

# Comments on PRB O<sub>3</sub>

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# Importance of Background O<sub>3</sub>

- PRB sets a limit on the amount of risk that can be reduced.
  - The lower the PRB, the more risk reduction EPA can claim.
  - Anne Smith: If EPA used PRB of 40 ppb instead of 15-35, 92-100% of risk would have disappeared.
- PRB establishes the O<sub>3</sub> level that can be achieved from State and Federal control Programs
  - An underestimation of actual PRB will result in failed control strategies.

# Estimates of PRB

- 2007 EPA Staff Paper- GEOS-Chem v <2007
- 2011 ICF/EPA – GEOS-Chem v9-01-01
- 2011 Zhang et al. – GEOS-Chem v8-02-03
- 2011 Emery et al. – v8-02-01 + CAMx

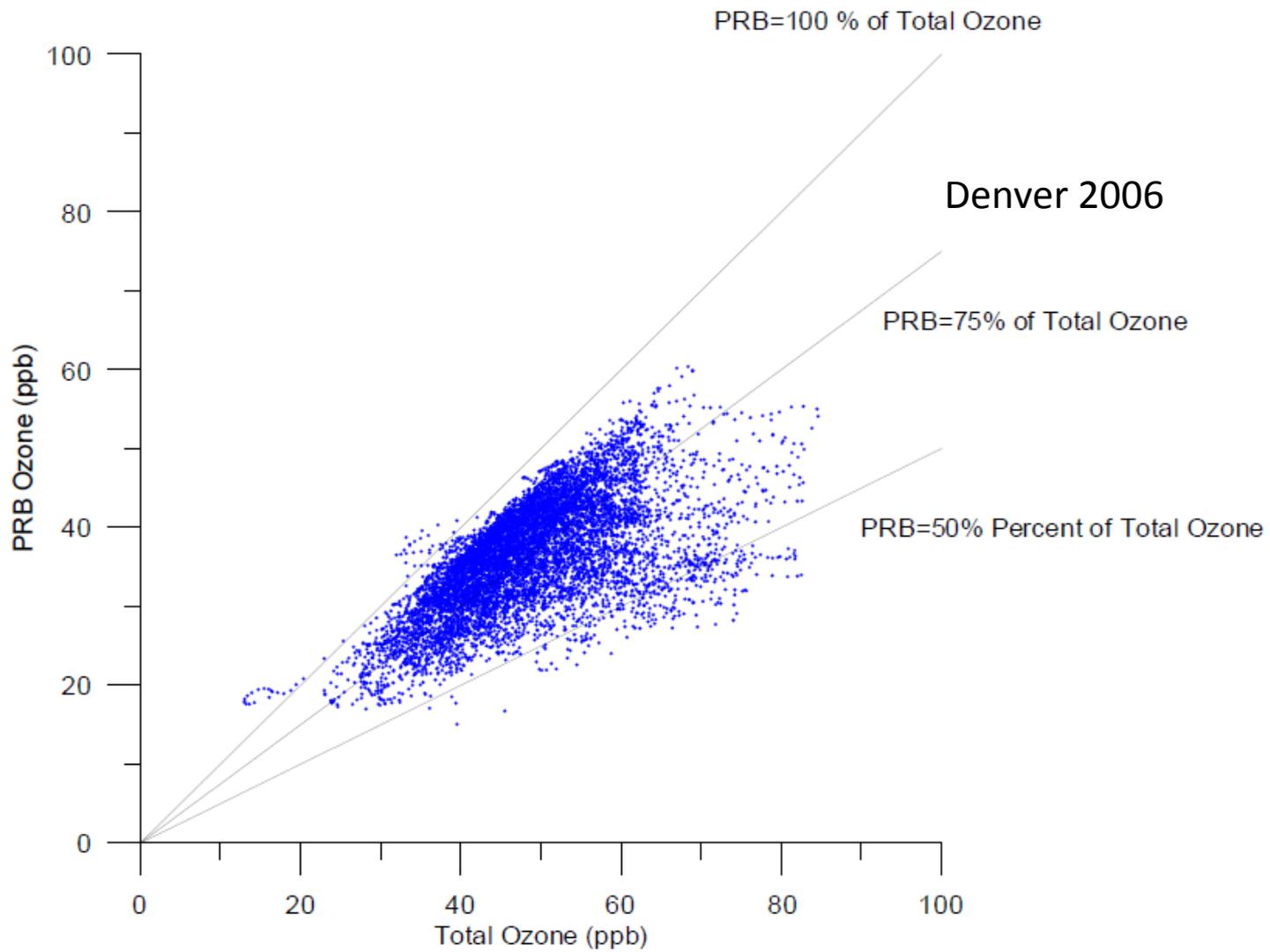
# All PRB Estimates Since 07 SP Are Higher

## Mean April-August PRB

- 2007 EPA Staff Paper 15-35 ppb
- 2011 ICF/EPA 17-43 ppb
- 2011 Zhang et al. 23-42 ppb
- 2011 Emery, GOES-Chem 20-45 ppb
- 2011 Emery, CAMx 25-50 ppb

# However, 2007 SP Inappropriately Uses Mean Monthly Diurnal Profiles of PRB

- Fails to capture daily variation and the important 4<sup>th</sup> highest daily MDA8 concentrations.
- Zhang et al. 4<sup>th</sup> highest MDA8:
  - United States 35-45 ppb
  - Intermountain West 50-60 ppb
- When total O<sub>3</sub> > 60 ppb, PRB frequently ≥ 50 ppb in West and 40 ppb in Midwest (Zhang et al.)



