Petition to EPA for Rulemaking to Adopt Ultra-Low NOx Exhaust Emission Standards for On-Road Heavy-Duty Trucks and Engines

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June 3, 2016

Via Electronic and U.S. Mail
The Honorable Gina McCarthy, Administrator
United States Environmental Protection Agency
William Jefferson Clinton Federal Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460
McCarthy.gina@epa.gov

Re: PETITION FOR RULEMAKING TO ADOPT ULTRA-LOW NOx EXHAUST EMISSION STANDARDS FOR ON-ROAD HEAVY-DUTY TRUCKS AND ENGINES

Dear Administrator McCarthy:

SUMMARY

The South Coast Air Quality Management District (SCAQMD) and the undersigned co-petitioners hereby petition the Administrator of the Environmental Protection Agency (EPA) to undertake a rulemaking to revise the on-road heavy-duty engine exhaust emission standards for oxides of nitrogen (ultra-low NOx standard) from 0.2 grams per brake horsepower-hour (g/bhp-hr) to 0.02 g/bhp-hr.[1, 2, 3]

As EPA knows, NOx is an ozone precursor. It reacts with volatile organic compounds (VOCs) in the presence of sunlight to form ground-level ozone. EPA, Ozone Pollution, https://www.epa.gov/ozone-pollution. This petition demonstrates that further control of NOx emission sources is essential in order to enable California's South Coast Air Basin (Basin) to achieve both the 1997 and 2008 8-hour National Ambient Air Quality Standards (NAAQS) as well as the 2015 8-hour NAAQS for ozone. Because the 2015 ozone standards are even more stringent than standards set in previous years, a revised NOx engine exhaust emission standard is also necessary to assist a number of other states in attaining the NAAQS. Further, exposure to

[1] The Administrative Procedure Act (APA) provides that "[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule." 5 U.S.C. § 553(e).
[2] For the purposes of this petition, an engine that meets the 0.02 g/bhp-hr is an "ultra-low NOx engine."
[3] Please refer to Tab 1 for Letter to Support the Adoption of Nationwide Lower On-Road Heavy-Duty Engine Exhaust Emission Standards for NOx submitted by Erik C. White, Air Pollution Control Officer, Placer County Air Pollution Control District (June 1, 2016).

ozone causes numerous harmful health effects which impact our population's most sensitive receptors. This continued harmful exposure compels immediate agency action.

Section 202(a)(1) of the Clean Air Act (CAA) directs EPA to prescribe, and from time to time revise, emissions standards for any class or classes of new motor vehicles or new motor vehicle engines which, in the Administrator's judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. 42 U.S.C. § 7521(a)(1). This paragraph, along with subparagraphs 202(a)(3)(A) and 202(a)(3)(C), apply to EPA's regulation of heavy trucks and truck engines. Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements, 66 Fed. Reg. 5002, 5007-08 (Jan. 18, 2001). In that rulemaking, EPA made an endangerment finding with regard to NOx emissions from heavy-duty trucks. 66 Fed. Reg. 5002, 5008. As the evidence in Part I of this petition demonstrates, such emissions unquestionably continue to endanger public health.

The SCAQMD is the regional agency responsible for the control of air pollution in the Basin. Cal. Health & Safety Code § 40412. It has the primary responsibility to control air pollution from non-vehicular sources, while the California Air Resources Board (CARB) is accountable for control of air pollution from motor vehicles to the extent allowed by federal law. Cal. Health & Safety Code § 40000. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The SCAQMD also includes portions of the Mojave Desert Air Basin and Salton Sea Air Basin in Riverside County, including the Palm Springs area. The SCAQMD encompasses over 10,000 square miles and is home to over 16 million people, about 5% of the U.S. population, and has some of the worst air quality in the nation. To guarantee continued progress toward the goal of clean air as well as to ensure compliance with state and federal requirements, the SCAQMD, along with CARB, prepares and submits to EPA the Air Quality Management Plan (AQMP) as required by federal law. *See* SCAQMD, Final 2012 Air Quality Management Plan (Feb. 2013) at ES-1 (Tab 2). The AQMP, which was last submitted to EPA in 2013, incorporates the most recent scientific and analytical tools and represents a comprehensive strategy aimed at controlling air pollution from all sources, including stationary sources, on- and off-road mobile sources, and area sources. *Id.* (Tab 2).

There have been substantial reductions in ozone through regulations and programs at the local, state, and federal levels. However, the Basin will be unable to achieve the ozone standards by the attainment dates of 2024 and 2032 without the additional emissions reductions from a revision of the existing on-road heavy-duty engine exhaust emission standards for NOx. A nationwide standard is also critical in assisting other states to achieve the more stringent 2015 NAAQS.

The APA codifies the right to petition federal agencies for rulemakings, providing that "[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule." 5 U.S.C. § 553(e). As defined in the APA, a "person" is any "individual, partnership, corporation, association, or public or private organization other than an agency." 5 U.S.C. § 551(2). Courts have construed the APA broadly to permit the public to petition for rulemaking

under the Act. *See Friends of the Earth v. EPA*, 934 F. Supp. 2d 40, 54 (D.D.C. 2013) (suggesting that 5 U.S.C. §§ 553(e) and 555(b) apply broadly to the EPA and CAA). Given that the term "agency" means any authority of the United States Government, 5 U.S.C. § 551(1), it follows that the SCAQMD is not considered an "agency" – which may not petition EPA – but rather is a "public organization" meeting the definition of "interested person" and is entitled to bring this Petition. EPA itself acknowledges that any person may petition it for a rulemaking under the CAA, *see* EPA, Petitions for Rulemaking, http://www.epa.gov/aboutepa/petitions-rulemaking, and case law affirms this right. *Com. of Va. v. EPA*, 108 F.3d 1397, 1402 (D.C. Cir.), *decision modified on reh'g*, 116 F.3d 499 (D.C. Cir. 1997); *Friends of the Earth*, 934 F. Supp. 2d at 54. Furthermore, the Supreme Court recognizes that Section 307(b)(1) of the CAA, 42 U.S.C. § 7607(b)(1), contains the "concomitant procedural right to challenge the rejection of [a] rulemaking petition as arbitrary and capricious." *Mass. v. EPA,* 549 U.S. 497, 520 (2007).

As such, the SCAQMD and the undersigned co-petitioners petition EPA to take the following action:

1. EPA shall begin rulemaking on the development of an ultra-low NOx exhaust emissions standard (0.02 g/bhp-hr) for on-road heavy-duty engines with the goal of having a proposed rule by July 2017 and a Final Rule by December 31, 2017.

2. In developing the Proposed Rule, the EPA shall require ultra-low NOx engines meeting the 0.02 g/bhp-hr standard by January 1, 2022.

3. If full implementation of an ultra-low NOx exhaust emission standard is not feasible for certain classes or vocations of vehicles by January 1, 2022, EPA shall phase-in the requirements for sale of ultra-low NOx engines beginning that year for classes or vocations of vehicles that are more readily amenable to having cleaner engines deployed in the fleet. In doing so, EPA may establish intermediate NOx exhaust emission standards that are higher than the ultra-low NOx standard. However, the higher standards shall be no higher than 0.05 g/bhp-hr. Full implementation of the 0.02 g/bhp-hr standard shall occur no later than January 1, 2024.

4. To encourage early development and deployment of 0.02 g/bhp-hr engines, EPA shall develop guidelines under the Diesel Emissions Reduction Act. The guidelines shall allow for owners of existing on-road heavy-duty vehicles with engines that meet the 2010 on-road heavy-duty NOx exhaust emissions standard of 0.2 g/bhp-hr to qualify for incentive funding to purchase an ultra-low NOx engine. Owners should not be required to scrap the 2010 standard vehicle provided that the vehicle is sold and used outside of an area that is in nonattainment of the NAAQS for ozone. The guidelines shall ensure that the existing 2010 vehicles shall not operate in a nonattainment area.

Although EPA's regulations do not set forth a particular format or requirements for such a petition, SCAQMD and co-petitioners include herein the factual and legal basis for the requested rule.

ACRONYMS

APA - Administrative Procedure Act
AQMP – Air Quality Management Plan
CAA – Clean Air Act
CARB – California Air Resources Board
CEC – California Energy Commission
CO – Carbon Monoxide
COPD – Chronic Obstructive Pulmonary Disease
CSAPR – Cross-State Air Pollution Rule
CT DEEP – Connecticut Department of Energy and Environmental Protection
CWI – Cummins Westport Inc.
DERA – Diesel Emissions Reduction Act
DOT – United States Department of Transportation
EPA – United States Environmental Protection Agency
FTP – Federal Test Procedure
g/bhp-hr – grams per brake horsepower hour
GHGs – Greenhouse Gases
HD – Heavy-Duty
ISA – Integrated Science Assessment
MECA – Manufacturers of Emissions Controls Association
MSRC – Mobile Source Air Pollution Reduction Review Committee
NACAA – National Association of Clean Air Agencies
NAAQS – National Ambient Air Quality Standards
NESCAUM – Northeast States for Coordinated Air Use Management
NH DES - New Hampshire Department of Environmental Services
NHSTA – National Highway Traffic Safety Administration
NOx – Oxides of Nitrogen
OAR – Office of Air and Radiation
PM – Particulate Matter
PNA – Passive NOx adsorber
ppb – parts per billion
ppm – parts per million
RECLAIM – REgional CLean Air Incentives Market
SCAB or Basin – South Coast Air Basin
SCAG – Southern California Association of Governments
SCAQMD – South Coast Air Quality Management District
SCR – Selective Catalytic Reduction
SIP – State Implementation Plan
SwRI – Southwest Research Institute
tpd – tons per day
VOC – Volatile Organic Compound

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EVIDENTIARY AND LEGAL BASIS FOR PETITION

I. A Revised National Standard is Necessary

A. Regulatory Background

The CAA was designed by Congress to protect the public health and welfare from the adverse effects of air pollution. To that end, the CAA requires EPA to establish the NAAQS for certain

"criteria pollutants," including both ground-level ozone and oxides of nitrogen.[4] Primary NAAQS set limits to protect public health, including the health of at-risk populations such as those with pre-existing medical conditions, children, and the elderly. *See* 42 U.S.C. § 7409(b)(1). Secondary NAAQS set limits to protect the public welfare, which includes protection against visibility impairment, damage to animals, crops, vegetation, and buildings. *See* 42 U.S.C. § 7409(b)(2). In setting these limits, EPA must establish standards that are no more or less stringent than necessary to protect the public health and welfare. *See* EPA, Integrated Science Assessment for Ozone and Related Photochemical Oxidants (EPA Ozone ISA) (Feb. 2013) at lxxvi (Tab 3). However, in promulgating the NAAQS the EPA may neither consider the costs of implementing the standards, *Whitman v. Am. Trucking Ass'ns, Inc.*, 531 U.S. 457, 471 (2001), nor the attainability or technological feasibility of achieving the standards. *Am. Petroleum Inst. v. Costle*, 665 F.2d 1176, 1185 (D.C. Cir. 1981).

In 2008, the primary and secondary 8-hour NAAQS for ozone were reduced from 0.080 ppm – set in 1997 – to 0.075 ppm. National Ambient Air Quality Standards for Ozone, 73 Fed. Reg. 16,436 (Mar. 27, 2008). Expected attainment dates for these standards for "extreme" ozone areas, including the Basin, are fast-approaching. The 1997 standards must be attained in 2023 while the 2008 standards must be met in 2031. Further, and based on its review of the air quality criteria for ozone and related photochemical oxidants, EPA revised the primary and secondary 8-hour ozone standard levels to a more stringent 0.070 ppm as of December 2015. *See* National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292 (Oct. 26, 2015). The newly revised standard is projected to result in the addition of multiple new nonattainment areas in rural regions of California and will require further emission reductions in existing nonattainment areas. CARB, Mobile Source Strategy (2016 Mobile Source Strategy) (May 2016) at 21 (Tab 4). State Implementation Plans (SIPs) for the 2008 standard are due in 2016, while SIPs for the revised 2015 standard will be due to EPA in 2021, with attainment dates through 2037. *Id.* (Tab 4).

B. Attainment of the NAAQS in California

Since the year 2000, ozone levels have decreased by approximately 30% in the Basin. *See* EPA, Janet G. McCabe, Implementing the 2015 Ozone National Ambient Air Quality Standards, Memorandum, (McCabe Memorandum) (Oct. 2015) at 7 (Tab 5); *see also* 2016 Mobile Source Strategy at 20 ("Twenty-five years ago the entire South Coast region violated the current 8-hour ozone standard of 75 ppb. Today, concentrations have declined 45 percent, and 40 percent of the population lives in communities that meet the standard") (Tab 4). Still, this region remains one of only two areas in the United States designated as "extreme" nonattainment for the 1997 and 2008 8-hour ozone standards.[5] *See* 2016 Mobile Source Strategy at 21 (Tab 4); *see also* Figures

[4] The Act directs the EPA Administrator to list air pollutants that, in her judgment "cause or contribute to air pollution which may reasonably be anticipated to endanger the public health or welfare … the presence of which in the ambient air results from numerous or diverse mobile or stationary sources [and] for which [the Administrator] plans to issue air quality criteria." 42 U.S.C. § 7408(a)(1).

[5] The San Joaquin Valley is also designated as extreme nonattainment for both standards. 2016 Mobile Source Strategy at 21 (Tab 4).

