Attainment Modeling Status Report

Metropolitan Washington Air Quality Committee

(MWAQC)

Meeting

December 14, 2005

Presented by: VA Department of Environmental Quality

Presentation Topics

- Purpose of Attainment Modeling
- Overview of Modeling Process
- Progress to Date
- Next Steps/Schedule
- Other Modeling Efforts

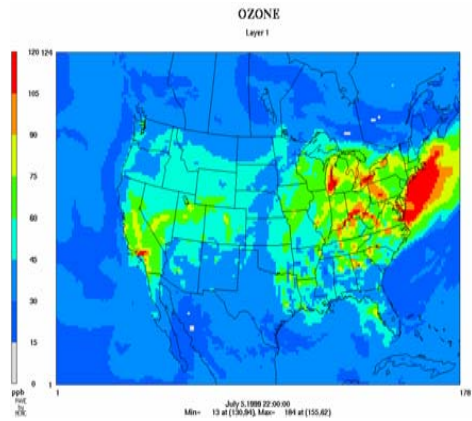
Purpose of Attainment Modeling

- Meet EPA requirements & guidance
- Predict future air quality conditions
- Develop & test potential control strategies
- Translate emission reductions into air quality benefit
- Demonstrate desired air quality outcome

Overview of Modeling Process

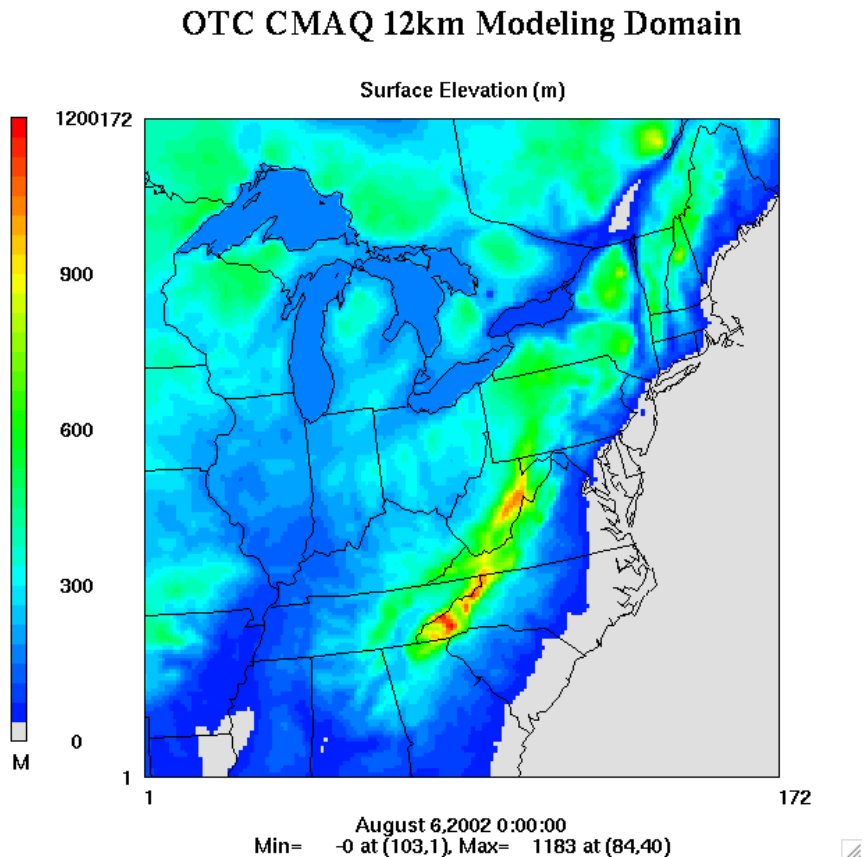
Regional Photochemical Models:

- Mathematical models that simulate actual air quality events (episodes)
- Three major components:
  - Weather Patterns
  - Pollutant Levels
  - Chemistry & Transport of Pollutants



