particulate matter (PM) or both; many others live in areas just on the cusp of nonattainment. NO<sub>x</sub> emissions contribute appreciably to each of these serious public health problems and are linked with many adverse impacts on the respiratory system, as well as with the other ill effects associated with exposure to ozone and PM, even at levels below the current and proposed future NAAQS, including premature death. NO<sub>x</sub> emissions also contribute to acid deposition, regional haze and the eutrophication and nitrification of water bodies. This nationwide need for NO<sub>x</sub> reductions must be acknowledged and addressed.

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<sup>1</sup> <https://oal.ca.gov/wp-content/uploads/sites/166/2020/06/2020-Notice-Register-Number-26-Z-June-26-2020.pdf> and <https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox>

CARB began its HD Omnibus Regulation effort, with technology demonstrations, in 2013. NACAA applauds CARB for, once again, leading the way on important mobile source programs that yield substantial emission reductions from key sectors. We support CARB's proposed HD Omnibus Regulation and approval of this regulation by the Board at its August meeting. In addition, NACAA continues to support California's statutory authority under Clean Air Act (CAA) Section 209 to adopt and enforce mobile source programs and the authority of other states across the nation, under Section 177 of the CAA, to adopt and enforce CARB's standards.

In November 2018, EPA announced its Cleaner Trucks Initiative (CTI) to reduce highway heavy-duty emissions of NO<sub>x</sub> and solicited feedback via a January 21, 2020 Advance Notice of Proposed Rulemaking (ANPRM), "Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine Standards" (85 Fed. Reg. 3306). NACAA supports that initiative and responded to the ANPRM on February 20, 2020<sup>2</sup> offering compelling information on the need for such a program and recommendations for key program elements.

At the time, EPA planned to propose a federal rulemaking by mid-summer 2020. However, last month we were notified by the agency that the Administrator has decided to take more time to develop the CTI. Although a new schedule has not been announced, it appears that an NPRM will not be forthcoming until the end of this year at the earliest.

This delay in federal action makes prompt approval and implementation of the CARB HD Omnibus Regulation even more important. Some states were already considering exercising their authority under CAA 177 to adopt CARB's regulation. With the timing of federal standards now uncertain, more states are likely to join that effort to benefit from the accelerated NO<sub>x</sub> reductions.

NACAA strongly supports swift establishment of a single national highway heavy-duty truck and engine program but only if that program includes critically important components. We have attached NACAA's February 20, 2020 comment letter to EPA on the agency's ANPRM, cited above, and ask that CARB consider that letter in the context of the HD Omnibus Regulation as well. In that comment letter we call for, and elaborate on, a full complement of robust provisions including, among others, the following:

- 1) engines designed to a fundamentally lower standard to achieve a reduction in NO<sub>x</sub> emissions of at least 90 percent from current in-use levels as soon as possible but by no later than model year (MY) 2027,
- 2) anti-backsliding requirements for PM,
- 3) in-use performance requirements that ensure achievement of the requisite emission standards across all duty cycles – idling, low load and loaded,
- 4) revamped test procedures correlated to real world operation,
- 5) longer useful life and warranty periods,
- 6) enhanced enforcement, including an updated program for reporting defects,
- 7) onboard diagnostics and vehicle maintenance,
- 8) incorporation of advanced and emerging technologies and
- 9) early introduction of the cleanest engines and technologies for MYs 2024 through 2026.

NACAA believes that CARB's proposed HD Omnibus Regulation effectively addresses each of these requirements and we note that the technology to fulfill these requirements is feasible, available and cost

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<sup>2</sup> [http://4cleanair.org/sites/default/files/Documents/Highway\\_HD-EPA\\_ANPRM-NACAA\\_Comments-022020.pdf](http://4cleanair.org/sites/default/files/Documents/Highway_HD-EPA_ANPRM-NACAA_Comments-022020.pdf)

effective. Moreover, we cannot overstate the national need for the regulatory program described above. We urge CARB to review not only the details of NACAA's recommendations in our February 20, 2020 comment letter to EPA but also the included state and local air agencies' appeals, in their own words, for this more rigorous program to reduce highway heavy-duty NO<sub>x</sub> emissions.

Finally, in addition to adopting the HD Omnibus Regulation, we request that CARB continue to work in close collaboration with EPA to achieve a single national program that preserves all the features and benefits of the CARB program. A single national program is essential to ensuring that the critical *national* need for reductions in highway heavy-duty NO<sub>x</sub> emissions of at least 90 percent from current in-use levels is met by no later than MY 2027 to help states and localities across the country achieve and sustain their clean air goals.

Once again, on behalf of NACAA, we strongly support CARB's proposed HD Omnibus Regulation and urge that the Board approve this program now. If you have any questions or would like further information, please contact either of us or Nancy Kruger, Deputy Director of NACAA.

