Review of Emission Limitations and Standards for the Revised 2024 Fine Particle ($PM_{2.5}$) and Sulfur Dioxide (SO_2) National Ambient Air Quality Standards

Report to the Governor and General Assembly

Iowa Department of Natural Resources

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IOWA DEPARTMENT OF NATURAL RESOURCES

Executive Summary

In 2024, the U.S. Environmental Protection Agency (EPA) adopted revisions to the ambient (outdoor) air quality standards for fine particulate matter ($PM_{2.5}$) and sulfur dioxide (SO_2). The revisions strengthened the air quality standards for those pollutants in order to adequately protect public health and public welfare.

To fulfill the requirements of Iowa Code 455B.134(14), the Department of Natural Resources (DNR) convened meetings with stakeholders in 2025 and 2026 to review emission limitations and standards related to the maximum amounts of SO_2, $PM_{2.5}$, and $PM_{2.5}$ precursors that may be emitted from sources in Iowa. The DNR prioritized SO_2 in the stakeholder discussions because the EPA previously withdrew its support for the revised 2024 $PM_{2.5}$ standard. An appeal to invalidate the 2024 $PM_{2.5}$ standard is currently awaiting the U.S. Supreme Court's decision to hear the case or leave the standard in place.

No changes to Iowa Code were identified by stakeholders or the DNR as necessary for the attainment of the revised SO_2 standard. The stakeholders and the DNR also concluded that no rulemaking to amend existing administrative rules related to thresholds that trigger air permitting of sources of SO_2 was necessary. For the 2024 $PM_{2.5}$ standard, no code or rule revisions were identified at this time, due to the ongoing legal uncertainty.

This report to the Governor and Iowa General Assembly summarizes the DNR's activities related to the provisions of Iowa Code 455B.134(14).

Revised Ambient Air Quality Standards

Under the Clean Air Act (CAA), the EPA is required to establish health and welfare based standards for criteria pollutants, which include SO_2 and $PM_{2.5}$. These standards are referred to as the National Ambient Air Quality Standards (NAAQS). The NAAQS establish maximum permissible airborne pollutant concentrations in outdoor air. There are two types of NAAQS, primary and secondary. Primary NAAQS protect public health while secondary NAAQS protect public welfare (for example, from negative effects on soils, water, and crops). The CAA requires the EPA to review the latest scientific information and health studies for each criteria pollutant at least every five years. The EPA then revises existing NAAQS or promulgates new NAAQS for a given criteria pollutant as appropriate based on that review.

Sulfur Dioxide 2024 NAAQS Revision

On December 11, 2024, the EPA promulgated a revision to the secondary SO_2 NAAQS to safeguard public welfare, adding a new annual secondary SO_2 standard of 10 parts per billion (ppb) to protect sensitive aquatic ecosystems from acidification (89 FR 105692, December 27, 2024). The EPA concurrently concluded that human health remained adequately protected by the existing short-term (1-hour) primary standard of 75 ppb established in 2010.

Fine Particle 2024 NAAQS Revision and Subsequent Uncertainty

On February 7, 2024, the EPA promulgated revisions to the $PM_{2.5}$ NAAQS to strengthen the primary standard to adequately protect public health (89 FR 16202, March 6, 2024). Specifically, the EPA lowered the level of the annually-averaged standard from 12.0 micrograms per cubic meter ($\mu g/m^3$) to 9.0 $\mu g/m^3$.

After the change in administration, the EPA questioned the legality of the 2024 $PM_{2.5}$ NAAQS revision and subsequently asked the D.C. Circuit Court of Appeals to vacate that standard. The D.C. Circuit denied the EPA's request, fully retaining the 9.0 $\mu g/m^3$ annual $PM_{2.5}$ NAAQS. However, the standard's future is still in question because the U.S. Supreme Court may review the D.C. Circuit's ruling, as requested by a coalition of associations and states, including Iowa. The United States also filed a brief supporting those petitioners.

Sulfur Dioxide Pollutant Overview

SO_2 is a colorless gas with a strong odor. Power plants and other large industrial facilities emit over 90% of Iowa's SO_2 emissions. Coal combustion accounts for the majority of that total. The emitted SO_2 can react in the atmosphere to form acidic compounds that later deposit on land or waterbodies. Aquatic ecosystems are more susceptible to damage. Example harms include decreases in species richness and populations.

Fine Particle Pollutant Overview

$PM_{2.5}$ is the term used for microscopic solids or liquid droplets of pollution with diameters equal to or less than 2.5 micrometers. These particles are easily inhaled deep into the lungs. Scientific studies have linked fine particle pollution with a series of significant health problems, including: increased respiratory symptoms; aggravated asthma; development of chronic bronchitis; nonfatal heart attacks; and premature death in people with heart or lung disease.

$PM_{2.5}$ is a complex pollutant. While $PM_{2.5}$ is directly emitted from many different sources, most fine particles form through chemical reactions in the atmosphere (secondary formation). Pollutants that lead to the secondary formation of $PM_{2.5}$ are called "precursors." Precursor pollutants include SO_2, nitrogen oxides (NO_X), ammonia (NH_3), and volatile organic compounds (VOC).

Fossil-fuel combustion accounts for the majority of Iowa's SO_2 and NO_X emissions. Fertilizer use and livestock waste are the principal sources of ammonia. Solvent use is a common source of anthropogenic VOC, but biogenic (natural) plant growth and decomposition processes generate more than half of the state's VOC emissions total.

