8-Hour Ozone SIP Modeling Update

MWAQC TAC MEETING

November 17, 2006

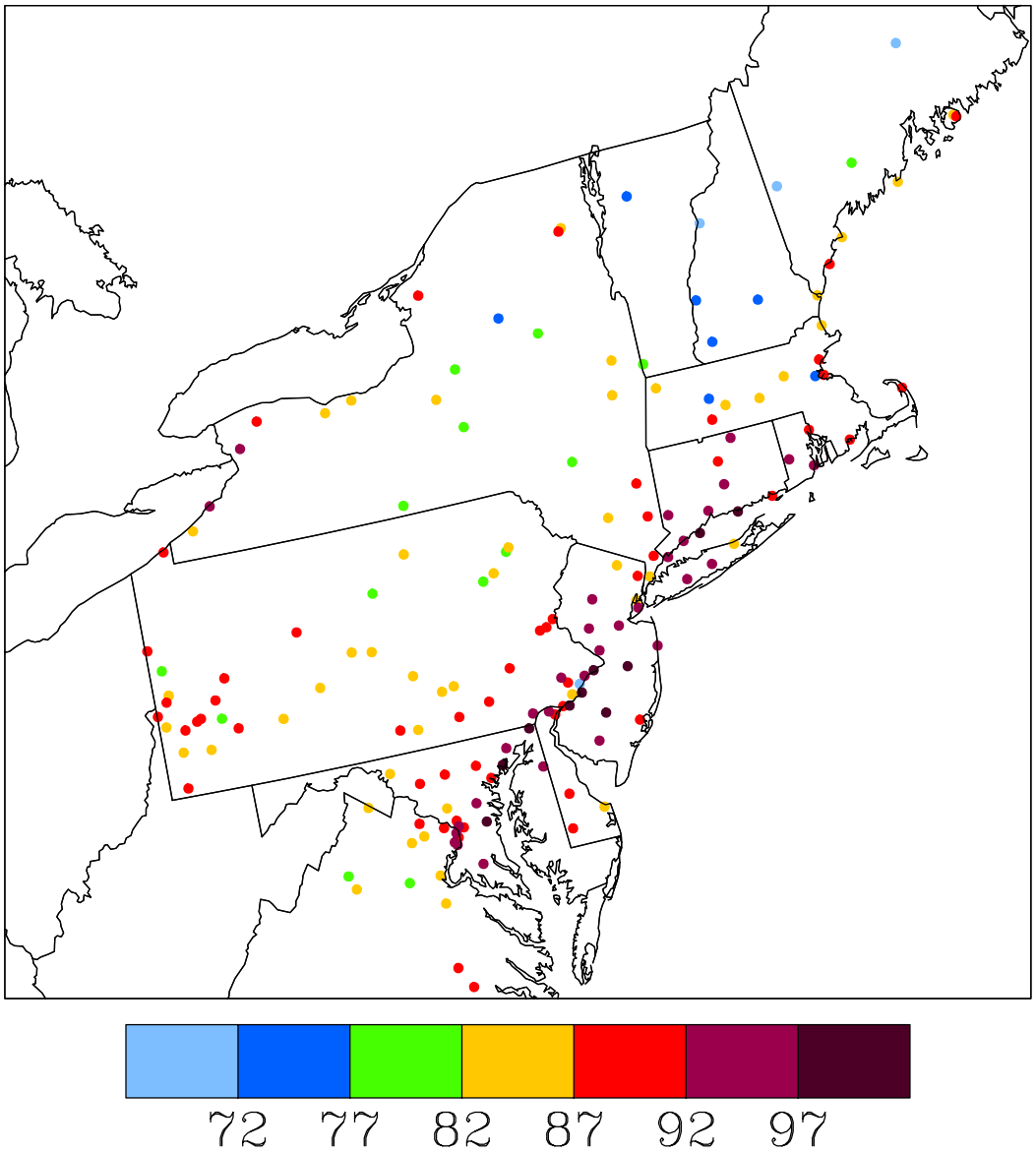
2002 Base Year Model Performance Results

- Overall performance for ozone and other pollutants can be considered satisfactory. No attempt was made to ‘fine-tune’ the model platform.