Sincerely,



Steven E. Flint  
Co-Chair  
NACAA Mobile Sources and Fuels Committee



Eric C. White  
Co-Chair  
NACAA Mobile Sources and Fuels Committee

cc: Richard Corey, CARB, Executive Officer  
Steve Cliff, CARB, Deputy Executive Officer  
Jack Kitowski, CARB, Chief, Mobile Sources Control Division

February 20, 2020

U.S. Environmental Protection Agency  
EPA Docket Center  
Air and Radiation Docket  
Docket ID No. EPA-HQ-OAR-2019-0055  
Mail Code 28221T  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

To Whom It May Concern:

The National Association of Clean Air Agencies (NACAA) offers the following comments on the U.S. Environmental Protection Agency's (EPA) Advance Notice of Proposed Rulemaking (ANPRM), "Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine Standards," which was published in the *Federal Register* on January 21, 2020 (85 Fed. Reg. 3306). NACAA is the national, non-partisan, non-profit association of air pollution control agencies in 41 states, including 115 local air agencies, the District of Columbia and four territories. The air quality professionals in our member agencies have vast experience dedicated to improving air quality in the U.S. These comments are based upon that experience. The views expressed in these comments do not represent the positions of every state and local air pollution control agency in the country.

## **I. Introduction**

EPA last set nitrogen oxide (NO<sub>x</sub>) emission standards and related requirements for highway heavy-duty trucks and engines in January 2001. NACAA has been actively urging EPA to take meaningful action to update and strengthen these standards for the past five years. Attaining and maintaining health-based National Ambient Air Quality Standards (NAAQS) require such federal action and protecting public health and welfare demands it. Therefore, on November 13, 2018, NACAA welcomed EPA Administrator Andrew Wheeler's announcement of the agency's Cleaner Trucks Initiative (CTI), to include a future rulemaking to further decrease NO<sub>x</sub> emissions from highway heavy-duty trucks and engines. When making the announcement, the Administrator stated, "The U.S. has made major reductions in NO<sub>x</sub> emissions, but it's been nearly 20 years since EPA updated these standards. Through rulemaking and a comprehensive review of existing requirements, we will capitalize on these gains and incentivize new technologies to ensure our heavy-duty trucks are clean and remain a competitive method of transportation." NACAA now welcomes this ANPRM, soliciting perspectives on what to include in a forthcoming Notice of Proposed Rulemaking.

Overall, NACAA strongly supports prompt establishment of a single national on-road heavy-duty truck and engine program that includes robust emissions standards, in-use performance requirements that ensure achievement of the emission standards across all duty cycles, test procedures correlated to real world operation, longer useful life and warranty periods and other important provisions that will take full effect as soon as possible but not later than model year (MY) 2027 and achieve a reduction in NO<sub>x</sub> emissions of at least 90 percent from current in-use levels. In addition, the program should incentivize early introduction of the cleanest engines and technologies for MYs 2024 through 2026. We elaborate on these recommendations in section III, below.

## II. The Need for NO<sub>x</sub> Reductions Throughout the U.S.

EPA data show that nearly 130 million people – over a third of the U.S. population – live in areas of the country that are designated nonattainment for the health-based NAAQS for ozone, particulate matter or both. NO<sub>x</sub> emissions contribute significantly to each of these public health problems and are linked with a large number of adverse impacts on the respiratory system, as well as with the other ill effects associated with exposure to elevated levels of ozone and PM, including premature death. NO<sub>x</sub> emissions also contribute to acid deposition, regional haze and the eutrophication of water bodies.

It is widely known and demonstrated that heavy-duty vehicles will continue to be one of the largest contributors to the national mobile source NO<sub>x</sub> inventory in 2028. Therefore, as the agency states in the ANPRM, “Reducing NO<sub>x</sub> emissions from highway heavy-duty trucks and buses is thus an important component of improving air quality nationwide and reducing public health and welfare effects associated with these pollutants, especially for vulnerable populations and lifestyles, and in highly impacted regions.”

States and localities all across the country are in need of NO<sub>x</sub> reductions to achieve and sustain their clean air goals. A new federal heavy-duty truck rule that includes a standard to reduce NO<sub>x</sub> emissions by at least 90 percent from current in-use levels would provide a cost-effective and least-burdensome path to assisting states and localities – from those with the most intractable ozone problems to those currently in attainment but struggling to stay there – in meeting their legal obligation to attain and maintain the health-based NAAQS for ozone and meet Clean Air Act (CAA) anti-backsliding requirements. Given the interstate nature of truck usage, national standards are necessary to effectively garner the broad NO<sub>x</sub> reductions needed across the nation. Moreover, such a national low-NO<sub>x</sub> emission standard will spur domestic clean technology industries and production of American-made trucks and engines to help ensure economic and national security. Further, reductions in NO<sub>x</sub> emissions will help states and local areas reduce secondary PM, regional haze, acid deposition and the eutrophication of water bodies and address environmental justice concerns. In the absence of a more stringent national highway heavy-duty NO<sub>x</sub> standard, many nonattainment areas, and areas on the cusp of nonattainment, across the country will find themselves unable to address emissions from one of their largest sources, likely delaying their attainment or driving them into nonattainment of the NAAQS.

