

Denver Carbon Monoxide and PM10 SIP Maintenance Plans Revisions



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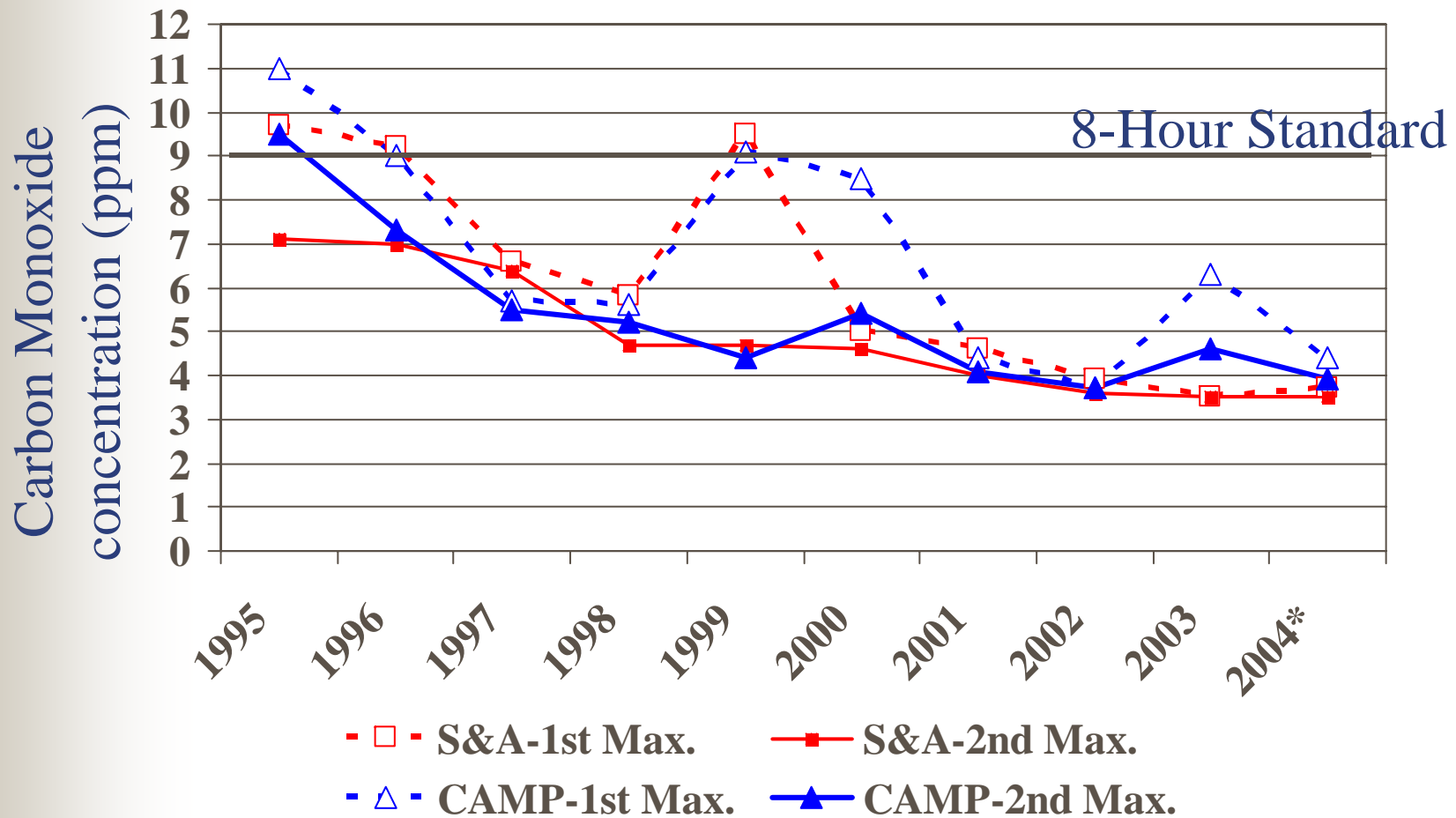
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Denver CO SIP Revision

- **Ambient carbon monoxide levels have dropped dramatically over past 10 years**
- **Current ambient levels are at or below half the CO NAAQS**
- **Mobile source related CO control programs are not as effective as in the past**
- **Re-evaluate whether programs are necessary to maintain CO NAAQS**
 - **I/M 240 program**
 - **Oxygenated fuel program**