1 & 2, below. The Basin has the highest 2012-2014 8-hour ozone design value in the nation at 102 ppb, with the San Joaquin Valley coming in a close second at 95 ppb. McCabe Memorandum at 7 (Tab 5). Additionally, in 2015, the Basin exceeded the 2008 ozone standards on 81 days while the San Joaquin Valley exceeded the standards on 82 days. *See* http://www.arb.ca.gov/aqmis2/ozone_annual.php; *see also* Figure 3, below (number of days the Basin exceeded the standard from the late 1970s through 2012).

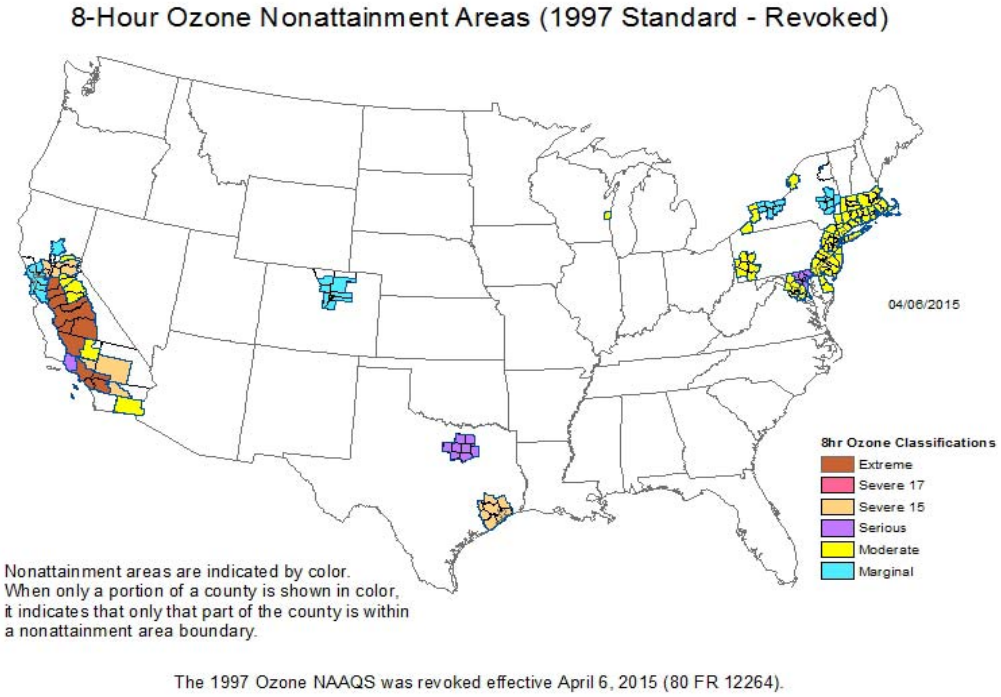

Figure 1. Depicting the Basin and the San Joaquin Valley as the only two areas in extreme nonattainment for the 1997 8-hour ozone standard. **Source:** https://www3.epa.gov/airquality/greenbook/map8hr.html.

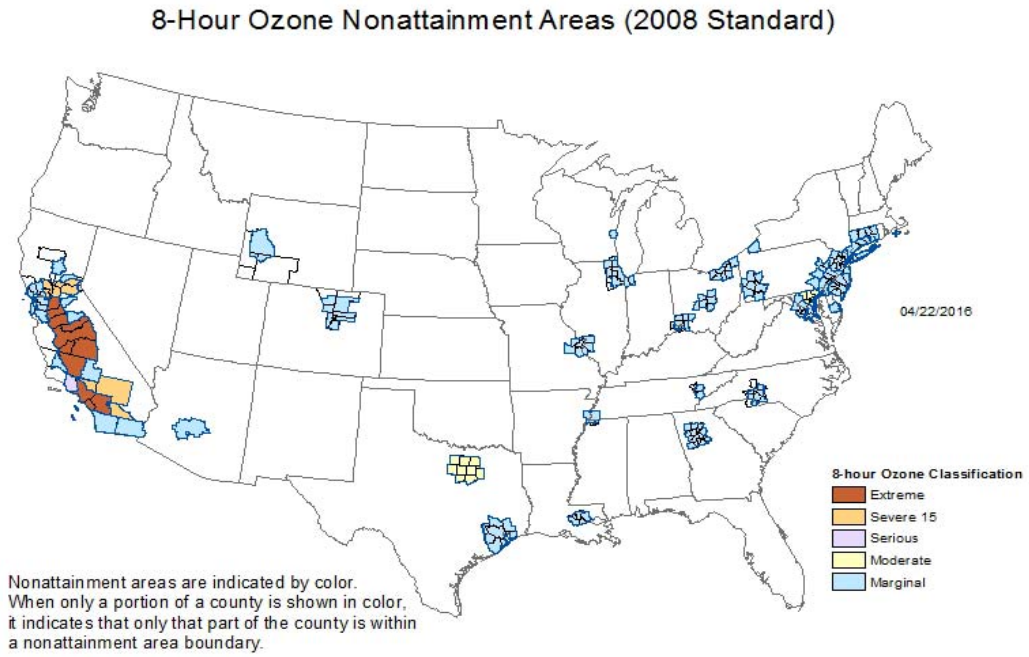

Figure 2. Depicting the Basin and the San Joaquin Valley as the only two areas in extreme nonattainment for the 2008 8-hour ozone standard. **Source:** https://www3.epa.gov/airquality/greenbook/map8hr_2008.html.

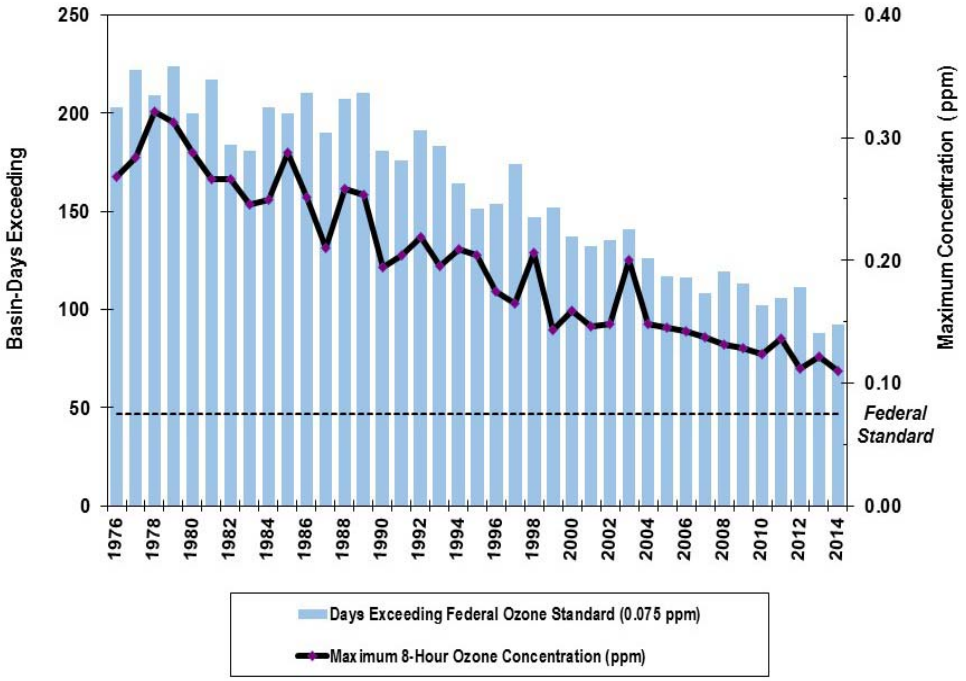

Figure 3. Depicting a steady decline in days exceeding the 2008 8-hour ozone standard in the Basin since 1976. **Source:** SCAQMD, Blueprint for Clean Air: 2016 AQMP White Paper (Blueprint for Clean Air White Paper) (October 2015) at 2 (Tab 6).

This is not to say that California has evaded its duty to attain the standards. In fact, enormous efforts have been made on this front. In 2008, California implemented a one-of-a-kind mandatory program to regulate in-use trucks and buses in order to reduce emissions from the legacy fleet. Additionally, CARB has adopted a set of voluntary low-NOx engine exhaust emission standards – at 0.1, 0.5, and 0.02 g/bhp-hr – for on-road heavy-duty engines in order to encourage engine manufacturers to develop and utilize new technologies to reduce NOx emissions for Model Years 2010 and later. Though engine manufacturers are not required to produce engines meeting these optional standards, heavy-duty engines that are certified to the lower optional NOx standards may be eligible for public funding since the resulting lower emissions produced by these engines would be considered surplus to the mandatory standard. *See* SCAQMD, Goods Movement: 2016 AQMP White Paper (Goods Movement White Paper) (October 2015) Appendix A at A-1 (Tab 7). State funding for incentive programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program has also prompted manufacturers to pursue more innovative mobile source technologies, with the ultimate goal of reducing emissions from the legacy fleet.

Furthermore, between 2008 and 2015, the state of California spent nearly three billion dollars in funding the demonstration and deployment of such technologies, including zero-emission trucks and buses, hybrid-electric medium- and heavy-duty vehicles, and zero-emission freight equipment. *See* McCabe Memorandum at 8 (Tab 5). In January 2016, Governor Brown released his Fiscal Year 2016-17 Budget Proposal, which includes a one-year appropriation of funding for cleaner vehicles, equipment, and fuels used to transport passengers and freight, in addition to off-road equipment used for agricultural and other purposes. *See* California Department of Transportation, et al., California Sustainable Freight Action Plan, Draft Discussion Document (Freight Action Plan) (May 2016) at 12 (Tab 8).

Finally, the federal government's Diesel Emissions Reduction Act and the Department of Agriculture's Environmental Quality Incentive Program have provided over $200 million in additional funding and grants and it is also projected that existing CARB and District control programs will reduce NOx emissions in the Basin by over 50% between 2015 and 2031. *See* 2016 Mobile Source Strategy at 22 (Tab 4). Still, the Basin continues to exceed both 8-hour ozone standards and will not reach attainment without further controls.

Given the need to attain the NAAQS for fine particulates prior to attainment of the ozone NAAQS, the most effective way to achieve long-term ozone attainment goals is to maintain an emissions reduction strategy focusing primarily on NOx reductions because NOx is also a precursor to PM 2.5. Current Basin NOx emissions are approximately 528 tons per day (tpd) and are expected to drop to around 265 tpd and 224 tpd in 2023 and 2031, respectively, as a result of currently adopted rules, programs, and commercial available technologies. *See* Draft 2016 AQMP Emission Inventories, http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/planning-inventory-ozone.pdf?sfvrsn=7. However, the District projects that further control measures to reduce NOx emissions by an additional 50% in 2023 and an additional 15% by 2031 (for a total of 65%) will be necessary in order to meet the ozone NAAQS by their applicable dates. *See* Figures 4 and 5,

below. EPA itself has acknowledged that, "[e]ven with … aggressive regulatory and non-regulatory programs to control mobile-source emissions, and with the most stringent stationary source emission standards in the U.S., most of central and southern California is likely to be designated nonattainment for the 2015 ozone standards."[6] McCabe Memorandum at 8 (Tab 5). The SCAQMD estimates that attaining the 0.07 ppm 8-hour ozone standard by 2037 will require a reduction of at least 80%-85% of NOx emissions from 2012 levels. *See* SCAQMD, Proposed 2015 Revised Ozone NAAQS, Presentation by Philip Fine, Ph.D, www.aqmd.gov/docs/default-source/Agendas/aqmp/advisory4-item3.pdf?sfvrsn=2 (2015) at Slide 6; McCabe Memorandum at 8 ("For California's ozone nonattainment areas to attain the 2015 ozone standards, the state and the EPA have recognized that *transformational change* is likely needed") (emphasis added) (Tab 5).

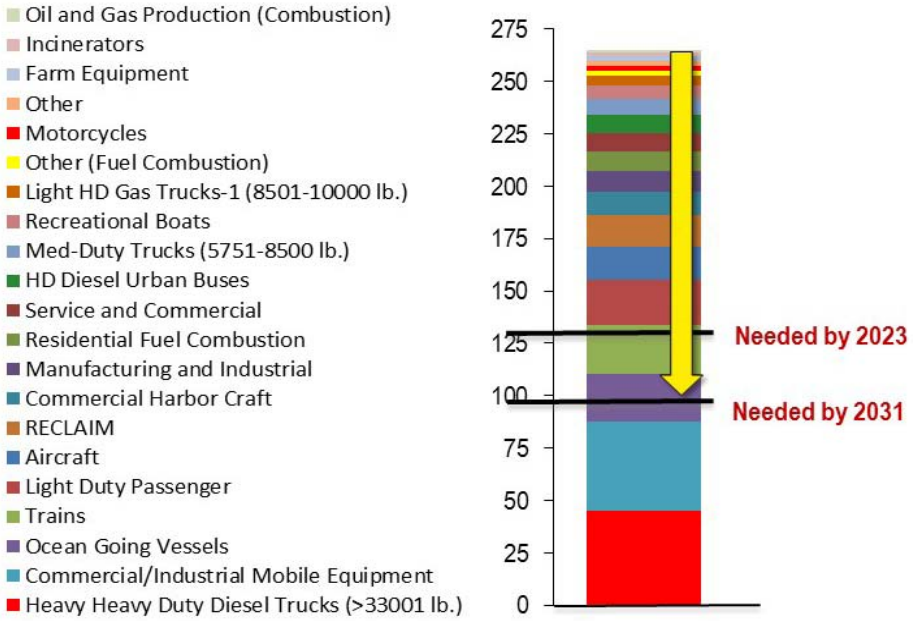

Figure 4. Needed pollution reduction to meet ozone air quality standards in the Basin. As can be seen, absent substantial reductions from heavy-duty trucks and other mobile equipment, every other source of NOx would need to be entirely eliminated. **Source:** Presentation by Mr. Henry Hogo, SCAQMD, at the West Coast Collaborative Partners Meeting, Tacoma, WA (April 5, 2016) at Slide 16 (Tab 9).

