Ozone Overview

2003 Ozone Plan
Technical Issues Workshop
July 23, 2003

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What is Ozone ($O_3$)?

- Molecule consisting of three oxygen atoms bound together
- Strong oxidizing agent—damages tissue and materials
- Forms naturally and from anthropogenic sources
O$_3$ Exists @ 2 Levels in Atmosphere

UV

Stratospheric Ozone

VOCs + NOx + Sunlight = Ground-level Ozone
Ground-level O$_3$ Pollution

- Formed by complex series of chemical reactions in the atmosphere
- Precursors = chemicals that react to form ozone
  - Nitrogen Oxides (NOx)
  - Volatile Organic Compounds (VOC)
- Light winds, high temperature & sunlight needed for reaction
Precursor Sources

- Societal and natural sources
- Most NOx comes from fuel combustion
- Most VOC comes from transportation, industry, consumers & natural sources
Ozone Health Effects

- Damages lungs
- Causes chest pain, coughing, shortness of breath and throat irritation
- Worsens respiratory diseases such as asthma
- Compromises the ability of the body to fight respiratory infections
Other Ozone Effects

- Damages plants
  - Crops
  - Landscaping
- Damages forests
- Damages materials
  - Rubber
  - Plastic
  - Vinyl
O₃ Air Quality Standards

- 0.12 ppm for federal 1-hour ozone
- 0.08 ppm for federal 8-hour ozone
- 0.09 ppm for state 1-hour ozone
Federal Standards

- Primary standards protect public health
- Secondary standards protect welfare (prevent materials damage, protect crops and forests, etc.)
- Averaging times represent time over which air sample taken (1-hr vs 8-hr)
SJVAB 1-hr Ozone Trends

- Exceedances of federal 1-hr standard decreased from 74 days (1988) to 31 days (2002)
- Maximum O$_3$ value decreased from 0.200 ppm (1987) to 0.164 in 2002
- But can only have 3 days over 3 yr period with 1-hr levels $>0.124$ ppm @ given monitor
Attainment Classification

- EPA uses measured pollutant levels to classify areas as attainment or nonattainment, and to characterize magnitude of nonattainment
  - Pollutant levels above standard
  - Number of days @ given monitor
- Nonattainment classes: marginal ⇒ moderate ⇒ serious ⇒ severe ⇒ extreme
- Nonattainment planning requirements vary with classification
Planning Requirements

- SJVAB previously designated *serious* nonattainment for federal 1-hour ozone, with attainment required by November 15, 1999
- SJVAB failed to reach attainment on schedule; in Nov. 2001, EPA bumped SJVAB up to *severe* status (attainment 11/15/05)
- EPA also requested
  - 6 RACT rules adopted by 11/15/02; sanctions on June 11, 2003 if not
  - Other rule revisions, rate of progress demonstration, and attainment demonstration (all due 5/31/02)
District submitted RACT rules, severe area permit rule amendments, and 2002-2005 Rate of Progress (ROP) Plan on time.

But District and ARB unable to identify sufficient controls for 2005 attainment.

EPA issued Federal Register notice with Finding of Failure to Submit attainment demonstration & additional severe status items, effective September 18, 2002 (Federal clocks start).
Severe Plan Federal Clocks

- September 18, 2002—Sanction clocks and FIP clock start (EPA Federal Register notice)
- March 18, 2004—offset sanctions begin
- September 18, 2004—highway $ sanctions begin and FIP promulgated
How to Stop the Clocks?

- EPA completeness finding of submittal stops sanctions:
  - OADP w/ 11/15/05 goal
  - ROP demonstration
  - RACT rule--lime kilns
  - Emissions inventory
  - Contingency measures

- EPA final approval of submittal stops FIP

- All items constitute submittal—no “partial credit”
O₃ Attainment Demonstration

- Previous modeling showed emission reduction shortfall of 300-400 tpd for SJVAB attainment (2005 VOC+NOₓ)
- District unable to identify reductions of this magnitude under our control
- Need additional emission reductions (state, federal & other District measures)
- State & federal measures are post-2005 & arrive too late for severe federal deadline
Voluntarily Change Attainment Status

- The District can voluntarily request a change in our designation to allow time for more emission reductions to be achieved.
- Self-designation to extreme status, and subsequent EPA approval, would eliminate severe area requirements and institute more stringent ones.
- Attainment date changes from 11/15/05 to 11/15/10.
Extreme Nonattainment

- In June 2002 Board directed staff to:
  - Develop expeditious rule schedule for all feasible control measures under District’s control
  - Prepare plan for 2010 attainment & bring to Board no later than 12/03
  - Prepare resolution requesting reclassification to extreme & bring to Board no later than 9/03

- Changing attainment status from severe to extreme allows time for additional controls to be implemented (especially for critical mobile source NOx controls)
Complicating Factors

- EPA implementation of 8-hr $O_3$ standard proposes revocation of 1-hr standard
- EPA proposed rule for implementing 8-hr $O_3$ standard contains many options—no clear path
Ozone Attainment Demonstration Plan - Draft Schedule
San Joaquin Valley Air Basin--1-hr Federal Ozone Standard

Plan Development
Emissions Inventory
Control Measures
Ozone Modeling
Synthesis/Writing
Public Outreach
CEQA
Valley Ozone SIP Team
Workshops
Public Hearing / Adoption

Federal Clocks (67 FR 61784)


Baseline Future Lockdown
Adopted Committed New
Model Episode Evaluation Model Application
Draft Final
Draft Document Final
Receive & File
Hearing/Adoption
ARB Adopted
Offset Sanctions Start (3/18/04)
Federal High Sanctions Start Promulgated 12/18/04
Summary

- Ozone is formed in the atmosphere by chemical reaction among pollutants emitted by society and by natural sources.
- Ozone air pollution causes adverse health effects and crop and material damage.
- Attaining the 1-hr ozone standard requires emission controls outside District authority.
- Planning requirements complicated by changing standards.