



November 12, 2019

U.S. EPA
EPA Docket Center
Mail Code 28221T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Attn: Docket No. ID EPA-HQ-OAR-2015-0072

Re: Policy Assessment for Review of the National Ambient Air Quality Standards for Particulate Matter, External Review Draft (Draft PA)

The Institute of Clean Air Companies (ICAC) appreciates the opportunity to offer comments in response to EPA's Policy Assessment for Review of the National Ambient Air Quality Standards for Particulate Matter, External Review Draft (*Draft PA*) (EPA-HQ-OAR-2015-0072).

ICAC is the national trade association of companies that supply air pollution control and monitoring systems, equipment and, services for stationary sources. For 60 years, ICAC member companies have helped to clean the air by developing and installing reliable, cost effective control and monitoring systems. We believe that improved air quality and industrial growth best occur when achievable cost-effective policies are paired with innovative technologies.

Our comments will focus on diesel particulate filters, an existing reliable and cost-effective control technology, to help reduce PM_{2.5} emissions.

Again, ICAC appreciates the opportunity to offer comments on this, and we look forward to answering any further questions should EPA seek additional information.

Sincerely,

A handwritten signature in cursive script that reads 'Clare Schulzki'.

Clare Schulzki
ICAC Executive Director

Background: Proven Control Technologies to Address Increasing PM_{2.5}

EPA's *Policy Assessment for Review of the National Ambient Air Quality Standards for Particulate Matter, External Review Draft* concluded that there "is evidence sufficient to conclude that a causal relationship is likely to exist between short-term PM_{2.5} exposure and respiratory effects" (U.S. EPA, 2018, p. 5-155). The same conclusion was reached for long-term exposure (page 3-33, line 34).

What is apparent from EPA's policy assessment is that although there have been dramatic improvements in the reduction of emissions of ammonia, NO_x, SO₂ and VOCs, by contrast the reduction in PM emissions since 2002 (and especially PM_{2.5}) has been minimal at best (see **Table 1**). While fires and dust storms can limit the progress in reducing PM_{2.5}, some stationary diesel engines can sometimes contribute to local air quality issues.

It is reasonable to conclude that diesel particulate emissions should be controlled whenever there is a demonstrated control strategy for those pollutant emissions. ICAC believes that even short-term exposure to PM_{2.5} must be addressed, and the technology to provide such PM_{2.5} control is both well proven and cost-effective. Throughout the U.S., diesel particulate filters (DPF) have been reliably and cost-effectively controlling the particulate count by over 99%. DPFs have been successfully deployed on emergency back-up, non-emergency back-up, and prime power generators. In California alone, one supplier identified over 1,000 installations on diesel gensets having installed a DPF.

Table 1. Percent Changes in PM and PM Precursor Emissions in the NEI for the Time Periods 1990-2014 and 2002-2014. Source: U.S. EPA's Policy Assessment for Review of the National Ambient Air Quality Standards for Particulate Matter, External Review Draft (September 2019).

Pollutant	Percent Change in Emissions: 1990 to 2014	Percent Change in Emissions: 2002 to 2014	Major Sources
NH ₃	-21%	-10%	Agricultural Sources (Fertilizer and Livestock Waste), Fires
NO _x	-50%	-48%	EGUs, Mobile Sources
SO ₂	-80%	-69%	EGUs, other Stationary Sources
VOCs	-38%	-15%	Solvents, Fires, Mobile Sources
PM _{2.5}	-40%	-4%	Dust, Fires
PM ₁₀	-38%	-15%	Dust, Fires

PM_{2.5} Emissions from Stationary Diesel Engines

It is challenging for air quality professionals to address emissions from uncontrolled diesel engines due to the lack of uniform information regarding operating hours, particulate emission rates, and the potential harm from increased exposure to PM_{2.5}. NESCAUM previously reported in 2012 that "uncontrolled diesel backup generators operating under the exemption included in EPA's recent proposal could by themselves create hotspots exceeding the national health-based one-hour NO₂ air standard." Increased use of uncontrolled diesel backup engines in economic demand response programs, such as peak shaving, may prevent areas from achieving air quality standards.

