

Clean Air Act Enforcement

Key Environmental Issues in U.S.
EPA Region 2

May 19, 2023

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Area Source Boiler Rule

- ▶ “National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources,” 40 C.F.R. Part 63, Subpart JJJJJJ.
- ▶ Promulgated under the “area source” provisions in Section 112 of the Clean Air Act (CAA), *see* CAA § 112(d)(5) and (h).
- ▶ Area source (i.e., not a “major source”): any stationary source that emits or has the potential to emit less than 10 tons per year of any hazardous air pollutant (HAP) or less than 25 tons per year of any combination of HAPs, *see* CAA § 112(a).
- ▶ Key purpose: ensure existing oil-fired boilers are operated and maintained to achieve greater energy efficiency, which reduces fuel usage and corresponding HAP emissions.
 - Regulated HAPs: Non-mercury metallic HAP (nickel) and organic HAP (polycyclic organic matter). Particulate matter (PM) and carbon monoxide (CO).
- ▶ Work practice standard to control HAPs from oil-fired boilers: initial tune-up, and periodic tune-ups thereafter (biennial for larger boilers, every five years for smaller boilers).
- ▶ Compliance date for initial tune-ups: March 21, 2014.
- ▶ Natural gas boilers are exempt under the Area Source Boiler Rule.

New York City Department of Education

- ▶ Largest school district in the US: over 1,800 schools, approx. 137,500 employees, and 1.1 million students.
- ▶ Each school building with an oil-fired boiler is regulated as an “area source” under the Area Source Boiler Rule.
- ▶ Division of School Facilities (DSF) is primarily responsible for the maintenance, repair, and safe operation of schools and their boiler systems.
- ▶ In November 2021, the settlement addressed approximately **1,300 oil-fired boilers** of various sizes and ages, located at **566 schools**.
- ▶ These boilers burn either No. 2 fuel oil or more polluting No. 4 fuel oil.
- ▶ NYC DOE’s latest info from December 31, 2022, indicates there are still 1,048 oil-fired boilers in service, of which 545 burn No. 4 oil (73 large No. 4 boilers greater or equal to 10MMBtu/hr; 472 small No. 4 boilers less than 10 MMBtu/hr).

Violations of Area Source Boiler Rule

NYC DOE failed to comply with:

- ▶ **Initial Notification** for existing oil-fired boilers, 40 C.F.R. §§ 63.9(b), 63.11225(a)(2).
- ▶ **Notification of Compliance Status (“NOCS”)**, 40 C.F.R. §§ 63.9(h), 63.11225(a)(4).
- ▶ **Initial and periodic (biennial) boiler tune-ups**, 40 C.F.R. §§ 63.11214, 63.11223.
- ▶ **One-time Energy Assessments** for larger boilers 10 MMBtu/hr or greater, 40 C.F.R. §§ 63.11196(a)(3), 63.11214(c), 63.11237.

Why these violations matter: Public health risks

- ▶ Oil-fired boiler emissions (HAPs and PM): increased cancer risk, worsening lung and heart disease, increased hospitalizations, premature mortality. Children and elderly are most vulnerable.
- ▶ Fine particulate matter can aggravate existing respiratory diseases such as asthma and cause heart attacks or other cardiovascular episodes.
- ▶ **No. 4 fuel oil is still burned in approx. 545 NYC DOE boilers.** Many located in minority or low-income communities that experience disproportionate impacts from poor air quality. Raising environmental justice concerns.

Settlement Terms

- ▶ \$1 million civil penalty
- ▶ Comprehensive compliance management plan for conducting periodic tune-ups and necessary maintenance/repairs
- ▶ Mitigation of excess emissions in designated EJ communities: Conversion/replacement of seven No. 4 oil boilers to natural gas by March 2023
 - Upfront capital cost: \$50.5 million
 - We focused on larger, older boilers that burn No. 4 oil

Mitigation

- ▶ NYC DOE is required to mitigate excess emissions that would not have occurred had it completed initial tune-ups on time. On average, initial tune-ups were 3 years late. Mitigation focused on No. 4 oil boilers.
- ▶ EPA's analysis of NYC DOE tune-up records showed that efficiency improvements from initial tune-ups would be expected to reduce No. 4 oil usage by 7.6%.
- ▶ Applying 7.6% reduction to NYC DOE's fuel usage data for the 3-year average period of noncompliance, we calculated that NYC DOE burned an **excess of 3,132,326 gallons of No. 4 oil** (with resulting PM and HAP emissions).
- ▶ EPA Policy Memo: <https://www.epa.gov/sites/default/files/2013-10/documents/2ndeditionsecuringmitigationmemo.pdf>

