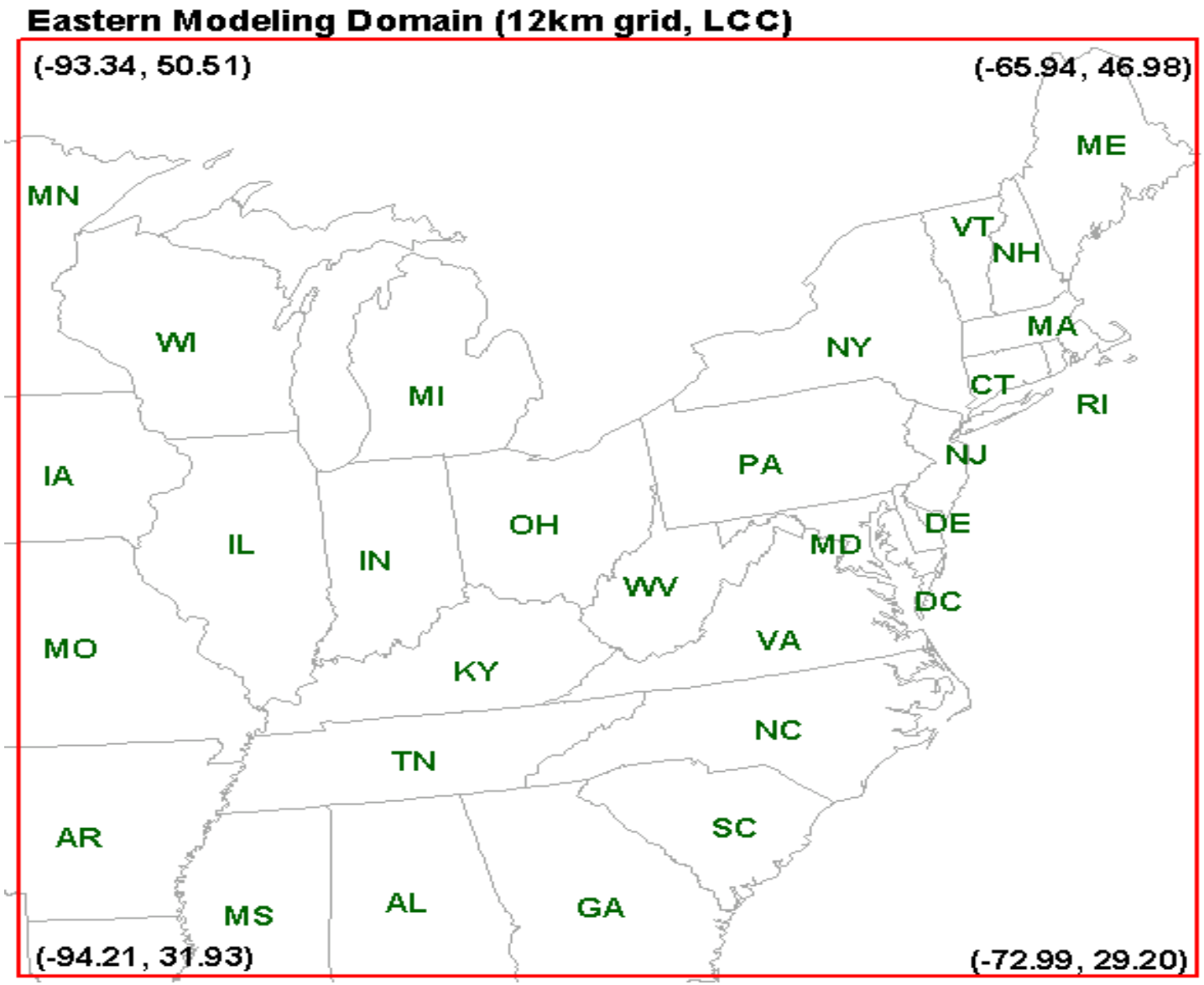
OTC 8-Hour Ozone SIP Modeling Update

OTC Meeting

March 2, 2007

Modeling Domain for Ozone, PM2.5 and Regional Haze



Status as of 3/2/07

Modeling completed

- 2009 CMAQ OTB/OTW run (updated emissions) (VA DEQ)
- 2009 CMAQ Beyond OTB/OTW run (NY DEC)
- 2012 CMAQ Beyond OTB/OTW Run (NY DEC)
- 2009 CALGRID Smartways/Fuel Additives Run (NHDES)

Sensitivity modeling work now underway

- 2009 CALGRID CAIR Plus Run (NHDES)
- 2009 CMAQ with Advanced CAIR Plus (UMD)
- 2009 CALGRID High Electrical Demand Day Run (NHDES)

OTC 2009 Control Strategy Runs

- 2009 CMAQ OTB/OTW run (VA DEQ)
  CAIR EGU cap based on 0.15 lbs NOx/MMBtu across modeling domain and OTB controls in all states