- Recommend that each state perform similar analysis for their respective areas

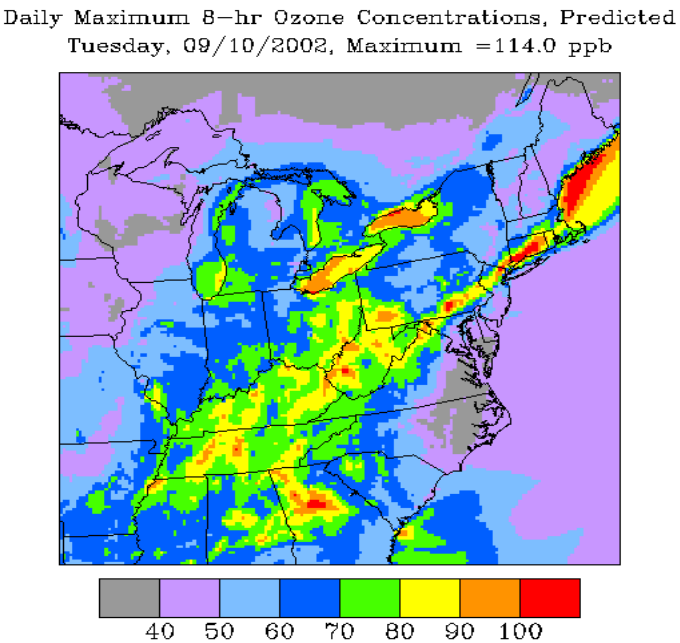
- Model statistics posted on NY DEC at ftp://ftp.dec.state.ny.us/dar/air_research/kevin

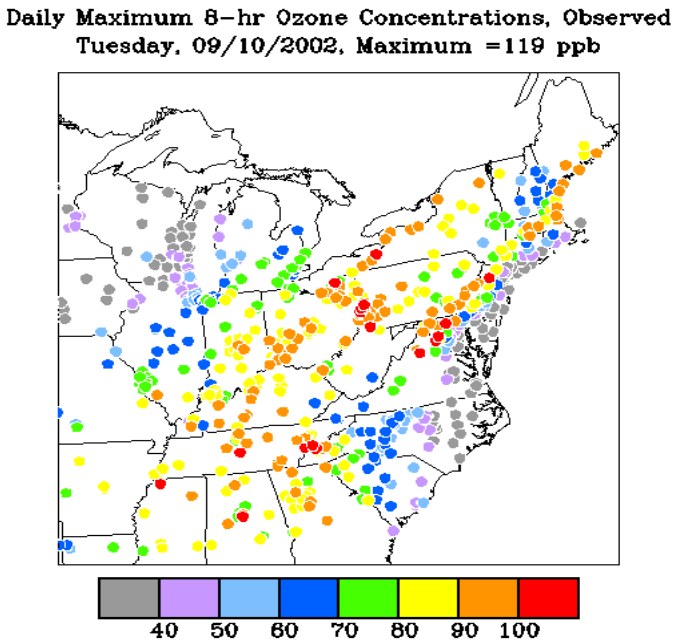
“Current Design Values (DVC)” Determined from Observations



Average of 8-hr O_3 Design Values for 2000-2002, 2001-2003, and 2002-2004 at OTC monitors (“Current Design Values” for the purpose of the modeled attainment test)

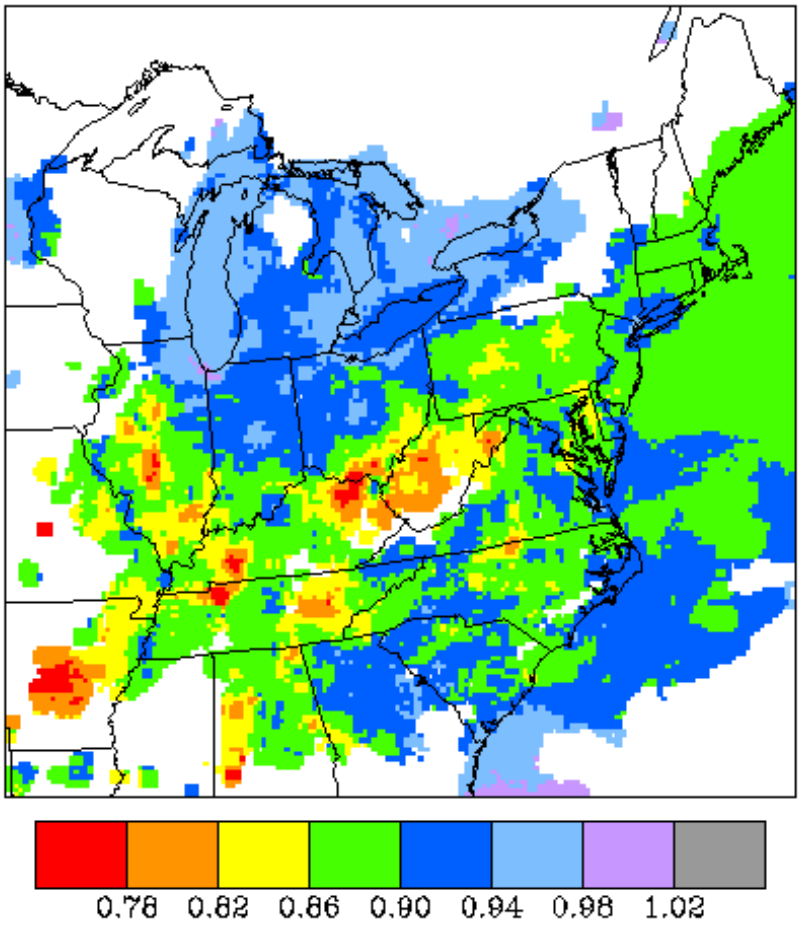
Patterns of Maximum 8-Hour Ozone Predictions Compare Favorably with Ozone Observations