Stakeholder Meetings

To fulfill the requirements of Iowa Code 455B.134(14), the DNR solicited input from stakeholders at its biannual Air Quality Client Contact meetings regarding the need for changes to implement the revised SO_2 and $PM_{2.5}$ NAAQS. The DNR conducted these meetings on November 12, 2025, and May 21, 2026.

During the November 12, 2025, meeting, stakeholders were given a presentation that: 1) summarized the revised SO_2 and $PM_{2.5}$ NAAQS; 2) reviewed the DNR's plans and timelines for implementing the 2024 SO_2 secondary standard; and 3) solicited feedback. Stakeholders were specifically requested to bring forward at the May 21, 2026, Air Quality Client Contact meeting any changes to Iowa laws, administrative rules, forms, or guidance that may be necessary to implement the revised SO_2 NAAQS. The DNR also welcomed input on the 2024 $PM_{2.5}$ NAAQS, while acknowledging the standard's uncertain future. Forty-two stakeholders participated in that meeting. Forty-five stakeholders attended the overview and feedback session held during the May 21, 2026, meeting. Suggestions by email were also welcomed and requested by June 26, 2026.

Conclusions

No changes to Iowa Code, administrative rules, or forms and guidance, related to emissions limitations or standards, were identified by stakeholders as necessary to implement or attain the 2024 SO_2 secondary NAAQS. Reviews conducted by the DNR and reported to stakeholders concluded that no rulemaking to amend existing administrative rules related to thresholds that trigger air permitting of SO_2 sources was necessary. Given the standard's uncertain future, no changes for $PM_{2.5}$ were identified, but the DNR will convene additional stakeholder meetings as necessary dependent upon the outcome of the litigation.

Statutory Requirements

The DNR has traditionally requested stakeholder input when implementing a new or revised ambient air quality standard. Pursuant to House File 2418, this approach was codified in 2010 in Iowa Code 455B.134(14), which instructs the DNR to convene meetings to review emission limitations or standards relating to the maximum quantities of a pollutant that can be emitted from a source. The statute reads as follows:

> 14. Convene meetings not later than June 1 during the second calendar year following the adoption of new or revised federal ambient air quality standards by the United States environmental protection agency to review emission limitations or standards relating to the maximum quantities of air contaminants that may be emitted from any air contaminant source as provided in section 455B.133, subsection 4. By November 1 of the same calendar year, the department shall submit a report to the governor and the general assembly regarding recommendations for law changes necessary for the attainment of the new or revised federal standards.

Subsection 4 of section 455B.133 specifies the duties of the Environmental Protection Commission regarding adopting emission limitations or standards for the maximum quantities of air pollutants that may be emitted from a source. The subsection also includes provisions on alternative means of emissions limitation, such as design, equipment, material, work practice or operational standards. The statute reads as follows:

> 4. Adopt, amend, or repeal emission limitations or standards relating to the maximum quantities of air contaminants that may be emitted from any air contaminant source. The standards or limitations adopted under this section shall not exceed the standards or limitations promulgated by the administrator of the United States environmental protection agency or the requirements of the federal Clean Air Act as amended through January 1, 1991. This does not prohibit the commission from adopting a standard for a source or class of sources for which the United States environmental protection agency has not promulgated a standard. This also does not prohibit the commission from adopting an emission standard or limitation for infectious medical waste treatment or disposal facilities which exceeds the standards or limitations promulgated by the administrator of the United States environmental protection agency or the requirements of the federal Clean Air Act as amended through January 1, 1991. The commission shall not adopt an emission standard or limitation for infectious medical waste treatment or disposal facilities prior to January 1, 1995, which exceeds the standards or limitations promulgated by the administrator of the United States environmental protection agency or the requirements of the federal Clean Air Act, as amended through January 1, 1991, for a hospital, or a group of hospitals, licensed under chapter 135B which has been operating an infectious medical waste treatment or disposal facility prior to January 1, 1991.
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> *a*. (1) The commission shall establish standards of performance unless in the judgment of the commission it is not feasible to adopt or enforce a standard of performance. If it is not feasible to adopt or enforce a standard of performance, the commission may adopt a design, equipment, material, work practice or operational standard, or combination of those standards in order to establish reasonably available control technology or the lowest achievable emission rate in nonattainment areas, or in order to establish best available control technology in areas subject to prevention of significant deterioration review, or in order to adopt the emission limitations

promulgated by the administrator of the United States environmental protection agency under section 111 or 112 of the federal Clean Air Act as amended through January 1, 1991.

(2) If a person establishes to the satisfaction of the commission that an alternative means of emission limitation will achieve a reduction in emissions of an air pollutant at least equivalent to the reduction in emissions of the air pollutant achieved under the design, equipment, material, work practice or operational standard, the commission shall amend its rules to permit the use of the alternative by the source for purposes of compliance with this paragraph with respect to the pollutant.

(3) A design, equipment, material, work practice or operational standard promulgated under this paragraph shall be promulgated in terms of a standard of performance when it becomes feasible to promulgate and enforce the standard in those terms.

(4) For the purpose of this paragraph, the phrase "*not feasible to adopt or enforce a standard of performance*" refers to a situation in which the commission determines that the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations.

b. The degree of emission limitation required for control of an air contaminant under an emission standard shall not be affected by that part of the stack height of a source that exceeds good engineering practice, as defined in rules, or any other dispersion technique. This paragraph shall not apply to stack heights in existence before December 30, 1970, or dispersion techniques implemented before that date.