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Revision to the Carbon Monoxide Maintenance State Implementation Plan for Lowell, Massachusetts

Bureau of Waste Prevention

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REVISION TO THE CARBON MONOXIDE MAINTENANCE STATE IMPLEMENTATION PLAN FOR LOWELL, MASSACHUSETTS

Summary

This is a revision to the 2001 Massachusetts Carbon Monoxide (CO) Maintenance State Implementation Plan (SIP) for the City of Lowell (the 2001 Maintenance Plan). The Massachusetts Department of Environmental Protection (MassDEP) is revising the 2001 Maintenance Plan by eliminating the requirement to monitor CO concentrations in the ambient air in Lowell. Instead, MassDEP will verify continued attainment of the National Ambient Air Quality Standard (NAAQS) for CO in Lowell by using the CO monitor located in the City of Worcester as a surrogate. MassDEP will also use the Worcester monitor data as the trigger for adoption in Lowell of contingency measures in the event that the CO NAAQS is violated. MassDEP will discontinue CO monitoring in Lowell because monitored CO readings in Lowell have been well below the CO NAAQS for many years. The staff and resources used to monitor CO in Lowell will be reallocated to other monitoring efforts upon the U.S. Environmental Protection Agency's (EPA's) approval of this SIP revision.

Background

Carbon monoxide is a colorless, odorless gas emitted as a by-product of incomplete combustion of fossil fuels. When inhaled, CO has a high affinity for the body's red blood cells, and displaces the oxygen molecules carried to organs and other tissues. The NAAQS for CO promulgated by the U.S. Environmental Protection Agency (EPA) to protect public health and welfare is 9.0 parts per million (ppm) averaged over an eight-hour period, and 35.0 parts per million averaged over one-hour. The CO NAAQS may not be exceeded more than once per year at any monitoring site.

To measure the concentration of CO in the ambient air, MassDEP has operated one CO monitor in Lowell, one in Springfield, one in Worcester and two in Boston. The monitors have been continuously operated for more than 15 years. MassDEP has routinely collected and quality assured the CO data from these stations in accordance with 40 CFR 58.

Lowell was first designated as a non-attainment area for CO in 1978 (43 FR 9003). CO emissions were significantly reduced as a result of state and federal control measures throughout the 1980s and 1990s, particularly from controls on motor vehicles.¹ On November 6, 1991, as

¹ Federal mobile source reduction strategies include the pre-1990 Federal Motor Vehicle Control Program (FMVCP), federal Tier I emission standards for newly manufactured cars and trucks (phased-in beginning with the 1994 model year), and reformulated gasoline (beginning in January 1995). In 1983, Massachusetts began implementation of a basic inspection and maintenance program for on-road

required by the 1990 Clean Air Act Amendments, EPA designated Lowell as an unclassifiable² non-attainment area for CO.³ At that time, monitored readings of CO in Lowell were already below the CO NAAQS, but the 1990 Clean Air Act Amendments required that the area remain classified as a non-attainment area, even though ambient monitoring showed attainment at that time.

On May 25, 2001, MassDEP submitted to EPA a request that Lowell (and Springfield, Waltham and Worcester) be redesignated to attainment.⁴ It also submitted a Maintenance Plan for Lowell demonstrating how the area would maintain compliance with the NAAQS for the next 10 years. The submittal was based on EPA's Limited Maintenance Plan option guidance. The Limited Maintenance Plan option was available to non-classifiable CO non-attainment areas seeking redesignation, provided that monitored design values were at or below 7.65 ppm (85% of the 8-hour NAAQS). The monitored data for Lowell qualified the area for this option. On February 19, 2002, EPA approved the redesignation request and 2001 Maintenance Plan for Lowell (and for Springfield, Waltham and Worcester). (See 67 FR 7272).⁵

Current CO Status

As illustrated in Figure 1, monitored CO levels throughout Massachusetts have fallen significantly since the 1980s. There has not been a violation of the NAAQS in Lowell since 1984. For the 2005-2008 period, the second-highest monitored 8-hour concentrations in Lowell and Worcester have been under 2.2 ppm – less than one-quarter of the standard.⁶

vehicles. It implemented an enhanced inspection and maintenance program starting in 1999. Local traffic flow improvements were implemented in heavily congested areas to reduce CO concentrations.

² Non-classifiable means that there were no air quality measurements that would justify classifying these non-attainment areas as either serious or moderate non-attainment areas.