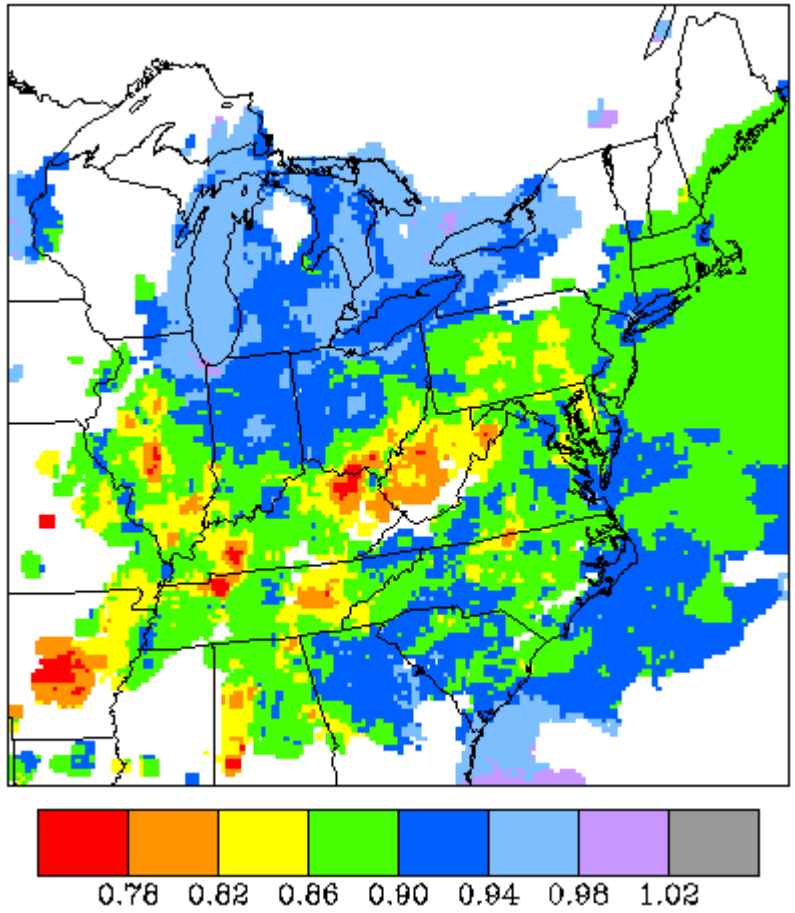


Relative Reduction Factors (RRF) Calculated From CMAQ Simulations with 2002 and 2009 BaseB1 Emissions For May 15 – September 29

