



# Comments on First External Review Draft of “Health Risk and Exposure Assessment for Ozone”

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# HDDM Rollback's Potential Benefits & Limitations



- Potential Benefits

- Shifts away from generic & hypothetical assumptions of quadratic rollback towards location-specific fundamentals of atmospheric chemistry
- “Background” ozone concentrations become endogenous to the rollback

- Potential Limitations

- More complexity in the development of the risk analysis inputs
- Loss of ability to test for sensitivity to background uncertainty
- Loss of ability to assess health risks above background
- Lost ability to compare to prior risk assessment results



Following are several thoughts and questions concerning use of the HDDM-based approach for the REA

# What to Assume about Emissions Reductions?



- HDDM requires an explicit assumption about which emissions would be reduced
  - Which species (NO<sub>x</sub> or VOC?)
  - Which source categories (point sources, mobile sources, other?)
  - Where (e.g., within certain distance of nonattainment area?)
- The newness of this approach for the REA suggests a need for a thoughtful exploration of alternative emissions reduction assumptions
  - How sensitive are estimated risk reductions under alternative assumptions about emissions reductions that achieve attainment?
  - What are the most realistic emissions reductions to assume?
    - Which source categories are most likely to be part of a control strategy?
    - How far from the nonattainment area is it reasonable to assume reductions will occur?

# What Does EPA Plan to Assume about Emissions Reductions for the REA?



- Simon *et al.* memo (p. 7) states EPA's HDDM analysis assumes:

- That emissions are reduced “domainwide”
- That emissions are reduced (apparently in equal percentage amounts) from:
  - area sources*
  - off-road equipment*
  - on-road vehicles*
  - commercial transportation*
  - & all point sources*



**How realistic are these assumptions?**

**How sensitive are risk reduction estimates to these assumptions?**

# What Emissions Reductions Will Have Been Assumed in the REA Rollbacks?



- Critical new assumptions to report are the percentage reduction in emissions...
  - ... for each city & each alternative NAAQS in the REA
    - By species
    - By source category
    - Identifying the domain over which those reductions were applied

**This information will provide insight about whether the reductions required for attaining each alternative NAAQS are realistic.**

# Letting the Model Endogenously Determine Background Ozone Has Consequences



- The HDDM-based approach will conceal the implicit levels of “background” ozone, with consequences for the REA:

- Impossible to estimate health risks for exposures “above background”
- Impossible to assess risk estimates’ sensitivities to uncertainty in the model’s projection of background ozone levels

- The HDDM-based approach also understates the true range of temporal variability in background ozone levels:

- EPA’s plan for “binning” HDDM results into averages by “day-types” appears to eliminate the modeled daily peaks in background levels
- Those peaks in background may impede attainment of stringent NAAQS

The planned HDDM-based method can overstate the physically-feasible rollback – resulting in REA overstating risk reductions from alternative NAAQS