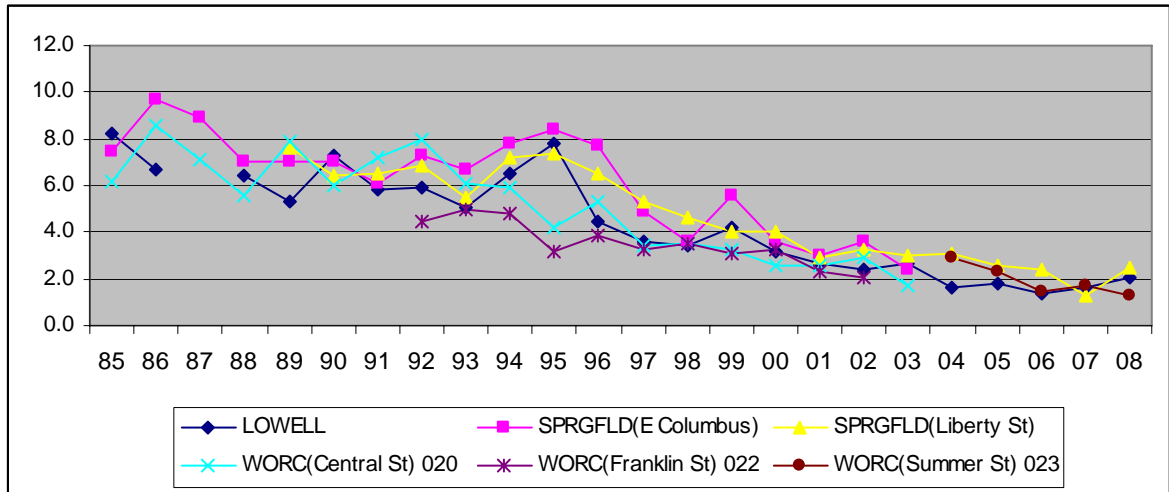
³ At the time that EPA designated Lowell, it also designated Springfield, Waltham and Worcester as CO nonattainment areas. Like Lowell, these cities have been re-designated to attainment, are subject to a Maintenance Plan, and have monitored readings well below the CO NAAQS. The Maintenance Plan revision for Lowell will have no impact on the Maintenance Plans that apply to these cities.

⁴ The Redesignation Request, including the Technical Support document and Maintenance Plan provisions, is available on MassDEP's website at: www.mass.gov/dep/air/priorities/cotsd.doc

⁵ These were the last MA cities to be redesignated for CO. Nine Boston-area communities were redesignated to attainment in 1999.

⁶ Since a monitor must exceed the NAAQS of 9.0 ppm more than once a year to violate the standard, the second highest eight-hour value recorded each year is the indicator of attainment.

FIGURE 1: CO Trends 1985-2008
2nd Maximum 8-hour Values
Standard = 9 ppm



(Note: only the Summer Street monitor in Worcester remains in operation.)

Worcester Monitor

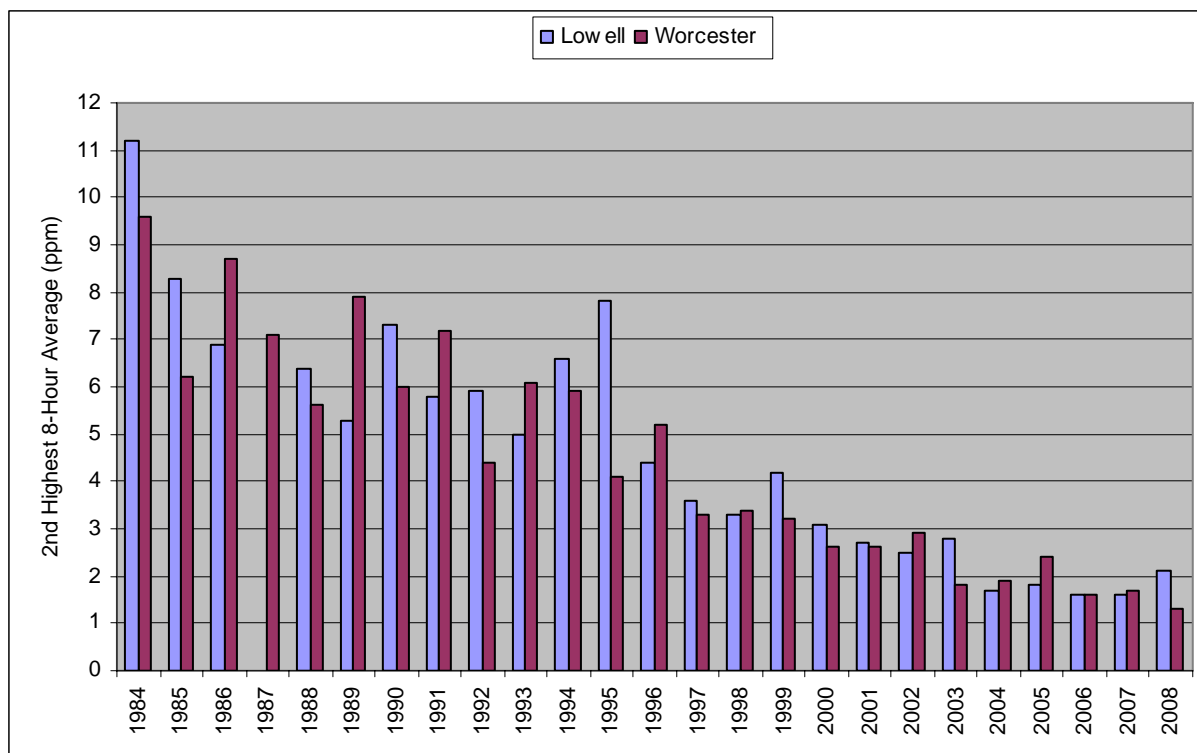
Given the low CO concentrations in Lowell and throughout Massachusetts, and MassDEP's expectation that CO levels will remain well below the NAAQS, MassDEP will shut down the CO monitor in Lowell upon EPA's approval of this SIP Revision. Only CO is monitored at the existing Lowell monitor and MassDEP allocates considerable staff and other resources to maintain the monitoring and support equipment, to travel to and from the site to collect data, and to conduct routine and emergency maintenance at the site.