2009 OTW BaseB1



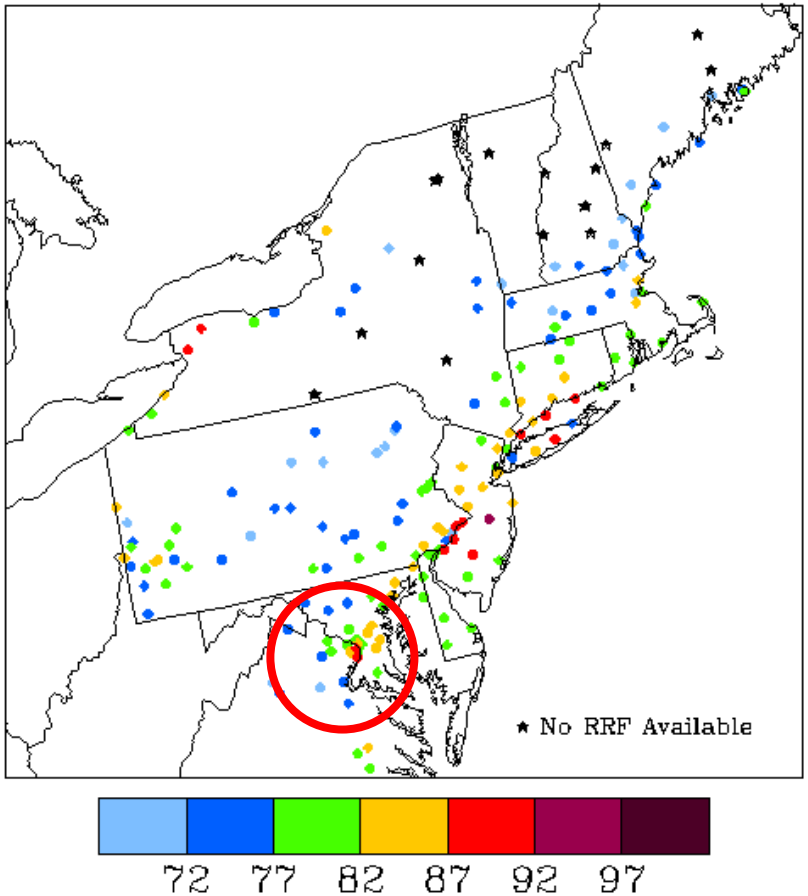
2009 BOTW BaseB1



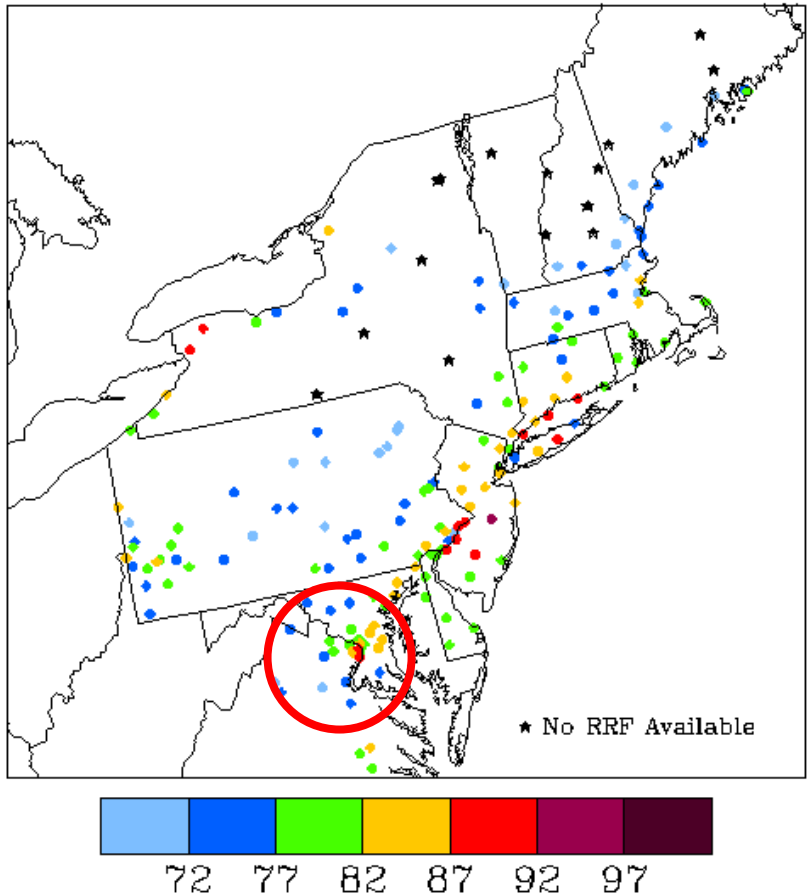
- RRF calculation was performed for each grid cell, based on values in surrounding grid cells (3*3 array) and only those days that fulfill the threshold criteria as specified in the EPA modeling guidance. Uncolored regions are those for which no RRF could be calculated per guidance, fewer than 5 days greater than 70 ppb were predicted in the 2002 base case simulations

2009 Base Case "Future Design Values (DVF)" Calculated as "Current Design Values (DVC)" x RRF

DVF 2009 OTW/OTB BaseB1



DVF 2009 BOTW/BOTB BaseB1



- 2009 Design Values for 8-hr O_3 at OTC monitors, estimated by multiplying the "Current Design Values" with the model-predicted RRF
- These values represent the "Future Design Values" for the purpose of the modeled attainment test. 2009 OTW/OTB and BOTW/BOTB results are **very** similar