If EPA does not require sufficient NO<sub>x</sub> reductions from heavy-duty trucks many areas will have no choice but to adopt severe limits on local businesses. Because the CAA largely preempts state and local regulation of mobile sources, states and local authorities facing ozone nonattainment may be forced to impose extremely stringent limits on stationary sources such as factories, power plants and refineries as they pursue necessary emission reductions, if reductions from such sources are even available. In turn, such limits will harm local, state and national economies, and will likely not be sufficient to attain the ozone NAAQS.

For example, the Louisville, KY metropolitan area has recently been designated nonattainment for the 2015 ozone standard. As a NO<sub>x</sub>-limited ozone nonattainment area – one that is more influenced by reductions in NO<sub>x</sub> than volatile organic compounds (VOCs) – NO<sub>x</sub> reductions from heavy-duty vehicles are needed in order to meet and maintain compliance with the NAAQS and achieve the public health improvements that come with reduced ozone exposure. Heavy-duty vehicles are the third largest source of NO<sub>x</sub> emissions within Jefferson County, KY and neighboring Floyd County, IN, as well as the nonattainment area as a whole; they are the largest source of NO<sub>x</sub> emissions in three of the five nonattainment counties. According to the Louisville Metro Air Pollution Control District, the only way to move the needle on emissions from the heavy-duty sector is through federal engine and fuel standards.

Michigan currently has four areas designated marginal nonattainment for ozone, located in West and Southeast Michigan (the state is currently working on a redesignation request for Berrien County in West Michigan). The nonattainment counties in West Michigan are largely affected by transport-related ozone; NO<sub>x</sub> reductions from existing stationary sources within the state are scarce and would have limited benefit. A substantial portion of the state's population resides in the large nonattainment area in Southeast Michigan, which encompasses seven counties. Although a substantial segment of the state's industry is also located in this Southeast nonattainment area, mobile sources still account for more NO<sub>x</sub> emissions than stationary sources in the area. Highway heavy-duty diesel vehicles constitute one of the largest categories of mobile source NO<sub>x</sub> emissions, second only to light-duty vehicles. Therefore, the Michigan Department of Environment, Great Lakes, and Energy (EGLE) says additional NO<sub>x</sub> reductions from heavy-duty trucks would assist the state in attaining and maintaining the ozone standard. Additionally, EGLE is concerned that Michigan may not meet the August 2021 marginal attainment deadline for the 2015 ozone standard. The potential for a "bump up" to moderate nonattainment is a real possibility and something that the state has begun to think about and plan for. Several stakeholder workgroups, including one focused on mobile source emissions, have been convened to assess ways in which the state can reduce NO<sub>x</sub> and VOC emissions. At this point in its planning efforts, EGLE says it is looking at any and all sectors as a means to reduce its emissions and meet its attainment goals, but the state recognizes that significant NO<sub>x</sub> reductions, with the exception of the planned retirement of several of its large coal-fired power plants (outside of the August 2021 attainment window), may be difficult to achieve.

Washoe County, NV is also in need of NO<sub>x</sub> reductions from heavy-duty trucks. Washoe County is currently designated attainment for the 2015 ozone NAAQS, but recent ozone design values have been 100 percent (or more) of the NAAQS. On-road motor vehicles, including heavy-duty trucks, represent the largest source of NO<sub>x</sub> emissions in Washoe County. The Washoe County Health District joined EPA's Ozone Advance program in 2016 to improve ozone levels and avoid a nonattainment designation. Reducing air quality impacts from on-road motor vehicles, including heavy-duty trucks, is one of five goals in the Health District's Ozone Advance Path Forward. Freight/goods movement by heavy-duty trucks is a major factor in Northern Nevada's economy. Reno/Sparks is home to many warehouses and distribution centers that generate heavy-duty truck trips. Just east of Reno/Sparks is the world's largest industrial center (Tahoe-Reno Industrial Center), which also generates heavy-duty truck trips. In addition, Interstate 80 is the primary transportation corridor for goods moving east from the Port of Oakland in California, generating even more heavy-duty truck trips through the Reno/Sparks area. The Washoe County Air Quality Management District (AQMD) has permitting authority for only a very small portion of the county's NO<sub>x</sub> inventory and NO<sub>x</sub> reductions from sources subject to AQMD permits will be expensive. Two other potential NO<sub>x</sub> reduction strategies under consideration, and for which the AQMD has authority to pursue, are an emissions banking/offset program and an indirect source rule.

