TECHNICAL REPORT
W-6139-4 10-31-02

INTERNATIONAL MACCS USERS GROUP

Proceedings of the Fourth International MACCS Users Group Meeting

Principality of Monaco
September 6, 2002

Energy Sciences & Technology Department
Brookhaven National Laboratory, Brookhaven Science Associates
Upton, New York 11973-5000

BROOKHAVEN NATIONAL LABORATORY

Prepared for the U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Contract No. DE-AC02-98CH10886

based on earlier work by Briggs (1971, 1972) may be implemented as the default model in a future version. The present model will be retained as an option to allow the user to make runs that are comparable to previous work.

Other improvements to the MACCS2 models that are being considered as user options, but not yet implemented, are the following:

1. a change in the treatment of atmospheric dispersion beyond 30 km,
2. a model to account for administration of potassium iodide to diminish health consequences from inhalation of radioactive iodine, and
3. a model to accommodate changes in mixing height during plume transport.

Finally, comparing MACCS2 with a more sophisticated atmospheric transport code to determine whether the simple Gaussian plume model is adequate for Level 3 PRA studies is being considered.

An additional possibility is to restructure MACCS2 to use dynamic memory allocation, a feature that is supported by the newer FORTRAN compilers. Dynamic memory allocation would allow complete flexibility in selecting numbers of input parameters or requests for results. For example, the current extension of the maximum number of plume segments to 10 would become obsolete. The user could choose any number of plume segments, and the code would automatically be dimensioned to that number.

3. WinMACCS Development

MACCS2 version 1.12 was originally created to be a batch-mode tool. As a result, MACCS2 has a number of deficiencies that make it less user-friendly and more cumbersome to use than many of the modern programs that were designed for the Windows environment. The current development of WinMACCS is intended to improve the usability of MACCS2 by creating a user interface between the user and the MACCS2 code. In particular, the interface allows the user to create or modify MACCS2 input files in a more intuitive and efficient manner, which should lead to fewer input errors. It also allows the user to evaluate results more efficiently. Finally, the user interface integrates a stratified Monte-Carlo sampling technique, know as Latin Hypercube Sampling (LHS) (Wyss and Jorgensen, 1998), with MACCS2 so that uncertain input parameters can be sampled and sensitivities evaluated.

The user begins by creating a new project or opening an existing one. The user must then make major decisions that affect the overall calculation, such as which modules to run (ATMOS, EARLY, and CHRONC), choices affecting meteorological sampling, etc. This is illustrated in Fig. 1. These major choices are contained on a *Properties* form. Once these major choices are made, the user is guided to make other required property assignments through a color-coding scheme, as illustrated in Fig. 2. Categories of input parameters are displayed as red hexagons, green checks, or gray hexagons or checks to show that they are needed but not yet assigned, needed and already assigned, or not needed in the current calculation, respectively. The gray checks and hexagons are used to indicate whether an unneeded variable has been set or not, respectively.