Preliminary 2009 Design Values above 84 ppb for OTW and BOTW control scenarios

AIRS-ID	State	Monitor	2002 BASE	2009 OTW	2009 BOTW	BOTW benefit	8-hr Ozone Nonattainment Area
340290006	NJ	Colliers Mills	106.0	93	93		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
90013007	CT	Stratford	98.3	91	91		New York-N. New Jersey-Long Island,NY-NJ-CT
90093002	CT	Madison	98.3	90	89	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
360290002	NY	Amherst	95.7	90	90		Buffalo-Niagara Falls, NY
361030009	NY	Holtsville	97.0	90	90		New York-N. New Jersey-Long Island,NY-NJ-CT
340070003	NJ	Camden	98.3	89	89		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
340155001	NJ	Clarksboro	98.3	89	89		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
420170012	PA	Bristol	99.0	89	89		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
510130020	VA	Arlington Co.	96.7	89	89		Washington, DC-MD-VA
90010017	CT	Greenwich	95.7	88	88		New York-N. New Jersey-Long Island,NY-NJ-CT
340071001	NJ	Ancora St. Hos	100.7	88	88		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
360631006	NY	Middleport	91.7	88	88		Buffalo-Niagara Falls, NY
421010024	PA	Northeast	96.7	88	88		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
510590018	VA	Fairfax Co.	96.7	88	88		Washington, DC-MD-VA
240251001	MD	Edgewood	100.3	87	86	-1 ppb	Baltimore, MD
340210005	NJ	Rider Univ.	97.0	87	87		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
360450002	NY	Perch River	91.3	87	86	-1 ppb	Jefferson Co, NY
361030002	NY	Babylon	93.7	87	86	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
510590030	VA	Fairfax Co.	95.0	87	86	-1 ppb	Washington, DC-MD-VA
90011123	CT	Danbury	95.7	86	86		New York-N. New Jersey-Long Island,NY-NJ-CT
90019003	CT	Westport	94.0	86	86		New York-N. New Jersey-Long Island,NY-NJ-CT
90070007	CT	Middletown	95.7	86	85	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
90099005	CT	Hamden	93.3	86	85	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
240030019	MD	Ft. Meade	97.0	86	86		Baltimore, MD
340030005	NJ	Teaneck	91.7	86	86		New York-N. New Jersey-Long Island,NY-NJ-CT
361192004	NY	White Plains	91.3	86	86		New York-N. New Jersey-Long Island,NY-NJ-CT
510591005	VA	Fairfax Co.	94.0	86	85	-1 ppb	Washington, DC-MD-VA
110010043	DC	McMillan Reser	92.7	85	84	-1 ppb	Washington, DC-MD-VA
240030014	MD	Davidsonville	98.0	85	85		Baltimore, MD
340190001	NJ	Flemington	95.3	85	85		New York-N. New Jersey-Long Island,NY-NJ-CT
340230011	NJ	Rutgers Univ.	96.0	85	84	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
340250005	NJ	Monmouth Univ.	95.7	85	85		New York-N. New Jersey-Long Island,NY-NJ-CT
340273001	NJ	Chester	95.3	85	85		New York-N. New Jersey-Long Island,NY-NJ-CT
360130006	NY	Dunkirk	93.0	85	85		Jamestown, NY
360850067	NY	Susan Wagner	93.0	85	84	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
420070002	PA	Hookstown	91.3	85	85		Pittsburgh-Beaver Valley, PA

Preliminary 2009 Design Values for OTW and BOTW (at or below 87 ppb WOE target)

AIRS-ID	State	Monitor	2002 BASE	2009 OTW	2009 BOTW	BOTW benefit	8-hr Ozone Nonattainment Area
240251001	MD	Edgewood	100.3	87	86	-1 ppb	Baltimore, MD
340210005	NJ	Rider Univ.	97.0	87	87		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
360450002	NY	Perch River	91.3	87	86	-1 ppb	Jefferson Co, NY
361030002	NY	Babylon	93.7	87	86	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
510590030	VA	Fairfax Co.	95.0	87	86	-1 ppb	Washington, DC-MD-VA
90011123	CT	Danbury	95.7	86	86		New York-N. New Jersey-Long Island,NY-NJ-CT
90019003	CT	Westport	94.0	86	86		New York-N. New Jersey-Long Island,NY-NJ-CT
90070007	CT	Middletown	95.7	86	85	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
90099005	CT	Hamden	93.3	86	85	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
240030019	MD	Ft. Meade	97.0	86	86		Baltimore, MD
340030005	NJ	Teaneck	91.7	86	86		New York-N. New Jersey-Long Island,NY-NJ-CT
361192004	NY	White Plains	91.3	86	86		New York-N. New Jersey-Long Island,NY-NJ-CT
510591005	VA	Fairfax Co.	94.0	86	85	-1 ppb	Washington, DC-MD-VA
110010043	DC	McMillan Reser	92.7	85	84	-1 ppb	Washington, DC-MD-VA
240030014	MD	Davidsonville	98.0	85	85		Baltimore, MD
340190001	NJ	Flemington	95.3	85	85		New York-N. New Jersey-Long Island,NY-NJ-CT
340230011	NJ	Rutgers Univ.	96.0	85	84	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
340250005	NJ	Monmouth Univ.	95.7	85	85		New York-N. New Jersey-Long Island,NY-NJ-CT
340273001	NJ	Chester	95.3	85	85		New York-N. New Jersey-Long Island,NY-NJ-CT
360130006	NY	Dunkirk	93.0	85	85		Jamestown, NY
360850067	NY	Susan Wagner	93.0	85	84	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
420070002	PA	Hookstown	91.3	85	85		Pittsburgh-Beaver Valley, PA

Preliminary 2009 Design Values for OTW and BOTW (above 87 ppb)