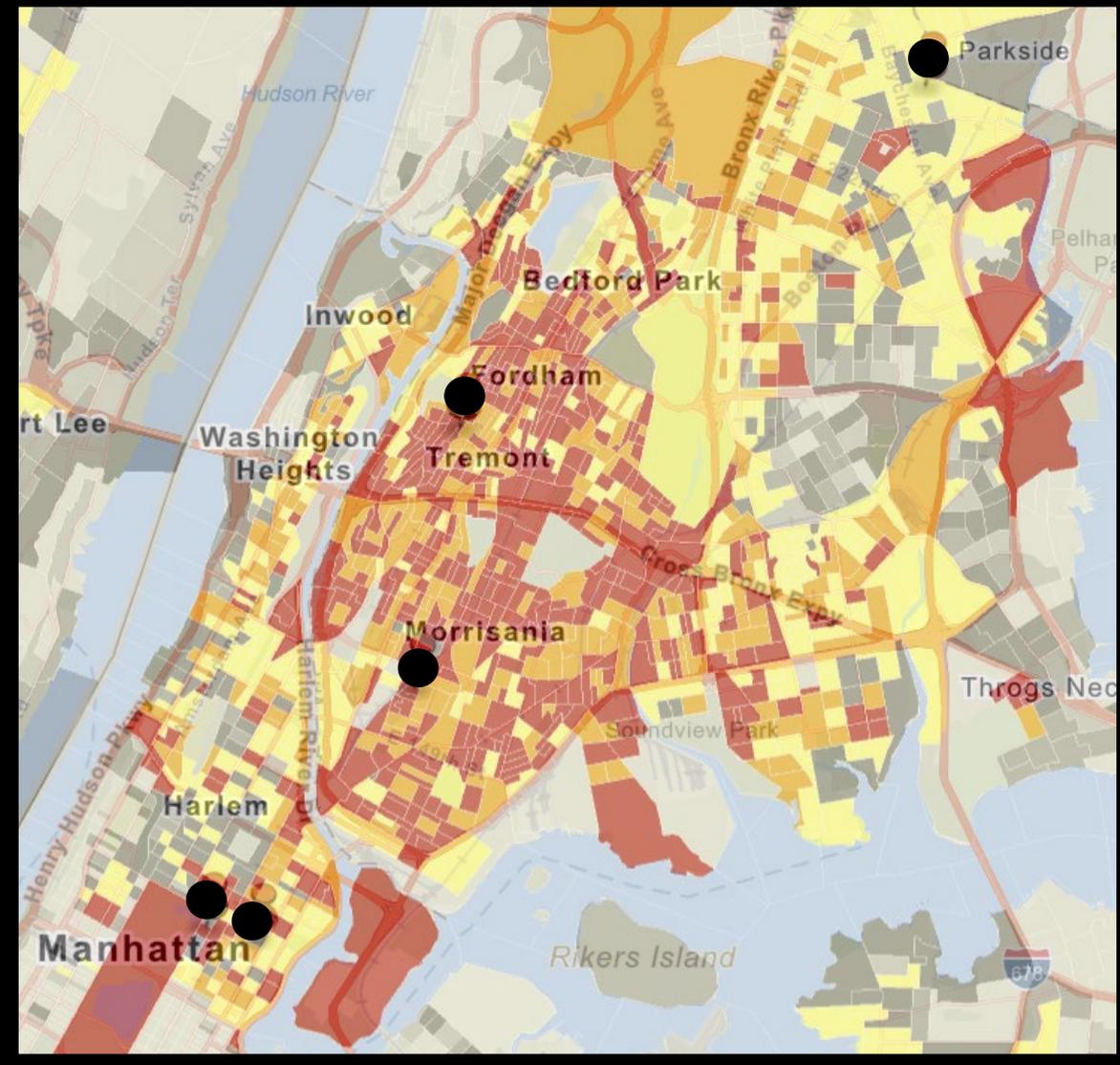
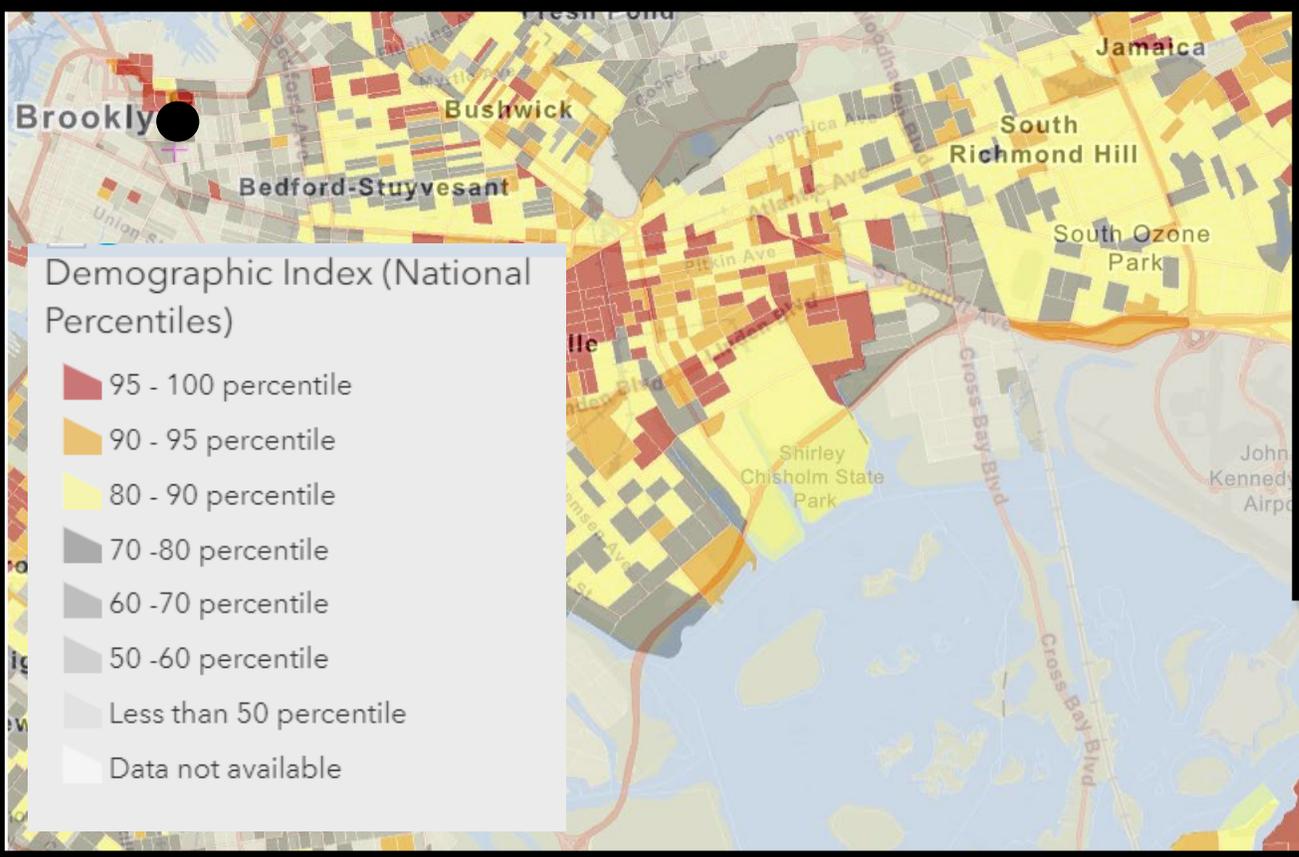
Environmental Justice Considerations in Seeking Mitigation