Paired-in-time total O<sub>3</sub> and PRB are positively correlated at all sites examined.

(From BP 12/29/2011 comments to CASAC)

# Conclusion

EPA Needs to Use Daily 8hr PRB  
Estimates based on CAMx  
not Monthly Averages

PRB is an inappropriate measure of achievable O<sub>3</sub> levels in the East and SW because of significant contributions from Canada and Mexico

Average enhancement of US Background (USB) over PRB

ME 22 ppb

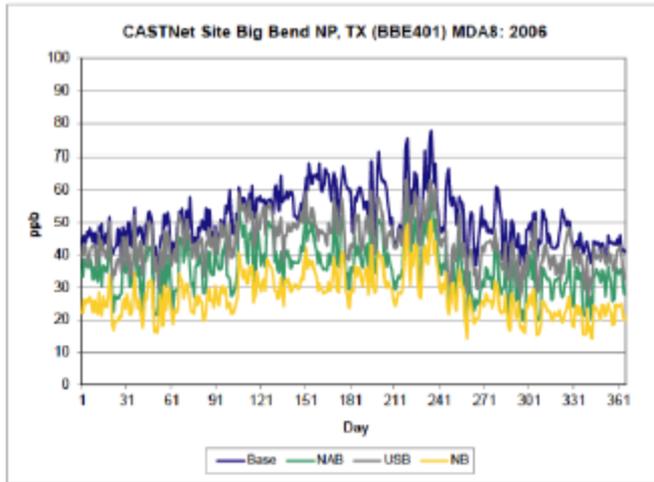
NY 9 ppb

TX 8 ppb

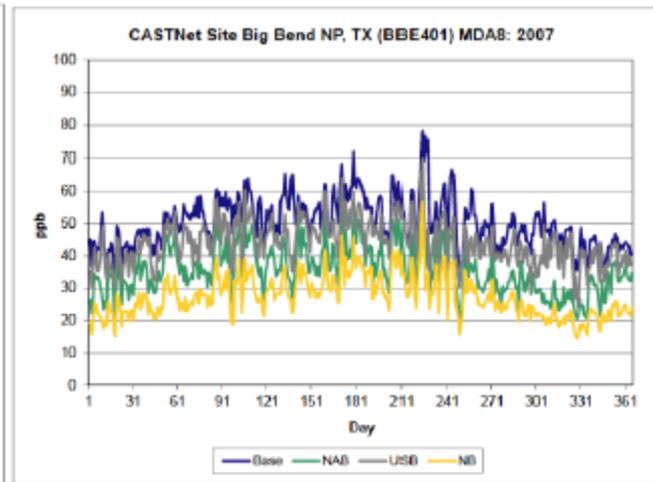
MI 5 ppb

However, just like it is inappropriate to use monthly average PRB, it is inappropriate to use monthly average enhancements.

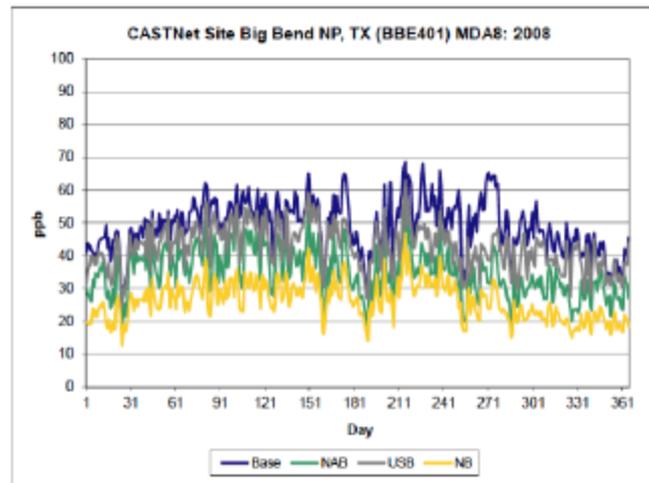
(a) 2006



(b) 2007



(c) 2008



Frequent USB excursions of 50 ppb and one of 70 ppb at Big Bend, Texas.  
(from ICF International, 2011)

# Unionville, MI (Wang et al., 2009)

- On several occasions the USB  $\geq 40$  ppb.
- 3 x's total  $O_3 \geq 75$  ppb and Canadian enhancement  $> 10$  ppb.
- 2x's Canadian enhancement  $> 30$  ppb.

# Conclusion

USB based on CAMx  
not PRB should be used in  
Eastern and Southwestern U.S.