

**Background and Technical Support Document  
For Proposed Amendments to  
310 CMR 6.00  
“Ambient Air Quality Standards for the Commonwealth of Massachusetts”  
and  
310 CMR 7.00 et seq.  
“Air Pollution Control”**

**Regulatory Authority:  
M.G.L. c. 111, Sections 142A through 142N**

**July 9, 2009**

## TABLE OF CONTENTS

<b>I. Introduction .....</b>	<b>3</b>
<b>II. Background .....</b>	<b>3</b>
<b>III. Particulate Matter .....</b>	<b>3</b>
<b>IV. Ozone .....</b>	<b>5</b>
<b>V. Lead .....</b>	<b>6</b>
<b>VI. Legal Authority.....</b>	<b>6</b>
<b>VII. Savings Clause.....</b>	<b>6</b>
<b>VIII. Economic Impacts .....</b>	<b>7</b>
<b>IX. Small Business Impacts.....</b>	<b>7</b>
<b>X. Agricultural Impacts.....</b>	<b>7</b>
<b>XI. Impact on Massachusetts Municipalities.....</b>	<b>7</b>
<b>XII. Massachusetts Environmental Policy Act.....</b>	<b>7</b>
<b>XIII. Public Hearings and Comment Period.....</b>	<b>7</b>

## **I. Introduction**

The Massachusetts Department of Environmental Protection (MassDEP) is proposing to amend the state ambient air quality standards (310 CMR 6.00) to bring the standards for ozone, lead, and particulate matter into conformance with the existing National Ambient Air Quality Standards (NAAQS) for these pollutants. Since 310 CMR 6.00 was last updated in 1994, the U.S. Environmental Protection Agency (EPA) has revised the NAAQS for ozone, particulate matter, and lead. Massachusetts is already required to meet the NAAQS pursuant to the federal Clean Air Act. In addition, Massachusetts General Law Chapter 111, §142D obligates MassDEP to set state ambient air quality standards that are at least as stringent as federal standards.

## **II. Background**

The Clean Air Act Section 109 directs EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. EPA has established NAAQS for six pollutants: ozone, particulate matter, carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide (collectively called the Criteria Pollutants). For each of these pollutants, EPA is required to set “primary” standards to protect public health and “secondary” standards to protect public welfare. EPA is required to review the standards once every five years to determine whether revisions to the standards are appropriate.

As part of its air quality protection program, MassDEP established 310 CMR 6.00, which contains ambient air quality standards for Massachusetts for ozone, particulate matter, sulfur oxides (sulfur dioxide), carbon monoxide, nitrogen dioxide, and lead. Currently, the standards for sulfur oxides, carbon monoxide, and nitrogen dioxide are identical to the effective NAAQS. However, the standards for lead, particulate matter, and ozone no longer match the corresponding NAAQS, because EPA revised those NAAQS to incorporate more stringent standards since the last amendments to 310 CMR 6.00. EPA replaced the 1-hour ozone standard with an 8-hour standard, revoked the annual PM<sub>10</sub> standard, added 24-hour and annual standards for PM<sub>2.5</sub>, and revised the lead standard. Therefore, MassDEP must amend the ambient air quality standards in 310 CMR 6.00 to be at least as stringent as the federal standards.

## **III. Particulate Matter**

Standards for particulate matter have evolved over the years as new studies have been published on the health effects of various particle sizes. The trend has been to set stricter standards for smaller size particulates, as studies have linked exposure to smaller particles with adverse health effects.

In 1970, EPA set a particulate matter standard based on Total Suspended Particulates (TSP). In 1987, EPA replaced the TSP standard with a 24-hour PM<sub>10</sub> standard of 150 micrograms per cubic meter (ug/m<sup>3</sup>) and an annual PM<sub>10</sub> standard of 50 ug/m<sup>3</sup>. For both the 24-hour and annual standards, the primary and secondary NAAQS were the same. PM<sub>10</sub> refers to particulate matter 10 microns or less in diameter. MassDEP’s 310 CMR 6.00 regulations currently reflect the 1987 PM<sub>10</sub> NAAQS.