[6] Relatedly, in 2015, the Basin exceeded the 2015 8-hour ozone NAAQS (0.070 ppm) on 115 days. The San Joaquin Valley exceed that standard on 99 days. *See* http://www.arb.ca.gov/aqmis2/ozone_annual.php.

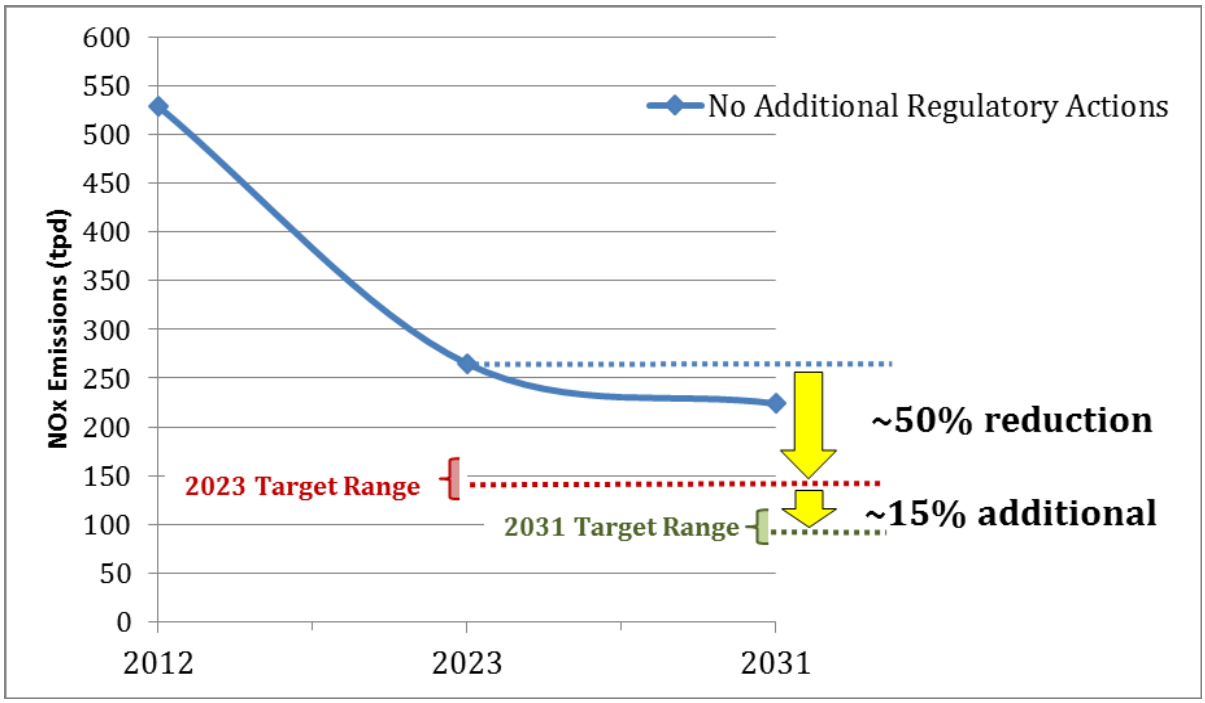

Figure 5. Total Basin NOx emissions must be reduced by 50% in 2023 and by an additional 15% (for a total of 65%) beyond 2023 levels by 2031. **Source:** SCAQMD, http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/revisedfactsheet-2016-aqmp.pdf?sfvrsn=2.

C. Heavy-Duty Engines: Impacts in the Basin and Beyond

There are approximately 21,000 miles of highways and arterials in the Basin and almost 90% of trips made within the region utilize this system. *See* Goods Movement White Paper at 3 *citing* Southern California Association of Governments (SCAG) (2012) Regional Transportation Plan and Sustainable Community Strategies, (Adopted 2012) (Tab 7). The region is also home to two of the nation's largest marine ports, the Ports of Los Angeles and Long Beach, which bring in nearly 40% of the nation's goods. *See* McCabe Memorandum at 7 (Tab 5); Blueprint for Clean Air White Paper at 1 (Tab 6). Cargo volumes at these ports are expected to grow to 43 million containers annually by 2035 – more than three times today's levels. *See* Blueprint for Clean Air White Paper at 1 *citing* SCAG, Regional Transportation Plan 2012-2035, Goods Movement Appendix (April 2012) at 7 (Tab 6).

In short, the goods movement sector is vital to the economies of both the Basin and the nation as a whole. However, Basin residents are exposed to emissions associated with the movement of goods across the region for the benefit of the entire nation. *See* Goods Movement White Paper at 2-3 (Tab 7); *see also* Freight Action Plan at 1 ("Freight transportation in California generates a high portion of local pollution in parts of the State with poor air quality") (Tab 8).

According to the 2011 National Emissions Inventory, the largest source of NOx emissions (at approximately 40-67%) in the nation and in major population centers, including cities and surrounding communities, is highway vehicles. *See* EPA, Integrated Science Assessment for

Oxides of Nitrogen – Health Criteria (EPA NOx ISA) (Jan. 2016) at 1-7 (Tab 10). In the Basin alone, 88 percent of regional NOx emissions come from mobile sources. On-road heavy-duty diesel trucks comprise the largest single category of NOx emissions sources in 2012, and they are projected to remain the largest contributor to these emissions in both 2023 and 2031. *See* Figures 6, 7, and 8, below; McCabe Memorandum at 8 (noting that even with the implementation of all measures currently adopted and planned for by 2032, heavy-duty diesel trucks will be among the sources contributing the most NOx emissions in California's nonattainment areas) (Tab 5).

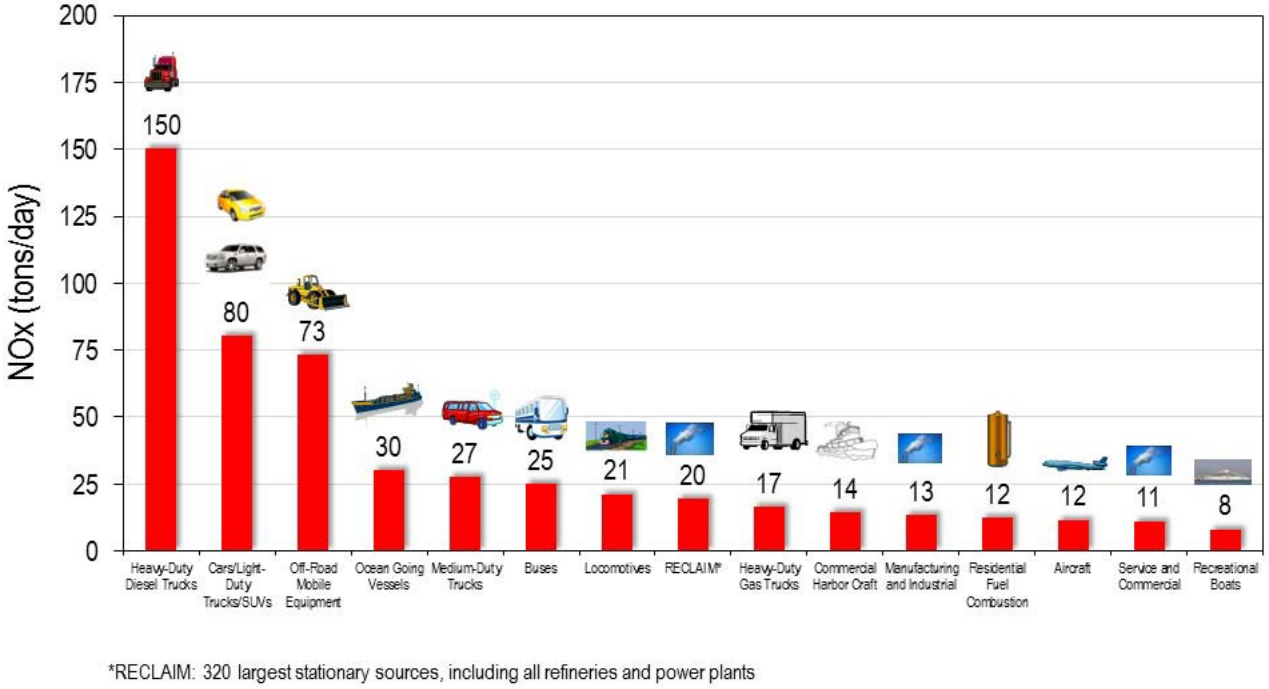

Figure 6. Heavy-duty diesel trucks were the top NOx emissions source in the Basin in 2012. **Source:** SCAQMD (2016), http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/planning-inventory-ozone.pdf?sfvrsn=7.

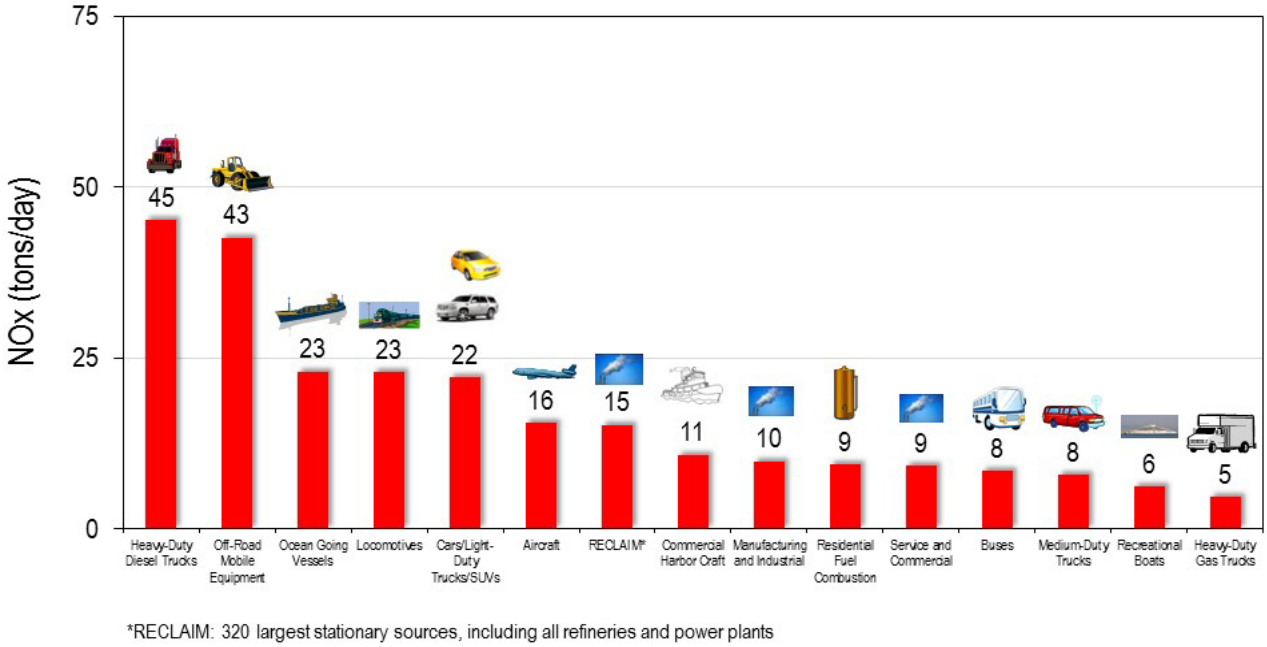

Figure 7. Heavy-duty diesel trucks are projected to be the top NOx emissions source in the Basin in 2023. **Source:** SCAQMD (2016), http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/planning-inventory-ozone.pdf?sfvrsn=7.

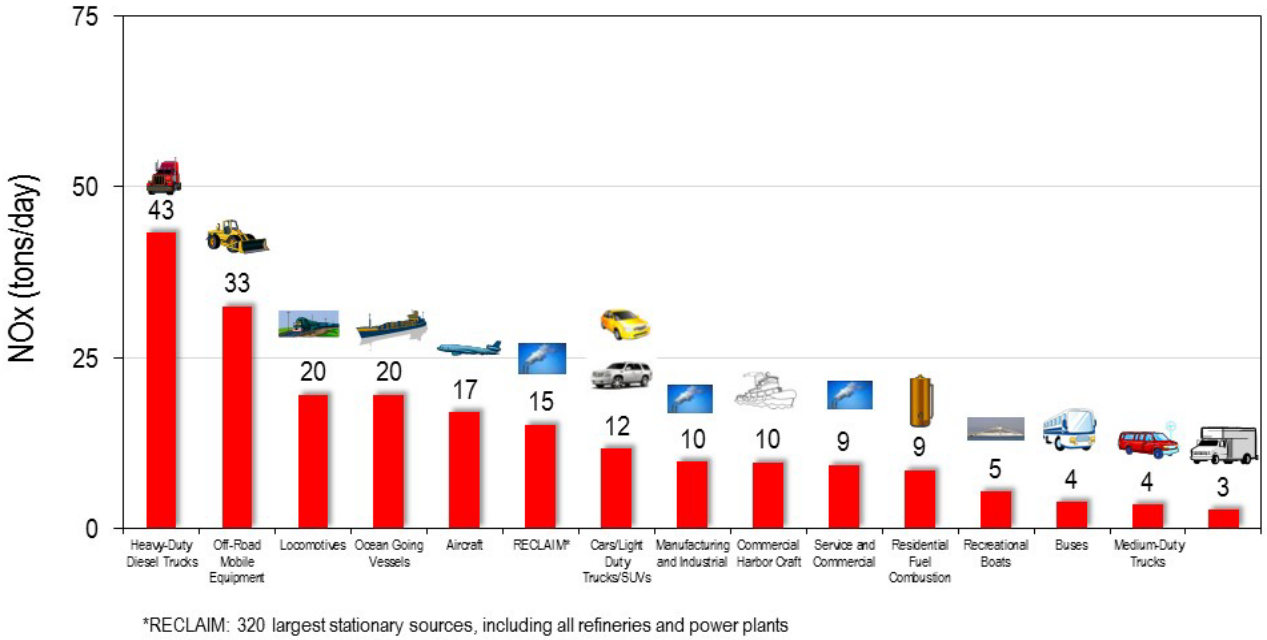

Figure 8. Heavy-duty diesel trucks are projected to be the top NOx emissions source in the Basin in 2031. **Source:** SCAQMD (2016), http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/planning-inventory-ozone.pdf?sfvrsn=7. Very small emission reductions are expected between 2023 and 2031 absent further regulation.