Use of Regional Scale Air Quality Models

- Regional scale modeling used to simulate & evaluate ozone transport impacts



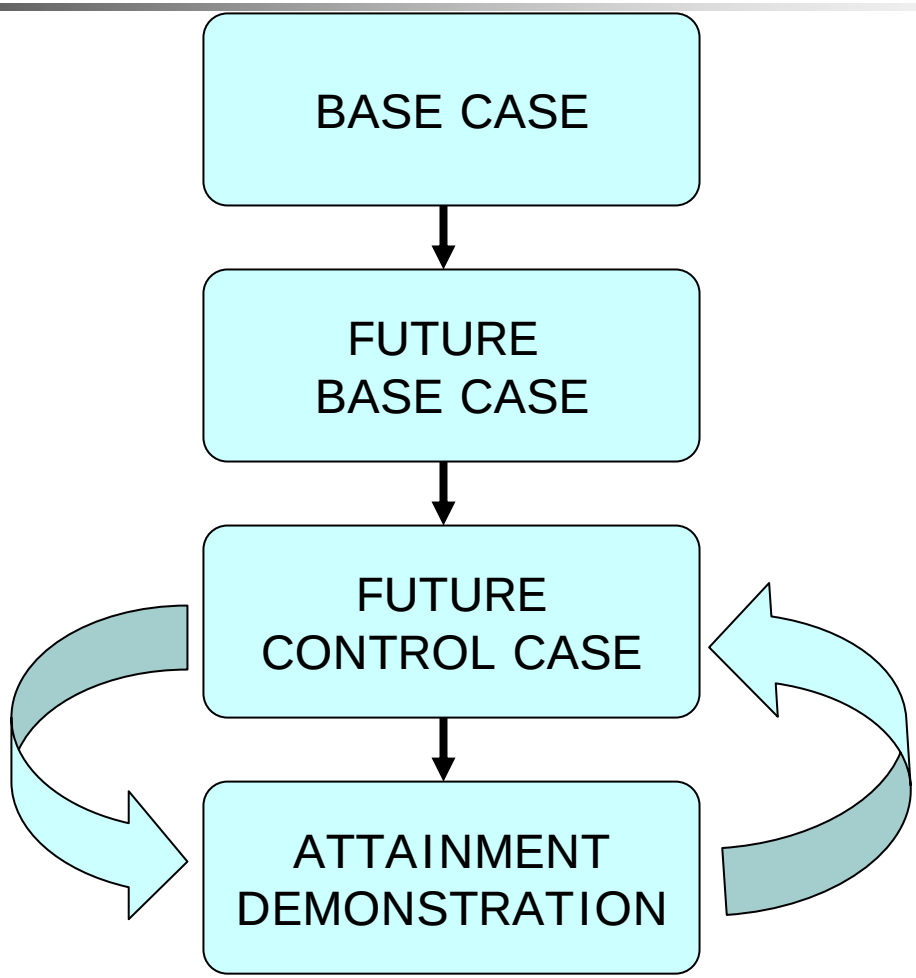
Attainment Modeling Steps

- Historical Base Case Modeling
  - Select representative high ozone events/ozone season
  - Develop event specific model data input
  - Run event simulation(s)
  - Compare model results to actual concentrations (model validation)
- Future Base Case Modeling
  - Develop future year emissions
  - Include known existing/future control measures
  - Run simulation(s)
  - Evaluate results
  - Perform sensitivity analyses

Attainment Modeling Steps (Continued)

- Future Control Case Modeling
  - Develop potential control measures
  - Estimate emissions reductions
  - Test control strategies (iterative process)
  - Perform attainment test
  - Develop/document supporting analyses (Weight of Evidence)
  - Document results for inclusion in SIP

