

Photochemical Modeling for 8-Hour Attainment Ozone SIP

Presentation to
Regional Air Quality Council
September 6, 2007

8-Hour Ozone SIP

Modeling Protocol Requirements

- Guidance on the Use of Models & Other Air Quality Goals for Ozone, PM_{2.5} and Regional Haze (EPA April 2007)

Elements of the Modeling Protocol

- Schedule, Deliverables
- Justification of Episode and Domain Selection
- Description of Emissions, Meteorological and Photochemical Models to be Used
- Model Performance Evaluation Criteria
- Description of Attainment Demonstration and how “Weight of Evidence” tools will be used
- Technical Support Documentation including model inputs, outputs, finding and conclusion

Proposed Schedule for Photochemical Modeling

- **Modeling Protocol** **October 2007**
- **Mesoscale Meteorological Modeling and Evaluation** **Oct 07-Feb 08**
- **Base Year Emissions** **Oct 07-Feb 08**
- **Base Year Photochemical Modeling** **Feb 08-Mar 08**
- **Attainment & Future Year Photochemical Modeling** **April 2008**
- **Control Case Photochemical Modeling** **May 08 - Aug 08**
- **Technical Support Documentation** **August 2008**

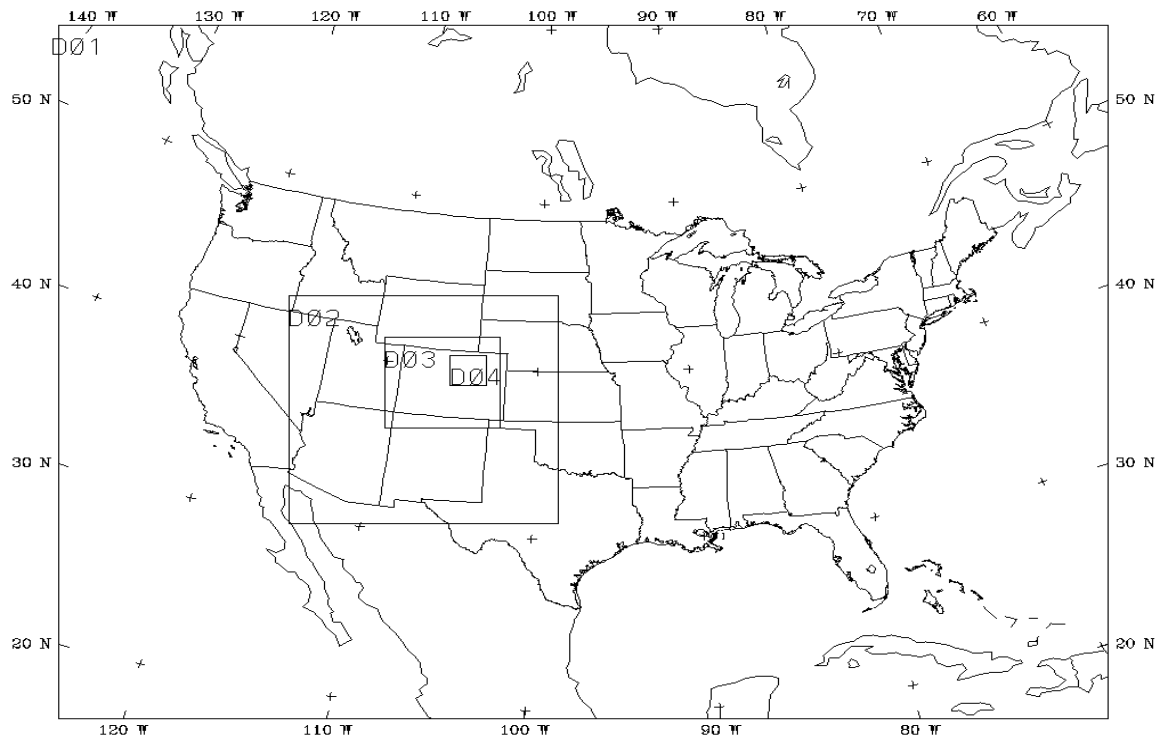
Proposed Base Year - 2006

- Guidance requires modeling of an ozone season
- Consistent meteorological & emissions data required
 - 2006 is most recent meteorological data set available
 - “good” year for ozone formation
 - Mid-year of the 2005-07 violation timeframe
 - 2006 point source Air Pollution Emissions Notice (APEN) data available July 2007

Meteorological Model & Data Requirements

- **PSU/NCAR Mesoscale Meteorological Model, MM5, most commonly used model for providing meteorological inputs to emissions and photochemical models for SIP regulatory applications**
- **Input files**
 - Wind
 - Temperature
 - Water-vapor concentration
 - Effective mixing height
 - Cloud cover
 - Rainfall rate