Carbon Monoxide Maximum 8-Hour Values



* Through
2/29/04



Emission Inventory Modeling

- **Analysis years**
 - **2001 Base Year**
 - **2009**
 - **no oxygenated fuels**
 - **I/M 240 benefit phase-out**
 - **2010 – no mobile source related controls**
 - **2013 – maintenance year in Redesignation SIP**
 - **2015, 2020, 2025 and 2030 future years**
 - **2021 Maintenance Year**



Mobile Source Emission Modeling

- **Vehicle Miles Travelled (VMT)**
 - DRCOG 2030 Regional Transportation Plan
 - 2001, 2005, 2015, 2020, 2030
- **EPA Mobile6.2 Emission Factor Model**
 - 2001 I/M 240 program
 - 2001 oxygenated fuels programs
- **2009**
 - Run Mobile6.2 with and without I/M
 - No oxygenated fuel program
- **2010 and later**
 - no mobile source control programs



Non-mobile Source Categories

- **Point Sources – based on 2001 actuals**
- **Area sources**
 - Aircraft, construction, natural gas, railroad based on National Emission Inventory (NEI)
 - Woodburning based on 2002 Metropolitan Denver Woodburning Survey
- **Non-Road based on EPA NonRoad model (2004)**
 - Airport equipment
 - Commercial equipment
 - Construction & Industrial equipment
 - Lawn and Garden (commercial & residential)
 - Railroad equipment
 - Recreational equipment
- **Future year projections based on appropriate models and surrogates**



Carbon Monoxide Maintenance Demonstration

- **Gridded emission inventory comparison**
 - Evaluate CO inventory in a 9-cell subset of the Central Business District
 - all future year CO loading < 2001
 - Evaluate entire grid domain for areas of high growth
 - Determine maintenance with roll forward analysis
- **Intersection modeling with Mobile6.2 and CAL3QHC**
 - Highest volume intersections
 - University Boulevard and 1st Avenue
 - Wadsworth Boulevard and Alameda Avenue
 - University Boulevard and Belleview Avenue
 - Highest congestion intersections
 - 28th Street and Arapahoe Road (Boulder)
 - University Boulevard and Belleview Avenue
 - Foothills Parkway and Arapahoe Road (Boulder)



Denver PM10 SIP Revision

- **Revise SIP with Mobile6.2 (PM10, NO_x, SO₂)**
- **Revise Base year to 2001**
 - **more accurately reflect current day emissions scenario**
- **EPA suggested reviewing basis for secondary PM10 estimates**
 - **Use speciated PM2.5 data collected in the Denver metro area**
- **Remove I/M240 program**
 - **provides only a small NO_x benefit**



PM10 Emission Inventory Modeling

■ Analysis years

- 2001 Base Year
- 2009
 - I/M 240 benefit phase-out (assume 12/31/07 termination)
- 2010
 - no mobile source related controls
- 2015, 2020, 2025, 2030 future years
- 2022 Maintenance Year

■ Combustion related PM10 components

- modeled using the same methodologies as for CO
- Mobile6.2 and EPA Nonroad model



PM10 Emission Inventory Modeling

■ Geological PM10

- **Mobile Source: re-entrained & sanding**
 - Use 2001 current practice for control level
 - Assume SIP controls for future years
 - 30% region-wide (20% in foothills)
 - 50% in central Denver
 - 54% I-25 between University and 6th Ave
 - 72% CBD (Colfax Ave, Broadway, 20th St., Wynkoop and Speer Blvd.)
- **Construction – NEI**



PM10 Maintenance Demonstration

- **Four components**
 - **RAM modeling – ground level primary PM10**
 - **Estimate of secondary PM10 – NO_x and SO₂**
 - **Major point source contribution**
 - **Background concentrations**
- **Sum of the four components represents an estimate of the maximum PM10 expected in the Denver metro area**



PM10 Maintenance Demonstration

- **RAM dispersion modeling**
 - 1985-1989 meteorological data
 - Sixth-highest concentration will represent contribution to total PM10
- **Estimate of secondary PM10 – NO_x and SO₂**
 - 1986-1994 PM10 samples are basis of current secondary estimate
 - 1999 – June 2004
 - 308 PM2.5 samples collected at Welby
 - 98 wintertime speciated samples
 - 26.95 micrograms/m³, highest monitored value
 - Winter 2004-2005 data will be considered when available
- **Major point sources – modeled with ISCST3**