Subsequent health studies showed a significant association between exposure to fine particles (particulate matter 2.5 microns or less in diameter, or PM<sub>2.5</sub>) and adverse health effects, including premature death from heart or lung disease. Fine particles can aggravate heart and lung diseases and have been linked to effects such as cardiovascular symptoms, cardiac arrhythmias, heart attacks,

respiratory symptoms, asthma attacks, and bronchitis. These effects can result in increased emergency room visits, hospital admissions, absences from school or work, and restricted activity days. Individuals that may be particularly sensitive to fine particle exposure include people with heart or lung disease, older adults, and children.

Based on the health studies that demonstrated the need to better protect public health, in 1997 EPA promulgated a fine particle (PM<sub>2.5</sub>) NAAQS, setting primary and secondary annual standards at 15 µg/m<sup>3</sup>, and 24-hour standards at 65 µg/m<sup>3</sup>. Based on subsequent air quality monitoring provided by MassDEP, EPA designated Massachusetts as unclassifiable/attainment<sup>1</sup> for both the 24-hour and annual PM<sub>2.5</sub> NAAQS in December 2004.<sup>2,3</sup>

In December 2006, based on additional health studies demonstrating the need for a more stringent standard, EPA revised the PM<sub>2.5</sub> NAAQS by lowering the 24-hour standard from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup>, but did not change the 15 µg/m<sup>3</sup> annual standard<sup>4</sup>. EPA also retained the existing 24-hour PM<sub>10</sub> standard of 150 µg/m<sup>3</sup>, but revoked the annual PM<sub>10</sub> standard. The changes to the PM<sub>2.5</sub> and PM<sub>10</sub> standards applied to both the primary and secondary standards. Based on subsequent air quality monitoring provided by MassDEP, EPA designated Massachusetts as attainment for the 24-hour PM<sub>2.5</sub> NAAQS in December 2008.

Various parties filed appeals challenging the 2006 PM<sub>2.5</sub> and PM<sub>10</sub> standards.<sup>5</sup> In February 2009, the U.S. District of Columbia Circuit Court of Appeals ruled on the appeals remanding both the primary and secondary annual PM<sub>2.5</sub> standards to EPA for reconsideration. Both 2006 standards remain in place during EPA's review.

MassDEP proposes to revoke the annual standard for PM<sub>10</sub> and adopt the 2006 24-hour and annual standards for PM<sub>2.5</sub> equal to the NAAQS (35 µg/m<sup>3</sup> and 15 µg/m<sup>3</sup>, respectively). These revisions will apply to both the primary and secondary standards and will have the same level, form, and averaging time as the NAAQS. It is not appropriate to wait until EPA has completed its Court-mandated review of the primary and secondary annual PM<sub>2.5</sub> standards because the 2006 PM<sub>2.5</sub> standards are currently in place. Furthermore, it is unclear if or when any new PM<sub>2.5</sub> standards will be promulgated by EPA because the EPA review could find the 2006 PM<sub>2.5</sub> NAAQS to be sufficient.

MassDEP also proposes to make corresponding amendments to definitions related to particulate matter in 310 CMR 7.00: Air Pollution Control, 310 CMR 7.54: Large Combustion Emission Units, and

---

<sup>1</sup> EPA may designate an area as attainment/unclassifiable, if: 1) monitored air quality data show that area has not violated the fine particle standards over a three-year period; or if 2) there is not enough information to determine the air quality in the area.

<sup>2</sup> Areas Designated Nonattainment for the Fine Particle National Air Quality Standards. Fact Sheet. December 17, 2004. <http://www.epa.gov/pmdesignations/documents/final/factsheet.htm>

<sup>3</sup> These designations were published in the Federal Register on January 5, 2005. See Air Quality Designations and Classifications for the Fine Particles (PM<sub>2.5</sub>) National Ambient Air Quality Standards; Final Rule. Vol. 70, No. January 5, 2005. p 944-1019.

<sup>4</sup> See 40 CFR Part 51, Clean Air Fine Particle Implementation Rule; Final Rule. April 2, 2007, Federal Register, Vol. 72 (79), p. 20586-20667.

<sup>5</sup> Three sets of petitioners, joined by several intervenors and amici, filed petitions for review of the EPA's final rule. The American Lung Association, Environmental Defense, and the National Parks Conservation Association (environmental petitioners) challenged the primary annual and secondary standards for fine PM as well as the elimination of the annual standard for coarse PM. Several states and state agencies (state petitioners) challenged the primary annual fine PM standard. The American Farm Bureau Federation, the National Pork Producers Council, the National Cattlemen's Beef Association, and the Agricultural Retailers Association (industry petitioners) challenged the EPA's retention of the PM<sub>10</sub> indicator for coarse PM and the 150 µg/m<sup>3</sup> level for the daily coarse PM standard.