The current on-road heavy-duty engine exhaust emission standard of 0.2 g/bhp-hr NOx was phased in beginning in 2007, with full implementation starting in 2010. 66 Fed. Reg. 5002, 5005 (Jan. 18, 2001). The standard became mandatory in 2008 for spark ignition engines and 2010 for diesel engines. *Id.* On-road heavy-duty trucks, including diesel and spark-ignition heavy-duty trucks, are projected to contribute 53% of goods movement NOx emissions in 2023. *See* Goods Movement White Paper at A-1 (Tab 7). In the absence of further controls, spark ignition trucks, including both gasoline and natural gas, are estimated at approximately 15 tpd NOx in 2023, an amount that represents 22% of truck emissions and 12% of NOx emissions from all goods movement. *Id.* (Tab 7). Meanwhile, CARB's Truck and Bus Regulation will require turnover of almost all heavy-duty diesel trucks to at least the 0.2 g/bhp-hr NOx emissions standard by 2023. *Id.* (Tab 7). The 2012 AQMP emissions inventory for goods movement from port-related sources, which includes heavy-duty trucks, was estimated to be approximately 51 tpd of NOx in 2014. *See* Blueprint for Clean Air White Paper at 1 *citing* 2012 AQMP, Appendix IV-A, at IV-A-39, December 2012 (Tab 6).

In May 2016, CARB released its Mobile Source Strategy which, in relevant part, is proposed to be included in the development of the 2016 AQMP, to attain the 75 ppb NAAQS even though under regulations already adopted NOx emissions from heavy-duty trucks will be cut by 70% by 2031. 2016 Mobile Source Strategy at 34 (Tab 4). However, these reductions are not sufficient to achieve the target for this category by either 2023 or 2031. *Id.* at 22 (Tab 4). As noted above, implementation of all current rules will reduce NOx in the Basin by over 50% between 2015 and 2031. *Id.* (Tab 4). However, further NOx emission reductions will be needed to attain either standard. *Id.* at 16, Figure 2-3 (Tab 4).

Importantly, because the majority of heavy-duty trucks that operate in California are purchased out-of-state and may be operated as part of a nationwide fleet, substantial reductions in NOx emissions from this fleet are required. 2016 Mobile Source Strategy at 83-84 (Tab 4). As such, CARB and the SCAQMD have concluded that a nationwide standard would be far more effective than a California-only standard, with the relative benefit increasing over time. *See* Figure 9, below. Indeed, as depicted in Figure 9, below, a revised 0.02 g/bhp-hr California-only standard (refer to the yellow, middle-most line in Figure 9) would not bring the Basin into the range for attainment of the 2008 8-hour ozone standard and, in fact, any benefits would likely level off and even decrease over time.

On the other hand, a new, tighter nationwide standard would do its fair share toward bringing the Basin into attainment for the 2008 standard approximately 14 to 15 years from its introduction (refer to the orange, bottom-most line in Figure 9), compared to emissions from this category with no further rules (refer to blue, top-most line in Figure 9). Given that the Basin must attain the 75 ppb ozone NAAQS by 2031 (within the next 15 years), a new on-road heavy-duty engine exhaust emissions standard for NOx is critical given the time needed for such standards to be adopted and the lead time necessary for engine manufacturers to produce complying engines.

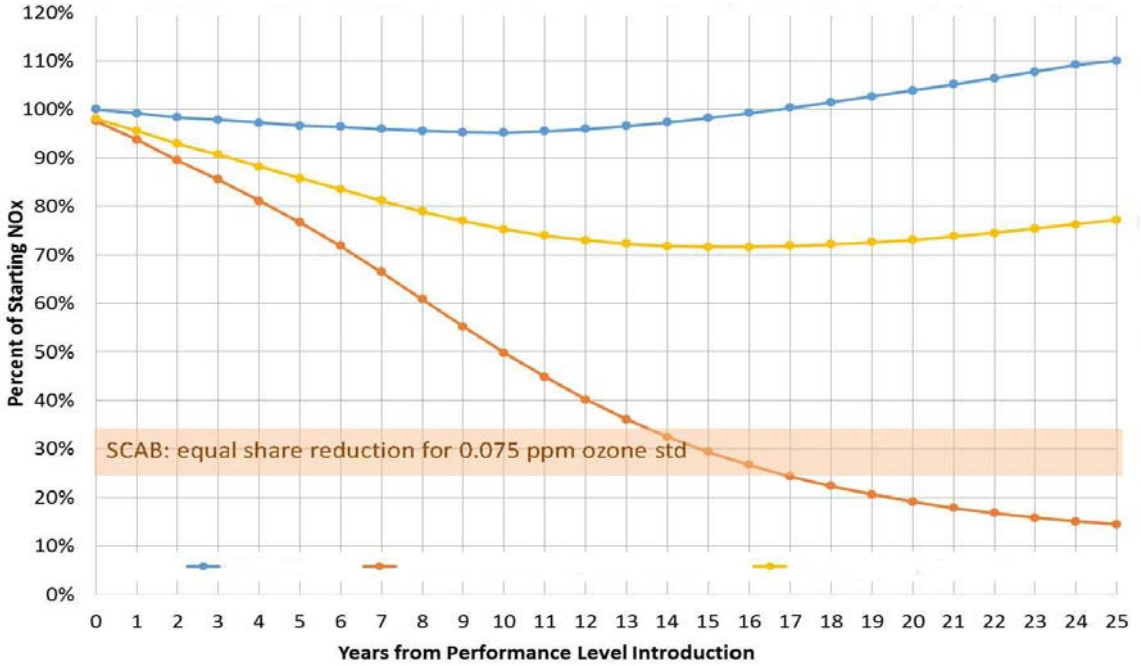

Figure 9. Illustrating the relative impact of a revised national NOx standard as compared to a California-only standard. **Source:** SCAQMD Governing Board Presentation (May 7, 2015), Further Emission Reduction from Mobile Sources Needed to Attain Federal Air Quality Standards, Agenda Item 2 at Slide 16 (Tab 11) citing Presentation by Mr. Cory Palmer, ARB at the Symposium on California's Development of its Phase 2 Greenhouse Gas Emission Standards for On-Road Heavy-Duty Vehicles (April 22, 2015).

As discussed above, the requested rule would promote achievement of the prior 80 ppb NAAQS by 2023 and the 75 ppb NAAQS by 2031 in the Basin. In fact, in order for the Basin to attain, additional reductions will be needed from other sources within EPA's authority, such as locomotives, ships, and non-road engines. A nationwide truck rule effective January 1, 2022 could potentially provide up to 6 tpd NOx reductions in 2031.[7] Personal Communications with Karen Magliano of CARB (May 25, 2016).[8] This is by far the largest new emission reduction measure CARB identified in the Mobile Source Strategy.

Vehicles purchased out-of-state account for a majority of the heavy-duty vehicle miles traveled in the South Coast. Therefore, according to CARB, "[a] lower NOx standard that reduces emissions from all trucks operating in California is critical to meeting 2031 air quality goals." 2016 Mobile Source Strategy at 85 (Tab 4). A national rule would be far more effective than a California-only rule. *See* Figure 9, above. Regardless, California will adopt an ultra-low on-road heavy-duty engine NOx exhaust emissions standard if EPA does not. 2016 Mobile Source Strategy at 98 (Tab 4). In addition, zero-emission heavy-duty vehicles will be needed in applications where they are feasible and are commercially available, such as transit buses, last

[7] 12 tpd total including the benefit of a California truck rule.
[8] A reduction of 1 ppb represents the benefits above and beyond a California-only standard and is slightly underestimated as calculations involved 6 tpd as opposed to 5 tpd. *See* 2016 Mobile Source Strategy at 56 (Tab 4).

mile delivery, and in vocations where trucks operate on a fixed route such as drayage from the marine ports to the nearby rail and intermodal yards. 2016 Mobile Source Strategy at 79-80 (Tab 4).

Moreover, sources primarily under federal and international control such as ocean-going vessels, locomotives, and aircraft are only expected to reduce NOx emissions by about 20% by 2031. *See* SCAQMD, http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/planning-inventory-ozone.pdf?sfvrsn=7. Therefore, new regulations will be needed for other sources under EPA's control. If such standards or additional reductions do not occur, there will necessarily be a greater need for the on-road heavy-duty truck sector to achieve a significantly large amount of emission reductions well beyond the 50% and 65% NOx emission reductions projected to be needed for the region to attain the ozone NAAQS. CARB's Mobile Source Strategy includes control measures for new Tier 5 lower NOx standards for locomotives, revising the definition of "new" locomotives so that CARB can regulate "non-new" engines and proposing new Tier IV NOx standards for ocean-going vessels. 2016 Mobile Source Strategy at 79-82 (Tab 4).

A nationwide heavy-duty standard would also benefit other regions in attaining the new 2015 ozone standard. For example, EPA projects that, currently, 241 counties would violate the 0.07 ppm 8-hour standard. *See* Figure 10, below. EPA further projects that by 2025, 14 counties outside of California will still be in violation of the revised NAAQS. *See* Figure 11, below. All of those areas would benefit from the proposed rule.

The Northeast States for Coordinated Air Use Management (NESCAUM) is a regional association of air pollution control agencies in Connecticut, Maine, Massachusetts, New Hampshire, New Hersey, New York, Rhode Island, and Vermont. NESCAUM Comment Letter on EPA Proposed Rules for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles-Phases 2 (NESCAUM Comment) (Oct. 1, 2015) at 1 (Tab 12). This region is home to over 42 million people. It is impacted not only by pollution from local sources, but by transported pollutants from hundreds of miles away that contribute to elevated ozone and fine particulate levels. NESCAUM Comment at 3 (Tab 12). While EPA projects that most of the country outside of California will attain the 2015 ozone standard by 2025, *see* Figure 11, below, additional NOx reductions will be critical to attaining the new standard, which EPA projects will continue to be exceeded in the NESCAUM region in 2025. NESCAUM Comment at 5 (Tab 12). NESCAUM has also cited the importance of NOx emissions reductions to prevent further progression of marine eutrophication, visibility impairment, and acid deposition. NESCAUM Comment at 5-6 (Tab 12). For all of these reasons, NESCAUM has urged EPA to begin a rulemaking without delay to lower NOx standards for heavy duty trucks, which are the second largest source of NOx emissions in the region. NESCAUM Comment at 3 (Tab 12).

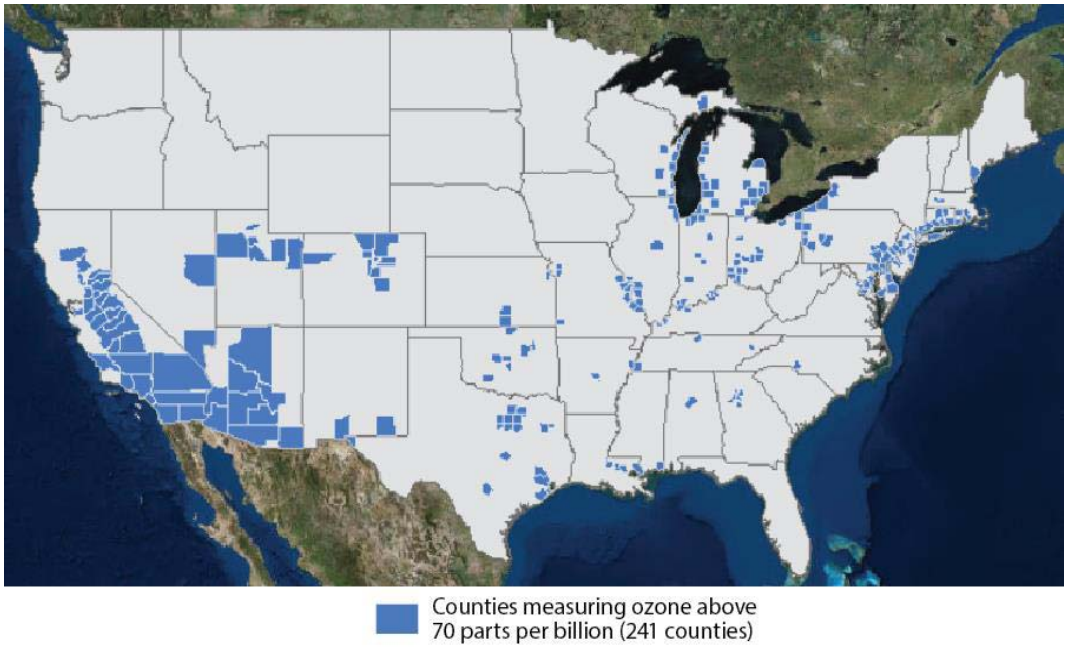

Figure 10. 241 counties with measured ozone above the 2015 ozone standard (based on 2012-2014 monitoring data) **Source:** Congressional Research Service, Ozone Air Quality Standards: EPA's 2015 Revisions (Jan. 25, 2016), Figure 2 (Tab 13).