AIRS-ID	State	Monitor	2002 BASE	2009 OTW	2009 BOTW	BOTW benefit	8-hr Ozone Nonattainment Area
340290006	NJ	Colliers Mills	106.0	93	93		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
90013007	CT	Stratford	98.3	91	91		New York-N. New Jersey-Long Island,NY-NJ-CT
90093002	CT	Madison	98.3	90	89	-1 ppb	New York-N. New Jersey-Long Island,NY-NJ-CT
360290002	NY	Amherst	95.7	90	90		Buffalo-Niagara Falls, NY
361030009	NY	Holtsville	97.0	90	90		New York-N. New Jersey-Long Island,NY-NJ-CT
340070003	NJ	Camden	98.3	89	89		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
340155001	NJ	Clarksboro	98.3	89	89		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
420170012	PA	Bristol	99.0	89	89		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
510130020	VA	Arlington Co.	96.7	89	89		Washington, DC-MD-VA
90010017	CT	Greenwich	95.7	88	88		New York-N. New Jersey-Long Island,NY-NJ-CT
340071001	NJ	Ancora St. Hos	100.7	88	88		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
360631006	NY	Middleport	91.7	88	88		Buffalo-Niagara Falls, NY
421010024	PA	Northeast	96.7	88	88		Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE
510590018	VA	Fairfax Co.	96.7	88	88		Washington, DC-MD-VA

Summary & Next Steps

- New results 3-4 ppb higher at key monitors in the DC area
- Contributing factors?:
  - Emissions
  - Updated AQ Model (CMAQ)
  - Meteorology
- Review thus far points to the model
- Further review & EPA consultation