Appendix A: Emission Offsets and Nonattainment Review. These changes are based upon a thorough review of the regulations encoded in 310 CMR 7.0 to ensure the addition of definitions for PM<sub>2.5</sub> to all relevant sections. MassDEP is proposing to add a significance level for PM<sub>2.5</sub> to 310 CMR 7.54, but to delete the significance level for particulate matter from Appendix A. A significance level is the amount of net emissions increase that qualifies a proposed project at an existing facility as a major modification, thus triggering permitting requirements. A significance level for PM<sub>2.5</sub> must be added to 310 CMR 7.54, which regulates major modifications in Massachusetts attainment areas, because Massachusetts is in attainment for the PM<sub>2.5</sub> NAAQS. Future projects are potentially subject to 310 CMR 7.54, so applicability determinations must include currently-regulated air contaminants and their respective applicability criteria.

In contrast, Appendix A regulates major modifications in Massachusetts non-attainment areas. Massachusetts is in attainment of the PM<sub>10</sub> and PM<sub>2.5</sub> NAAQS, thus Appendix A does not currently apply to Massachusetts sources for PM<sub>10</sub> and PM<sub>2.5</sub> emissions. The addition of a significance level for PM<sub>10</sub>, and PM<sub>2.5</sub> to Appendix A will remain unnecessary unless and until there are any nonattainment areas for these pollutants in Massachusetts. These revisions would then occur, in the context of broad revisions to Appendix A after final rulemaking and further guidance is released from EPA concerning nonattainment new source review for these pollutants.

#### **IV. Ozone**

Ground-level ozone forms when nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) interact in the presence of sunlight. Sources of these pollutants include cars and trucks, power plants, large industrial facilities, consumer products, and some natural sources. Breathing ozone can irritate air passages, reduce lung function, aggravate asthma, and inflame and damage the cells lining the lungs. It also may aggravate chronic lung diseases like emphysema and bronchitis, reduce the immune system's ability to fight off bacterial infections in the respiratory system, or cause permanent lung damage.

In 1971, EPA established a 1-hour ozone NAAQS at 0.08 parts per million (ppm), measured over one hour. In 1979, EPA revised the 1-hour ozone standard to 0.12 ppm. MassDEP's 310 CMR 6.00 regulations currently reflect the 1979 1-hour ozone NAAQS.

Subsequent studies have shown that the 1-hour ozone standard was inadequate for protecting public health since ozone can have adverse health effects at lower levels and over longer exposure times than one hour. In response, EPA established an 8-hour ozone standard in 1997 at 0.08 ppm, averaged over eight hours. Based on subsequent monitoring provided by MassDEP, EPA designated Massachusetts in April 2004 as moderate non-attainment of the 8-hour ozone standard with two non-attainment areas, Eastern and Western Massachusetts.<sup>6</sup> Massachusetts submitted a State Implementation Plan (SIP) to EPA in January 2008 that demonstrates how Massachusetts will attain the 1997 8-hour ozone standard by 2010.

EPA revoked the 1-hour ozone standard in June 2005. Then, in March 2008, based on additional health studies demonstrating the need for a more stringent standard, EPA strengthened the primary and secondary ozone standards to 0.075 ppm averaged over eight hours<sup>7</sup>. Based on air quality monitoring,

---

<sup>6</sup> Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates. Federal Register. Vol. 69, No. 84. April 30, 2004. p 23858-23951.

<sup>7</sup> See 40 CFR Parts 50 & 58, National Ambient Air Quality Standards for Ozone; Final Rule. March 27, 2008, Federal Register, Vol. 73 (60), p. 16436-16514.

Massachusetts recommended in March 2009 to EPA that EPA continue to designate Massachusetts as non-attainment under the new 8-hour ozone standard. EPA's final designation is expected in 2010.

Currently, 310 CMR 6.00 includes an ozone standard based on 1-hour ozone concentrations, rather than 8-hour ozone concentrations. MassDEP proposes to replace its 1-hour ozone standard with an 8-hour ozone standard set equal to the 2008 NAAQS (0.075 ppm). This revision will apply to both the primary and secondary standards and will have the same level, form, and averaging time as the NAAQS.