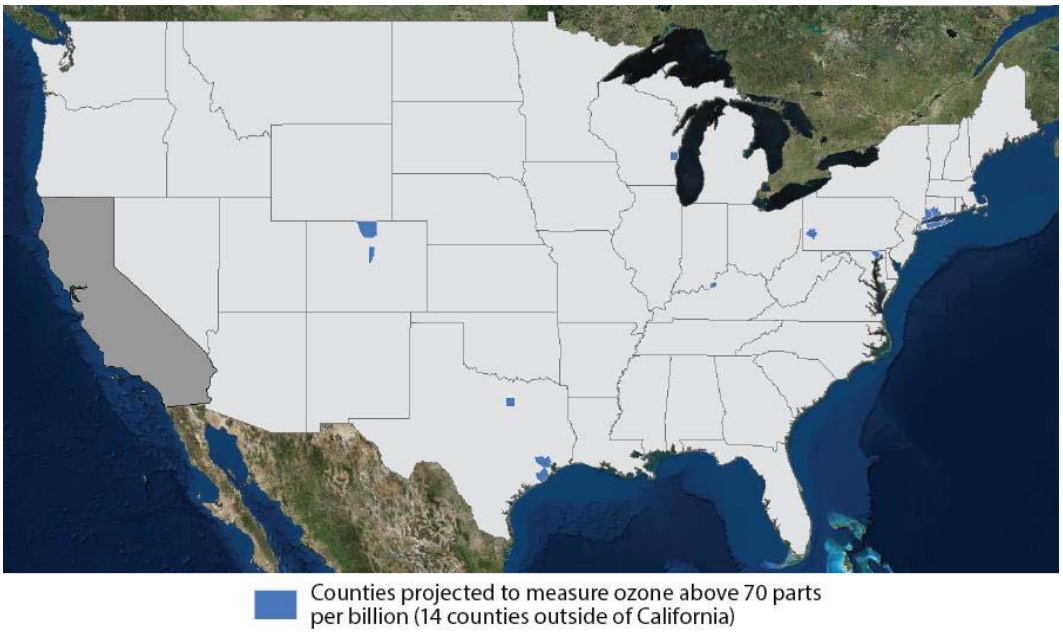

Figure 11. EPA projection of counties that will not meet the 2015 ozone standard in 2025 without further emission controls. **Source:** Congressional Research Service, Ozone Air Quality Standards: EPA's 2015 Revisions (Jan. 25, 2016), Figure 3 (Tab 13).

The National Association of Clean Air Agencies (NACAA) is a national, non-partisan, non-profit association of air pollution control agencies in 40 states, the District of Columbia, four territories, and 116 metropolitan areas. NACAA, Testimony before the EPA and National Highway Traffic Safety Administration (NHTSA) on the Proposed Greenhouse Gas and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles – Phase 2 (Aug. 6th and 18th, 2015) at 1 (Tabs 14 and 15). NACAA has recommended that EPA articulate in its Phase 2 proposal the need for significantly lower national heavy-duty NOx standards beyond the 0.2 g/bhp-hr standard and commit to implementing such a standard. NACAA, Testimony of NACAA before the EPA and NHTSA on the Proposed Greenhouse Gas and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles – Phase 2 (NACAA Testimony (Aug. 6, 2015) at 2, 4 ("We are very disappointed that EPA has not included such a discussion in [the Phase 2] proposal") (Tab 14). NACAA has noted that although ancillary NOx reductions may occur as a result of the Phase 2 rule, such reductions are not certain and, even if they occur, they will not be anywhere near sufficient "given the challenges state and local agencies face in attaining and maintaining current and upcoming ozone and fine PM standards and protecting against visibility impairment and eutrophication of water bodies." *Id.* at 2-3 (Tab 14). As NACAA has further noted:

> In addition to early climate benefits, federal action on our recommendation to adopt [Phase 2] Alternative 4 (full implementation by 2024) would also provide manufacturers the ability to incorporate technologies to significantly reduce NOx emissions from heavy-duty vehicles in a more timely manner. While already crucial for a number of areas, NOx reductions from the heavy-duty sector will become increasingly important to additional areas under strengthened [NAAQS] for ozone, which are expected imminently. We urge that EPA include in the final Phase 2 rule a clear and comprehensive discussion of the need for very substantial additional NOx reductions from heavy-duty vehicles and engines and, even more critically, an explicit commitment to begin immediately a separate rulemaking initiative to capture those reductions.

NACAA Letter to Administrators McCarthy and Rosekind (Sept. 29, 2015) at 4 (Tab 16).

Additionally, the Connecticut Department of Energy and Environmental Protection (CT DEEP) is responsible by law for "the preservation and protection of the air, water and other natural resources of the state." Connecticut General Statues § 22a-2d. All of Connecticut is currently classified as nonattainment for the 8-hour ozone NAAQS as revised in 2008. 73 Fed. Reg. 16,436 (March 27, 2008), 80 Fed. Reg. 12,264 (March 6, 2015); and 81 Fed. Reg. 26,697 (May 4, 2016). By EPA's own projections, four Connecticut ozone monitors will continue to be nonattainment or maintenance sites in 2017 of the 2008 ozone NAAQS even after full implementation of the proposed Cross-State Air Pollution Rule (CSAPR) Update for the 2008 Ozone NAAQS, 80 Fed. Reg. 75,706, 75,725-75,726 (Dec.3, 2015), Tables V.C-1 and V.C-2. While Connecticut has adopted and implemented many programs that will continue progress towards achieving the 2008 ozone NAAQS over the next several years, it cannot fully achieve this standard, nor the recently revised more stringent 2015 ozone NAAQS, without additional reductions in NOx emissions from sources not fully under CT DEEP's regulatory jurisdiction.

Among those sources, on-road heavy-duty vehicles are one of the largest NOx emission sources in Connecticut and accounted for 12.5% of statewide NOx emissions according to Connecticut's 2011 Periodic Emissions Inventory. Furthermore, NOx emissions from on-road heavy-duty vehicles located in upwind regions negatively impact Connecticut's air quality. Connecticut needs a national standard limiting NOx emissions from these vehicles in order to address their adverse public health and environmental impacts occurring within the state.

Likewise, the New Hampshire Department of Environmental Services (NH DES) is the responsible agency for air pollution control in the state. *See* N.H. Rev. Stat. Ann. 21-O (1987). While New Hampshire currently attains the 2008 ozone NAAQS, it is experiencing pollution levels above the revised 2015 ozone NAAQS of the 0.070 parts per million 8-hour average, including exceedances already recorded in May 2016. High ozone pollution levels most often occur along New Hampshire's southern border and coastline, areas that are home to a large portion of the state's population. These areas are affected by ozone pollution transported from areas upwind and outside the state, to which mobile sources, including heavy-duty on-road trucks, are large contributors. New Hampshire also contains two federal Class I areas that are subject to EPA's Regional Haze Rule – including the Great Gulf Wilderness and the Presidential-Dry River Wilderness, both of which abut Mt. Washington, the highest point in the Northeast. Nitrate particles formed from NOx emissions transported from upwind pollution sources act with other aerosols to obscure the clarity of vistas within this highly scenic region of the state. New Hampshire does not have legal authority to address these out-of-state NOx sources, and needs a more stringent national NOx limit for heavy-duty vehicles to help achieve and maintain cleaner air for its citizens.

Additionally, New York City (City), as one of the largest metropolitan areas in the NESCAUM region, is crossed by a number of major truck routes. The volume of trucks that travel along local streets and roadways doing business within the City plus the volume that travel through the city often along heavily congested highways are major contributors of NOx emissions – a pollutant that adds to localized air pollution problems as well as to regional ozone formation. Although New York City is currently engaged in local efforts to reduce emissions, including NOx, from trucks with heavy-duty diesel engines and other types of diesel fueled vehicles that are owned, leased, or licensed by the City, the City does not have the authority to regulate the much larger number of trucks that are not under City control. Moving to a national standard that further reduces NOx emissions from heavy-duty truck engines would support the City in providing its citizens with cleaner air and reduce the City's contribution to the formation of ozone.

Further, although CARB may adopt a mandatory ultra-low-NOx standard for California, and other states may opt in to such standards pursuant to section 177 of the CAA, other states are also plagued by emissions from trucks registered outside their state and even outside their region. As a result, adopting only a California standard would not fully control heavy-duty truck emissions. NESCAUM has obtained data regarding 2002 truck registrations which immediately reveals anomalies.

For example, Oklahoma had nearly twice as many trucks registered (204,700) as did California (112,000) despite having only one tenth as many people (3.8 million compared to 38 million). If truck registration were proportional to population, the ratio of percent of national trucks to percent of national population should be one (1). In addition to Oklahoma, with 11.85 times as many trucks as expected, other sparsely populated states had at least three times as many trucks as expected, including North Dakota, Nebraska, Idaho and South Dakota. In contrast, some more heavily populated states had less than half the trucks expected, including New York, Pennsylvania, Massachusetts and Maryland, while California had only about two-thirds the number expected.

There is some evidence that trucking companies were preferentially registering their trucks in states with lower registration fees. Paul Carpenter, *Lehigh Valley Morning Call*, Nov. 2, 2008 (Tab 17). Thus, NESCAUM states cannot fully address their local heavy-duty truck NOx emissions by adopting California standards, since many truck miles likely result from out-of-state and out-of-region trucks. Only a national standard can reduce truck emissions throughout the country, thus reducing transport into the region. Finally, an EPA national rule, if implemented by January 1, 2022, could significantly aid in attaining the 2015 ozone standards in the 14 counties outside of California that will not otherwise attain the standard by 2025, including the heavily-populated New York area. EPA (2015), EPA's Final Air Quality Standards for Ground-level Ozone: By the Numbers. https://www.epa.gov/sites/production/files/2015-10/documents/20151001_bynumbers.pdf. A national rule may even accelerate attainment for some of the areas that are projected to attain by 2025, thus providing large public health benefits.

In summary, the Basin, with over 16 million residents, cannot attain the existing 75 ppb standard without the requested ultra-low NOx truck rule. Certainly, the region could not attain the new 70 ppb ozone standard without the rule. Because of fleet turnover, the rule will continue to provide benefits far into the future. Moreover, other states will gain significant health benefits as well as the ability to attain the 2015 ozone NAAQS from implementation of the requested rule.

SCAQMD has not yet completed its socioeconomic analysis for the 2016 AQMP, which will be designed to attain the 75 ppb ozone standard as well as the 12 $\mu g/m^3$ annual average PM2.5 standard and the 35 $\mu g/m^3$ 24-hour PM2.5 standard.[9] However, the 2007 AQMP calculated the benefits of attaining the prior ozone standard of 80 ppb as well as the benefits of attaining the 1997 annual average PM2.5 NAAQS of 15 $\mu g/m^3$ by 2014. Because EPA has proposed to find that the South Coast region attained the referenced PM2.5 standard, Clean Data Determination for 1997 PM 2.5 Standards; California—South Coast; Applicability of Clean Air Act Requirements, 79 Fed. Reg. 72,999 (Dec. 9, 2014), this discussion will focus on the benefits of attaining the ozone standard. The socioeconomic analysis for the 2007 AQMP calculated health benefits from attaining the 80 ppb standard in 2023 as $1.291 billion in avoided premature

[9] In January 2016, EPA reclassified the Basin as a Serious Nonattainment area for the 2006 PM 2.5 NAAQS. Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; California; South Coast Moderate Area Plan and Reclassification as Serious Nonattainment for the 2006 PM 2.5. 81 Fed. Reg. 1514 (Jan. 13, 2016).

deaths, and $143 million in other health benefits. SCAQMD, Socioeconomic Report for 2007 AQMP (June 2007), Benefits and Costs, Table 3-5 (Quantifiable Health Benefits) (Tab 18). Since the Basin cannot attain even the 80 ppb standard without the requested rule, a large share of these projected benefits will not be attained. A nationwide truck rule effective January 1, 2022 could potentially provide up to 6 tpd NOx reductions in 2031.[10] Personal Communications with Karen Magliano of CARB (May 25, 2016).[11] These reductions translate to approximately 1 ppb reduction in ozone concentrations at the maximum benefit station.

D. Health Effects

Ozone is a powerful oxidant with significant adverse impacts on human health and the environment. Specifically, exposure to ozone causes numerous harmful effects on the respiratory system, including difficulty breathing and inflammation of the airways. *See* EPA Ozone ISA at 1-5 (indicating the existence of a causal relationship between short-term exposure to ozone and respiratory effects as well a likely causal relationship between long-term ozone exposure and respiratory health effects) (Tab 3). When ozone is inhaled into the respiratory tract, it can react with tissues and cause airway damage. 2012 AQMP, Appendix I at I-4 (Tab 2). The EPA 2013 ISA further concluded that short-term exposures to ozone are likely to cause premature death. EPA Ozone ISA at 6-221- 6-222 (Tab 3). Ozone exposure can aggravate diseases such as chronic obstructive pulmonary disease (COPD), and asthma, leading to increased emergency room visits, hospital admissions and use of medications.