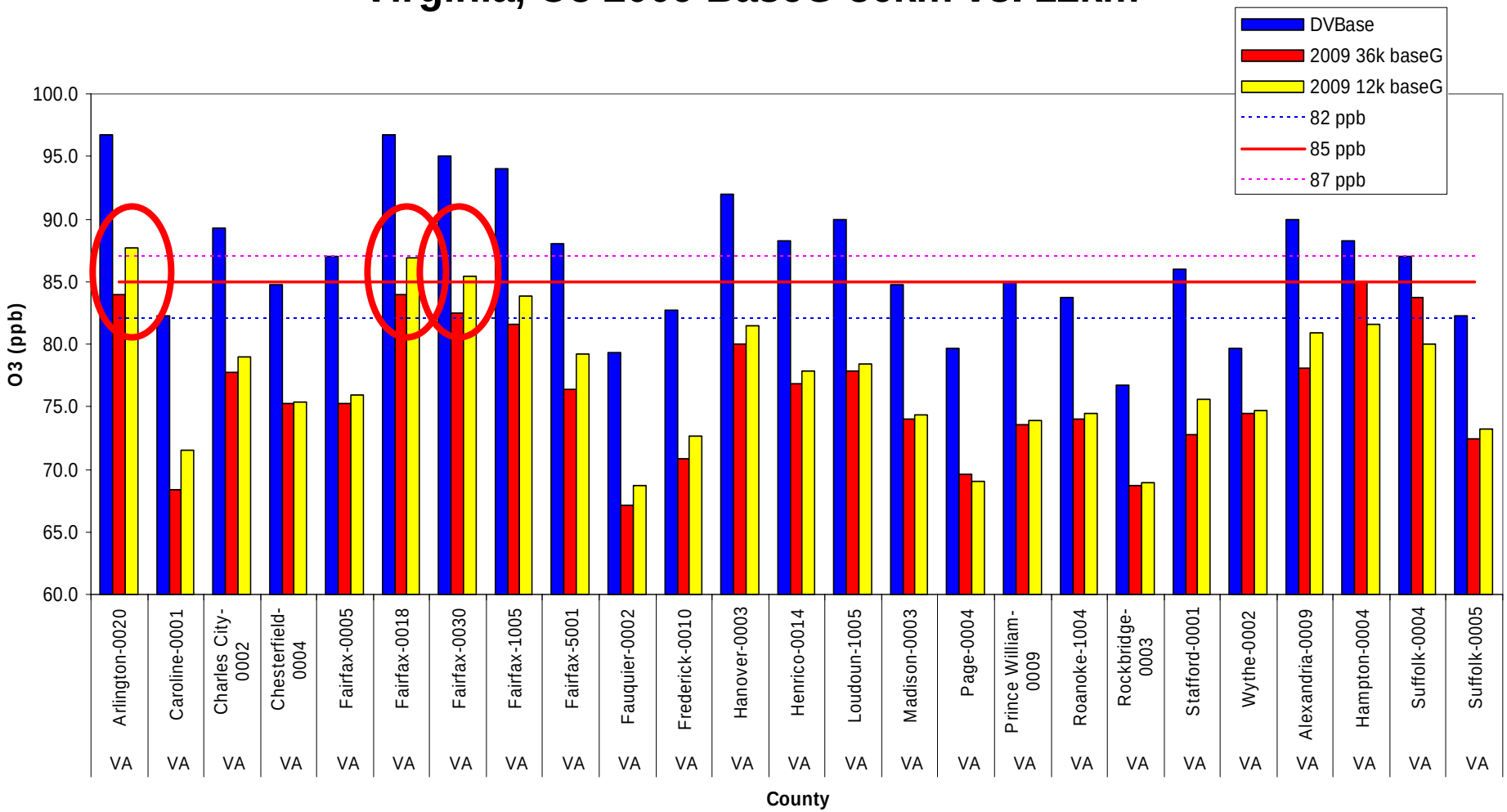
OTHER MODELING RESULTS

VISTAS/ASIP BASE G RESULTS

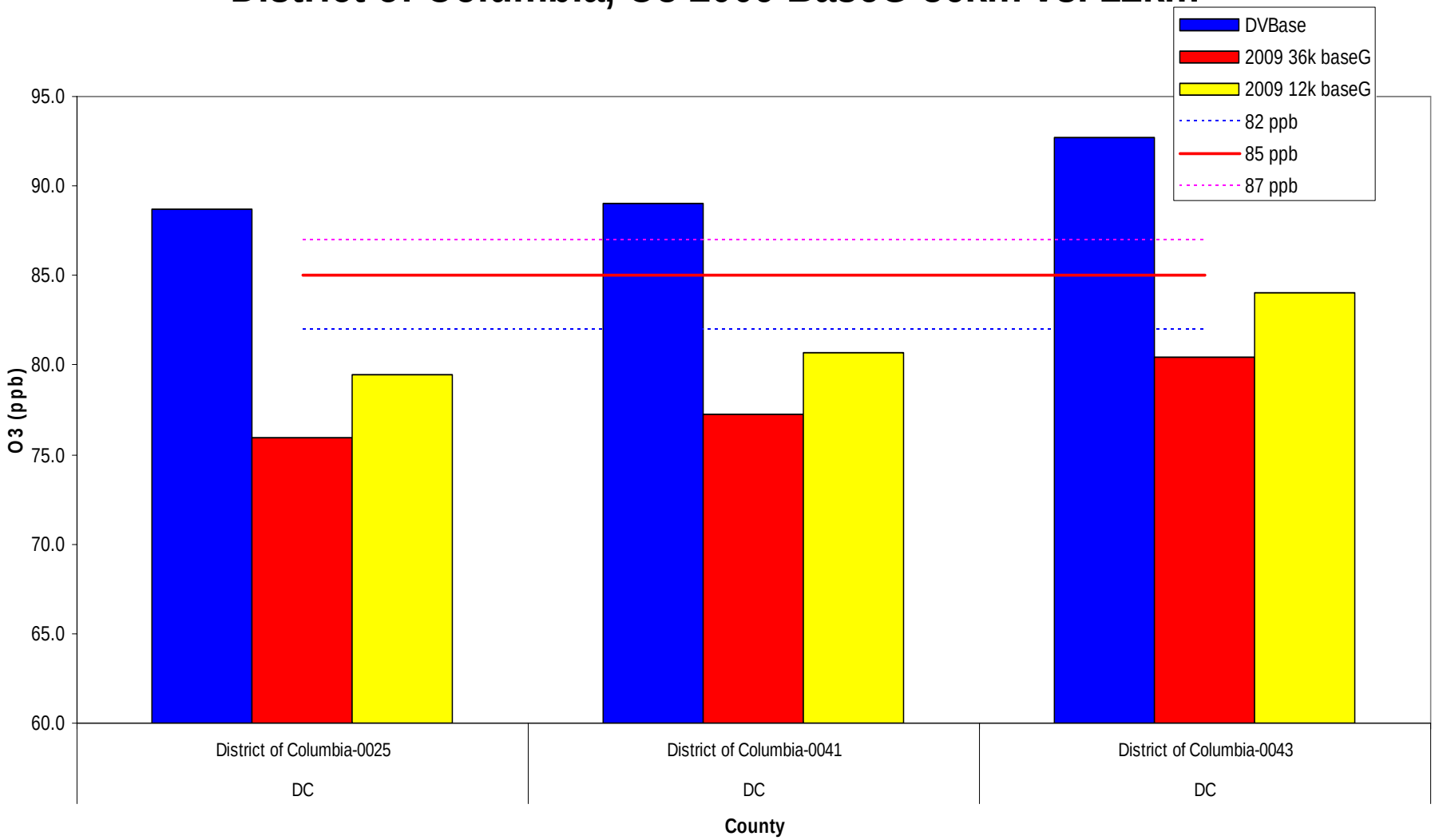
2009 12 km Base G ASIP 8-Hour Ozone Problem Areas

- Virginia
  - Arlington-0020 = 87.7 ppb
  - Fairfax-0018 = 86.9 ppb
  - Fairfax-0030 = 85.4 ppb
- Maryland
  - Anne Arundel = 88.0 ppb
  - Anne Arundel = 86.2 ppb

