

Appendix J - Evaluation of the Regional Air Impact Modeling Initiative (RAIMI) Modeling Tool

The RAIMI software program was found to be an effective tool to model multiple sources simultaneously. Acting as a screen model it allows the user the ability to input emissions data from multiple facilities with multiple emission points. Its software interface allows the user to review and modify the predicted ambient concentrations without having to re-run the mathematical air dispersion model. The RAIMI program utilizes existing USEPA approved air dispersion models and adds the capability to display the output on satellite imagery. This capability makes the RAIMI program an effective tool to generate output data for presentations allowing the user to effectively convey ideas.

1.0 Evaluate the effectiveness and usefulness of the RAIMI software

Within the Advanced Analyses section of the Air Toxics Data Analysis Workbook¹, USEPA describes approved methodology to evaluate modeled to monitored air toxics data. Even though, the Tonawanda Air Quality Study data was limited to four monitoring sites, all compounds meeting our Category C criteria were evaluated with the approved methodology to determine whether the modeled concentrations were within an acceptable range. The range established by USEPA was a model to monitor ratio that is within a factor of two. As suggested in the workbook, the median and average ratios for the ten compounds meeting our Category C requirements are described and presented in Appendix L.

The RAIMI software can be an effective tool for analyzing many sources with multiple contaminants. As with using any new software, a learning curve was encountered that delayed our initial use. Presently, the latest version of the RAIMI program is version 3.0 which required the later version of GIS software ArcMap, version 9.3. The software requires interaction between Microsoft Access and Excel and these subsequent files need to be accessed by the RAIMI software. All these steps require individuals with background in data management, air dispersion modeling and GIS training. The usefulness of the RAIMI software program for community groups and non-air pollution personnel is limited.

The limitations encountered and future improvements suggested by NYSDEC staff for running the RAIMI software were:

- 1.) It was difficult to add additional air contaminants and their associated health based guideline concentrations to the original set of air contaminants packaged in the RAIMI software and was not accomplished for this Study.
- 2.) When the RAIMI software was conceived, the air dispersion model of choice was the Industrial Source Complex (ISC) model, since then the USEPA requires

¹ USEPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC, June 2009

the use of AerMod to evaluate ambient air concentrations for regulatory use. The air dispersion model within the software should be updated.

3.) The RAIMI software in conjunction with its meteorological data processor (see Appendix I) requires a large amount of the data needed to run ISC such as land classifications, etc. but the current software does not utilize it. Also, the meteorological data processor associated with the RAIMI software requires that the meteorological data be processed with the EPA software, Meteorological Processor for Regulatory Models (MPRM)² originally written in 1986 requiring a binary formatting process. Air modeling staff within our Division have stated this process could be updated with newer meteorological processing techniques and/or that the RAIMI software accept preprocessed data.

4.) The RAIMI software is limited to point source air dispersion modeling only. Some traditional volume or area sources needed to be reconfigured to be accepted by the software's input files. A simpler process for inputting files should be investigated.

Overall, RAIMI software performed to our satisfaction but has difficulty with non-point sources such as landfills and mobile emissions. It is a strong tool when combined with GIS and we believe that EPA needs to enhance the model with more capabilities and upgrade the dispersion model to AerMod.

² USEPA, TTN, Support Center for Regulatory Air Models
http://www.epa.gov/scram001/metobsdata_procaccprogs.htm