- 2009 CMAQ Beyond OTB/OTW run (NY DEC)
  CAIR EGU cap based on 0.15 lbs NOx/MMBtu across modeling domain and Beyond OTB controls in OTC states only

  Note: OTB/OTW mean “on the books and on the way”

2009 OTB/OTW Control Measures

- NOx SIP Call and CAIR requirements
- Federal on-road and off-road fuels, Federal motor vehicle standards and state LEV (Low Emission Vehicle) programs
- Federal MACT rules, 2001 OTC model rules for Consumer Products, Architectural coatings, Distributed generation, other state-specific rules

2009 Beyond OTB/OTW Control Measures

- On Road — No Changes
- Area — Consumer products except for VT
  Portable fuel Containers except for VT
  Asphalt Paving in 2009 except for DC, MD, ME, PA,VT, Adhesives and sealants in 2009 except for NH and DC
  ICI Boilers reduction in 5-county region of Philadelphia, PA, and MD, NY and NJ
- Non-EGU Point — Individual state regulations

OTC Sensitivity Runs

- 2012 CMAQ Beyond OTB/OTW Run (NY DEC)
- 2009 CALGRID Smartways/Fuel Additives Run (NH DES)

2012 Sensitivity Run

- CAIR EGU cap based on 0.15 lbs NOx/MMBtu across modeling domain and Beyond OTB controls in OTC states only.
- On-road /Off-road emissions reflecting federal motor vehicle controls in 2012
- 2009 area source emissions for CENRAP were used as a surrogate for 2012 emissions. VISTAS 2012 area source emissions were interpolated from 2009 and 2018 emissions

2009 CALGRID Smartways/Fuel Additives Sensitivity Run

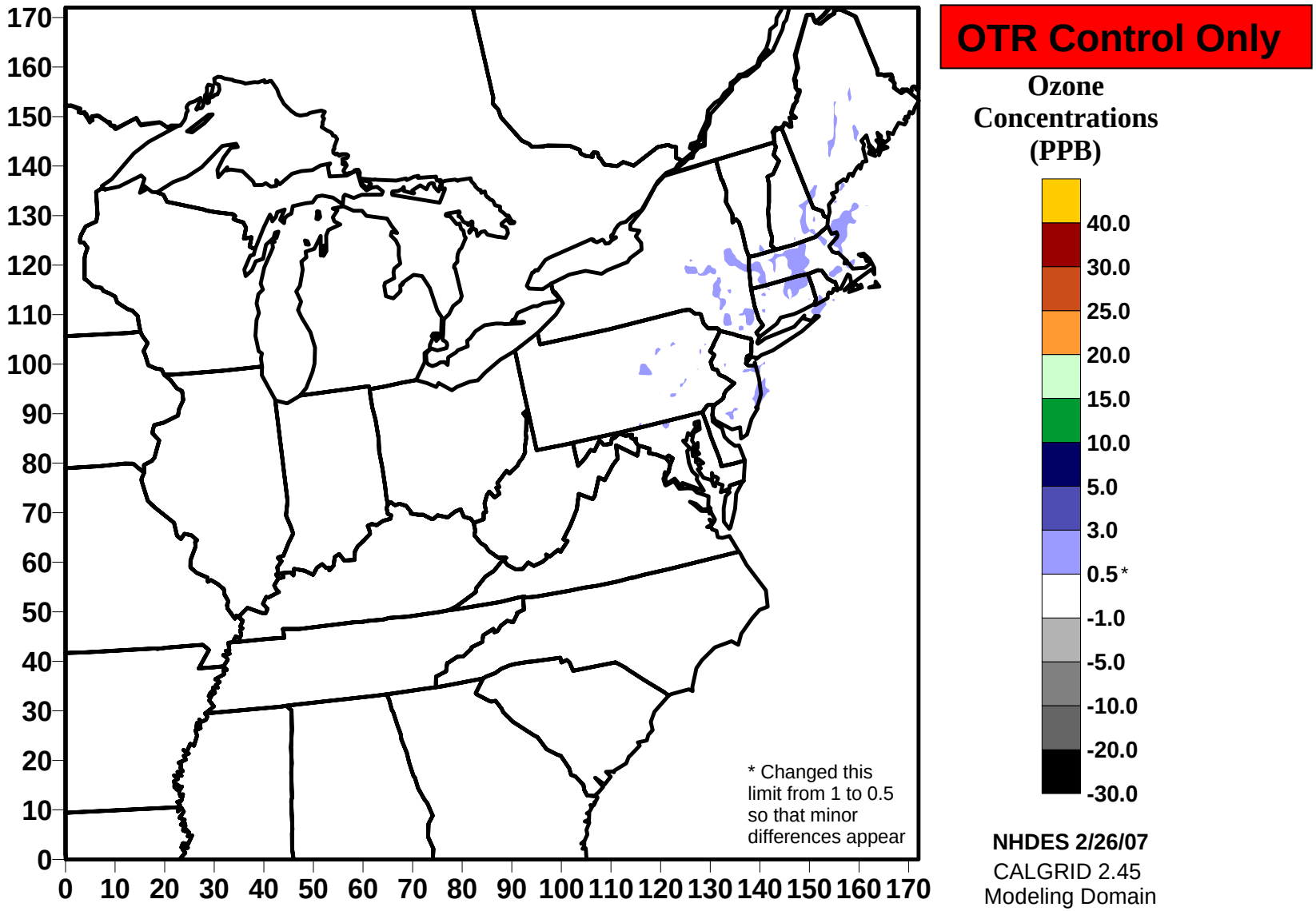
- Based on Beyond OTB/OTW emissions across the modeling domain.