The adverse impacts of short-term ozone exposure (lasting for a few hours) are greater with increased physical activity which increases the breathing rate as well as the volume of air reaching the lungs, thereby resulting in an increased amount of ozone also reaching the lungs. 2012 AQMP, Appendix I at I-5 (Tab 2). Children are among those most at risk from ozone exposure because their lungs are still developing, they are active outside more than adults and they are more likely to have asthma. Accordingly, children get more ozone exposure, per pound of body weight than do adults. *Id.* at I-6 – I-7 (Tab 2), citing McConnell, 2002 ("In Southern California communities with high ozone concentrations, the relative risk of developing asthma in children playing three or more sports was found to be over three times higher than in children playing no sports.")

Other sensitive receptors are also at risk of effects from ozone exposure. These include older age groups, individuals with reduced intake of nutrients such as Vitamins C and E, and those with preexisting lung disease, such as asthma and chronic pulmonary lung disease. Outdoor workers are also at risk for ozone exposure effects. *See* 2012 AQMP, Appendix I at I-5 (Tab 2). Short-term exposures to ozone at levels typically found in the Basin can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of

[10] 12 tpd total including the benefit of a California truck rule.
[11] A reduction of 1 ppb represents the benefits above and beyond a California-only standard and is slightly underestimated as calculations involved 6 tpd as opposed to 5 tpd. *See* 2016 Mobile Source Strategy at 56 (Tab 4).

the lung tissue, and some immunological changes. *See, generally,* Final 2012 AQMP, Chapter 2 (Tab 2).

EPA estimates that meeting the new 2015 70 ppb ozone standard nationwide, except in California, will provide health benefits valued at $2.9 billion to $5.9 billion (in 2011 dollars) in 2025 nationwide. These are the benefits above and beyond meeting the prior 75 ppb standard and include both benefits directly related to short-term ozone exposure and PM 2.5 co-benefits.[12] The benefits include avoiding 320-660 premature deaths, 230,000 asthma attacks in children, 160,000 missed school days, and 28,000 missed work days. 2015 Ozone NAAQS RIA at ES-16 (Tab 19).

As previously discussed, the Basin is not expected to meet the 75 ppb standard in 2025, not to mention the new standard of 70 ppb. As a result, the scenario where California will have attained both standards is estimated separately for year 2038. Under this scenario, EPA estimates additional nationwide health benefits at $1.2 to $2.1 billion. This estimate includes avoiding 120-220 premature deaths, 160,000 asthma attacks in children, 120,000 missed school days, and 300 missed work days. 2015 Ozone NAAQS RIA at ES-18 (Tab 19).

Indeed, as Part I of this Petition shows, the Basin cannot meet even the 75 ppb standard without the national heavy-duty truck rule that this Petition seeks. *See* 2016 Mobile Source Strategy at 21 ("The progression of greater health protection in federal standards underscores the ongoing need for continuing transformation in the transportation sector") (Tab 4). Nor has the Basin met the prior 80 ppb 8-hour ozone standard. The Basin's deadline to meet 80 ppb is a few short years away, in 2023, yet its 2012-2014 design value is 102 ppb.

The ozone-related public health benefits quantified above accounted for effects due to short-term exposure.[13] While the 2013 EPA Ozone ISA for ozone concluded that the existing evidence is only suggestive of long-term ozone exposures causing mortality, more recent research has continued to uncover associations that support such a causal link. A recent analysis showed that long-term exposure to ozone is associated with an increased risk of death, especially from cardiovascular disease, COPD or diabetes. Turner, et al. *Long-term Ozone exposure and Mortality in a Large Prospective Study*, American Journal of Respiratory and Critical Care Medicine, Vol 193, No. 10 (2016). Long term exposure to ozone is associated with a 15% increase in the risk of dying from dysrhythmias, heart failure or cardiac arrest, a 16% increase in the risk of dying from diabetes, and a 14% risk increase for COPD deaths, for every additional 10 ppb of ozone. *Id.* The study also found that a 10 ppb increase in ozone is associated with a 12% increased mortality risk from lung disease, a 3% increased risk of cardiovascular disease deaths, and a 2% increased risk of deaths from all causes. *Id.*

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[12] Note that PM 2.5 co-benefits account for approximately two-thirds of the total quantified benefits. EPA, Regulatory Impact Analysis of the Final Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone (2015 Ozone NAAQS RIA) (Sept. 2015) at ES-14 (Tab 19).

[13] The EPA estimated health benefits include associated co-benefits from reducing particulate levels.

II. A Revised Standard is Technologically Feasible

A. Overview

The SCAQMD has a long history of working with state and federal agencies and technology providers to accelerate development of on-road heavy-duty engines and has developed significant expertise in this field. The SCAQMD's focus is to fund and participate in technology development projects that go beyond existing regulatory requirements. This effort is driven by the Basin's need to attain the 2024 and 2032 NAAQS, which CARB has acknowledged cannot be achieved without significant reductions in emissions from mobile sources. Freight Action Plan at 6 (Tab 8). In fact, these sources contribute to as much as 45 percent of statewide nitrogen oxide emissions. *Id.* (Tab 8).

The EPA has not re-evaluated on-road heavy-duty NOx emissions standards since its adoption of the 2007 to 2010 heavy-duty highway engine standard over fifteen years ago. However, in the joint EPA and U.S. Department of Transportation Greenhouse Gas Emissions and Proposed Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles- Phase 2, EPA and DOT discussed additional NOx emission reductions needed to meet ozone national ambient air quality standards in California and potentially other regions in the U.S. Those discussions, however, have not resulted in the proposal of any new NOx exhaust emission standards. *See* 80 Fed. Reg. 40138.

Significant technological improvements have been made since the 2001 EPA rulemaking that indicate lower levels of NOx exhaust emissions are achievable. SCAQMD's experience has shown that recent technological advances support the adoption of a new on-road heavy-duty truck emissions standard of 0.02 g/bhp-hr. A 0.02 g/bhp-hr is equivalent to a 90% reduction from EPA's 2010 highway, heavy-duty engine standards. CARB (Oct. 2013) Staff Report: Initial Statement of Reasons for Proposed Rulemaking Proposed Greenhouse Gas (GHG) Regulations for Medium- and Heavy-Duty Engines and Vehicles, Optional Reduced Emission Standards for Heavy-Duty Engines, and Amendments to the Tractor-Trailer GHG Regulation, the Diesel-Fueled Commercial Motor Vehicle Idling Rule, and the Heavy-Duty Hybrid-Electric Vehicles Certification Procedures (CARB 2013 Staff Report) at 47 (Tab 20). An engine meeting this standard is already commercially available for certain heavy-duty applications and the SCAQMD submits that it is technologically feasible for all on-road heavy-duty trucking applications by January 1, 2022. The standard could be met through optimization of existing engine technologies developed to meet the 2010 truck standard, and will not require a revolutionary engine change.

The SCAQMD further takes the position of the engine emissions control manufacturers that it is critical that EPA consider an ultra-low NOx engine exhaust emissions standard to be met on an implementation schedule that is aligned with EPA's Proposed Phase 2 Heavy-Duty Greenhouse Gas Standards. The technological improvements that will lead to lower NOx levels are very

much intertwined with advances required to meet greenhouse gas reduction goals. The most cost-effective way to reach both goals is to align regulations for ozone and greenhouse gas reductions so that engine manufacturers have the opportunity to co-optimize reductions concurrently.

The SCAQMD, California Energy Commission (CEC), and industry partners have invested significant efforts to bring trucks meeting the CARB optional ultra-low NOx engine exhaust emissions standard into the marketplace. Nonetheless, EPA action is required to ensure broad deployment of trucks with engines meeting that standard. A majority of heavy-duty trucks operating in California are purchased elsewhere and may be operated as part of a nationwide fleet. As a result, federal air quality standards and climate change goals cannot be met without a shift towards ultra-low emitting technologies in the goods movement sector. To accomplish this shift, a federal ultra-low NOx engine exhaust emissions standard of 0.02 g/bhp-hr is needed.

B. Ultra-Low NOx Standard Can Meet a January 1, 2022 Implementation Timeline

CARB has conducted extensive technical assessments on the types of control technologies that can further reduce NOx exhaust emissions beyond the current 2010 exhaust emissions standard. In adopting Optional NOx Standards for on-road heavy-duty engines, CARB stated that based on certification data, about 8 percent of the Model Year 2012 engines were already certifying at levels 30 percent or more below the optional 0.1 g/bhp-hr standard, at 0.03 to 0.07 g/bhp-hr. CARB 2013 Staff Report at 52 (Tab 20).

As discussed in the CARB Draft Technology Assessment: Low NOx Heavy-Duty Diesel Engines (CARB Draft Technology Assessment) (Sept. 2015) at V-1 (Tab 21). , the Southwest Research Institute (SwRI) under sponsorship of CARB and the Manufacturers of Emissions Controls Association (MECA) has initiated a study in 2013 to evaluate the feasibility of on-road heavy-duty engines (diesel and alternative fuel) to reach a 0.02 g/bhp-hr NOx emissions level. The work is anticipated to be completed by the end of 2016. CARB Draft Technology Assessment at V-1 (Tab 21).

Since 2013, engine development work initiated by the SCAQMD, the CEC, and Southern California Gas Company, has resulted in the certification of a natural gas engine meeting the 0.02 g/bhp-hr level. Cummins Westport Inc. (2016), http://www.cumminswestport.com/models/isl-g-near-zero. The 8.9 liter natural gas engine is used primarily in transit buses and medium heavy-duty vehicle applications (Class 4 through 7) such as solid waste collection vehicles, soda and bottled water delivery trucks, etc.

Work is currently underway on the development of an 11.9 liter natural gas engine for Class 7 and 8 vehicle classifications, which include the over the road tractor/trailer. SCAQMD Governing Board Meeting, Recognize Revenue and Execute Contract for Development, Integration and Demonstration of Ultra-Low-Emission Natural Gas Engine for On-Road Heavy-Duty Vehicles, Agenda Item 4 (Nov. 2015) at 2 (Tab 22).

The following sections of this petition further discuss the development of the ultra-low NOx natural gas engine and the work at SwRI on a low-NOx diesel engine.

1. Natural Gas Engine Technology Meeting 0.02 g/bhp-hr Emission Standard is Available Today and Larger Engine Sizes are Currently Under Development

In September 2015, as part of the SCAQMD efforts with the CEC and Southern California Gas Company, Cummins Westport Inc., (CWI) developed an 8.9 liter on-road medium heavy-duty natural gas engine that has now been certified by CARB to meet the cleanest California optional NOx exhaust emission standard of 0.02 g/bhp-hr. CARB (Sept. 2015) New On-Road Heavy-Duty Engines Certification Executive Order A-021-0630, http://www.arb.ca.gov/msprog/onroad/cert/mdehdehdv/2016/cummins_mhdd_a0210630_8d9_0d02-0d01_ng.pdf. The engine is in fact currently available for purchase beginning in the second quarter of 2016. The engine would typically be used for refuse trucks and transit or school buses. Cummins Westport Inc., http://www.cumminswestport.com/pdfs/general/product-brochures/ISL%20G_NZ_IntroSheet%20April%202016.pdf.

The SwRI study for natural gas engines includes a demonstration of a variety of technologies that would provide maximum NOx reductions without increasing GHG emissions. This demonstration project is targeted towards achieving "maximum NOx reductions possible from the 11.9 liter heavy-duty natural gas engine through a combination of advanced TWCs [three-way catalyst], advanced air-to-fuel ratio control, cold engine start-up strategies, and exhaust thermal management strategies." CARB Draft Technology Assessment: Low Emission Natural Gas and Other Alternative Fuel Heavy-Duty Engines, September 15 (CARB Draft Technology Assessment – Natural Gas Engines) at II-1 (Tab 23). The purpose of the project is to develop a combination of these technologies so that manufacturers may choose technology packages that provide maximum NOx and GHG benefits. In addition to meeting a NOx target of 0.02 g/bhp-hr, the technology solution must also continue to meet all applicable standards for criteria pollutants and not incur a GHG penalty. *Id.* (Tab 23).

CARB further anticipates that additional heavy-duty engines greater than 8.9 liters will become commercially available "as time goes on." CARB Draft Technology Assessment – Natural Gas Engines at ES-13 (Tab 23). Toward this goal, the SCAQMD and the California Energy Commission (CEC) have provided funding for the development of low NOx engines for other engine sizes, including a 15 liter engine to meet the 0.02 g/bhp-hr emissions level. SCAQMD Governing Board Meeting (Oct. 4, 2013), Agenda Item 9, Recognize Revenue and Execute Contracts for Development, Integration, and Demonstration of Ultra-Low Emission Natural Gas Engines for On-Road Heavy-Duty Vehicles at 4 (Tab 24).