- ▶ The localized nature of boiler emissions allowed us to target boiler replacement/conversions in EJ-designated communities.
- ▶ Utilized EPA's EJSCREEN tool to identify schools with No. 4 oil boilers located in designated EJ areas, see <https://www.epa.gov/ejscreen>.
- ▶ Criteria: EJ Index of 80th percentile or higher for PM-2.5 in a 0.5-mile radius around the school.
 - P.S./M.S. 29 in the Bronx ranks in the 92nd percentile for state PM 2.5 levels in EJ Index
 - Esperanza Preparatory Academy (90th percentile)
 - Central Park East High School (89th percentile)
 - P.S. 306 (88th percentile)
 - Success Academy Far Rockaway (86th percentile)
 - P.S. 68 (82nd percentile)
 - Brooklyn Technical High School K430 (74th percentile).

EJSCREEN

Demographic Index

School Locations



No. 4 Oil Boiler Conversions/Replacements

- ▶ Brooklyn Technical High School (K430):
 - CJ required replacement of largest No. 4 oil boiler in NYC DOE system with new natural gas boiler by **March 1, 2023**.
 - Will reduce No. 4 oil usage by approx. **342,911 gallons per year**, for a total early reduction of 2,400,377 gallons of No. 4 oil through the end of 2029
 - Upfront capital cost of **\$24 million**
 - NYC DOE stopped burning No. 4 oil by the deadline and has permanently removed the No. 4 boiler, but installation of the new gas-fired boiler is delayed until December 2023. A temporary No. 2 oil boiler is being used until the new gas boiler is operational.
- ▶ CJ required replacement of No. 4 oil boiler at P.S. 68 in Brooklyn with new natural gas boiler by March 1, 2023. Update: NYC DOE stopped burning No. 4 oil by the deadline and has permanently removed the No. 4 oil boiler, but installation of the new gas-fired boiler is delayed until October 2023. A temporary No. 2 oil boiler is being used until the new gas boiler is operational.
- ▶ NYC DOE converted the five additional No. 4 oil boilers in Queens, the Bronx, Brooklyn, and Manhattan by October 15, 2022.

No. 4 Oil Boiler Conversions/Replacements (cont'd)

- Altogether, early boiler conversions will offset NYC DOE's excess No. 4 oil usage by approximately **671,078 gallons per year** through the end of 2029, for a total early reduction of approximately 4,697,546 gallons.
- NYC DOE will achieve the 3.1 million gallon "break-even" point for mitigation purposes by December 2027.

Estimated Emission Reductions

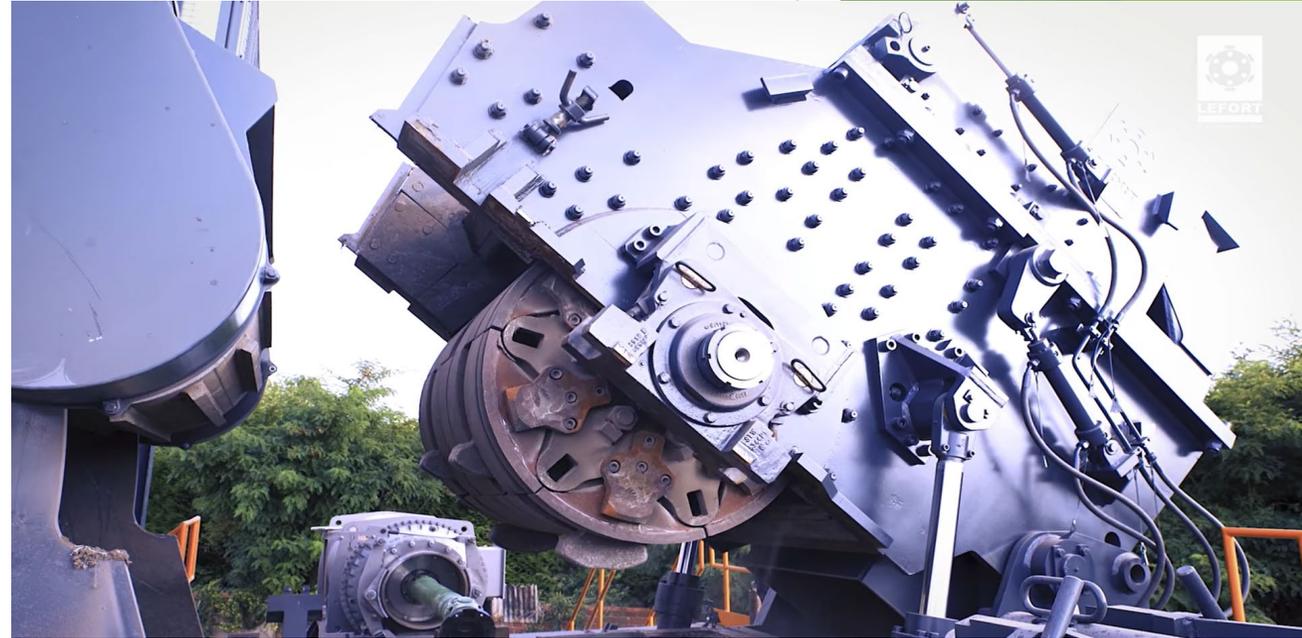
- ▶ Reductions in No. 4 oil usage secured by the settlement correspond to annual emissions reductions of approximately:
 - 2,920 lbs/yr of PM-10 (10.2 tons PM-10 through Dec. 2029)
 - 1,180 lbs/yr of PM 2.5 (4.1 tons PM 2.5 through Dec. 2029)
 - 167 lbs/yr of total HAPs (0.58 tons HAPs through Dec. 2029)
 - Incidental reductions of 13,420 lbs/yr of nitrogen oxides (NO_x) and 15,100 lbs/yr of sulfur oxides (SO_x)

Scrap Metal Shredders EPA Enforcement Alert (July 2021):

<https://www.epa.gov/system/files/documents/2021-07/metalshredder-enfalert.pdf>

What is a scrap shredder?