Delaware also says it cannot achieve the ozone standard without additional control measures and that a strong national standard to reduce NO<sub>x</sub> emissions from all heavy-duty vehicles is critical to protecting the health and welfare of its citizens. The state's one nonattainment county, New Castle, includes the heavily traveled I-95 corridor. Heavy-duty vehicles make up approximately 25 percent of all vehicle NO<sub>x</sub> emissions. Strong national standards for controlling NO<sub>x</sub> emissions from this class of vehicles will help Delaware's New Castle County achieve the ozone standard.

New Jersey, too, needs additional NO<sub>x</sub> reductions from highway heavy-duty trucks. A recent 2017 annual emissions inventory for New Jersey indicates that mobile sources are the most significant contributor

to the state's total NO<sub>x</sub> inventory (42 percent) and heavy-duty trucks contribute the greatest share of the mobile source NO<sub>x</sub> emissions (25 percent). These emissions can be compared to other sources such as electric generating units (EGUs), which contribute only 4 percent of the total NO<sub>x</sub> inventory, as well as non-EGU point and area sources, which, when combined, contribute only 26 percent. The Northern New Jersey nonattainment area is classified as serious nonattainment for the 2008 75-ppb ozone NAAQS and moderate nonattainment for the 2015 70-ppb ozone NAAQS. New Jersey's Department of Environmental Protection (DEP) says attainment by the statutory attainment dates for this area is unlikely due, in large part, to the continuing significant contributions of highway heavy-duty trucks to the New Jersey and regional inventories. In addition, the Southern New Jersey nonattainment area is classified as marginal nonattainment for the 2015 ozone NAAQS. New Jersey sits in the middle of a major commercial corridor and is bisected by the I-95 corridor. New Jersey is also home to one of the largest ports in the country, the Port Authority of New York and New Jersey (PANYNJ), which provides goods movement to over 25 percent of the U.S. population, from Boston to Washington, DC. The environmental justice community surrounding the PANYNJ is negatively affected by the emissions from the dirty trucks conducting business at the Port on a daily basis. Diesel exhaust is the most significant air toxic affecting these neighborhoods. Ozone is a persistent air pollutant on the East Coast and mobile sources are currently, and projected in the future to be, the largest contributors to ozone precursor pollutants, especially NO<sub>x</sub>. Due to the timing of the ozone nonattainment problems and attainment dates in New Jersey, DEP says it is important that EPA adopt lower heavy-duty truck NO<sub>x</sub> emission standards by MY 2027 and notes that controlling highway heavy-duty trucks would also contribute to reducing transported emissions to downwind states and assist states in meeting their Good Neighbor State Implementation Plan requirements.

EPA action to significantly reduce NO<sub>x</sub> emissions from highway heavy-duty vehicles is critical for Wisconsin to meet its Clean Air Act attainment obligations relative to ozone, since reductions in regional NO<sub>x</sub> emissions are necessary to resolve persistent ozone nonattainment issues along Wisconsin's Lake Michigan shoreline. Wisconsin currently has multiple areas in nonattainment for both the 2008 and 2015 ozone standards, from urban centers to rural Door County. Due to the overwhelming impact of transport of ozone and ozone precursors, Wisconsin has limited ability to reduce these ozone levels; in 2017, for example, approximately 87 percent of the ozone concentrations at Sheboygan County's Kohler-Andrae monitor were attributed to out-of-state emissions. Notably, Wisconsin's ozone nonattainment areas are located downwind of major population centers, including transportation and freight hubs that are a significant source of heavy-duty vehicle emissions. Wisconsin will not achieve attainment without additional reductions in emissions in these upwind areas, including from mobile sources.

Reductions in heavy-duty diesel vehicle NO<sub>x</sub> emissions are also important for the Washington, DC-MD-VA ozone nonattainment area to attain the ozone NAAQS. The Ozone Transport Commission (OTC) conducted source apportionment modeling with the 2011 emissions inventory, projected to 2023; this modeling assessment further confirmed the need for NO<sub>x</sub> reductions from heavy-duty vehicles. OTC's source apportionment modeling work shows that the highway diesel sector is projected to contribute to ozone levels in DC, on average, 6.8 percent throughout the ozone season and 9.8 percent on exceedance days. On some days the highway diesel sector is projected to contribute up to 14 percent to ozone levels. By contrast, on average, DC is projected to contribute 3.1 percent to its own ozone levels throughout the ozone season and 6.8 percent on exceedance days.

Connecticut is nonattainment for both the 2008 and 2015 8-hour ozone NAAQS. Because the state failed to attain the 2008 standard by the July 2018 statutory deadline it has been bumped up to serious nonattainment. With respect to the 2015 standard, the Greater Connecticut area is designated marginal

nonattainment and the NY-NJ-CT area is designated moderate nonattainment. Highway heavy-duty vehicles are a significant and growing contributor to the state's NO<sub>x</sub> inventory. In 2018, highway heavy-duty vehicles accounted for 40 percent of on-road NO<sub>x</sub> emissions in the state and by 2045 highway heavy-duty vehicles are projected to contribute 66 percent of all on-road NO<sub>x</sub> emissions. Since stationary sources represent an increasingly smaller share of Connecticut's emissions inventory the potential for stationary source reductions to contribute to attainment of the ozone standard is limited and expensive, exceeding \$40,000 per ton of NO<sub>x</sub> reduced, according to the Connecticut Department of Energy and Environmental Protection.