Proposed Meteorological Modeling Domain



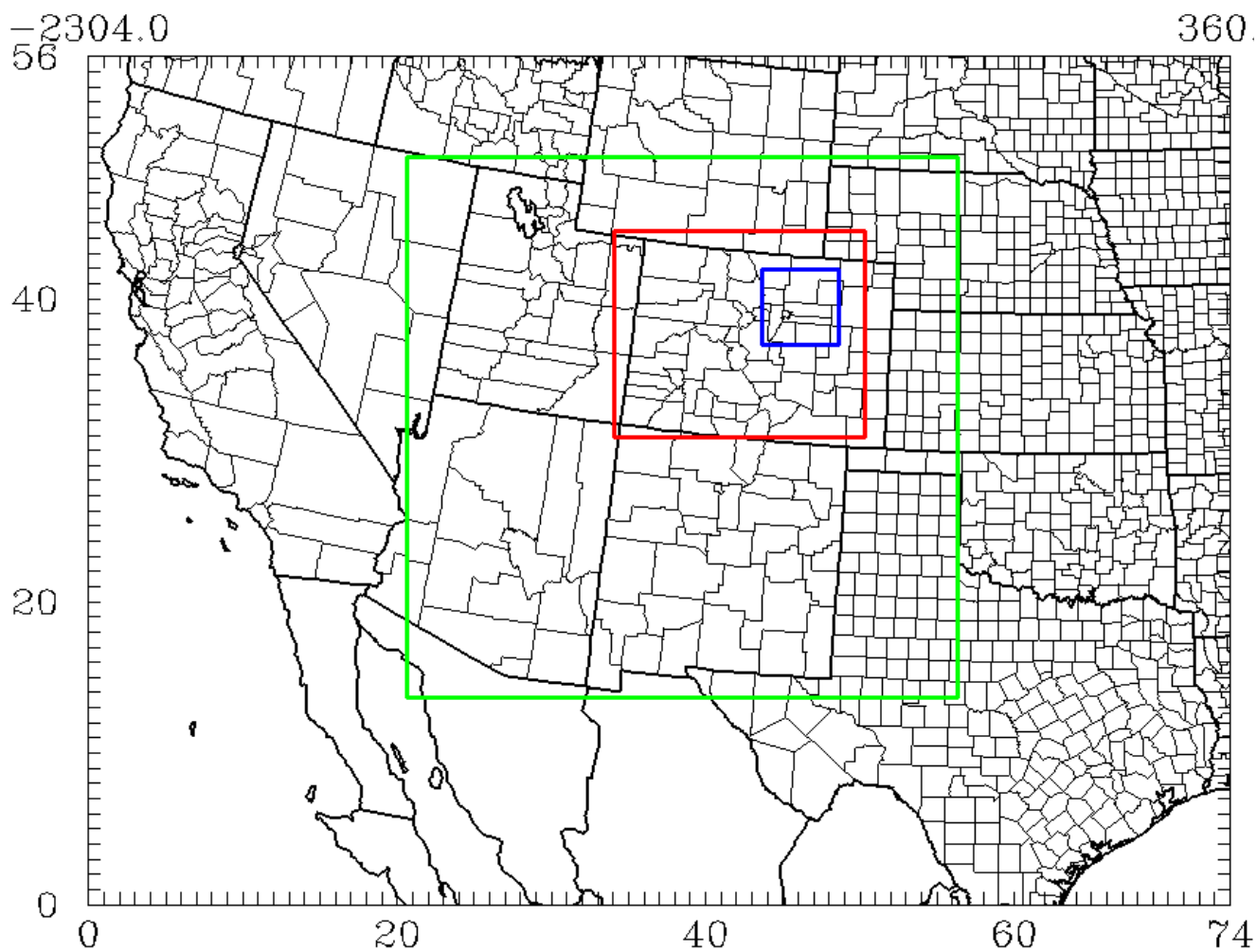
Proposed Emissions Models & Data Requirements

- **SMOKE for point, area, and non-road sources**
- **CONCEPT for link based mobile sources**
- **Input files**
 - **Low-level anthropogenic sources**
 - Point sources
 - Area & non road sources
 - Mobile sources
 - **Elevated point sources**
 - **Biogenic emissions estimate**
- **Input provided by**
 - **APCD – Colorado/DMA/NFR**
 - **Contractor – NEI for other states and WRAP Phase I & II Oil & Gas Studies**

Proposed Photochemical Model & Data Requirements

- CAMx which was used in the EAC work
- Air Quality related input files
 - Initial conditions
 - Boundary conditions
- Chemistry input files
 - Chemical reaction rates
 - Photolysis rates
- Geographic/other input files
 - Land-use
 - Haze and ozone column

Proposed Photochemical Modeling Domain



How Modeling Result Used to Demonstrate Attainment of 8-HR Ozone NAAQS (cont.)

- Modeling results used in a *relative* way to project future design values
- Relative Reduction Factor (RRF)
 - Ratio of future-year to base-year modeled ozone estimate near each monitor
- Future year value = initial design value X RRF
- Initial design values at each monitor
 - 5 year weighted average of 4th maximum 2003-2007
 - 3 year average of 4th maximum 2005-2007

Recommendation of Contract Extension

- RAQC and APCD staffs recommend extension of RAQC's previous contract with ENVIRON International Corporation and Alpine Geophysics, LLC (ENVIRON/Alpine)
 - photochemical dispersion modeling
 - emissions processing
 - meteorological modeling
- Environ/Alpine were previously selected through a competitive RFP process

Justification of Contract Extension

- Extremely short timeframe available – 12 months
- Saves at least 2 months over a new RFP alternative
- Photochemical modeling will be more complex, requiring more time to complete
- Environ/Alpine are highly qualified firms
- Environ/Alpine can build upon early work and working relationships from previous EAC modeling work
- Environ/Alpine can utilize work completed for WRAP and other Western states

Next Steps

- Secure funding (\$400,000 total needed)
 - \$100,000 committed by CDOT, contract amendment in process
 - Seeking funding assistance from DRCOG and NFRMPO
 - CDPHE considering supplemental budget request
- Negotiate contract extension and scope of work with Environ/Alpine
- Begin modeling process with CDOT funding
 - Develop formal modeling protocol
 - Perform meteorological modeling