## **V. Lead**

EPA established the initial lead NAAQS of 1.5  $\mu\text{g}/\text{m}^3$  measured over one calendar quarter in 1978. MassDEP's 310 CMR 6.00 regulations currently reflect the 1978 lead NAAQS.

Scientific evidence about the health effects of lead has expanded dramatically since 1978. More than 6,000 new studies on lead health effects, environmental effects, and lead in the air have been published since 1990. Evidence from health studies shows that adverse effects occur at much lower levels of lead in blood than previously thought.

Children are particularly vulnerable to the effects of lead. Exposure to low levels of lead early in life have been linked to effects on IQ, learning, memory, and behavior. There is no known safe level of lead in the body. Massachusetts sources of lead include jewelry manufacturers, electroplating operations, electric generating units, municipal waste combustors, and general aviation aircraft fuel (small, piston-driven aircraft, not jet fuel).

Based on the significantly increased level of scientific knowledge of the effects of low levels of lead exposure, EPA revised the primary and secondary lead standards in 2008 to 0.15  $\mu\text{g}/\text{m}^3$  measured over a rolling three month period.<sup>8</sup> No new lead significance levels, the amount of net emissions increase that qualifies a proposed project at an existing facility as a major modification, have been promulgated at this time. EPA requires that, by October 2009, states recommend whether they should be designated as attainment or nonattainment under the new lead standard. Massachusetts expects to recommend an attainment designation. Final EPA designations are expected in 2010.

MassDEP proposes to adopt a lead standard set equal to the 2008 NAAQS of 0.15  $\mu\text{g}/\text{m}^3$ . This revision will apply to both the primary and secondary standards and will have the same level, form, and averaging time as the NAAQS.

## **VI. Legal Authority**

MassDEP is granted the power to make and amend ambient air quality standards by M.G.L. c. 111, §142D, which reads, "...the department may adopt, and from time to time amend, after public hearings, ambient air quality standards..."

## **VII. Savings Clause**

---

<sup>8</sup> See 40 CFR Parts 50, 51, 53, & 58, National Ambient Air Quality Standards for Lead; Final Rule. November 12, 2008, Federal Register, Vol. 73 (219), p. 66964-67062.

Any regulatory amendments that affect regulations and programs that are part of the Massachusetts State Implementation Plan (SIP) must demonstrate that they are no less stringent than the existing SIP and that any projected increases in emissions that result from the amendments are offset by equal or greater predicted emission decreases. These proposed amendments will not result in any emission increases or adverse air quality impacts and are no less stringent than the existing SIP.

### **VIII. Economic Impacts**

These regulations will have no significant economic impact since Massachusetts is already subject to the NAAQS under federal law.

### **IX. Small Business Impacts**

Small businesses will not be significantly impacted by these amendments since Massachusetts is already obligated to meet the proposed air quality standards by federal law.

### **X. Agricultural Impacts**

Pursuant to the intent of Massachusetts General Laws, Chapter 30A, Section 18, state agencies must evaluate the impact of proposed programs on agriculture within the Commonwealth. These regulations will have no significant economic impact on agriculture since Massachusetts is already subject to the proposed ambient air quality standards under federal law.

### **XI. Impact on Massachusetts Municipalities**

Pursuant to Executive Order 145, MassDEP must assess the fiscal impact of new regulations on the Commonwealth's municipalities. These regulations will have no practical impact on municipalities since Massachusetts is already subject to the proposed standards under federal law.

### **XII. Massachusetts Environmental Policy Act**

This proposed action is “categorically exempt” from the “Regulations Governing the Preparation of Environmental Impact Reports,” 301 CMR 11.00, because the NAAQS that these amendments codify in Massachusetts regulations will result in federal and state actions to decrease levels of emissions.

### **XIII. Public Hearings and Comment Period**

In accordance with M.G.L. Chapter 30A, MassDEP will hold a public hearing and solicit comments on the proposed revisions to 310 CMR 6.00 and 310 CMR 7.00. MassDEP plans to submit the final 310 CMR 6.00 and 310 CMR 7.00 regulations to EPA as a revision to the Massachusetts SIP and the scheduled public hearing will serve as a hearing for this SIP revision. Since the proposed regulation is in response to federal law and will be submitted to EPA, formal notice will be issued 30 days before the public hearings. A copy of the proposed amendments to 310 CMR 6.00 and 310 CMR 7.00 is available on MassDEP’s website at: <http://www.mass.gov/dep/>.