The eight-county Charlotte, NC region (which includes Mecklenburg County) is a former 2008 ozone nonattainment area that was redesignated by EPA as a maintenance area, effective August 27, 2015. As a NO<sub>x</sub>-limited area, additional NO<sub>x</sub> reductions from heavy-duty trucks would be valuable and necessary given that more than 90 percent of the ozone-forming NO<sub>x</sub> in Mecklenburg County originates from mobile sources. Of this, 22 percent can be directly attributed to the equipment used for goods movement (i.e. heavy-duty diesel trucks). Recently, on September 11, 2019, Mecklenburg County recorded an 8-hour maximum ozone concentration of 81 parts per billion (ppb). This is the highest value in the county since 2012 and jeopardizes the area's already narrow compliance with the 2015 ozone NAAQS of 70 ppb. Mecklenburg County's air quality emissions inventories have shown that a significant portion of ozone-forming NO<sub>x</sub> emissions in the county originate from other mobile sources such as passenger transportation (34 percent), aircraft and ground support equipment (13 percent) and non-road equipment used in construction (21 percent).

In Maryland, research on ozone production efficiency has shown that reductions in NO<sub>x</sub> will not only help reduce ozone levels within the state, but also continue to change the atmospheric chemistry in the Mid-Atlantic such that a ton of NO<sub>x</sub> reduced in 2020 yields a much greater ozone reduction compared to that same ton of NO<sub>x</sub> reduced in 2000.

Although Minnesota does not have NO<sub>x</sub>-related nonattainment issues at this time, the Minnesota Pollution Control Agency (MPCA) says it needs additional NO<sub>x</sub> reductions from heavy-duty trucks to achieve its environmental justice goals. Transportation is Minnesota's largest source of air pollution and the state says it is not achieving the pollution reductions it needs in this sector. Low-income areas and communities of color in Minnesota are disproportionately exposed to air pollution from transportation. Reducing NO<sub>x</sub> emissions from heavy-duty trucks would help mitigate disproportionate health impacts in these areas (see a Minnesota-specific study here: <https://www.mdpi.com/1660-4601/12/5/5355>). As found in other studies, lower-income areas and communities of color in the Minneapolis-St. Paul metropolitan area (those identified as environmental justice areas by the MPCA) tend to have higher levels of traffic-related air pollution, even though residents of these areas generally drive less than residents of wealthier, majority-white areas. According to the state of Minnesota's *Life and Breath* report (<https://www.pca.state.mn.us/air/life-and-breath-report>) if the state reduces 2013 levels of fine particles and ground-level ozone by 10 percent – roughly equal to the air quality improvements seen in the past decade – the following adverse health events could be prevented: 200 to 500 early deaths, 70 hospitalizations and 150 emergency department visits. Minnesota is pursuing LEV/ZEV standards for passenger vehicles through the Clean Cars Minnesota rulemaking. This will reduce overall transportation emissions and local air pollution, but will not address heavy-trucks, which are the largest NO<sub>x</sub> source. Even though Minnesota also uses DERA funding and Volkswagen settlement funding to reduce NO<sub>x</sub> pollution from heavy-trucks and off-road equipment, those efforts do not meet all of the states needs with respect to heavy-duty NO<sub>x</sub> emissions.

Environmental justice concerns also drive Rhode Island's need for additional NO<sub>x</sub> reductions from highway heavy-duty trucks. The mobile source sector is by far the largest source of NO<sub>x</sub> in the state,

accounting for nearly 80 percent of total NO<sub>x</sub> emissions. Stationary source fuel combustion is the second largest emitting sector of NO<sub>x</sub>, at 13.1 percent. Approximately 35 percent of the state's NO<sub>x</sub> emissions come from highway heavy-duty vehicles, while almost 45 percent of all highway heavy-duty NO<sub>x</sub> emissions occur in Providence County and within frontline/environmental justice communities. For example, the Port of Providence and surrounding industrial areas hold regional energy and economic significance, yet present local impacts that are often in conflict with surrounding communities. Communities close to the highway, port, freight transportation corridors and industrial areas with more emission sources (NO<sub>x</sub> and others) experience increased exposure to air pollution and the risk of health effects. Low-income communities of color in Providence bear most of the burden of port-related highway mobile activities and suffer the greatest environmental health consequences of air pollution.

