CORPUS PUBLISHERS

Environmental Sciences and Ecology: Current Research (ESECR)

ISSN: 2833-0811

Volume 5 Issue 1, 2024

Article Information

Received date : March 25, 2024

Published date: Apri 08, 2024

*Corresponding author

Rossol M, Safety Officer for local USA829 of the International Alliance of Theatrical Stage Employees (IATSE), New York, USA

DOI: 10.54026/ESECR/10100

Key Words

EPA; Environmental Protection Agency; PM2.5 ; Unhealthy; Exposure; Wildfires

Opinion

EPA Reduces Exposure Standards for $PM_{2.5}$

M Rossol*

Safety Officer for local USA829 of the International Alliance of Theatrical Stage Employees (IATSE), New York, USA

Opinion

On February 7, 2024, the U.S. Environmental Protection Agency (EPA) announced a final rule to strengthen the nation's National Ambient Air Quality Standards (NAAQS) for fine particle pollution, also known as fine particulate matter ($PM_{2.5}$) such as soot from industrial processes and smoke particles from wildfires.

Breakpoint changes: EPA has changed a number of the primary (health-based) annual $PM_{2.5}$ standards based on the amounts of micrograms per cubic meter (ìg/m³) are in the air. Their press releases and fact sheets dwell on the "good" air breakpoint reduction from 12 to 9 ìg/m³ when, in my opinion, the most important changes are in the "unhealthy" and "hazardous" categories. For example, the breakpoint between "unhealthy" and "very unhealthy" was reduced from 150.4 ìg/m³ to 125.4 ìg/m³. Even more importantly, the two"hazardous" categories which originally ranged from 150.5 to 500 ìg/m³ were replaced with a single breakpoint of 225.5+ ìg/m³ indicating that anything above this is outright hazardous for people to breathe. The EPA press release [1] says that the "updated standard will save lives-preventing up to 4,500 premature deaths and 290,000 lost workdays, yielding up to $46 billion in net health benefits in 20³2" (the date by which the law is projected to be fully implemented). I assume these benefits will result primarily from reducing the level at which the air is considered "hazardous" rather than the breakpoint between "good" and "moderate" air quality.

Rethinking Index Values

I also hope the EPA drops the use of the AQI Index Values. These Index Values are designed to provide the public with a single number on a scale of 0 to 500 to indicate how hazardous the air was. I think they underestimate the public and people are quite capable of understanding the significance of the actual number of micrograms per cubic meter (ìg/m³) in each category. The single index number is a barrier to people understanding that the particles they are inhaling have an actual weight in milligrams. The Index Values were instituted when those numbers were relatively close the number of ìg/m³ in some categories, but they are way off now and misleading.

The New Rule is Complex

The actual regulation in all its complexity is at: *https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-50/section-50.14*, I recommend reading it over. The law contains some complex requirements for states to meet these standards. But the primary problem, as I see it, will be the enforcement schedule. The plan is to have most (99%) of U.S. counties meeting this more protective standard by 2032. That's a long time to wait. In addition, there are many exemptions which will allow the air quality to be unhealthy at times. This is sometimes necessary, such as in the case of deliberately set fires to clear areas of underbrush that would result in even more dangerous forest fires. However, one exemption for firewor quoted below might be worth some additional scrutiny.

Exemption for Fireworks

Generally: The Administrator shall exclude data from use in determinations of exceedances and violations identified in paragraph (a)(1)(i) of this section where a State demonstrates to the Administrator's satisfaction that an exceptional event caused a specific air pollution concentration at a particular air quality monitoring location and otherwise satisfies the requirements of this section.

Fireworks displays: The Administrator shall exclude data from use in determinations of exceedances and violations where a State demonstrates to the Administrator's satisfaction that emissions from fireworks displays caused a specific air pollution concentration in excess of one or more national ambient air quality standards at a particular air quality monitoring location and otherwise satisfies the requirements of this section. Such data will be treated in the same manner as exceptional events under this rule, provided a State demonstrate that such use of fireworks is significantly integral to traditional national, ethnic, or other cultural events including, but not limited to, July Fourth celebrations that satisfy the requirements of this section.

Pyrotechnic displays create emissions that are more toxic than forest fire soot particles. They usually contain cadmium, chrome, copper, nickel, titanium, antimony, and a host of rare earth and other metals. Some shells may even release some lead and arsenic. The various fireworks colors and some of the explosive reactions are dependent on metals and metal compounds. The metal-containing particles from spent pryotechnic reactions can be inhaled and also have lasting effects on the land where they eventually deposit. The American Pyrotechnics Association says about 25. 3 million pounds [11,476 tons] of display fireworks and 435.4 million pounds [197,494 tons] of consumer fireworks were sold in 2022 [2]. This is not a trivial amount of pollution because most of the weight of a firework or pyrotechnic shell is due to the metallic compounds, and those will be airborne. I understand the artistic and entertainment issues here, but suggest we need to creatively limit the use of the more toxic metals and explore laser lighting, LED drones, and other effects to reduce the use of pyrotechnics (Figure 1).

AQI Category and Index Value	Updated AQI Category Breakpoints
Good (0 – 50)	0.0 to 9.0
Moderate (51 – 100)	9.1 to 35.4
Unhealthy for Sensitive Groups (101 – 150)	35.5 to 55.4
Unhealthy (151 – 200)	55.5 to 125.4
Very Unhealthy (201 – 300)	125.5 to 225.4
Hazardous (301+)	225.5+

Figure 1: Graphic modified from: naaqs-air-qualilty-index-fact-sheet.pdf.

Reference

1. (2024) EPA finalizes stronger standards for harmful soot pollution, significantly increasing health and clean air protections for families, workers, and communities 7: EPA Press Office, USA
2. (2024) Industry Facts & Figures
3. (2024) Final Reconsideration of the National Ambient Air Quality Standards for Particulate Matter (PM)