Attainment Modeling Steps



Attainment Modeling Progress to Date

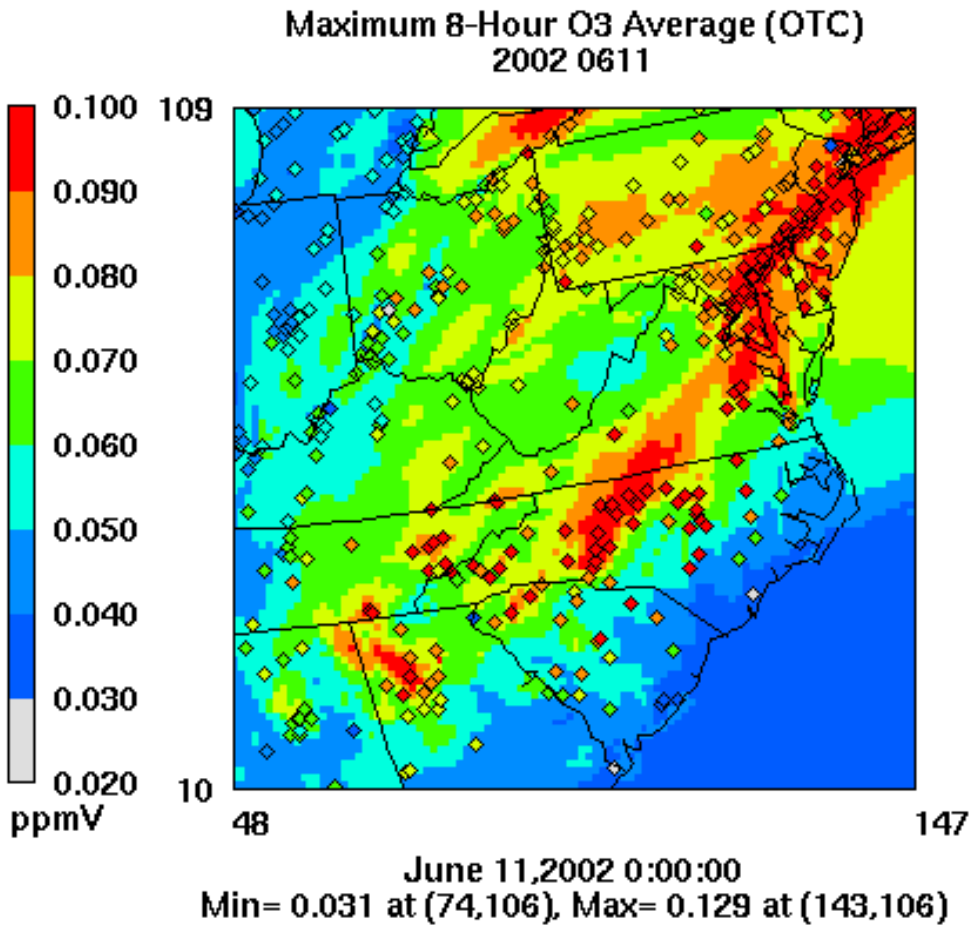
- Draft modeling protocol
  - EPA final guidance issued on November 7, 2005
  - Draft protocol updated and under review
  - Final version expected - Winter 2005
- Participation in OTC modeling efforts
  - Successful benchmark tests completed:
    - Emissions pre-processor (SMOKE)
    - Photochemical model (CMAQ)
  - VDEQ modeling platform produces accurate and comparable results

Attainment Modeling Progress to Date (continued)

Base Case Modeling

- Base year for ozone modeling – 2002
- Covers all major high ozone weather conditions
- Base case modeling performed for entire period
- Final base case modeling completed – Fall 2005
- May be updated in 2006 if revised emissions inventory is available

Example of Model Performance
Actual Observations vs. Model Results
June 11, 2005



Model Evaluation Conclusions

- Model results meet EPA performance criteria
- Model tends to slightly under-predict peak ozone levels