Clark County, NV is currently designated marginal nonattainment for the 2015 ozone NAAQS. The trends both in NO<sub>x</sub> emissions and ambient ozone concentrations in Clark County are decreasing and the county believes that it can attain the 2015 ozone NAAQS with the existing control programs already in place (and believes this is true even with the likely probability that Clark County could be bumped up to moderate nonattainment). Excepting 2018 data that was significantly affected by wildfire smoke, NO<sub>x</sub> and ozone measurements appear to be on track with EPA modeling that was completed with the 2015 ozone NAAQS. If this trend continues, the area should achieve attainment in 2023. Having said that, however, the Clark County Department of Environment and Sustainability notes that from a policy perspective that takes into account what is in the best interest of its citizens, and anticipating other future ozone standard reductions, the county will benefit from every NO<sub>x</sub> reduction that is plausible and, therefore, would welcome further NO<sub>x</sub> emission reductions from heavy-duty trucks. In addition, reducing NO<sub>x</sub> in Southern California would be greatly beneficial to Clark County since the long-range transport of ozone across the border has been observed in studies performed by the National Oceanic and Atmospheric Administration to contribute to ozone nonattainment problems in Southern Nevada.

While Massachusetts is designated attainment for the 2015 ozone standard, the state says it is important to further reduce NO<sub>x</sub> emissions from heavy-duty vehicles to ensure maintenance of attainment, reduce the number of unhealthy ozone days that occur and reduce direct exposure of its citizens, particularly in environmental justice areas. The Massachusetts Department of Environmental Protection notes that it is also important that upwind states get the benefits of lower NO<sub>x</sub> emissions from heavy-duty vehicles for their own citizens and because most of the elevated ozone that occurs in Massachusetts is due to transport from the I-95 corridor.

Likewise, many other areas of the country seeking to maintain their attainment status will benefit from nationwide NO<sub>x</sub> reductions, including areas like Wyandotte County, KS, which has been "flirting" with nonattainment of the ozone standard for many years.

In 2016, state and local air agencies from around the country joined together to petition EPA to adopt "ultra-low NO<sub>x</sub>" emission standards for highway heavy-duty trucks and engines. Petitioners, who based their case on their need for the related NO<sub>x</sub> reductions, included the South Coast (CA) Air Quality Management District; Pima County (AZ) Department of Environmental Quality; Bay Area (CA) Air Quality Management District; Connecticut Department of Energy and Environmental Protection; Delaware Department of Natural Resources and Environmental Control, Division of Air Quality; Washoe County (NV) Health District, Air Quality Management; New Hampshire Department of Environmental Services; New York City (NY) Department of Environmental Protection; Akron (OH) Regional Air Quality Management District; Washington State Department of Ecology; Puget Sound (WA) Clean Air Agency; Rhode Island Department of

Environmental Management; Massachusetts Department of Environmental Protection; Vermont Department of Environmental Conservation; New York State Department of Environmental Protection; and Sacramento (CA) Metropolitan Air Quality Management District.

### III. NACAA's Recommendations for EPA's CTI Rule

EPA states in the ANPRM that it intends the CTI “to be a holistic rethinking of emission standards and compliance.” NACAA supports this intention and strongly recommends that EPA include the following components in its rule.

#### A. Emission Reductions

NACAA recommends that engines be designed to a fundamentally lower standard to achieve a reduction in NO<sub>x</sub> emissions of at least 90 percent from current in-use levels as soon as possible but by no later than MY 2027.

EPA, as part of a collaboration with state and local agencies in cooperation with engine original equipment manufacturers (OEMs) and technology suppliers, has contributed resources to fund low-NO<sub>x</sub> engine demonstration work conducted by Southwest Research Institute. The results of these demonstrations, conducted with “bolt-on” technologies added to today’s production engines, are very impressive and underscore the feasibility of NO<sub>x</sub> reductions of at least 90 percent from current in-use levels and of full-duty cycle high-efficiency emission control by MY 2027.

The demonstrations show that 1) under the Federal Test Procedure (FTP), improved aftertreatment can achieve 0.015 grams per brake horsepower-hour (g/bhp-hr) NO<sub>x</sub> (compared to the current standard of 0.2 g/bhp-hr) without any fuel economy penalty (in fact, there is a fuel economy benefit of about 1 percent) and 2) on the low-load cycle, improved aftertreatment, air handling and software calibration can achieve 0.07 g/bhp-hr NO<sub>x</sub> without any fuel economy penalty.

New engine layouts being engineered today by Achates Power, Cummins and Nissan, with the support of the California Air Resources Board (CARB), the U.S. Army and the U.S. Department of Energy’s ARPA-e, are similarly capable of at least a 90-percent improvement in NO<sub>x</sub> performance when coupled with these aftertreatment approaches.

Among the technologies that manufacturers can use to meet the NO<sub>x</sub> emission reduction target that NACAA recommends are advanced catalyst formulation, 48-volt technology, cylinder deactivation, passive and active thermal management, variable valve actuation and battery electric and fuel cell vehicles.

