

Minnesota Air, Water, and Waste Environmental Conf.

Air Modeling – Training (8am-noon)
Sheraton Bloomington Hotel, Atrium 7

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Air Modeling (98 Slides)

- AERMOD Status and MPCA “Draft” Data
- AERMOD Urban Modeling Developments
 - Metropolitan Statistical Areas and Micropolitan Statistical Areas
- New MPCA NAAQS/MAAQs Feature: FAR Data
- Break - slide 40
- Rochester and Olmsted County SIP Work
 - RPU-Silver Lake Plant Sensitivity Analyses
- Break - slide 75
- AERA/RASS with supplemental Post-RASS Option
- Fugitive PM₁₀ emissions: roads, cooling towers, etc.
- VISCREEN (Nearby areas v. Class I areas)
- Future Possibilities

AERA/RASS with Q/CHI Sums

- AERA option - computationally efficient
- Eliminates conservative unpaired events
- Input is “Q / CHI” instead of “Q”
- Output is “Risk” instead of “Concentration”

AERA/RASS with Q/CHI Sums

- Input is “Q / CHI” instead of “Q”
 - Critical Health Index (CHI “concentration standard”)

- Past approaches:
 - Unit emission rates (Q=1 gram/second)
 - Other (MCES) approaches
 - Equivalent Risk Emission Rate (proposed by Mr. Dustin Hamari, NRG)
 - Goal: incorporate into RASS spreadsheet

Q/CHI Sums – The Math

- Q/CHI for Source (i) = SUM (Q_{i,j} / T_i)

- Q(i,j) denotes source (i) and pollutant (j)
- T(j) denotes Toxicity of pollutant (j)

- Example: 1 source with M chemicals

- $Q_1/T_1 + Q_2/T_2 + Q_3/T_3 + \dots + Q_m/T_m$

- Example: N sources with M chemicals

- $SV001 = \text{SUM } (Q_{1m} / T_m) \text{ for } m=1 \text{ to } M.$
- $SV002 = \text{SUM } (Q_{2m} / T_m) \text{ for } m=1 \text{ to } M.$
- $SV003 = \text{SUM } (Q_{3m} / T_m) \text{ for } m=1 \text{ to } M.$
- $SV00N = \text{SUM } (Q_{nm} / T_m) \text{ for } m=1 \text{ to } M.$

Q/CHI Sums Advantages vs. RASS

- Less conservative than DISPERSE
 - Reason: events are paired in time & space
- Run many sources (RASS = 10 stacks)
- Run all AERMOD source types
 - Point and Volume
 - Area (AREA, AREACIRC, AREAPOLY)
- Needs no PLOTFILE or POSTFILE files
 - use PLOTFILE for plots & culpability tables

Q/CHI Sums – “Disadvantages”

- Need separate runs for each risk type
 - 4 runs for total inhalation pathway risks
 - Acute, sub-chronic, chronic, cancer
 - 4 runs for total indirect pathway risks
 - Farmer non-cancer and cancer
 - Resident non-cancer and cancer
 - 4 runs for total multi-pathway risks
 - Farmer non-cancer and cancer
 - Resident non-cancer and cancer
- Large AERMOD run times
 - 20 hours for 4 risks with 15 sources & 1140 receptors
- Internal calculations-less transparent than RASS
 - Post-RASS software???