- OTR states with Beyond OTB/OTW controls, voluntary mobile programs (diesel retrofit, low NOx diesel fuel additives, smartways, etc.)

Design Values For OTR Monitors Above 8-Hour Ozone NAAQS (84 PPB) for OTC 2009 OTB/OTW Modeling and Sensitivity Runs

AIRS-ID	State	Monitor	2002	2009 OTB/OTW	2009 BOTB/OTW	Smartways/Fuels	2012 BOTB/OTW
340290006	NJ	Colliers Mills	106.0	92	92	91	86
90013007	CT	Stratford	98.3	90	90	89	86
361030009	NY	Holtsville	97.0	90	89	89	86
420170012	PA	Bristol	99.0	88	88	89	84
90093002	CT	Madison	98.3	89	88	88	83
340070003	NJ	Camden	98.3	88	88	87	83
340155001	NJ	Clarksboro	98.3	88	88	87	83
90010017	CT	Greenwich	95.7	87	87	87	83
340071001	NJ	Ancora St. Hos	100.7	87	87	87	82
421010024	PA	Northeast	96.7	87	87	87	82
340210005	NJ	Rider Univ.	97.0	86	86	86	81
510130020	VA	Arlington Co.	96.7	86	86	86	80
510590018	VA	Fairfax Co.	96.7	86	86	85	79
361030002	NY	Babylon	93.7	85	85	85	82
361192004	NY	White Plains	91.3	85	85	84	82
90011123	CT	Danbury	95.7	86	85	84	81
90019003	CT	Westport	94.0	85	85	84	81
90099005	CT	Hamden	93.3	85	85	84	81
340030005	NJ	Teaneck	91.7	85	85	84	81
240251001	MD	Edgewood	100.3	85	85	84	80

Benefits of SMARTWAYS & Fuel Additives



What Does the Modeling Tell Us?

- We can expect significant improvements in ozone air quality over the OTR from 2002 levels
  - We are observing improvements now.
- Continued non-attainment in 2009 is predicted over portions of the OTR, indicating the need for additional emissions reductions within and outside of the OTR
- Additional ozone improvements are difficult to achieve; we have examined all emission sectors within the OTR, regardless of cost effectiveness

Questions / Discussion

Reference Slides

How the Models are Applied

1. Model is run for a base case (2002)
2. Model is run for a control case
3. Relative ozone improvements from model strategy are applied to monitor data from 2000 through 2004.
4. Results provide estimate of future year concentrations

- Conservative because pollution levels have declined in the OTR since 2000-04.

Observations

- Historically, modeled predictions have not fully captured benefits of point source emission reductions
- We are all measuring significant improvements in air quality largely due to NOx SIP call
- Banked allowances delay achieving full emission reduction benefits from EGU sector
- Results confirm initial assessment that CAIR does not provide sufficient reductions for 2009 attainment

2002 Base Case Design Value (DV)

The 2002 base case ozone design value for each ozone monitor was determined by averaging the 8-hr ozone design values (dv) reported to EPA for three periods of time (2000-2002, 2001- 2003 and 2002-2004).

2002 DV = (2002dv+2003dv+2004dv)/3

Relative Reduction Factors (RRF)

- For each high ozone day, the highest of 8-hour averages from the nine grid cells containing and surrounding each ozone monitor was selected.

- The average of these maximum daily values for both the 2002 base case and 2009 control case was then determined.

- The RRF for each monitor was calculated by dividing the 2009 control case max daily average by the 2002 base case max daily average.

RRF = 2009 ave daily max/2002 ave daily max

Future Case Design Value (DV)

The 2009 control case ozone design value for each ozone monitoring station was determined by multiplying the 2002 base case ozone design value by the RRF calculated for each ozone monitor.

2009 DV = 2002 DV x RRF

2009 Advanced CAIRPLUS Simulation

- Approximates an actual emission rate of 0.093 lbs NOx/MMBtu across the modeling domain
- 21% EGU NOx reduction in MANE-VU states
- 40-45% EGU NOx reduction in other regions (MWRPO, VISTAS and CENRAP)