Due to limitations of fueling infrastructure, natural gas trucks are ideal for general purpose operations within a narrow geographical location, such as buses, local delivery trucks and refuse trucks. These trucks generally use an 8.9 liter engine and will thus be technologically feasible

well before the January 1, 2022 timeframe. Cummins Westport Inc., http://www.cumminswestport.com/pdfs/general/product-brochures/ISL%20G_NZ_IntroSheet%20April%202016.pdf

The CARB and the Mobile Source Air Pollution Reduction Review Committee (MSRC) have introduced incentive funding for trucks meeting the 0.02 g/bhp-hr standard. Specifically, CARB provides incentive funding through its Proposition 1B Goods Movement Emission Reduction Program. CARB also is looking to provide additional funding through the Low Carbon Transportation Investments and Air Quality Improvement Program funding plan that will be released in June 2016. SCAQMD Technology Committee Meeting, (May 20, 2016), Agenda Item 1, Issue Program Announcement for Heavy-Duty Diesel Trucks and Transport Refrigeration Units Under Proposition 1B-Goods Movement Program. The MSRC has also approved $10 million towards the purchase of refuse trucks and transit buses with the ultra-low NOx engines. MSRC Meeting, (May 19, 2016), Agenda Item 10, Consider Program Announcement for Near-Zero Natural Gas Engine Incentive Program at 3.

In sum, the ultra-low NOx natural gas heavy-duty truck engine is well on its way to full commercialization across a significant number of vocations in the heavy-duty trucking sector well before the target January 1, 2022 timeframe. A nationwide standard mandating the 0.02 g/bhp-hr heavy-duty engine standard will maximize use of this technology as well as diesel technologies.

2. Heavy-Duty Diesel Trucks Capable of Meeting a 0.02 g/bhp-hr Standard Can be Developed by 2022

A national heavy-duty 0.02 g/bhp-hr engine exhaust emissions standard that includes diesel engines is necessary because a large fraction of trucks traveling to and from California as well as other states are purchased outside of California and those states. In a recent article in the Diesel Technology Forum, California ranked 48th in shares of 2010 and newer trucks registered in the state indicating that most new truck sales occur outside of California. Diesel Technology Forum, (May 4, 2016), http://www.dieselforum.org/policyinsider/you-can-t-always-get-what-you-want-what-the-rolling-stones-and-emerging-technologies-have-in-common. CARB estimates that around a million on-road heavy-duty trucks operate in California and 52 percent of the on-road heavy heavy-duty trucks (greater than 33,000 lbs. gross vehicle weight rating) operating in California are non-California registered trucks. As discussed above in Part 1 of this petition, other states experience similar effects from out-of-state trucks.

As mentioned earlier, SwRI is also conducting research on the technical feasibility of having an ultra-low NOx diesel engine in addition to the work with natural gas engines – such a diesel engine could be useful throughout the United States. One of the objectives of the study on diesel engines is to reduce NOx emissions during cold-starts and low operational speeds where the selective catalytic reduction (SCR) is not effective at low exhaust temperatures. CARB Draft Technology Assessment (Tab 21). The goal is to provide several exhaust system solutions for

engine manufacturers. In this case, MECA expects the technology will "deploy the most advanced substrate and catalyst combinations into novel system architectures focused on low temperature NOx reduction." MECA, Written Statement of MECA on the EPA's Proposal to Revise the National Ambient Air Quality Standards for Ozone (MECA Written Statement) (Mar. 16, 2016) at 3 (Tab 25). Specifically, some of the technology packages include passive NOx adsorbers and selective catalytic reduction catalyst coated directly on to diesel particulate filters. The SCAQMD has been participating on the Advisory Group overseeing the project. Based on progress to-date, evolutionary enhancements to current known, 2010 style emission control technologies can achieve significantly lower NOx emission levels.

In September 2015, CARB released a technology assessment on the potential for lower NOx heavy-duty diesel engines. The study indicates that "based on the above assessment and the current certification levels, [CARB] staff believes diesel engines are likely to be certified to the optional NOx exhaust emission standard of 0.1 g/bhp-hr by 2016, while engines meeting 0.05 g/bhp-hr or below are likely to be certified later." CARB Draft Technology Assessment at ES-9 (Tab 21). In fact, the diesel truck population will likely rely on the translation of existing technologies used in the light-duty sector to meet an ultra-low NOx emission standard. *Id.* at III-9 (Tab 21).

The traditional and primary method of reducing NOx emissions from diesel engines is through the use of a SCR system. CARB Draft Technology Assessment at II-2 (Tab 21). The SCR catalyst is capable of achieving high NOx conversion efficiencies during steady-state and high-speed operations. However, SCRs have poor NOx conversion efficiency when exhaust gas temperatures are low, such as during cold start, low-speed city driving and during extended idling. *Id.* at II-3 (Tab 21). A significant challenge to achieving further emission reductions involves reducing cold start emissions to the lowest possible levels and controlling emissions at light load and low-speed operations. This can be achieved by improving the low temperature performance of the SCR system, which would involve controlling NOx during cold start and accelerating the catalyst light-off temperatures; controlling emissions at light load and low-speed operations; and once warmed-up, maintaining high conversion efficiency. *Id.* at II-4 (Tab 21).

Additional NOx emissions reductions may be accomplished in many ways, including through the direct application of an SCR catalyst to the diesel particulate filter substrate. CARB Draft Technology Assessment (Tab 21). The catalyst and substrate technologies and exhaust architectures that are being demonstrated in the CARB low-NOx program at SwRI are already commercialized on some light-duty diesel passenger cars in Europe. As history has shown, the emission control strategies first demonstrated on light-duty vehicles can be translated to the heavy-duty truck sector and eventually off-road equipment. *Id.* at III-9 (Tab 21).

The addition of a passive NOx adsorber (PNA), is an effective method to reduce NOx emissions during the cold-start phase of operation. The PNA is a catalyst technology used upstream of the traditional exhaust control system, in combination with the DOC, to trap and store NOx at temperatures below 200°C before urea can be dosed into the hot exhaust and the SCR can

effectively reduce NOx. Once the exhaust temperature is sufficient for SCR catalysts to convert NOx to nitrogen, and to allow the urea dosing system to be activated, the NOx stored on the PNA begins to thermally and passively desorb so it can be converted by the ammonia reductant over the SCR catalyst.

CARB Draft Technology Assessment at III-2 (Tab 21). These and other technology improvements are in the demonstration and early commercialization phases on passenger cars and are proving to be promising methods of reducing both criteria pollutants and greenhouse gas emissions. CARB Draft Technology Assessment at ES-8 (Tab 21).

MECA has stated previously to EPA that heavy-duty diesel engines are capable of reducing emissions below the current 2010 engine exhaust standard through a combination of more advanced diesel engine design with advanced diesel exhaust emission control technologies including advanced substrates, improved SCR catalysts and/or NOx adsorber catalysts. MECA, Statement of the Manufacturers of Emission Controls Association on the U.S. Environmental Protection Agency's Proposed Rulemaking on Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles – Phase 2 (MECA Written Statement 2) (Sept. 25, 2015) at 7 (Tab 26). They have further advocated for the adoption of a lower heavy-duty engine NOx standard as a cost-effective strategy to reduce ozone levels nationally. They believe that multiple technologies are available to significantly reduce NOx emissions while facilitating the reduction of greenhouse gas emissions through the "application and optimization of advanced emission control technologies on advanced heavy-duty powertrains." *Id* (Tab 26).

Thus, the work on developing commercially available heavy-duty diesel engines to meet an ultra-low NOx standard is ongoing and shows significant promise. The evidence demonstrates that the technology currently exists to incrementally advance existing 2010 truck technology to meet the proposed new standard for diesel engines. EPA adoption of a national standard is required to give the necessary signal and certainty to the market and industry to optimize, integrate, and deploy the available technologies on heavy-duty trucks in a timely manner.

C. Engines Meeting the Standard are Projected to be Economically Feasible

The shift from the existing 0.2 g/bhp-hr to a 0.02 g/bhp-hr will not require revolutionary engine changes, therefore the incremental cost for the technology is expected to be relatively low. The incremental cost for the currently commercially available 0.02 g/bhp-hr 8.9 liter natural gas engine is around $10,000 to $12,000 over the existing 8.9 liter natural gas engine certified at 0.2 g/bhp-hr. Communication with Cummins Cal Pacific (2016). And while natural gas trucks generally cost $30,000 to $80,000 more than an equivalent diesel truck, this increase is usually recouped in operational savings, primarily through lower fuel costs. CARB Draft Technology Assessment – Natural Gas Engines at V-1 (Tab 23).

Meanwhile, for diesel trucks, the incremental cost for the after-treatment system, averaged over the medium and heavy-duty truck sector, for a 2010 truck to meet a 0.02 g/bhp-hr standard is

about $500 to $1,000 for the enhanced after-treatment system. MECA Written Statement 2 at 7 (Tab 26); Personal Communications with MECA (May 2016). This increase is equivalent to a cost-effectiveness of $3,000-$4,000 per ton of NOx reduced, which is more cost effective than most stationary source measures. MECA Written Statement 2 at 7 (Tab 26).

D. The Ultra-Low NOx Standard Should be Aligned with EPA Phase 2 Requirements

An ultra-low NOx standard for heavy-duty trucks will require modifications to the same engine system that will be modified to meet EPA Phase 2 GHG reduction requirements. It is more cost-effective for engine manufacturers to simultaneously develop an engine meeting both standards. MECA has stated that in reviewing

> heavy-duty engine certifications from 2002 to 2016 …once emission and efficiency technologies were required on engines, the relationship between CO2 and NOx emissions at the tailpipe went from a trade-off to a benefit. By setting stringent emission targets for both CO2 and NOx through realistic regulations and expanding the calibrator's tool box from the engine to the powertrain allowed engineers to achieve both reduced NOx levels and engine efficiency improvements simultaneously.

MECA Written Statement 2 at 4-5; *see also* Figure 12, below.

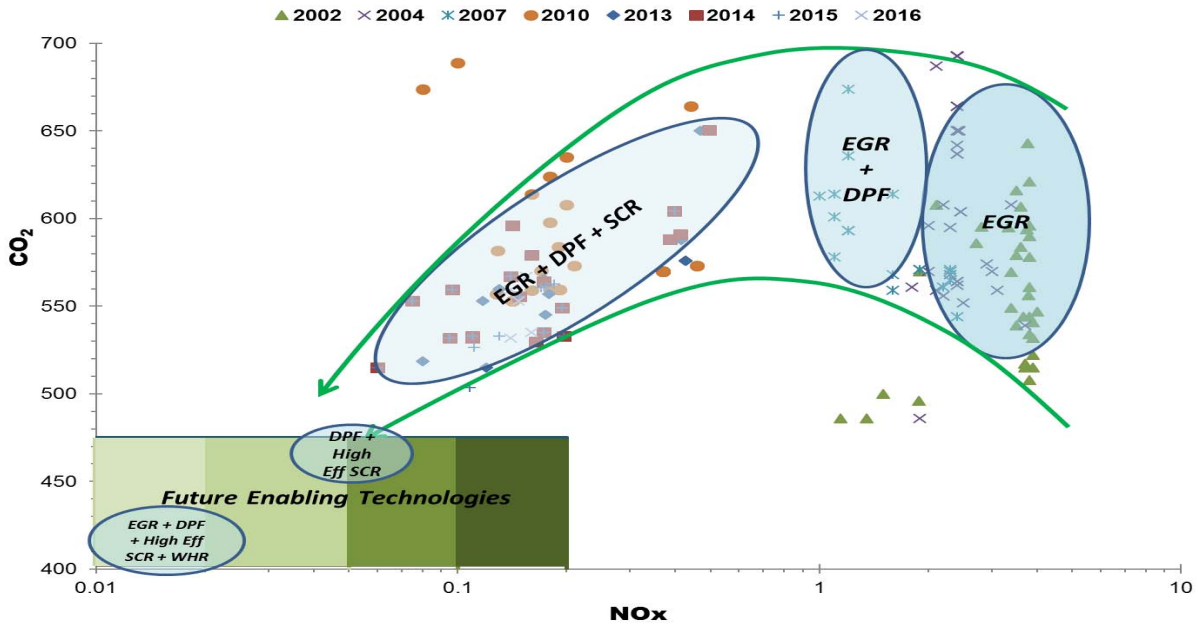

Figure 12. Heavy-Duty Engine Certification Levels for NOx and CO_2. **Source:** MECA Written Statement (Tab 25).

Fourteen years of certification experience shows that it is possible to reduce NOx and CO2 emissions from heavy-duty trucks concurrently. But the most cost-effective way to achieve co-optimization of the reductions is through aligned regulatory requirements for NOx and GHGs.

III. EPA Must Adopt a Revised National Standard

A. EPA Has Clear Legal Authority to Adopt the Proposed Rule

As the evidence in Part I of this Petition demonstrates, NOx emissions from heavy-duty trucks undoubtedly continue to endanger public health.

EPA's regulations must require "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." CAA § 202(a)(3)(A). In discussing EPA's 2001 heavy-duty truck standards, the D.C. Circuit explained that EPA is not obliged to "provide detailed solutions to every engineering problem", but need only "identify the major steps " for technology improvement and "give plausible reasons for its belief that the industry will be able to solve those problems in the time remaining." *Nat'l Petrochemical & Refiners Ass'n. v. EPA,* 287 F. 3d 1130, 1136 (D. C. Cir. 2002) (citations omitted*).* Moreover, EPA is authorized to adopt "technology-forcing" regulations for heavy-duty trucks. *Id.*

As demonstrated above in Part II of this Petition, a 0.02 g/bhp-hr NOx standard can be met within 4 years after 2017. But if EPA decides otherwise, it must nevertheless adopt the standard achieving the greatest emission reduction achievable, and has the authority to phase-in new standards. Since diesel heavy duty trucks are already being made that have certification levels close to a 0.05 g/bhp-hr NOx standard, EPA has no reason not to set a standard at least that stringent by January 1, 2022. EPA should at the same time adopt a rule that phases in the 0.02 standard as rapidly as possible. Thus, the 0.02 standard should be effective by 2024 at the latest.