- ▶ A powerful engine connected to a hammermill (rotating cylinder with large hammers that act like teeth to crush and shred the metal into smaller pieces generating a significant amount of heat.)
- ▶ Reduces large items made primarily of metal such as cars, refrigerators, stoves, construction materials and other scrap metal into smaller pieces of metal and other by-products.



- Metal recycling facilities with shredders collect ferrous and non-ferrous metals from a variety of sources.
- Scrap metal and automobiles are conveyed to a hammermill shredder then through magnetic and other separators.
- All shredders separate ferrous from non-ferrous (“fluff”).
- Some shredders further separate metals and other useful materials

What is a scrap shredder?



- ▶ Plastics, paints, caulks, sealants, rubber, switches, and fluids and fluid residues in scrap automobiles are also shredded.
- ▶ The process of grinding and shredding scrap metal results in the formation of particles and the volatilization of residual fluids.

VOC Emissions from Shredders

- Sixteen (16) emissions tests were performed between 2013 and 2021 at scrap metal shredders. The maximum emission rate measured in these tests was 0.651 lb VOC per ton of scrap shredded (lb/ton), and the minimum rate was 0.066 lb/ton.
- The range of emission rates may be due to several issues but the most significant is likely the effectiveness of capture systems. Many of these tests failed to collect, and therefore measure, the VOC emissions generated by the shredders. Tests that have inadequate capture efficiency significantly under-estimate emissions.

Enforcement Alert

Publication no. EPA 310-F-21-003

July 2021

Violations at Metal Recycling Facilities Cause Excess Emissions in Nearby Communities

Purpose

The U.S. Environmental Protection Agency (EPA) is publishing this enforcement alert (Alert) because EPA and state investigations have identified Clean Air Act violations at metal recycling facilities that operate auto and scrap metal shredders, causing excess emissions of air pollution. Over 250 metal recycling facilities are currently operating with a shredder in the United States. These facilities are often located in densely populated areas - noncompliant shredders can have an impact on overburdened communities. This Alert is intended to inform metal recycling facility owners and operators about the Clean Air Act requirements that might apply at their facilities and the air pollution control systems that are in use for shredders at similar facilities. Specifically, shredder operators should be aware of the amount of volatile organic compounds (VOCs) and other emissions from their facilities and should contact their local regulatory or permitting authority for further guidance. Enforcement actions have assessed substantial penalties and have required

EPA Enforcement Alert

- ▶ EPA and state investigations have identified Clean Air Act violations at metal recycling facilities that operate auto and scrap metal shredders, causing excess emissions of air pollution (VOCs).
- ▶ Over 250 metal recycling facilities are currently operating with a shredder in the United States.
- ▶ “These facilities are often located in densely populated areas - **noncompliant shredders can have an impact on overburdened communities.**”

EPA Enforcement Alert (cont'd)

- ▶ Test data shows that VOC emissions from shredding operations are at levels that can trigger regulatory applicability and the need for emission controls. The test data reveals that typical shredding operations emit VOCs at rates **between 20 and 200 lbs of VOCs per hour** (based on size of shredder and type of material shredded).
- ▶ VOC emissions from scrap metal shredding facilities are regulated by the Clean Air Act because VOC emissions can contribute to the formation of **ground level ozone** and contribute to exceedances of the National Ambient Air Quality Standards (NAAQS) for ozone.
- ▶ Emission rates are generally reduced if the shredder has an enclosure and existing controls such as a cyclone or scrubber.
- ▶ Emission rates are also generally reduced where the facility removes contaminants before shredding (known as “depolluting”).

EPA Enforcement Alert (cont'd) - VOC Control Strategies

- ▶ Air pollution controls have been installed on several metal shredding operations across the country.
- ▶ Emissions must first be captured before they can be controlled (e.g., construct permanent total enclosure around the shredder).
- ▶ Large fans and overhead hoods are often required to maintain negative pressure within the enclosure to ensure that emissions do not escape from openings.
- ▶ With an effective enclosure and ducting in place, emissions can be routed to a control system.
- ▶ Due to metal particles present in the exhaust, the first phase in the control train captures large and smaller particles.
- ▶ Downstream of the particulate control device, a **regenerative thermal oxidizer (RTO)** for VOC control is typically used.
- ▶ The final component of the control train is usually a scrubber designed to control the acid gases (e.g., hydrogen fluoride and hydrogen chloride) that can be present in the exhaust.



Thank you!

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