The Manufacturers of Emission Controls Association (MECA) discusses technology options in “Technology Feasibility for Heavy-Duty Diesel Trucks Achieving 90% Lower NO<sub>x</sub> Standards in 2027,” ([http://www.meca.org/resources/MECA\\_2027\\_Low\\_NOx\\_White\\_Paper\\_FINAL.pdf](http://www.meca.org/resources/MECA_2027_Low_NOx_White_Paper_FINAL.pdf)) published February 4, 2020. In this white paper, MECA presents “dynamometer test results and emission models from fully aged aftertreatment systems installed on heavy-duty on-road engines to offer several compliance paths that are technologically and economically achievable by MY 2027. The models used have been optimized over decades of testing of accelerated aged commercial catalysts and validated against real world emission control systems. The technologies outlined in this assessment are either commercial or

market ready options that can be deployed on vehicles by model year 2027 to achieve 0.02 g/bhp-hr on the heavy-duty FTP certification cycle and approximately 0.075 g/bhp-hr in low load operation using the low load certification cycle being proposed by CARB.”

NACAA also notes the potent impact of diesel PM and many states’ and local areas’ efforts to reduce it, including through the use of grants under the Diesel Emissions Reduction Act program, and with initiatives such as local anti-idling and smoke opacity programs. NACAA recommends that EPA include anti-backsliding provisions for PM, such as a 50-percent reduction from the current PM emission standard, to discourage backsliding on diesel particulate filter (DPF) filtration efficiency.

To reduce emissions of VOCs from gasoline engines, NACAA recommends that EPA establish evaporative emission standards, including onboard vapor recovery.

## B. In-Use Performance

So that new low-NO<sub>x</sub> emission standards are fully realized in the real world NACAA recommends that EPA require all engines to achieve high emission-control performance in use across all duty cycles of operation (idling, low load and loaded), including through introduction of a low-load cycle for certification upfront demonstration so that certification accurately reflects in-use performance.

NACAA additionally recommends that EPA strengthen the approach for assessing compliance with in-use performance requirements by adopting a new in-use emissions algorithm to evaluate a full day of a vehicle’s in-use emissions data without exclusion (i.e., *all* emissions from the vehicle’s work shift must be considered).

NACAA also recommends that EPA increase the stringency of standards in full recognition of technologies to accelerate warm up after a cold start, such as the incorporation of light-duty vehicle best practices for controlling emissions, including engine control strategies such as cold-start and warm-up strategies, and catalyst placement for faster warmup.

NACAA further recommends that, as part of certification testing, EPA require an upfront durability demonstration using accelerated test methods with strong correlation to in-use performance.

In addition, NACAA recommends that EPA add an idle cycle for certification of new engines and establish a Not-to-Exceed engine exhaust NO<sub>x</sub> emissions limit of 10 grams per hour or less.

Finally, NACAA supports measuring PM emissions during in-use testing of engines equipped with DPFs and recommends that EPA retain this procedure. EPA states in the ANPMR that “PEMS measurement is more complicated and time-consuming for PM measurements than for gaseous pollutants such as NO<sub>x</sub>.” However, NACAA notes that the current in-use testing requirements allow OEMs to apply for and be granted a waiver on a case-by-case basis if the complications of in-use PM measurement for any given engine family are too difficult to overcome.

### C. Useful Life and Warranty Periods

NACAA recommends that EPA increase regulatory useful life, by class, to more accurately reflect how long vehicles actually remain in the fleet: light heavy-duty vehicles to 270,000 miles, medium heavy-duty vehicles to 350,000 miles, heavy heavy-duty vehicles to 800,000 miles and heavy-duty gasoline vehicles to 200,000 miles.

Likewise, NACAA recommends that EPA increase the length of warranties, by class, to levels on the order of 75 to 80 percent of the useful life (from the current warranty of 100,000 for all classes).

### D. Enforcement

NACAA recommends that EPA update the Defect Reporting Program to further enable early defect resolution by requiring warranty-claims-rate-triggered increases to reporting frequencies, tying screened warranty claims rate thresholds to mandatory remedial action for identified design defects and requiring manufacturer reporting of the emissions impacts of identified defects and the probability of defect recurrence across the similar engine population to full useful life.

NACAA also recommends that EPA include requirements such as emission control unit “hardening” to discourage tampering. EPA should also make enforcement against tampering a top agency priority.

NACAA recommends that EPA actively support the development of technologies and programs that leverage capable vehicle sensor-based emissions measurement to gain a clearer understanding of engine family emissions rate distributions exhibited in the real world across the variation of actual vocations and applications. Vehicle sensor-based emissions evaluations have potential to enhance accuracy and granularity of emissions inventories, confirm design robustness and reduce the logistics and resources otherwise needed to reach similarly statistically powerful determinations.

