

# AERMOD Implementation Workgroup

Randy Robinson/ Roger Brode  
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# Presentation Outline

- Background
  - AIWG - Version 1.0
- AIWG - Version 2.0
  - Goals
  - Membership
  - Work to date
    - Technical issues
    - Prioritization
    - Subgroups



# Original AIWG

- Formed in 2005 to:
  - deal with implementation issues associated with AERMOD
  - Provide recommendations to OAQPS
- Produced:
  - AERMOD Implementation Guidance 9/05
  - Final Report
    - Prioritized issues
    - Implementation Process Recommendations

# AIWG – Version 2.0

- Purpose

- Provide support to OAQPS regarding AERMOD implementation
  - Advise Clearinghouse on issues
  - Provide input for planning/budgeting purposes
  - Develop action plans with other groups, e.g., AERMIC
  - Provide feedback on guidance, CH process, and communication materials

# Membership

- Chairs

- Roger Brode      OAQPS
- Randy Robinson R5

- States

- Joe Sims      AL
- Doris Jung      CO
- Brad Ashton      IA
- Scott Leopold      IL
- Matt Will      IL
- Jim Haywood      MI
- David Ross      NC County
- Alan Dresser      NJ

- States

- Peter Mayes      NJ
- Margaret Valis      NY
- Steve Smutz      SC

- Regional Office

- Ian Cohen      R1
- Annamaria Coulter R2
- Al Cimorelli - HC R3
- Stan Krivo      R4
- Phuong Nguyen      R5
- Mary Portanova      R5
- Erik Snyder      R6
- Bret Anderson      R7

# Work to Date

- AIWG V1.0 Provided a good starting point for dealing with issues. Grouped issues as follows:
  - Mandatory Work
  - Model Improvements
  - Model Tools
  - Model Bugs



# Mandatory Work

1. Light winds. Revise AERMOD's treatment of light winds to avoid unrealistically high concentrations.
2. Bulk Richardson number: Complete development of approach to alleviate the need for on-site cloud cover - **beta version in AERMET**
3. Urban model improvements – guidance / reformulation
4. Add line source algorithm-
5. Optimize AERMOD: The present model takes too long to run
6. Upgrade AERMAP: Allow input of 7.5 min data - **done**
7. Develop approach for urban modeling in non-urban center
8. Performance test deposition algorithm
9. PM2.5 Output needed: 98<sup>th</sup> %tile of 3 year conc. dist. - **done**
10. Discontinuity in transitional mixing height – urban night to convective day
11. Evaluate PRIME simulations in complex terrain- **fix if needed**
12. Include meander for area sources
13. Incorporate double precision calculations

# Model Improvements (28 items)

- Capped and horizontal stacks – permanent fix / *BETA version*
- Re-code AERMET as single executable
- Add x,y,z receptor option to AERMAP
- Hardwire Guide's approach to capped and horizontal stacks
- Add flare option
- Improve debug output
- Improve BPIP
- Analyze sensitivity of ASOS vs pre-ASOS data
- Other issues fall into groups such as:
  - adding other source types
  - Improving output options
  - Model formulation improvements
  - Evaluating performance of alternative algorithms

# Model Tools/Guidance

- Improve surface characteristic guidance / *AERSURFACE work going on*
- Update QA guidance for input/output variables
- Update guidance for “required” variables
- Improve PRIME documentation
- Develop AERMOD programmer’s guide
- Update Appendix C checklist
- Complete modifications to MPRM for deposition
- Develop Lahey and Linux executables



# Bug Fixes

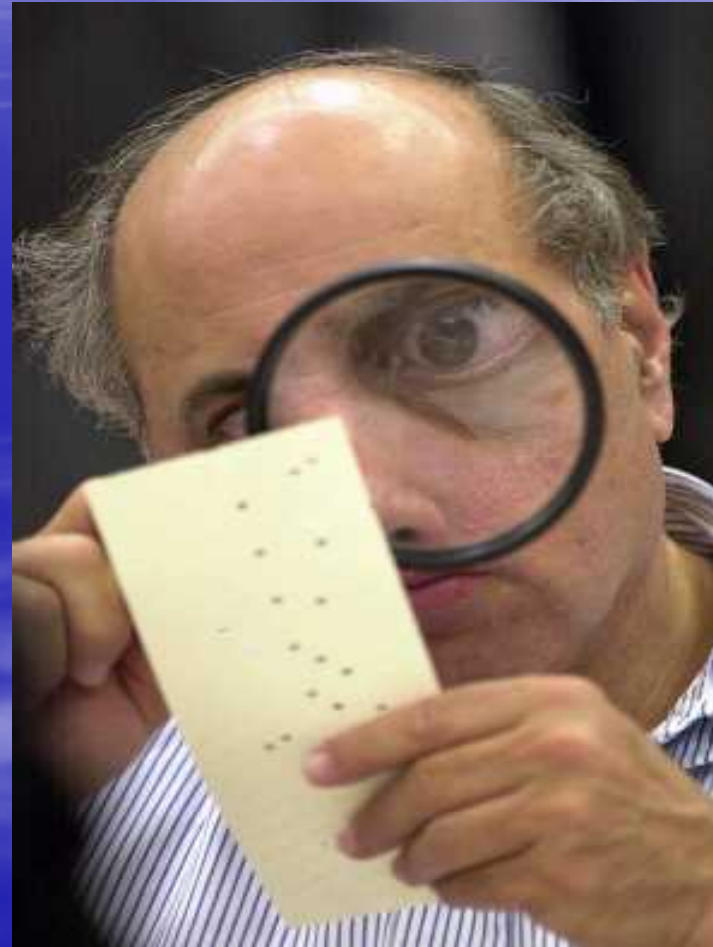


- Reflecting lid in SBL
- Modify AERMET to accept sigma-v and sigma-phi directly
- AERMET QA missing data flags
- 5 other issues related to the ISH met data format. (These issues have been addressed in updated version of AERMET)



# Process of Prioritizing Issues

- VOTING
  - Top 10 from entire list
    - Surface characteristics
    - Urban guidance improvement
    - Light winds
    - Evaluate deposition algorithms
    - Optimize AERMOD
    - AERSCREEN
    - Line Source in AERMOD
    - ASOS vs Non-ASOS
    - Mixing height discontinuity
    - BPIP improvement/fix
  - Top 3
    - Surface characteristics
    - ASOS / Met issues
    - Urban issues



# AIWG Subgroups

- Subgroups were formed to immediately deal with top 3 issues
  - Urban Issues - Margaret Valis
  - Surface Characteristics - Doris Jung
  - ASOS/Non-ASOS/Met Issues – Alan Dresser/Joe Sims

More to come

# “Low-hanging Fruit”

- Allow user sounding time in AERMET
- Guidance for QA input/output
- Double-precision calcs
- Capped/horizontal stacks
- Reg. modeling required variables
- Revise App. C checklist
- AERSCREEN (ASCREEN)
- AERSURFACE
- Source group options in AERMOD
- Allow long filenames



<http://images.google.com/lowhangingfruit>

Some of these may not be that low. We're currently evaluating what it will take to address these issues and plan to deal early with “easy” ones.



# Points to Remember

- AIWG is an inclusive process, relying on the experience and knowledge of model users in the states and regions to direct OAQPS on implementation issues.
- AIWG - Communication is key; both inward and outward.
- Hopefully, this process facilitates greater understanding of how AERMOD's characterization of the boundary layer impacts air quality predictions.
- Very appreciative of workgroup members' donation of time and efforts.