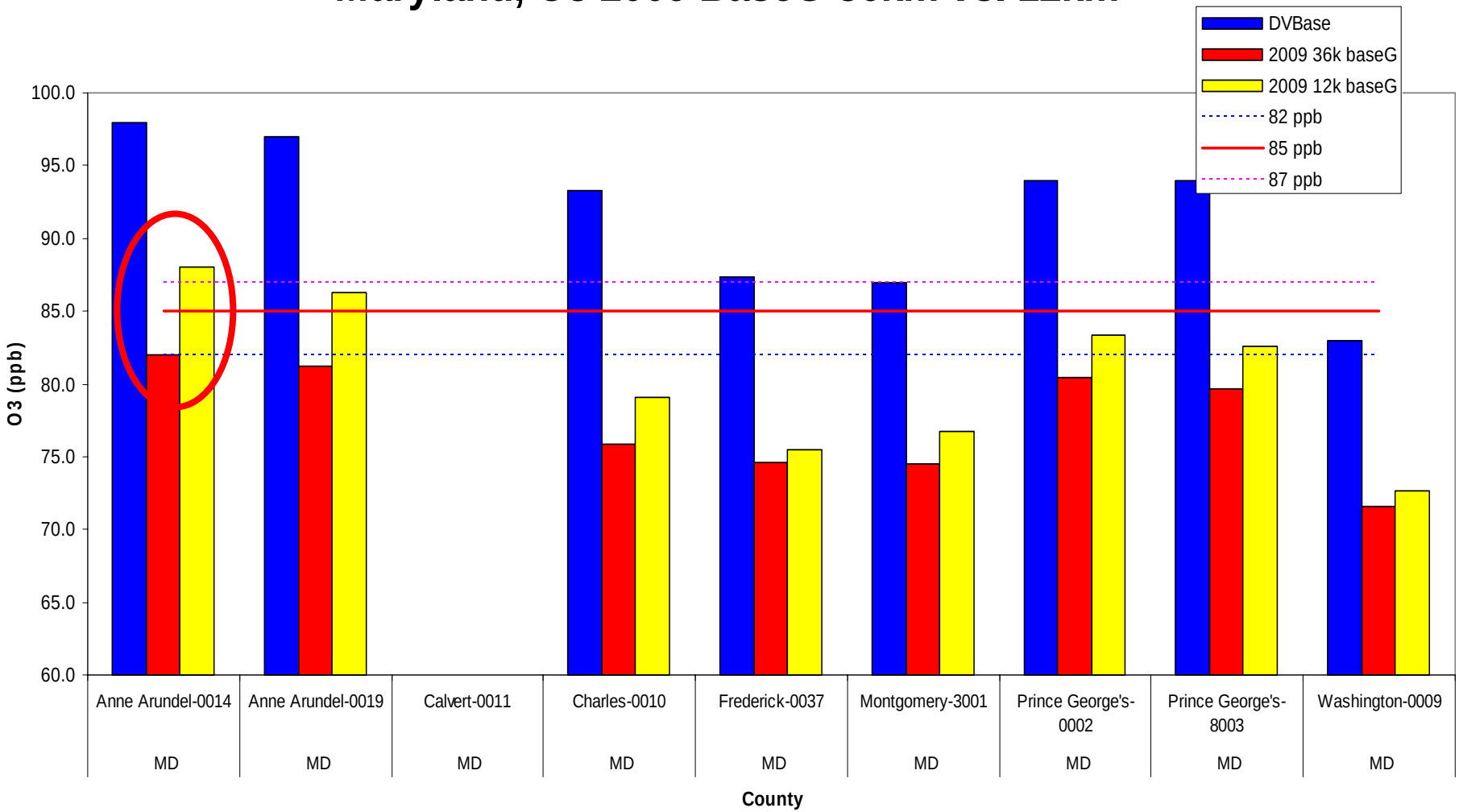
Virginia, O3 2009 BaseG 36km vs. 12km



District of Columbia, O3 2009 BaseG 36km vs. 12km



Maryland, O3 2009 BaseG 36km vs. 12km



2009 12 km Base G vs. Base F4 8-Hour Ozone Design Values > 82 ppb

State	County	DVBase	2009 12km Base F4	2009 12km Base G
MD	Anne Arundel-0014	98.0	87.1	88.0
VA	Arlington-0020	96.7	87.5	87.7
VA	Fairfax-0018	96.7	86.6	86.9
MD	Anne Arundel-0019	97.0	86.2	86.2
GA	Fulton-0055	94.3	86.8	86.1
VA	Fairfax-0030	95.0	85.1	85.4
NC	Mecklenburg-1009	97.3	85.3	85.0
NC	Rowan-0022	97.0	84.4	84.4
NC	Mecklenburg-0041	95.3	84.6	84.1
DC	District of Columbia-0043	92.7	83.9	84.1
NC	Rowan-0021	97.3	84.5	83.9
VA	Fairfax-1005	94.0	83.8	83.8
SC	Richland-1002	92.5	83.9	83.6
MD	Prince George's-0002	94.0	83.5	83.4
MD	Prince George's-8003	94.0	82.1	82.5
KY	Campbell-0003	90.7	83.1	82.4
GA	De Kalb-3001	91.0	82.9	82.3
NC	Wake-0015	92.7	81.5	82.1