### E. Onboard Diagnostics and Vehicle Maintenance

NACAA recommends that EPA maintain a robust onboard diagnostics (OBD) program with diagnostic specificity that will ensure OBD continues to accurately detect system failures for lower emission standards and inform the technician of what the problem is, and the cause, so it can be promptly, proficiently and cost-effectively repaired. The agency should also conform OBD provisions so states can develop and enforce comprehensive inspection and maintenance (I/M) programs, if they choose.

NACAA recognizes that properly maintaining a vehicle throughout its life is key to realizing real-world emissions benefits. NACAA recommends that EPA require practically affordable access to service information and tools for maintaining heavy-duty engines and aftertreatment emissions systems. This is especially important for aging vehicles; for small businesses, small fleets and independent owner/operators; and for rural operations that would require long-distance travel to access dealership repair networks. Such practically affordable access also provides a means of mitigating the reportedly long wait times that can be encountered when seeking dealer service or repairs. These actions to support

the ready repairability of vehicles would also assist states that choose to pursue vehicle I/M programs because such programs are more easily justified when potential barriers to repair access are reduced.

#### F. Incorporation of Advanced and Emerging Technologies

Through the CTI, EPA should encourage the expansion of advanced and emerging technologies, including electric drive systems, while structuring an averaging, banking and trading program that ensures preservation of NO<sub>x</sub> reductions and continued progress toward NAAQS attainment and maintenance regardless of the timing of widespread advanced technology systems' penetration into the heavy-duty market. OEMs all have active technology development efforts with a variety of emphases, including advanced combustion and electric drive vehicles and fuel cells. In fact, many of these manufacturers currently have products commercially available and being deployed in multiple commercial applications through such programs as the national Volkswagen settlement. Multiple reports have indicated neutral or better Total Cost of Ownership today or by 2027 for several vocational applications.

EPA should incorporate anticipated advanced technology as part of the stringency and anticipated compliance strategy, not just as a technology innovation incubator project on the side. Such an approach could complement current state and local programs that are underway across the country to deploy such vehicle types. For example, CARB is moving forward with its Advanced Clean Truck rule with ZEVs proposed for 50 percent of class 4-8 vocational truck sales in 2030 and the CARB Board has directed its staff to examine where that can be accelerated. Ideally, the CTI would encourage penetration of these cleanest vehicles well beyond the efforts of California and other jurisdictions such that these advanced technology vehicles could be available to fleets nationwide or, alternatively, ensure against loss of the emissions benefits of the CTI to federal over crediting of the California program.

#### G. Incentives for Early Action

NACAA recommends that EPA incentivize early introduction of the cleanest engines and technologies for MYs 2024 through 2026, which could include clarifying NO<sub>x</sub> credit programs, potential early introduction flexibilities or other voluntary incentives.

### **IV. Conclusion**

The technology for lower-emitting engines is feasible, available and cost-effective. It has been 19 years since EPA last set the heavy-duty on-highway NO<sub>x</sub> standards. Since that time, numerous engine technologies and controls to lower emissions have been successfully demonstrated and, as recent and ongoing studies show, more continue to emerge.

As we have explained, for many areas around the country facing ozone issues, mobile sources are the dominant source of NO<sub>x</sub> with highway heavy-duty trucks being among the greatest contributors. Similarly, numerous areas seeking to address environmental justice concerns are seeking NO<sub>x</sub> reductions from the highway heavy-duty sector. As such, it is incumbent upon EPA to act decisively in establishing the most technologically feasible NO<sub>x</sub> standards possible. Section (202)(a)(3)(A) of the Clean Air Act directs that NO<sub>x</sub> emission standards for heavy-duty vehicles and engines are to "reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to cost, energy,

and safety factors associated with the application of such technology.” If EPA does not take full advantage of the opportunity to put in place appropriately stringent national standards to reduce highway heavy-duty NO<sub>x</sub> emissions many states and local areas could suffer the consequences in the form of sanctions even though they have no control over the mobile source emissions that degrade their air quality. Moreover, these areas will suffer consequences in the form of harm to the health of their citizens.

EPA Administrator Wheeler has often articulated significantly reducing the number of nonattainment areas as one of his highest priorities. Establishing more stringent national NO<sub>x</sub> emission standards for heavy-duty trucks, to reduce emissions by at least 90 percent from current in-use levels, would contribute directly and substantially to achieving this goal by cleaning up the air in an expeditious and cost-effective manner, addressing the core problem instead of focusing on achieving additional reductions from stationary sources and assisting states and localities by taking action that is far better suited to occur at the federal level instead of a state or regional level.

As EPA develops a rulemaking to further regulate highway heavy-duty vehicles and engines we urge that the agency incorporate NACAA’s recommendations, as outlined above. We look forward to joining with other stakeholders to work with the agency as it proceeds with this initiative. If you have any questions or would like further information please contact either of us or Nancy Kruger, Deputy Director of NACAA.

Sincerely,



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