The approved 2001 Maintenance Plan, Section 7.4, *Monitoring Network and Verification of Future Attainment*, provides that MassDEP will continue to operate an appropriate air quality monitoring network during the maintenance period to verify the attainment status of the area and that it will operate CO monitors in Lowell, Springfield, and Worcester. MassDEP will use the Worcester monitor as a surrogate for Lowell to meet this commitment. Worcester and Lowell are located 42 miles apart. Worcester (pop. 175,454) is somewhat larger than Lowell (pop. 103,229), so its CO concentrations can be expected to be slightly higher due to greater motor vehicle emissions. Both monitors are located adjacent to high traffic volume intersections, which are generally areas of the highest CO concentrations. As shown in Figure 2, CO concentrations in Lowell and Worcester have tracked very closely for many years and both are well below the NAAQS. Based on these characteristics, ambient CO concentrations in Worcester are a valid surrogate for CO concentrations in Lowell.

Once MassDEP begins to use the Worcester monitor as a surrogate, in the event the second-highest monitored CO concentration in any calendar year in Worcester reaches 75 percent of the

federal 1-hour or 8-hour NAAQS for CO, MassDEP will, within 9 months of the date such concentrations are recorded, re-establish a CO monitoring site in Lowell consistent with EPA siting criteria, and resume analyzing and reporting CO concentrations in Lowell.

FIGURE 2: Lowell, MA Compared to Worcester, MA
2nd Highest 8-Hour Average Carbon Monoxide Concentration
(NAAQS = 9.0 ppm)



Contingency Plan Trigger

The Clean Air Act requires that maintenance plans include contingency provisions that will be implemented in the event that a violation of the NAAQS occurs after redesignation of the area to attainment. In Section 7.5, *Contingency Plan*, of the approved 2002 CO Maintenance Plan, MassDEP committed to implement the contingency plan if monitored CO concentrations in Lowell (or in Springfield, Waltham, or Worcester) violated the NAAQS, provided that the data met quality assurance criteria and did not qualify for exclusion under EPA's "exceptional events" policy.

In the approved 2001 Maintenance Plan, the trigger for implementing the contingency plan in Lowell was a violation at the Lowell monitor. Once the Lowell monitor is shut down, MassDEP will use the Worcester monitor data as the trigger for implementation of the contingency plan for Lowell. If the Worcester monitor measures a CO violation of either the 1-hour or 8-hour NAAQS for CO, MassDEP will implement contingency measures (discussed below) in Lowell. (A violation at the Worcester monitor will also trigger contingency measures in Worcester under

the terms of the existing Maintenance Plan for Worcester.) In the event that MassDEP re-establishes a CO monitor in Lowell (because the second-highest CO concentration in any calendar year in Worcester reaches 75 percent of the NAAQS, as discussed above), a violation of the NAAQS at the re-established Lowell monitor will trigger the contingency plan for Lowell. (In this case, a violation at the Worcester monitor would no longer trigger contingency measures in Lowell.)

Contingency Measures

The contingency plan measures that MassDEP committed to in 2001 are: 1) to investigate traffic conditions in the local vicinity of the monitor measuring violation, and work with relevant parties and officials to remedy the problem through local measures, such as traffic signal changes and revised parking restrictions; 2) to further reduce CO emissions based on implementation of the Massachusetts enhanced vehicle inspection/maintenance (I/M) program; and 3) to further reduce CO emissions based on implementation of the California low-emission vehicle (LEV) program. Subsequent to the approval of the 2001 Maintenance Plan in 2002, MassDEP adopted the second and third measures – enhanced I/M and LEV - for purposes of reducing ground-level ozone concentrations.

In the unlikely event that the contingency plan is triggered for Lowell by a monitored violation at the Worcester monitor, or at a re-established Lowell monitor, MassDEP will implement measures necessary to remedy the violation. It will first implement the first contingency measure described in the 2001 CO Maintenance Plan related to local traffic conditions. It will also review and adopt transportation control measures, or other additional vehicle or fuel controls as needed, to reduce monitored concentrations to levels that meet the NAAQS.