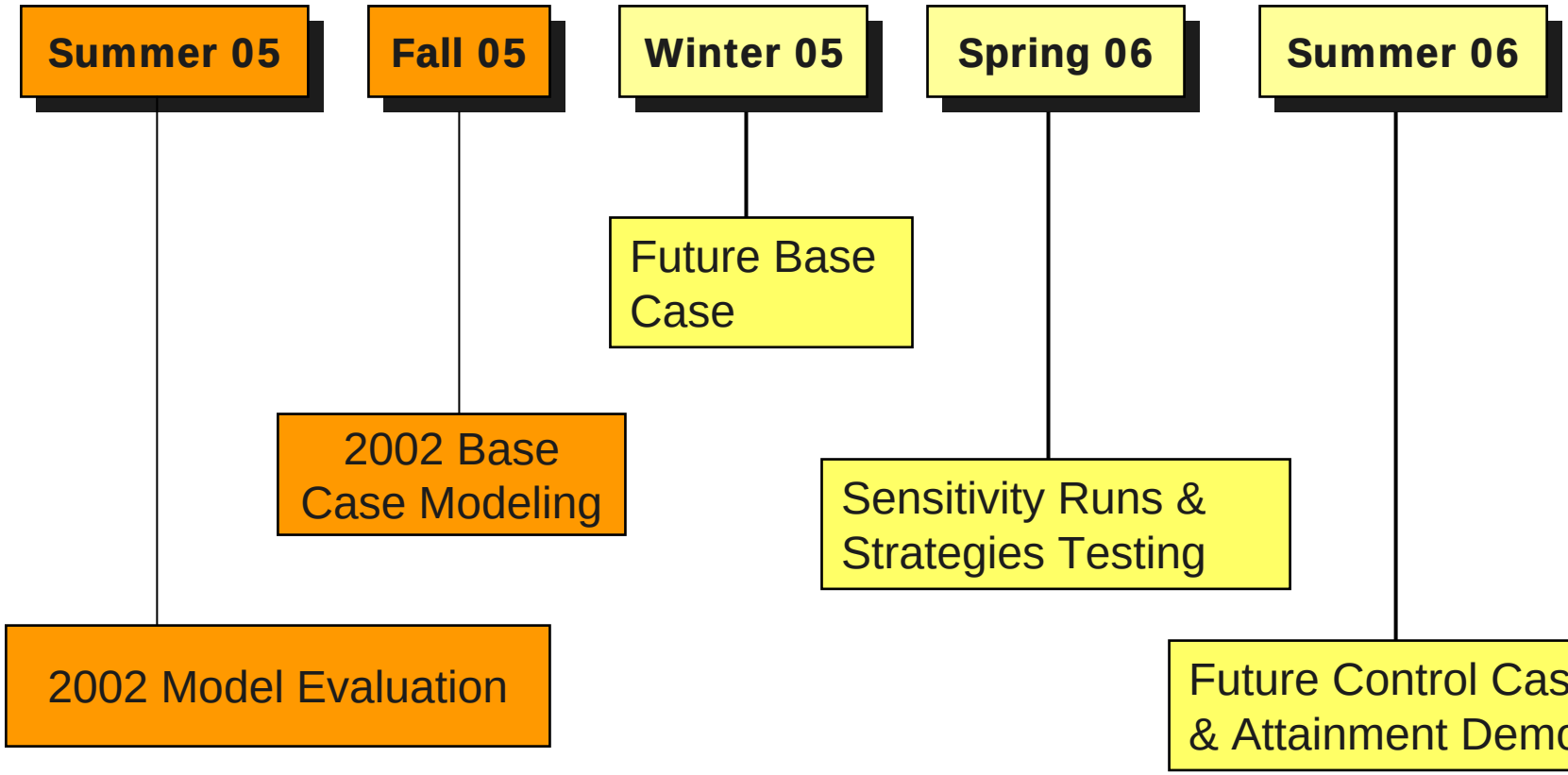
Attainment Modeling Next Steps

- **Future Base Case Modeling**
  - Future modeling year – 2009 (based on attainment date)
  - Waiting for “latest & greatest” projection inventory
    - Expected availability by mid-December 2005
  - Run future base case scenario
    - How close is DC to attainment?
    - Expected availability by mid-January 2006
  - Perform sensitivity analyses – What’s more effective to further reduce ozone?
    - Pollutants & source categories?
    - Need to develop DC specific list
    - ASIP sensitivities may provide additional information

Attainment Modeling Next Steps (continued)

- **Future Control Case Modeling**
  - Identify & Quantify additional control emissions
    - Control Measure Workgroup, OTC Workgroups
  - Run control case model to test these control strategies
  - Perform attainment test (using Relative Reduction Factors)
  - Repeat process as needed to demonstrates attainment
  - Perform Weight of Evidence (WOE) analysis
    - Other modeling results
    - Air quality and emissions trends
    - Others (need to develop DC specific list)
  - Document results for inclusion in SIP

Attainment Modeling Schedule



Other Related Modeling Efforts

- Ozone Transport Commission (NY, NJ, MD, & NESCAUM)
  - On a similar schedule for completion
  - Should be consistent with DC modeling since same platform
- Association for Southeastern Integrated Planning (ASIP)
  - Based on VISTAS modeling platform (emissions, met. data)
  - Preliminary 2009 base case results available
  - Currently performing series of sensitivity runs
- Results could be used in WOE

Preliminary 2009 Base Case Results – ASIP (DC Monitors)