# Don't Discard the Quadratic Rollback at this Time

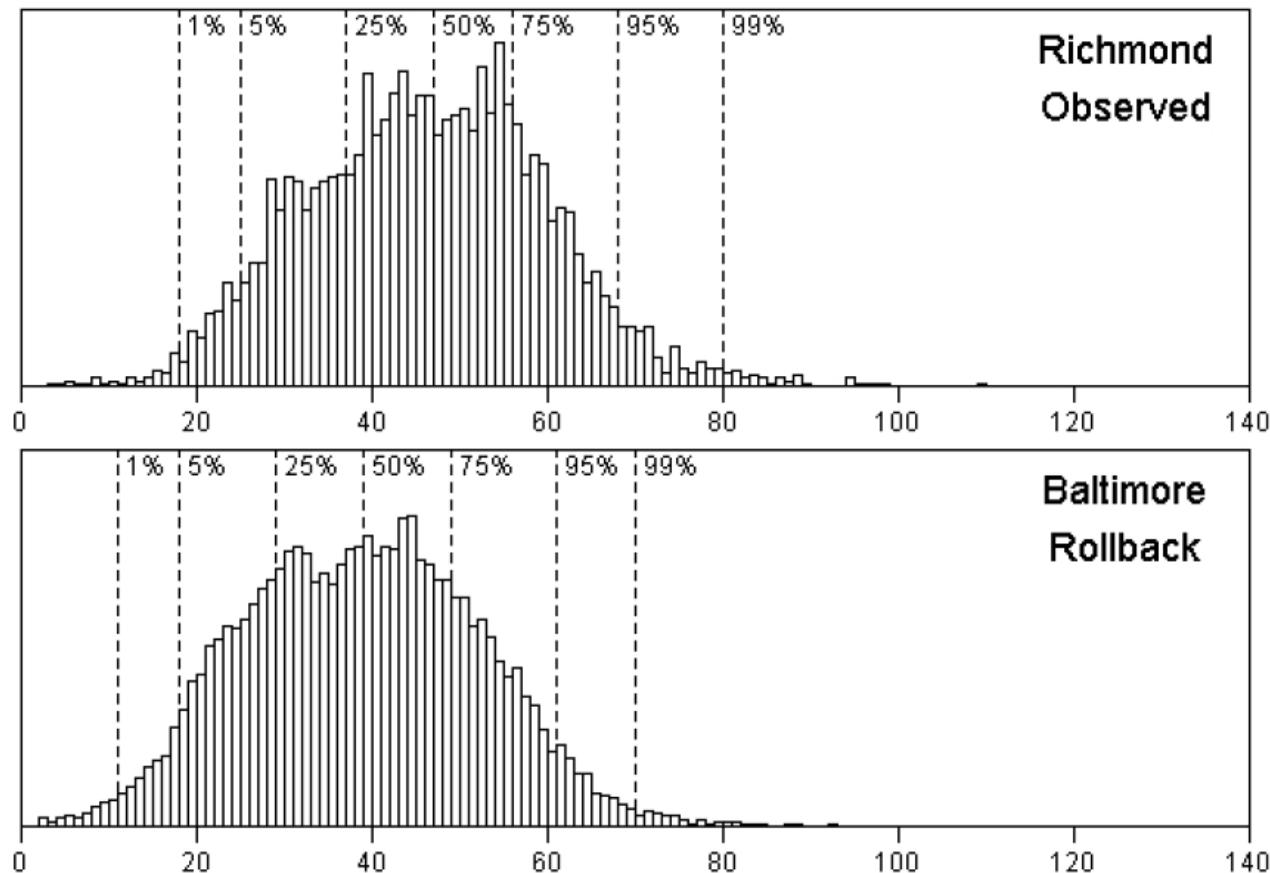


- Because the HDDM-based rollback is a new approach in the REA, its application should include performance evaluation
- To provide for such evaluation, the REA should perform risk reduction estimates for
  - The quadratic rollback method *and*
  - At least 3 alternative HDDM simulations (reflecting varied assumptions about the locations and source categories of emissions reductions)
- Doing this will allow:
  - Insights about causes of differences between prior & new risk estimates
  - Evaluation of the merits of undertaking the greater complexity of HDDM
  - Sensitivity to the alternative ways HDDM can simulate attainment
  - A back-up, in case unforeseen problems arise with the HDDM approach

# Example of a Question to Explore through Evaluation (1)



Paired city ozone concentrations: showing problems of quadratic rollback when large rollback is needed (From Figure 2-5 of Wells *et al.* memo):

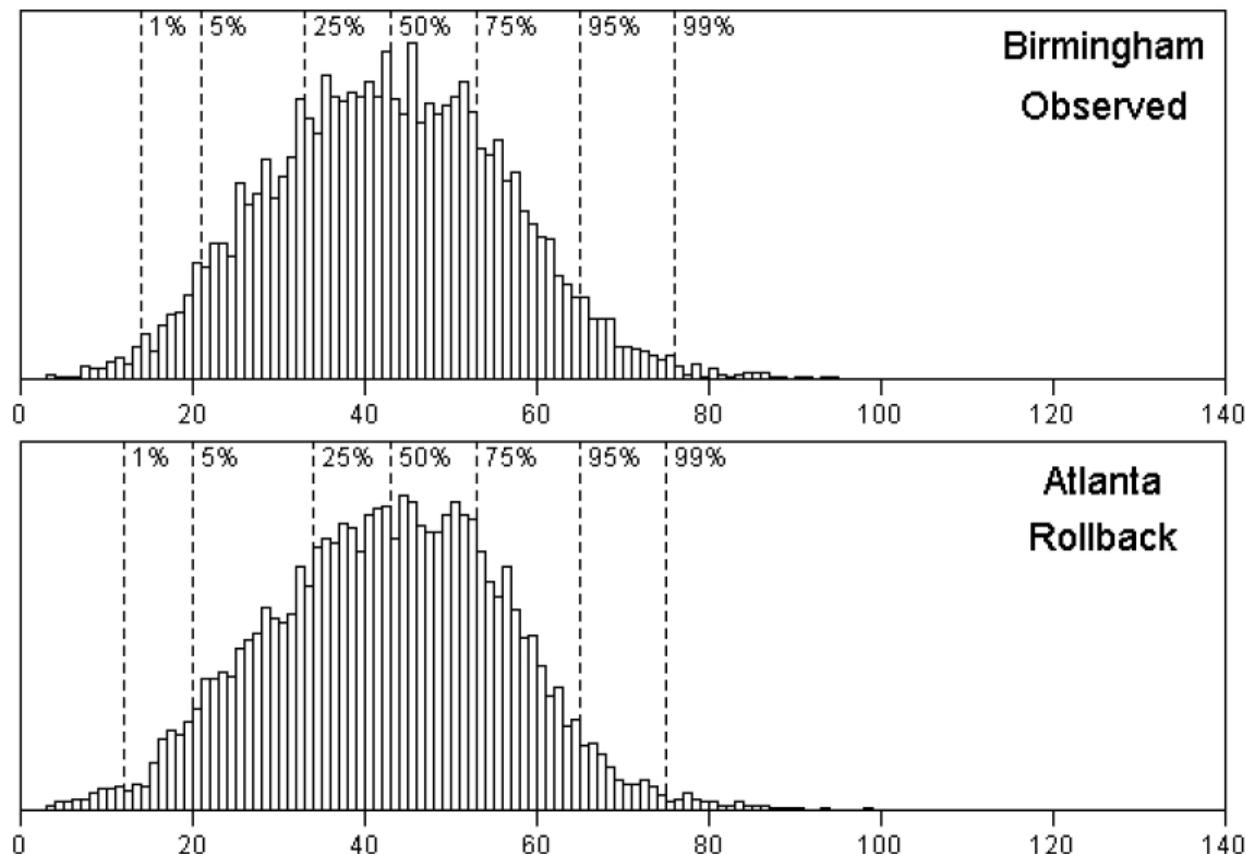


***...How much better is the HDDM rollback than the quadratic rollback evaluated above?***

# Example of a Question to Explore through Evaluation (2)



Paired city ozone concentrations: showing quadratic rollback works well when small rollback is needed (From Figure 2-5 of Wells *et al.* memo):



***...Does the HDDM rollback do at least as well as the quadratic rollback evaluated above?***

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