B. Failure to Adopt the Requested Rule Would be Arbitrary and Capricious

1. EPA Must Adopt the Requested Rule to Fulfill its Responsibility in the Cooperative Federalism Structure of the Clean Air Act

As recognized by the courts, "cooperative federalism" is "a defining feature of the [Clean Air Act]" *GenOnREMA. LLC v. EPA,* 722 F.3d 513, 516 (3d Cir. 2013). As a federal court of appeal put it, "[s]tates and the federal government must work together to improve air quality for individuals nationwide. This is so because the CAA has established a uniquely important system of cooperative federalism in the quest for clean air. 'The CAA makes the States and the Federal Government partners in the struggle against air pollution.'" *Comm. for a Better Arvin v. EPA*, 786 F.3d 1169, 1173 (9th Cir. 2015) (citations omitted). Moreover, "the CAA 'makes the regulation of mobile source emissions…a federal responsibility [and] Congress has expressly preempted states from setting emissions standards for mobile sources." *Id.* (citation omitted).

Although California has authority to set its own mobile source emission standards with EPA approval, 42 U.S.C. § 7543, such standards cannot effectively address many mobile sources that enter California nonattainment areas from out of state.

Thus, EPA's role in setting tailpipe emission standards for mobile sources is just as important as its role in setting the national ambient air quality standards in the cooperative federalism structure of the Act. Indeed, under the Act States are generally preempted from setting tailpipe standards for mobile sources, while EPA is generally authorized to do so. This structure dictates the conclusion that where national rules are necessary for an area to attain the standards, EPA must enact those rules because Congress has stripped the states of the ability to do so.

EPA has recognized this responsibility in the past. For example, in approving the 1994 1-hour ozone SIP for the Basin, EPA recognized that "massive further reductions are needed for attainment in the South Coast and that attainment may be either very costly and disruptive or impossible if further reductions are not achieved from national or international sources." 62 Fed. Reg. 1150, 1152 (Jan. 8, 1997). Accordingly, EPA made an "enforceable commitment" to adopt Federal measures which it determined to be EPA's responsibility. 62 Fed. Reg. 1150, 1154.

In view of these cooperative federalism principles, EPA must recognize that the Basin will not be able to meet the 75 ppb standard without the requested rule. Attainment will also require other controls on sources within federal regulatory authority, such as locomotives, marine vessels, and aircraft. 2016 Mobile Source Strategy, Table 5 at 55-56 (Tab 4). If the Basin is unable to submit an approvable attainment demonstration without the rule proposed by this petition and other federal regulations, the region will be subject to sanctions. 42 U.S.C. § 7509(a)(2). But these sanctions will be imposed because of factors that are beyond the control of the local air district or the State of California, i.e. emissions from sources under federal control.

The CAA recognizes that it would be manifestly unfair to penalize states for being unable to demonstrate attainment when it is beyond their reasonable control. 42 U.S.C. § 7509a requires EPA to approve an attainment demonstration if a state meets all the other requirements for its SIP and shows that it would attain the standard "but for emissions emanating from outside of the United States." In addition, if a severe or extreme nonattainment area fails to attain the ozone standard in a timely manner, but shows that it would have attained but for emissions emanating from outside the U.S., it is not subject to the $5,000 per ton VOC and NOx major source penalty fee set forth in Section 185;42 U.S.C. § 7511d. *See* § 179B(b); 42 U.S.C. § 7509a(b).

These provisions sharply demonstrate that Congress clearly did not intend for a state to suffer sanctions if the reason that it cannot attain is emissions from sources beyond its control.

The legislative history of Section 179B makes clear that Congress adopted the above-cited statute because it would be unfair to hold a state responsible for emissions over which it has no control. The amendment was sponsored by Senator Gramm from Texas, who explained: "It is unfair to hold El Paso accountable for pollution that is generated in a foreign country that they have no control over." Congressional Research Service, Senate Committee on Environment and

Public Works, *A Legislative History of the Clean Air Act Amendments of 1990* (1993) Vol. IV at 5741. Senator Baucus, the bill's floor manager, spoke in support of the provision, noting that areas like El Paso "do not have control over their own destiny themselves." *Id.* at 5742. Presumably, Congress did not realize that some areas would be unable to attain because of emissions from federal sources, which are equally beyond the State's control, because Congress contemplated that EPA would adopt controls over these sources as needed to provide for attainment.

Based on "cooperative federalism" and the clear Congressional intent, it would be unreasonable for EPA to deny California the help it needs to attain the ozone standards. This is especially true since for decades, CARB and the SCAQMD have adopted and implemented every feasible measure within their regulatory authority, including measures for mobile sources that CARB may regulate with EPA authorization under Section 209, 42 U.S.C. § 7543, yet still cannot attain the standards without significantly strengthened federal regulations.

2. Failure to Adopt the Requested Rule May be Overturned Where Grave Health and Safety Problems Urgently Warrant the Requested Rule

It is settled that an agency's refusal to institute rulemaking proceedings in response to a petition is judicially reviewable. *Nat'l Customs Brokers & Forwarders Ass'n of Am., Inc. v. United States*, 883 F.2d 93, 96 (D.C. Cir. 1989). Under CAA § 307(d)(9), EPA's rulemaking actions for motor vehicles under Section 202 may be overturned if they are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." However, the scope of review for failure to institute rulemaking is "limited" and "deferential." *National Customs*, 883 F.2d at 96. The court of appeals explained: "We will overturn an agency's decision not to initiate a rulemaking only for compelling cause, such as plain error of law or a fundamental change in the factual premises previously considered by the agency." *National Customs*, 883 F.2d at 96-97.

Critically, however, the Court recognized that the "compelling cause" justifying overturning a refusal to institute rulemaking may exist in cases "involving grave health and safety problems for the intended beneficiaries of the statutory scheme" which present "facts urgently warranting remedial rules." *National Customs*, 883 F.2d at 103. This principle was reiterated in *Midwest Indep. Transmission Sys. Operator, Inc. v. F.E.R.C.*, 388 F.3d 903, 910 (D.C. Cir. 2004).

There can be no doubt that both in California and nationwide, continued exposure to ozone levels exceeding the new NAAQS, let alone exposure exceeding older higher NAAQS levels, presents a grave health risk. As demonstrated in detail in Part 1 of this petition, exposure to ozone and particulates, which would be reduced by the requested rule, presents grave health risks. These risks not only warrant EPA's immediate attention, they also constitute "compelling circumstances" that would justify a court in overturning any failure to initiate the requested rulemaking.

C. EPA Cannot Justify Failure to Adopt the Requested Rule Based on Higher Agency Priorities

As detailed above, SCAQMD and co-petitioners have presented "compelling cause" demanding that EPA immediately begin the requested rulemaking, based on the established "grave health problems" and "facts urgently warranting remedial rules" in this case. *National Customs*, 883 F.2d at 103. We recognize that CAA section 202 directs EPA to "from time to time" revise its motor vehicle standards. The courts have held that such language generally "affords the agency discretion to prioritize sources that are the most significant threats to public health to ensure effective administration of the agency's regulatory agenda." *WildEarth Guardians v. EPA,* 751 F.3d. 649, 655 (D.C. Cir. 2014).

In that case, the Court declined to overturn EPA's decision denying a petition to add coal mines to the list of sources under Section 111 and to set emission standards for methane emissions from those sources. EPA explained its decision by noting resource constraints and stating that it was focusing first on promulgating standards for transportation and electricity generating systems. These systems are responsible for more than 60% of national greenhouse gas emissions, whereas coal mines represent only about 1% of such emissions. *WildEarth Guardians*, 751 F.3d at 653. EPA explained that it could not, because of resource limitations, immediately undertake the rulemaking activity requested by petitioners "without sacrifice to its ongoing, higher-priority activities." *WildEarth Guardians*, 751 F.3d at 655.

In contrast to the situation in *WildEarth Guardians*, in this case heavy-duty trucks represent the largest single source of NOx in the Basin currently, as well as in 2023 and 2031, the region's required attainment dates for the 80 ppb and 75 ppb standards, respectively.[14] Heavy-duty diesel trucks are expected to account for 45 tpd of NOx in the Basin in 2023 and about 43 tpd in 2031, with heavy-duty gasoline trucks accounting for an additional 5 tpd in 2023 and 3 tpd in 2031. Figures 7 & 8, supra. This is over triple the amount of NOx expected from the largest 320 stationary sources of NOx, the RECLAIM program, in those years. *Id.* The entire baseline inventory for 2023 is expected to be about 265 tpd NOx, while for 2031 it is expected to be about 224 tpd. *See* Draft 2016 AQMP Emission Inventories, http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/planning-inventory-ozone.pdf?sfvrsn=7. This means heavy-duty trucks represent about 19% of total NOx emissions in 2023 and over 20% in 2031. While other mobile sources are also large contributors, such that mobile sources together represent 80% of NOx in 2023 and about 77% in 2031, heavy-duty trucks are the largest single category and contribute the most to existing and future adverse health effects in the area with the worst ozone air pollution in the country.

[14] The Basin must focus primarily on NOx to attain the upcoming ozone standards, as VOC reductions are projected to be much less effective, but may be needed to avoid potential increases in ozone levels in the western portions of the Basin. 2016 AQMP VOC White Paper at 15 (Tab 27).

Moreover, in the San Joaquin Valley Air Basin, which is the only other "extreme" ozone area in the country besides the South Coast, heavy-duty diesel trucks alone accounted for about 140 of a total of about 336 tons per day of NOx emissions in 2012, or about 42% of the total. CARB, Almanac Emission Projection Data (2013) 2012 Estimated Annual Average Emissions, San Joaquin Valley Air Basin, http://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm.

In other parts of the country, heavy-duty trucks contribute large amounts of NOx as well. For example, in the NESCAUM states, heavy-duty trucks represent the second largest source of NOx, just behind area sources. NESCAUM Comment at 3 (Tab 12). Moreover, as discussed above, California and states opting in to California standards cannot obtain the necessary emission reductions by adopting emission standards for trucks registered within the state, since heavy-duty truck emissions come from trucks registered outside of the individual states.

In short, heavy-duty diesel trucks are the greatest single contributor to ozone in the most severely polluted areas in the country, and the second greatest contributor in the most highly-populated area of the country, the NESCAUM region, which has over 42 million residents. NESCAUM Comment at 3 (Tab 12). Therefore, this situation differs substantially from the *WildEarth Guardians* case, where EPA focused on the greatest contributors to GHG emissions rather than a source that contributed only 1% of such emissions. Here, heavy-duty diesel trucks are the greatest contributors to ozone in the dirtiest areas in the country encompassing about 20 million people (over 16 million in South Coast and about 4 million in San Joaquin Valley, www.aqmd.gov/home/about (for the Basin); https://en.wikipedia.org/wiki/San_Joaquin_Valley (for the San Joaquin Valley). These trucks are also the second greatest contributor to ozone in the NESCAUM region, which is home to over 42 million people. Given these impacts, and particularly in light of the fact that EPA has adopted GHG rules for the electricity sector and will shortly finalize GHG rules for heavy-duty trucks, SCAQMD submits that EPA cannot now reasonably have a higher priority for the Office of Air and Radiation than controlling these emissions.

IV. Relief Requested

As set forth above, a revised on-road heavy-duty engine exhaust emission standard for NOx is necessary in order to help the Basin achieve both the 1997 and 2008 8-hour federal ambient ozone standards as well as to allow the Basin and other States to attain the more stringent 2015 8-hour NAAQS.

Petitioners therefore respectfully request that the Administrator take the following action:

1. EPA shall begin rulemaking on the development of an ultra-low NOx exhaust emissions standard (0.02 g/bhp-hr) for on-road heavy-duty engines with the goal of having a proposed rule by July 2017 and a Final Rule by December 31, 2017.

2. In developing the Proposed Rule, the EPA shall require ultra-low NOx engines meeting the 0.02 g/bhp-hr standard by January 1, 2022.

3. If full implementation of an ultra-low NOx exhaust emission standard is not feasible for certain classes or vocations of vehicles by January 1, 2022, EPA shall phase-in the requirements for sale of ultra-low NOx engines beginning that year for classes or vocations of vehicles that are more readily amenable to having cleaner engines deployed in the fleet. In doing so, EPA may establish intermediate NOx exhaust emission standards that are higher than the ultra-low NOx standard. However, the higher standards shall be no higher than 0.05 g/bhp-hr. Full implementation of the 0.02 g/bhp-hr standard shall occur no later than January 1, 2024.

4. To encourage early development and deployment of 0.02 g/bhp-hr engines, EPA shall develop guidelines under the Diesel Emissions Reduction Act. The guidelines shall allow for owners of existing on-road heavy-duty vehicles with engines that meet the 2010 on-road heavy-duty NOx exhaust emissions standard of 0.2 g/bhp-hr to qualify for incentive funding to purchase an ultra-low NOx engine. Owners should not be required to scrap the 2010 standard vehicle provided that the vehicle is sold and used outside of an area that is in nonattainment of the NAAQS for ozone. The guidelines shall ensure that the existing 2010 vehicles shall not operate in a nonattainment area.

Respectfully Submitted,

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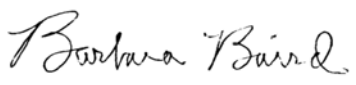

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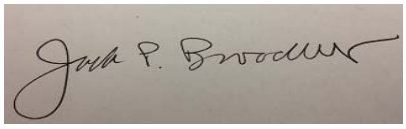

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