Reliability of Control Technologies

DPFs have proven to be extremely reliable and robust. In 2002, the California Air Resources Board (CARB) established an in-use compliance verification procedure, whereby after 300 filters have been sold in the California market, the technology provider must submit a test protocol to verify compliance with CARB standards of in-use filters.¹ Several suppliers of these filters have documented meeting these criteria, and several others are in the process of certifying to this standard as well. This rigorous reliability standard ensures the genset operator can expect reliable particulate control performance. For greater assurance, systems have been developed for active regeneration to further increase the reliability of the DPF.

EPA conducted tests on diesel particulate filters and in 2015 published the results.² The study confirmed the excellent capabilities of DPFs to control diesel particulate. Overall, the DPFs resulted in significant PM mass removal (80–99 %), while the diesel oxidation catalyst resulted in statistically insignificant reductions (0–25 %). Both black carbon and elemental carbon removal followed a similar trend. Particle number concentrations were also significantly reduced when using DPFs, with a greater than 97 % reduction in particle concentrations.

Table 2 illustrates the typical performance of a DPF on a 350 kW Caterpillar engine using ultra low sulfur diesel (ULSD) fuel.³ After 500 hours, the testing by University of California, Riverside, Bourns College of Engineering - Center for Environmental Research and Technology (CE-CERT) shows no degradation of performance and a consistent 93% mass reduction in diesel particulate. For the small engine used in the test, there would have been 1 lb of PM_{2.5} emitted every 7 hours of operation. Multiply this by the many thousands of engines that could all be operating during an emergency or demand response condition, and the emissions from these uncontrolled engines may create localized unhealthy air. Applying a DPF to these engines would control these emissions.

Table 2. Overall Test Summary of Triplicates, Weighted by ISO 8178 g/ehp-h. Source: Shah, et al.

Test	THC	CO	NOx	NO2	CO2	PM2.5 CFR	PM2.5 ISO
Baseline	0.079	1.043	6.76	0.234	566.6	0.1508	0.1537
ZeroHr	0.006	0.080	6.54	1.448	560.9	0.0100	0.0099
167Hr							
500Hr	0.007	0.097	6.71	1.237	556.3	0.0105	0.0106
1000Hr							

¹ Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines. California Air Resources Board. California Code of Regulations. 16 May 2002.

² "Emissions removal efficiency from diesel gensets using aftermarket PM controls", Tiffany L. B. Yelverton, Amara L. Holder, Jelica Pavlovic. Received: 27 October 2014 / Accepted: 6 January 2015. Springer-Verlag Berlin Heidelberg. 2015. U.S. EPA.

³ Shah SD, Cocker DR, Miller JW, Norbeck JM (2004) Emission rates of particulate matter and elemental and organic carbon from in-use diesel engines. *Environ Sci Technol* 38(9):2544–2550. doi:10.1021/es0350583

Cost-Effective Control Technologies

DPF technology has greatly advanced in reliability and cost-effectiveness. **Table 3** provides a generic pricing of a standard DPF for a variety of engine sizes based on industry pricing from ICAC member companies. As the engine output increases, the cost for PM control per power output (kW) is dramatically reduced. For example, a standard DPF for an engine output of 250 kW would cost between \$40-52 per kW, while an engine output of 3000 kW would only cost \$30-33 per kW.

Table 3. Typical Price Ranges for DPF. Source: Industry pricing data from ICAC members.

Engine Output (kW)	Equipment Price
250	\$10,000 - \$13,000
500	\$15,000 - \$18,000
1500	\$50,000 - \$60,000
2000	\$60,000 - \$70,000
3000	\$90,000 - \$100,000

Recommendation

ICAC believes that the technology to control diesel particulate emissions from diesel-fired gensets and back-up generators is well demonstrated and cost-effective for many engine types and applications. ICAC recommends that EPA consider the use of controls on back-up and prime power engines, especially in densely populated areas where even short-term exposure to elevated PM_{2.5} may contribute to significant health risks.

DPF technology can safely and prudently permit the use of diesel-fired backup generators in economic or demand response programs to cost-effectively enhance the progress that states are making to address electric sector emissions.

